



## What's new

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# Accessibility features in Excel

Microsoft Excel contains features that make software [accessible](#) to a wider range of users, including those who have limited dexterity, low vision, or other disabilities.

## Keyboard shortcuts

[Show or hide shortcut keys in ScreenTips](#)

1. On the **Tools** menu, click **Customize**.
2. Click the **Options** tab.
3. Under **Other**, select or clear the **Show ScreenTips on toolbars** check box.

**Note** Changing this setting affects all of your Microsoft Office programs.

Get more information about [keyboard shortcuts](#).

## Change text size and color

[Zoom the display in or out](#)

In the **Zoom** box , click the size you want, or enter a number from 10 to 400.

To enlarge the selected area to fill the window, click **Selection**.

**Note** Zooming in or out does not affect printing. Sheets are printed at 100 percent unless you change the scaling on the **Page** tab of the **Page Setup** dialog box (**File** menu).

[Make toolbar buttons or drop-down list boxes larger](#)

Do one of the following:

## [Increase the size of toolbar buttons](#)

1. On the **Tools** menu, click **Customize**.
2. Click the **Options** tab.
3. Select the **Large icons** check box.

## [Change the width of a drop-down list box on a toolbar](#)

1. Make sure the [toolbar](#) you want to change is visible.

### [How?](#)

1. On the **View** menu, point to **Toolbars**.
2. Do one of the following:
  - Click the toolbar you want to display.
  - To view more toolbars, click **Customize**. In the **Customize** dialog box, click the **Toolbars** tab, and then select the check box for the toolbar you want to display. Click **Close**.
2. On the **Tools** menu, click **Customize**.
3. With the **Customize** dialog box open, click the list box you want to change — for example, the **Font**  or **Font Size**  box on the **Formatting** toolbar.
4. Point to the left or right edge of the box. When the pointer changes to a double-headed arrow, drag the edge of the box to change its width.

## [Zoom using the Microsoft IntelliMouse pointing device](#)

You can move around and zoom on your worksheet or chart sheet by using the Microsoft IntelliMouse pointing device. For information about changing options and viewing troubleshooting tips for the Microsoft IntelliMouse, see the IntelliPoint Online User's Guide. (Click the Microsoft Windows **Start** button,

point to **Programs**, and then point to **Microsoft Input Devices**.)

To	Do this
Scroll up or down a few rows at a time	Rotate the wheel forward or back.
Pan through a worksheet	Hold down the wheel button, and drag the pointer away from the origin mark  in the direction you want to scroll. To speed up scrolling, drag away from the origin mark; to slow down scrolling, drag toward the origin mark.
Pan through a worksheet automatically	Click the wheel button, and then move the mouse in the direction you want to scroll. To speed up scrolling, drag away from the origin mark; to slow down scrolling, drag toward the origin mark. To stop automatic scrolling, click any mouse button.
Zoom in or out	Hold down CTRL, and then rotate the IntelliMouse wheel forward or back.
Show detail in <a href="#">outlines</a>	Point to a cell that summarizes data in the outline, hold down SHIFT, and then roll the wheel forward.
Hide detail in outlines	Point to any cell that contains detail data, hold down SHIFT, and then roll the wheel back.

#### [Tip](#)

If you use the Microsoft IntelliMouse pointing device to zoom more often than you use it to scroll on a sheet, you can set the wheel button to zoom instead of scroll. On the **Tools** menu, click **Options**, click the **General** tab, and then select the **Zoom on roll with IntelliMouse** check box.

## Customize toolbars and menus

#### [Create a toolbar](#)

1. On the **Tools** menu, click **Customize**.
2. Click the **Toolbars** tab.
3. Click **New**.
4. In the **Toolbar name** box, type the name you want, and then click **OK**.

5. Click the **Commands** tab.
6. Do one of the following:

[Add a button to the toolbar](#)

1. Click a category in the **Categories** box.
2. Drag the command you want from the **Commands** box to the displayed toolbar.

[Add a built-in menu to the toolbar](#)

1. In the **Categories** box, click **Built-in Menus**.
  2. Drag the menu you want from the **Commands** box to the displayed toolbar.
7. When you have added all the buttons and menus you want, click **Close**.

[Add a button to a toolbar](#)

1. Make sure the [toolbar](#) you want to change is visible.

[How?](#)

1. On the **View** menu, point to **Toolbars**.
2. Do one of the following:
  - Click the toolbar you want to display.
  - To view more toolbars, click **Customize**. In the **Customize** dialog box, click the **Toolbars** tab, and then select the check box for the toolbar you want to display. Click **Close**.
2. Click the **Toolbar Options** arrow .
3. Point to **Add or Remove Buttons**, and then click **Customize**.
4. Click the **Commands** tab.
5. In the **Categories** box, click a category for the command you want the button to perform.
6. Drag the command or [macro](#) you want from the **Commands** box to the displayed toolbar.
7. On the **Customize** dialog box, click **Close**.

[Add a command to a menu](#)

1. Display the toolbar that has the menu you want to add a command to: Click **Customize** on the **Tools** menu, click the **Toolbars** tab, select the check box for the toolbar, and then click **Close**.
2. On the **Tools** menu, click **Customize**, and then click the **Commands** tab.
3. In the **Categories** list, click the category for the command.
4. Drag the command you want from the **Commands** list over the menu you want to add it to.
5. When the menu displays a list of commands, point to where you want the command to appear, and then release the mouse button.

## Automate entering and editing



[Correct spelling and typing errors as you type](#)

To correct your common typing errors automatically, you must specify the commonly-mistyped word in advance.

1. On the **Tools** menu, click **AutoCorrect Options**, and then click the **AutoCorrect** tab.
2. Make sure the **Replace text as you type** check box is selected.
3. In the **Replace** box, type the word you often mistype or misspell, for example, type **usualy**.
4. In the **With** box, type the correct spelling of the word, for example, type **usually**.
5. Click **Add**.

**Note** If you save a long phrase or passage of text as an AutoCorrect entry, you can enter the text later by typing only a few letters. For example, you could type **afd** to enter "Aperture Film Distributors."

Select the text you want to reuse, copy it, click **Autocorrect Options** on the **Tools** menu, and then click the **AutoCorrect** tab. In the **Replace** box, type a

unique sequence of characters, a sequence that you would not usually type in a workbook. Click in the **With** box, press CTRL+V to paste the copied text, and then click **Add**.

### [Quickly fill in repeated entries in a column](#)

If the first few characters you type in a cell match an existing entry in that column, Microsoft Excel fills in the remaining characters for you. Excel completes only those entries that contain text or a combination of text and numbers; entries that contain only numbers, dates, or times are not completed.

- To accept the proposed entry, press ENTER. The completed entry exactly matches the pattern of uppercase and lowercase letters of the existing entries.
- To replace the automatically entered characters, continue typing.
- To delete the automatically entered characters, press BACKSPACE.
- To select from a list of entries already in the column, press ALT + DOWN ARROW, or right-click the cell and then click **Pick from List** on the shortcut menu.

[Show All](#)

# Keyboard shortcuts

Some of the content in this topic may not be applicable to some languages.

To print this topic, press TAB to select **Show All**, press ENTER, and then press CTRL+P.

## Keyboard shortcuts for using the Help

 [Keyboard shortcuts for using the \*\*Help\*\* task pane and Help window](#)

The Help Pane is a task pane that provides access to all Office Help content. As a task pane, the Help Pane appears as part of the active application. The Help window displays topics and other Help content and appears as a window next to, but separate from, the active application.

## In the **Help** task pane

F1

Display the **Help** task pane.

F6

Switch between the **Help** task pane and the active application.

TAB

Select the next item in the **Help** task pane.

SHIFT+TAB

Select the previous item in the **Help** task pane.

ENTER

Perform the action for the selected item.

DOWN ARROW and UP ARROW

In a Table of Contents, select the next and previous item, respectively.

RIGHT ARROW and LEFT ARROW

In a Table of Contents, expand and collapse the selected item, respectively.

ALT+LEFT ARROW

Move back to the previous task Pane.

ALT+RIGHT ARROW

Move forward to the next task Pane.

CTRL+SPACEBAR

Open the menu of Pane options.

CTRL+F1

Close and reopen the current task pane.

RIGHT ARROW

Expand a +/- list.

LEFT ARROW

Collapse a +/- list.

## In the Help window

### TAB

Select the next hidden text or hyperlink, or **Show All** or **Hide All** at the top of a topic

### SHIFT+TAB

Select the previous hidden text or hyperlink, or the **Browser View** button at the top of a Microsoft Office Web site article

### ENTER

Perform the action for the selected **Show All**, **Hide All**, hidden text, or hyperlink

### ALT+LEFT ARROW

Move back to the previous Help topic.

### ALT+RIGHT ARROW

Move forward to the next Help topic.

### CTRL+P

Print the current Help topic.

### UP ARROW AND DOWN ARROW

Scroll small amounts up and down, respectively, within the currently-displayed Help topic.

### PAGE UP AND PAGE DOWN

Scroll larger amounts up and down, respectively, within the currently-displayed Help topic.

### ALT+U

Change whether the Help window appears connected to (tiled) or separate from (untiled) the active application.

### SHIFT+F10

Display a menu of commands for the Help window; requires that the Help window have active focus (click an item in the Help window).

## Keys for the Office interface



[Display and use windows](#)

### ALT+TAB

Switch to the next program.

### ALT+SHIFT+TAB

Switch to the previous program.  
CTRL+ESC  
Display the Windows **Start** menu.  
CTRL+W or CTRL+F4  
Close the selected workbook window.  
CTRL+F5  
Restore the window size of the selected workbook window.  
F6  
Switch to the next pane in a worksheet that has been split (**Window** menu, **Split** command).  
SHIFT+F6  
Switch to the previous pane in a worksheet that has been split.  
CTRL+F6  
When more than one workbook window is open, switch to the next workbook window.  
CTRL+SHIFT+F6  
Switch to the previous workbook window.  
CTRL+F7  
When a workbook window is not maximized, perform the **Move** command (on the **Control** menu for the workbook window). Use the arrow keys to move the window, and when finished press ESC.  
CTRL+F8  
When a workbook window is not maximized, perform the **Size** command (on the **Control** menu for the workbook window). Use the arrow keys to resize the window, and when finished press ESC.  
CTRL+F9  
Minimize a workbook window to an icon.  
CTRL+F10  
Maximize or restore the selected workbook window.  
PRTSCR  
Copy a picture of the screen to the Clipboard.  
ALT+PRINT SCREEN  
Copy a picture of the selected window to the Clipboard.

 [Access and use smart tags](#)

ALT+SHIFT+F10  
Display the menu or message for a smart tag. If more than one smart tag is present, switch to the next smart tag and display its menu or message.

## DOWN ARROW

Select the next item in a smart tag menu.

## UP ARROW

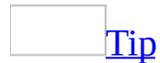
Select the previous item in a smart tag menu.

## ENTER

Perform the action for the selected item in a smart tag menu.

## ESC

Close the smart tag menu or message.



You can ask to be notified by a sound whenever a smart tag appears. To hear audio cues, you must have a sound card. You must also have Microsoft Office Sounds installed on your computer.

If you have access to the World Wide Web, you can download Microsoft Office Sounds from the Microsoft Office Web site. On the **Help** menu, click **Microsoft Office Online** and search for "Microsoft Office Sounds." After you've installed the sound files, you need to select the **Provide feedback with sound** check box on the **General** tab of the **Options** dialog box (**Tools** menu). When you select (or clear) this check box, the setting affects all Office programs that support sound.



## F6

Move to a [task pane](#) from another pane in the program window. (You may need to press F6 more than once.)

**Note** If pressing F6 doesn't display the task pane you want, try pressing ALT to place focus on the menu bar, and then pressing CTRL+TAB to move to the task pane.

## CTRL+TAB

When a menu or [toolbar](#) is active, move to a task pane. (You may need to press CTRL+TAB more than once.)

## TAB or SHIFT+TAB

When a task pane is active, select the next or previous option in the task pane

CTRL+SPACEBAR

Display the full set of commands on the task pane menu

DOWN ARROW or UP ARROW

Move among choices in a selected submenu; move among certain options in a group of options

SPACEBAR or ENTER

Open the selected menu, or perform the action assigned to the selected button

SHIFT+F10

Open a [shortcut menu](#); open a drop-down menu for the selected gallery item

HOME or END

When a menu or submenu is visible, select the first or last command on the menu or submenu

PAGE UP or PAGE DOWN

Scroll up or down in the selected gallery list

CTRL+HOME or CTRL+END

Move to the top or bottom of the selected gallery list



## [Access and use menus and toolbars](#)

F10 or ALT

Select the [menu bar](#), or close an open menu and submenu at the same time.

TAB or SHIFT+TAB

When a toolbar is selected, select the next or previous button or menu on the toolbar.

CTRL+TAB or CTRL+SHIFT+TAB

When a toolbar is selected, select the next or previous toolbar.

ENTER

Open the selected menu, or perform the action for the selected button or command.

SHIFT+F10

Display the [shortcut menu](#) for the selected item.

ALT+SPACEBAR

Display the **Control** menu for the Excel window.

DOWN ARROW or UP ARROW

When a menu or submenu is open, select the next or previous command.

LEFT ARROW or RIGHT ARROW

Select the menu to the left or right. When a submenu is open, switch between the main menu and the submenu.

HOME or END

Select the first or last command on the menu or submenu.

ESC

Close an open menu. When a submenu is open, close only the submenu.

CTRL+DOWN ARROW

Display the full set of commands on a menu.

CTRL+7

Show or hide the **Standard** toolbar.

**Note** You can select any menu command on the menu bar or on a displayed toolbar with the keyboard. To select the menu bar, press ALT. Then to select a toolbar, press CTRL+TAB repeatedly until you select the toolbar you want. Press the underlined letter in the menu that contains the command you want. In the menu that appears, press the underlined letter in the command that you want.

#### [Resize and move toolbars and task panes](#)

1. Press ALT to select the [menu bar](#).
2. Press CTRL+TAB repeatedly to select the [toolbar](#) or [task pane](#) you want.
3. Do one of the following:

#### [Resize a toolbar](#)

1. In the toolbar, press CTRL+SPACE to display the **Toolbar Options** menu.
2. Select the **Size** command, and then press ENTER.
3. Use the arrow keys to resize the toolbar.

#### [Move a toolbar](#)

1. In the toolbar, press CTRL+SPACE to display the **Toolbar Options** menu.
2. Select the **Move** command, and then press ENTER.

3. Use the arrow keys to position the toolbar. Press CTRL+ the arrow keys to move one pixel at a time. To undock the toolbar, press DOWN ARROW repeatedly. To dock the toolbar vertically on the left or right side, press LEFT ARROW or RIGHT ARROW respectively when the toolbar is all the way to the left or right side.

#### [Resize a task pane](#)

1. In the task pane, press CTRL+SPACE to display a menu of additional commands.
2. Use the DOWN ARROW key to select the **Size** command, and then press ENTER.
3. Use the arrow keys to resize the task pane. Use CTRL+ the arrow keys to resize by one pixel at a time.

#### [Move a task pane](#)

1. In the task pane, press CTRL+SPACE to display a menu of additional commands.
  2. Use the DOWN ARROW key to select the **Move** command, and then press ENTER.
  3. Use the arrow keys to position the task pane. Use CTRL+ the arrow keys to move one pixel at a time.
4. When you are finished moving or resizing, press ESC.

#### [Use dialog boxes](#)

##### TAB

Move to the next option or option group.

##### SHIFT+TAB

Move to the previous option or option group.

##### CTRL+TAB or CTRL+PAGE DOWN

Switch to the next tab in a dialog box.

##### CTRL+SHIFT+TAB or CTRL+PAGE UP

Switch to the previous tab in a dialog box.

Arrow keys

Move between options in an open drop-down list, or between options in a group of options.

SPACEBAR

Perform the action for the selected button, or select or clear the selected check box.

First letter of an option in a drop-down list

Open the list if it is closed and move to that option in the list.

ALT+ the underlined letter in an option

Select an option, or select or clear a check box.

ALT+DOWN ARROW

Open the selected drop-down list.

ENTER

Perform the action for the default command button in the dialog box (the button with the bold outline, often the **OK** button).

ESC

Cancel the command and close the dialog box.



[Use edit boxes within dialog boxes](#)

An edit box is a blank in which you type or paste an entry, such as your user name or the [path](#) to a folder.

HOME

Move to the beginning of the entry.

END

Move to the end of the entry.

LEFT ARROW or RIGHT ARROW

Move one character to the left or right.

CTRL+LEFT ARROW

Move one word to the left.

CTRL+RIGHT ARROW

Move one word to the right.

SHIFT+LEFT ARROW

Select or unselect one character to the left.

SHIFT+RIGHT ARROW

Select or unselect one character to the right.

CTRL+SHIFT+LEFT ARROW

Select or unselect one word to the left.

CTRL+SHIFT+RIGHT ARROW

Select or unselect one word to the right.

SHIFT+HOME

Select from the insertion point to the beginning of the entry.

SHIFT+END

Select from the insertion point to the end of the entry.



[Use the Open, Save As, and Insert Picture dialog boxes](#)

The **Open**, **Insert Picture**, and **Save As** dialog boxes support standard dialog box keyboard shortcuts. (To view standard shortcuts for dialog boxes, refer to the **Use Dialog Boxes** and **Use Edit Boxes Within Dialog Boxes** sections in the main Keyboard Shortcuts topic.) These dialog boxes also support the shortcuts below.

ALT+1

Go to the previous folder 

ALT+2

**Up One Level**  button: open the folder up one level above the open folder

ALT+3

**Search the Web**  button: close the dialog box and open your Web [search page](#)

ALT+4

**Delete**  button: delete the selected folder or file

ALT+5

**Create New Folder**  button: create a new folder

ALT+6

**Views**  button: switch among available folder views

ALT+7 or ALT+L

**Tools** button: show the **Tools** menu

SHIFT+F10

Display a [shortcut menu](#) for a selected item such as a folder or file

TAB

Move between options or areas in the dialog box

F4 or ALT+I

Open the **Look in** list

F5

Refresh the file list

## Keys for workbooks and worksheets



[Preview and print](#)

CTRL+P or CTRL+SHIFT+F12

Display the **Print** dialog box.

Use the following keys in print preview (to get to print preview, press ALT+F, then press V):

Arrow keys

Move around the page when zoomed in.

PAGE UP or PAGE DOWN

Move by one page when zoomed out.

CTRL+UP ARROW or CTRL+LEFT ARROW

Move to the first page when zoomed out.

CTRL+DOWN ARROW or CTRL+RIGHT ARROW

Move to the last page when zoomed out.



[Work with worksheets](#)

SHIFT+F11 or ALT+SHIFT+F1

Insert a new worksheet.

CTRL+PAGE DOWN

Move to the next sheet in the workbook.

CTRL+PAGE UP

Move to the previous sheet in the workbook.

SHIFT+CTRL+PAGE DOWN

Select the current and next sheet. To cancel selection of multiple sheets, press CTRL+PAGE DOWN or, to select a different sheet, press

CTRL+PAGE UP.

SHIFT+CTRL+PAGE UP

Select the current and previous sheet.

ALT+O H R

Rename the current sheet (**Format** menu, **Sheet** submenu, **Rename**

command).

ALT+E M

Move or copy the current sheet (**Edit** menu, **Move or Copy Sheet** command).

ALT+E L

Delete the current sheet (**Edit** menu, **Delete Sheet** command).



[Move and scroll within worksheets](#)

Arrow keys

Move one cell up, down, left, or right.

CTRL+arrow key

Move to the edge of the current [data region](#).

HOME

Move to the beginning of the row.

CTRL+HOME

Move to the beginning of the worksheet.

CTRL+END

Move to the last cell on the worksheet, in the bottom-most used row of the rightmost used column.

PAGE DOWN

Move down one screen.

PAGE UP

Move up one screen.

ALT+PAGE DOWN

Move one screen to the right.

ALT+PAGE UP

Move one screen to the left.

F6

Switch to the next pane in a worksheet that has been split (**Window** menu, **Split** command).

SHIFT+F6

Switch to the previous pane in a worksheet that has been split.

CTRL+BACKSPACE

Scroll to display the active cell.

F5

Display the **Go To** dialog box.

SHIFT+F5

Display the **Find** dialog box.

SHIFT+F4

Repeat the last **Find** action (same as **Find Next**).

TAB

Move between unlocked cells on a protected worksheet.



### [Move within a selected range](#)

ENTER

Move from top to bottom within the selected range.

SHIFT+ENTER

Move from bottom to top within the selected range.

TAB

Move from left to right within the selected range. If cells in a single column are selected, move down.

SHIFT+TAB

Move from right to left within the selected range. If cells in a single column are selected, move up.

CTRL+PERIOD

Move clockwise to the next corner of the selected range.

CTRL+ALT+RIGHT ARROW

In nonadjacent selections, switch to the next selection to the right.

CTRL+ALT+LEFT ARROW

Switch to the next nonadjacent selection to the left.

**Note** You can change the direction of movement after pressing ENTER or SHIFT+ENTER: press ALT+T and then O (**Tools** menu, **Options** command), press CTRL+TAB until the **Edit** tab is selected, and then change the **Move selection after Enter** settings.



### [Move and scroll in End mode](#)

**END** appears in the status bar when End mode is selected.

END key

Turn End mode on or off.

END+arrow key

Move by one block of data within a row or column.

END+HOME

Move to the last cell on the worksheet, in the bottom-most used row of the

rightmost used column.

END+ENTER

Move to the rightmost nonblank cell in the current row. This key sequence does not work if you have turned on transition navigation keys (**Tools** menu, **Options** command, **Transition** tab).

 [Move and scroll with SCROLL LOCK on](#)

When you use scrolling keys (such as PAGE UP and PAGE DOWN) with SCROLL LOCK off, cell selection moves the distance you scroll. To scroll without changing which cells are selected, turn on SCROLL LOCK first.

SCROLL LOCK

Turn SCROLL LOCK on or off.

HOME

Move to the cell in the upper-left corner of the window.

END

Move to the cell in the lower-right corner of the window.

UP ARROW or DOWN ARROW

Scroll one row up or down.

LEFT ARROW or RIGHT ARROW

Scroll one column left or right.

## Keys for selecting data and cells

 [Select cells, rows and columns, and objects](#)

CTRL+SPACEBAR

Select the entire column.

SHIFT+SPACEBAR

Select the entire row.

CTRL+A

Select the entire worksheet.

SHIFT+BACKSPACE

With multiple cells selected, select only the active cell.

CTRL+SHIFT+SPACEBAR

With an object selected, select all objects on a sheet.

CTRL+6

Alternate between hiding objects, displaying objects, and displaying placeholders for objects.

## [Select cells with specific characteristics](#)

CTRL+SHIFT+\* (asterisk)

Select the current region around the active cell (the data area enclosed by blank rows and blank columns). In a PivotTable report, select the entire PivotTable report.

CTRL+/  
Select the [array](#) containing the active cell.

CTRL+SHIFT+O (the letter O)

Select all cells that contain comments.

CTRL+\

In a selected row, select the cells that don't match the value in the active cell.

CTRL+SHIFT+|

In a selected column, select the cells that don't match the value in the active cell.

CTRL+[ (opening bracket)

Select all cells directly referenced by formulas in the selection.

CTRL+SHIFT+{ (opening brace)

Select all cells directly or indirectly referenced by formulas in the selection.

CTRL+] (closing bracket)

Select cells that contain formulas that directly reference the active cell.

CTRL+SHIFT+} (closing brace)

Select cells that contain formulas that directly or indirectly reference the active cell.

ALT+; (semicolon)

Select the visible cells in the current selection.

## [Extend a selection](#)

F8

Turn extend mode on or off. In extend mode, **EXT** appears in the status line, and the arrow keys extend the selection.

SHIFT+F8

Add another range of cells to the selection; or use the arrow keys to move

to the start of the range you want to add, and then press F8 and the arrow keys to select the next range.

SHIFT+arrow key

Extend the selection by one cell.

CTRL+SHIFT+arrow key

Extend the selection to the last nonblank cell in the same column or row as the active cell.

SHIFT+HOME

Extend the selection to the beginning of the row.

CTRL+SHIFT+HOME

Extend the selection to the beginning of the worksheet.

CTRL+SHIFT+END

Extend the selection to the last used cell on the worksheet (lower-right corner).

SHIFT+PAGE DOWN

Extend the selection down one screen.

SHIFT+PAGE UP

Extend the selection up one screen.

END+SHIFT+arrow key

Extend the selection to the last nonblank cell in the same column or row as the active cell.

END+SHIFT+HOME

Extend the selection to the last used cell on the worksheet (lower-right corner).

END+SHIFT+ENTER

Extend the selection to the last cell in the current row. This key sequence does not work if you have turned on transition navigation keys (**Tools** menu, **Options** command, **Transition** tab).

SCROLL LOCK+SHIFT+HOME

Extend the selection to the cell in the upper-left corner of the window.

SCROLL LOCK+SHIFT+END

Extend the selection to the cell in the lower-right corner of the window.

## Keys for entering, editing, formatting, and calculating data

[Enter data](#)

ENTER

Complete a cell entry and select the cell below.  
ALT+ENTER  
Start a new line in the same cell.

CTRL+ENTER  
Fill the selected cell range with the current entry.

SHIFT+ENTER  
Complete a cell entry and select the previous cell above.

TAB  
Complete a cell entry and select the next cell to the right.

SHIFT+TAB  
Complete a cell entry and select the previous cell to the left.

ESC  
Cancel a cell entry.

Arrow keys  
Move one character up, down, left, or right.

HOME  
Move to the beginning of the line.

F4 or CTRL+Y  
Repeat the last action.

CTRL+SHIFT+F3  
Create [names](#) from row and column labels.

CTRL+D  
Fill down.

CTRL+R  
Fill to the right.

CTRL+F3  
Define a name.

CTRL+K  
Insert a [hyperlink](#).

CTRL+; (semicolon)  
Enter the date.

CTRL+SHIFT+: (colon)  
Enter the time.

ALT+DOWN ARROW  
Display a drop-down list of the values in the current column of a range.

CTRL+Z  
Undo the last action.

## [Enter special characters](#)

Press F2 to edit the cell, turn on NUM LOCK, and then press the following keys by using the numeric key pad:

ALT+0162

Enters the cent character ¢.

ALT+0163

Enters the pound sterling character £.

ALT+0165

Enters the yen symbol ¥.

ALT+0128

Enters the euro symbol €.

## [Enter and calculate formulas](#)

= (equal sign)

Start a formula.

F2

Move the insertion point into the Formula Bar when editing in a cell is turned off.

BACKSPACE

In the Formula Bar, delete one character to the left.

ENTER

Complete a cell entry from the cell or Formula Bar.

CTRL+SHIFT+ENTER

Enter a formula as an [array formula](#).

ESC

Cancel an entry in the cell or Formula Bar.

SHIFT+F3

In a formula, display the **Insert Function** dialog box.

CTRL+A

When the insertion point is to the right of a function name in a formula, display the **Function Arguments** dialog box.

CTRL+SHIFT+A

When the insertion point is to the right of a function name in a formula, insert the argument names and parentheses.

F3

Paste a [defined name](#) into a formula.

ALT+= (equal sign)

Insert an AutoSum formula with the SUM function.

CTRL+SHIFT+" (quotation mark)

Copy the value from the cell above the active cell into the cell or the Formula Bar.

CTRL+' (apostrophe)

Copies a formula from the cell above the active cell into the cell or the Formula Bar.

CTRL+` (single left quotation mark)

Alternate between displaying cell values and displaying formulas.

F9

Calculate all worksheets in all open workbooks.

When a portion of a formula is selected, calculate the selected portion. You can then press ENTER or CTRL+SHIFT+ENTER (for array formulas) to replace the selected portion with the calculated value.

SHIFT+F9

Calculate the active worksheet.

CTRL+ALT+F9

Calculate all worksheets in all open workbooks, regardless of whether they have changed since the last calculation.

CTRL+ALT+SHIFT+F9

Rechecks dependent formulas and then calculates all cells in all open workbooks, including cells not marked as needing to be calculated.



[Edit data](#)

F2

Edit the active cell and position the insertion point at the end of the cell contents.

ALT+ENTER

Start a new line in the same cell.

BACKSPACE

Edit the active cell and then clear it, or delete the preceding character in the active cell as you edit cell contents.

DELETE

Delete the character to the right of the insertion point, or delete the selection.

CTRL+DELETE

Delete text to the end of the line.

F7

Display the **Spelling** dialog box.

SHIFT+F2

Edit a cell comment.

ENTER

Complete a cell entry and select the next cell below.

CTRL+Z

Undo the last action.

ESC

Cancel a cell entry.

CTRL+SHIFT+Z

When the AutoCorrect Smart Tags is displayed, undo or redo the last automatic correction.



### [Insert, delete, and copy cells](#)

CTRL+C

Copy the selected cells.

CTRL+C, immediately followed by another CTRL+C

Display the Microsoft Office Clipboard (multiple copy and paste).

CTRL+X

Cut the selected cells.

CTRL+V

Paste copied cells.

DELETE

Clear the contents of the selected cells.

CTRL+HYPHEN

Delete the selected cells.

CTRL+SHIFT+PLUS SIGN

Insert blank cells.



### [Format data](#)

ALT+' (apostrophe)

Display the **Style** dialog box.

CTRL+1

Display the **Format Cells** dialog box.

CTRL+SHIFT+~

Apply the General number format.

CTRL+SHIFT+\$

Apply the Currency format with two decimal places (negative numbers in parentheses).

CTRL+SHIFT+%

Apply the Percentage format with no decimal places.

CTRL+SHIFT+^

Apply the Exponential number format with two decimal places.

CTRL+SHIFT+#

Apply the Date format with the day, month, and year.

CTRL+SHIFT+@

Apply the Time format with the hour and minute, and AM or PM.

CTRL+SHIFT+!

Apply the Number format with two decimal places, thousands separator, and minus sign (–) for negative values.

CTRL+B

Apply or remove bold formatting.

CTRL+I

Apply or remove italic formatting.

CTRL+U

Apply or remove underlining.

CTRL+5

Apply or remove strikethrough.

CTRL+9

Hide the selected rows.

CTRL+SHIFT+( (opening parenthesis)

Unhide any hidden rows within the selection.

CTRL+0 (zero)

Hide the selected columns.

CTRL+SHIFT+) (closing parenthesis)

Unhide any hidden columns within the selection.

CTRL+SHIFT+&

Apply the outline border to the selected cells.

CTRL+SHIFT+\_

Remove the outline border from the selected cells.



[Use the \*\*Border\*\* tab in the \*\*Format Cells\*\* dialog box](#)

Press CTRL+1 to display this dialog box.

ALT+T

Apply or remove the top border.

ALT+B

Apply or remove the bottom border.

ALT+L

Apply or remove the left border.

ALT+R

Apply or remove the right border.

ALT+H

If cells in multiple rows are selected, apply or remove the horizontal divider.

ALT+V

If cells in multiple columns are selected, apply or remove the vertical divider.

ALT+D

Apply or remove the downward diagonal border.

ALT+U

Apply or remove the upward diagonal border.

## **Keys for filtering, outlining, and managing ranges**



[Use data forms \(Data menu, Form command\)](#)

DOWN ARROW

Move to the same field in the next record.

UP ARROW

Move to the same field in the previous record.

TAB and SHIFT+TAB

Move to each field in the record, then to each command button.

ENTER

Move to the first field in the next record.

SHIFT+ENTER

Move to the first field in the previous record.

PAGE DOWN

Move to the same field 10 records forward.

CTRL+PAGE DOWN

Start a new, blank record.

PAGE UP

Move to the same field 10 records back.

CTRL+PAGE UP

Move to the first record.

HOME or END

Move to the beginning or end of a field.

SHIFT+END

Extend selection to the end of a field.

SHIFT+HOME

Extend selection to the beginning of a field.

LEFT ARROW or RIGHT ARROW

Move one character left or right within a field.

SHIFT+LEFT ARROW

Select the character to the left within a field.

SHIFT+RIGHT ARROW

Select the character to the right within a field.



### [Filter ranges \(Data menu, AutoFilter command\)](#)

ALT+DOWN ARROW

In the cell that contains the drop-down arrow, displays the AutoFilter list for the current column.

DOWN ARROW

Selects the next item in the AutoFilter list.

UP ARROW

Selects the previous item in the AutoFilter list.

ALT+UP ARROW

Closes the AutoFilter list for the current column.

HOME

Selects the first item (**All**) in the AutoFilter list.

END

Selects the last item in the AutoFilter list.

ENTER

Filters the range based on the item selected from the AutoFilter list.



### [Show, hide, and outline data](#)

ALT+SHIFT+RIGHT ARROW

Groups rows or columns.

ALT+SHIFT+LEFT ARROW

Ungroups rows or columns.

CTRL+8

Displays or hides the outline symbols.

CTRL+9

Hides the selected rows.

CTRL+SHIFT+( (opening parenthesis)

Unhides any hidden rows within the selection.

CTRL+0 (zero)

Hides the selected columns.

CTRL+SHIFT+) (closing parenthesis)

Unhides any hidden columns within the selection.

## Keys for PivotTable and PivotChart reports



[Lay out a report onscreen](#)

1. Press F10 to make the menu bar active.
2. Press CTRL+TAB or CTRL+SHIFT+TAB to make the **PivotTable Field List** active.
3. Press the DOWN ARROW or UP ARROW key to select the field you want. Press RIGHT ARROW or LEFT ARROW to open or close a field that can be expanded.
4. Press TAB to select the **Add To** list, and then press DOWN ARROW to open the list.
5. Press DOWN ARROW or UP ARROW to select the area where you want to move the field, and then press ENTER.
6. Press TAB to select the **Add To** button, and then press ENTER.



[Use the PivotTable and PivotChart Wizard – Layout dialog box](#)

To display this dialog box, press TAB until **Layout** is selected in Step 3 of the

PivotTable and PivotChart Wizard.

UP ARROW or DOWN ARROW

Selects the previous or next field button in the list on the right.

LEFT ARROW or RIGHT ARROW

With two or more columns of field buttons, selects the button to the left or right.

ALT+R

Moves the selected field into the Row area.

ALT+C

Moves the selected field into the Column area.

ALT+D

Moves the selected field into the Data area.

ALT+P

Moves the selected field into the Page area.

ALT+L

Displays the **PivotTable Field** dialog box for the selected field.



[Display and hide items in a field](#)

ALT+DOWN ARROW

Displays the drop-down list for a field in a PivotTable or PivotChart report.

Use the arrow keys to select the field.

UP ARROW

Selects the previous item in the range.

DOWN ARROW

Selects the next item in the range.

RIGHT ARROW

For an item that has lower-level items available, displays the lower-level items.

LEFT ARROW

For an item that has lower-level items displayed, hides the lower-level items.

HOME

Selects the first visible item in the list.

END

Selects the last visible item in the list.

ENTER

Closes the list and displays the selected items.

## SPACEBAR

Checks, double-checks, or clears a check box in the list. Double-check selects both an item and all of its lower-level items.

## TAB

Switches between the list, the **OK** button, and the **Cancel** button.



[Change the layout of a report](#)

## CTRL+SHIFT+\* (asterisk)

Selects an entire PivotTable report.

## ALT+SHIFT+RIGHT ARROW

Groups the selected items in a PivotTable field.

## ALT+SHIFT+LEFT ARROW

Ungroups grouped items in a PivotTable field.

## Keys for charts



[Create charts and select chart elements](#)

## F11 or ALT+F1

Creates a chart of the data in the current range.

## CTRL+PAGE DOWN

Selects a chart sheet: selects the next sheet in the workbook, until the chart sheet you want is selected.

## CTRL+PAGE UP

Selects a chart sheet: selects the previous sheet in the workbook, until the chart sheet you want is selected.

## DOWN ARROW

Select the previous group of elements in a chart.

## UP ARROW

Selects the next group of elements in a chart.

## RIGHT ARROW

Selects the next element within a group.

## LEFT ARROW

Selects the previous element within a group.



[Select an embedded chart](#)

1. Display the **Drawing** toolbar: Press ALT+V, press T, press DOWN ARROW until **Drawing** is selected, and then press ENTER.
2. Press F10 to make the menu bar active.
3. Press CTRL+TAB or CTRL+SHIFT+TAB to select the **Drawing** toolbar.
4. Press the RIGHT ARROW key to select the **Select Objects**  button on the **Drawing** toolbar.
5. Press CTRL+ENTER to select the first object.
6. Press the TAB key to cycle forward (or SHIFT+TAB to cycle backward) through the objects until round [sizing handles](#) appear on the embedded chart you want to select.
7. Press CTRL+ENTER to make the chart active so that you can select elements within it.

## Keys for drawing objects and other objects

When both the **Reviewing** and **Drawing** toolbars are onscreen, ALT+U switches between the **Review** command and the **AutoShapes** command, and ENTER performs the selected command.

 [Select a drawing object](#)

When you're editing text in a drawing object, you can select the next or previous object by pressing TAB or SHIFT+TAB. Starting from a worksheet, do the following:

1. Press F10, press CTRL+TAB to select the **Drawing** toolbar, and then press RIGHT ARROW to select the **Select Objects**  button.
2. Press CTRL+ENTER to select the first drawing object.
3. Press the TAB key to cycle forward (or SHIFT+TAB to cycle backward) through the objects until sizing handles appear on the object you want to select.

If an object is grouped, TAB selects the group, then each object within the group, and then the next object.

4. To switch back to the worksheet when an object is selected, press ESC.

 [Insert an AutoShape](#)

1. Press ALT+U to select the **AutoShapes** menu on the **Drawing** toolbar.
2. Use the arrow keys to move to the category of AutoShapes you want, and then press the RIGHT ARROW key.
3. Use the arrow keys to select the AutoShape you want.
4. Press CTRL+ENTER.
5. To format the AutoShape, press CTRL+1 to display the **Format AutoShape** dialog box.

#### [Insert a text box](#)

1. Press F10, press CTRL+TAB to select the **Drawing** toolbar, and then press RIGHT ARROW to select the **Text Box**  button.
2. Press CTRL+ENTER.
3. Type the text you want in the text box.
4. Do one of the following:

To return to the worksheet when you are finished typing, press ESC twice.

To format the text box, press ESC, and then press CTRL+1 to display the **Format Text Box** dialog box. When you finish formatting, press ENTER, and then press ESC to return to the worksheet.

#### [Insert WordArt](#)

1. Press ALT+I, then press P, then press W (**Insert** menu, **Picture** submenu, **WordArt** command).
2. Use the arrow keys to select the WordArt style you want, and then press ENTER.
3. Type the text you want, and then use the TAB key to select other options in the dialog box.
4. Press ENTER to insert the WordArt object.
5. To format the WordArt object, use the tools on the **Word Art** toolbar, or press CTRL+1 to display the **Format WordArt** dialog box.

#### [Rotate a drawing object](#)

1. Select the drawing object you want to rotate.
2. Press CTRL+1 to display the **Format** menu for the object, and then press CTRL+TAB to select the **Size** tab.

3. Press ALT+T to select the **Rotation** box.
4. Use the arrow keys to select the amount of rotation you want.

### [Change the size of a drawing object](#)

1. Select the drawing object you want to resize.
2. Press CTRL+1 to display the **Format** menu for the object, and then press CTRL+TAB to select the **Size** tab.
3. Select the options you want to change the size.

### [Move a drawing object](#)

1. Select the drawing object you want to move.
2. Press the arrow keys to move the object.
3. To position the object precisely, press CTRL+ an arrow key to move the object in one-pixel increments.

### [Copy drawing objects and their attributes](#)

To make a copy of a drawing object, select the object and press CTRL+D. To copy attributes such as fill color and line style from one object to another, do the following:

1. Select the drawing object with the attributes you want to copy.

For AutoShapes with text, the text format is copied along with the other attributes.

2. Press CTRL+SHIFT+C to copy the object attributes.
3. Press TAB or SHIFT+TAB to select the object you want to copy the attributes to.
4. Press CTRL+SHIFT+V to copy the attributes to the object.

## **Keys for use with speech, e-mail, macros, and other languages**

### [Use speech recognition and text-to-speech](#)

CTRL

Switches between command mode and dictation mode.

ESC

Stops reading when text is being read aloud.



[Send e-mail messages](#)

To use keys to send e-mail messages, you must configure Microsoft Outlook as your default e-mail program. Most of these keys do not work with Outlook Express.

SHIFT+TAB

When cell A1 is selected, moves to the **Introduction** box in the e-mail message header. In the message header, moves to the **Subject**, **Bcc** (if displayed), **Cc**, **To**, and **From** (if displayed) boxes, then to the address book for the **Bcc**, **Cc**, **To**, and **From** boxes, and then to cell A1.

ALT+S

Sends the e-mail message.

CTRL+SHIFT+B

Opens the Address Book.

ALT+O

Opens the **Options** menu for access to the **Options**, **Bcc Field**, and **From Field** commands.

ALT+P

Opens the Outlook **Message Options** dialog box (**Options** menu, **Options** command).

ALT+K

Checks the names in the **To**, **Cc**, and **Bcc** boxes against the Address Book.

ALT+PERIOD

Opens the Address Book for the **To** box.

ALT+C

Opens the Address Book for the **Cc** box.

ALT+B

If the **Bcc** box is displayed, opens the Address Book for the **Bcc** box.

ALT+J

Goes to the **Subject** box.

CTRL+SHIFT+G

Creates a message flag.

ALT+A

Adds interactivity to the range or sheet being sent.

## [Work with macros](#)

### **ALT+F8**

Displays the **Macro** dialog box.

### **ALT+F11**

Displays the Visual Basic Editor.

### **CTRL+F11**

Inserts a Microsoft Excel 4.0 macro sheet.

## [Work with multiple national languages](#)

### **CTRL+RIGHT SHIFT**

Switches to right-to-left paragraph direction (the text must contain only [neutral characters](#)).

### **CTRL+LEFT SHIFT**

Switches to left-to-right paragraph direction (the text must contain only neutral characters).

### **ALT+SHIFT+UP ARROW**

In Japanese text for which you've displayed phonetic guides, moves the pointer into the phonetic guides.

### **ALT+SHIFT+DOWN ARROW**

Moves the pointer from the phonetic guides back to the parent string of characters.

### **NUM LOCK, ALT+numeric pad numbers**

Enter a unicode character.

### **ALT+X**

Pressed immediately after typing the hexadecimal code for a unicode character, converts the numbers to the character.

Pressed immediately following a unicode character, converts the character to its hexadecimal code.

[Show All](#)

# Excel specifications and limits

## [Worksheet and workbook specifications](#)

<b>Feature</b>	<b>Maximum limit</b>
Open workbooks	Limited by available memory and system resources
Worksheet size	65,536 rows by 256 columns
Column width	255 characters
Row height	409 points
Page breaks	1000 horizontal and vertical
Length of cell contents (text)	32,767 characters. Only 1,024 display in a cell; all 32,767 display in the formula bar.
Sheets in a workbook	Limited by available memory (default is 3 sheets)
Colors in a workbook	56
Cell styles in a workbook	4,000
Named <a href="#">views</a> in a workbook	Limited by available memory
Custom number formats	Limited by available memory
Names in a workbook	Limited by available memory
Windows in a workbook	Limited by system resources
Panes in a window	4
Linked sheets	Limited by available memory
<a href="#">Scenarios</a>	Limited by available memory; a summary report shows only the first 251 scenarios
Changing cells in a scenario	32
Adjustable cells in Solver	200

Custom functions	Limited by available memory
Zoom range	10 percent to 400 percent
Reports	Limited by available memory
Sort references	3 in a single sort; unlimited when using sequential sorts
Undo levels	16
Fields in a data form	32
Custom toolbars in a workbook	Limited by available memory
Custom toolbar buttons	Limited by available memory

### [Workgroup specifications](#)

<b>Feature</b>	<b>Maximum limit</b>
Users who can open and share a <a href="#">shared workbook</a> at the same time	256
Personal <a href="#">views</a> in a shared workbook	Limited by available memory
Days that <a href="#">change history</a> is maintained	32,767 (default is 30 days)
Workbooks that can be merged at one time	Limited by available memory
Cells that can be highlighted in a shared workbook	32,767
Colors used to identify changes made by different users when change highlighting is turned on	32 (each user is identified by a separate color; changes made by the current user are highlighted with navy blue)

### [Calculation specifications](#)

<b>Feature</b>	<b>Maximum limit</b>
Number precision	15 digits
Largest number	

allowed to be typed into a cell 9.999999999999999E307

Largest allowed positive number 1.79769313486231E308

Smallest allowed negative number -2.2250738585072E-308

Smallest allowed positive number 2.229E-308

Largest allowed negative number -1E-307

Length of formula contents 1,024 characters

Iterations 32,767

Limited by available memory. Also, arrays cannot refer to entire columns. For example, an array cannot refer to the entire column C:C or to the range C1:C65536. However, an array can refer to the range C1:D65535 because the range is one row short of the maximum worksheet size and does not include the entire C or D column.

Selected ranges 2,048

Arguments in a function 30

Nested levels of functions 7

Number of available worksheet functions 329

Earliest date allowed for calculation January 1, 1900 (January 1, 1904, if 1904 date system is used)

Latest date allowed for calculation December 31, 9999

Largest amount of time that can be entered 9999:59:59

#### [PivotTable report specifications](#)

<b>Feature</b>	<b>Maximum limit</b>
<a href="#">PivotTable reports</a> on a sheet	Limited by available memory
Unique items per field	32,500
<a href="#">Row</a> or <a href="#">column fields</a> in a PivotTable report	Limited by available memory
<a href="#">Page fields</a> in a PivotTable report	256 (may be limited by available memory)
<a href="#">Data fields</a> in a PivotTable report	256
<a href="#">Calculated item</a> formulas in a PivotTable report	Limited by available memory

#### [Charting specifications](#)

<b>Feature</b>	<b>Maximum limit</b>
Charts linked to a worksheet	Limited by available memory

Worksheets referred to by a chart	255
<a href="#">Data series</a> in one chart	255
<a href="#">Data points</a> in a data series for 2-D charts	32,000
Data points in a data series for 3-D charts	4,000
Data points for all data series in one chart	256,000
Line styles	8
Line weights	4
Area patterns (screen display)	18
Total area pattern and color combinations (color display)	56,448
Pattern and color combinations (color printer)	56,448 (the actual number depends on your printer and its software)
<a href="#">Page fields</a> in a <a href="#">PivotChart report</a>	256 (may be limited by available memory)
<a href="#">Data fields</a> in a PivotChart report	256
Calculated item formulas in a PivotChart report	Limited by available memory

[Show All](#)

# What's installed with Excel

Some of the content in this topic may not be applicable to some languages.

This topic provides reference information about what features are installed with Microsoft Excel and where you can find these features in the installation programs.

For current information about the features included in Office Excel 2003, see the xreadme.htm file in the \Program Files\Microsoft Office\Office11\1033 folder (or Microsoft Office folder if you installed the stand-alone version of Excel).



[Installed by default](#)

<b>Feature</b>	<b>Location in the installation program</b>
Clip art	Office Shared Features; Clip Organizer; Clip Organizer Collections
Document Update Utility	Office Tools
Encapsulated Postscript (EPS) File Import	Office Shared Features; Converters and Filters; Graphics Filters
English Proofing Tools	Office Shared Features; Proofing Tools
Graphics Interchange Format (GIF) File Import	Office Shared Features; Converters and Filters; Graphics Filters
Help for Microsoft Excel	Microsoft Excel for Windows; Help
Hosted Webs	Office Tools
Internet Assistant VBA	Microsoft Excel for Windows; Add-ins
Joint Photographic Experts Group (JPEG) File Import	Office Shared Features; Converters and Filters; Graphics Filters
Macintosh Graphics (PICT) File Import	Office Shared Features; Converters and Filters; Graphics Filters
Microsoft Excel Program Files	Microsoft Excel for Windows
Microsoft Graph (including Microsoft Graph Help)	Office Tools; Microsoft Graph
Microsoft Handwriting Component	Office Shared Features

Microsoft Office Document Image Writer	Office Tools; Microsoft Office Document Imaging
Microsoft Office Download Control	Office Shared Features
Microsoft Office Picture Manager	Office Tools
Office 2003 Web Components	Office Shared Features
Office SOAP Toolkit	Office Shared Features
Portable Network Graphics (PNG) File Import graphics converter	Office Shared Features; Converters and Filters; Graphics Filters
Recover Text Converter	Office Shared Features; Converters and Filters; Text Converters
Research Explorer Bar	Office Tools
Sample Files	Microsoft Excel for Windows
Save My Settings Wizard	Office Tools
Smart Tag Plug-ins	Office Tools
System Information	Office Tools
Typical Themes	Office Shared Features; Themes
Windows SharePoint Services Support	Office Tools
Word Text Converters	Office Shared Features; Converters and Filters; Text Converters
Visual Basic for Applications	Office Shared Features; Visual Basic for Applications

[Installed by default on first use](#)

<b>Feature</b>	<b>Location in the installation program</b>
Additional Themes	Office Shared Features; Themes
Analysis ToolPak	Microsoft Excel for Windows; Add-ins
Computer Graphics Metafile (CGM) File Import	Office Shared Features; Converters and Filters; Graphics Filters
Conditional Sum Wizard	Microsoft Excel for Windows; Add-ins
CorelDraw (CDR) File Import	Office Shared Features; Converters and Filters; Graphics Filters

Digital Certificate for VBA Projects	Office Shared Features
Equation Editor	Office Tools
Euro Currency Tools	Microsoft Excel for Windows; Add-ins
French Proofing Tools	Office Shared Features; Proofing Tools
HTML Source Editing (Including Web Scripting and Web Debugging)	Office Tools; HTML Source Editing
Japanese Font	Office Shared Features; International Support
Language Settings Tool	Office Tools; Language Settings Tool
Lookup Wizard	Microsoft Excel for Windows; Add-ins
Microsoft Office Binder Support	Office Tools
Microsoft Office Document Imaging - Help	Office Tools; Microsoft Office Document Imaging
Microsoft Office Document Imaging - Scanning, OCR, Indexing Service Filter	Office Tools; Microsoft Office Document Imaging
Microsoft Query (including Help and drivers)	Office Tools; Microsoft Query
Office Assistant	Office Shared Features
Spanish Proofing Tools	Office Shared Features; Proofing Tools
Solver	Microsoft Excel for Windows; Add-ins
Speech	Office Shared Features; Alternative User Input
Spreadsheet Templates	Microsoft Excel for Windows
Text to Speech	Microsoft Excel for Windows
Visual Basic Help	Office Shared Features; Visual Basic for Applications
WordPerfect Graphics (WPG) File Import	Office Shared Features; Converters and Filters; Graphics Filters

Word Perfect Text Converters

Office Shared Features; Converters and Filters; Text Converters

Works for Windows 7.0 converter

Office Shared Features; Converters and Filters; Text Converters

[Installed only with custom installation](#)

<b>Feature</b>	<b>Location in the installation program</b>
Handwriting	Office Shared Features; Alternative User Input
New and Open Office Document Shortcuts	Office Shared Features; New and Open Office Document Shortcuts
Syriac Font	Office Shared Features; International Support
Universal Font	Office Shared Features; International Support

[Show All](#)

# About disabled features

Programmability-related features in Microsoft Excel, including specific functionality in templates, Active-X controls, add-in programs, or custom commands, may be disabled or may not work the way you expect when the Microsoft [Visual Basic for Applications \(VBA\)](#) shared feature is disabled. Many features in Office are created in VBA or depend on VBA support to function correctly. If you choose not to install the VBA feature, these dependent applications and features will be disabled or not installed.

For additional information about the affects of disabling VBA, see the Microsoft Office Resource Kit Web site.

To re-enable VBA, follow these steps:

1. Run the Office Setup program again.



1. Quit all programs.
2. Double-click the **Add/Remove Programs** icon in the Microsoft Windows **Control Panel**.
3. Do one of the following:

For Windows XP, Windows 2000, and Windows Millennium Edition:

- If you installed your Office program as part of Microsoft Office, click **Microsoft Office** in the **Currently installed programs** box, and then click the **Change** button.
- If you installed your Office program individually, click the name of your program in the **Currently installed programs** box, and then click the **Change** button.

For Windows 98 and Windows NT 4.0:

- If you installed your Office program as part of Microsoft Office, click **Microsoft Office** on the **Install/Uninstall** tab, and then

click the **Add/Remove** button.

- If you installed your Office program individually, click the name of your program on the **Install/Uninstall** tab, and then click the **Add/Remove** button.
2. On the **Features to install** screen in the Setup program, click the plus sign (+) next to **Office Shared Features**.
  3. Select **Visual Basic for Applications**, click the arrow next to your selection, and then click **Run from My Computer**.

If someone else set up your Office installation for you, contact your System Administrator or Information Technology (IT) Professional to see whether you are running Office with VBA disabled.

## Help protect Office without removing functionality

To help protect against macro viruses, you should purchase and install specialized antivirus software. To further help protect yourself from macro viruses, you can use the following procedures:

### [Set macro security level to High](#)

1. On the **Tools** menu, click **Options**.
2. Click the **Security** tab.
3. Click **Macro Security**.
4. Click the **Security Level** tab, and then select the security level you want to use.

### [Clear the \*\*Trust all installed add-ins and templates\*\* check box](#)

Depending on your [macro](#) security setting, when you open a macro, you will receive a warning and the macro may be disabled for installed [templates](#) and [add-ins](#) (including wizards).

1. On the **Tools** menu, click **Options**, and then click the **Security** tab.
2. Click **Macro Security**.
3. Click the **Trusted Sources** tab.
4. Clear the **Trust all installed add-ins and templates** check box.

**Note** All templates, add-ins, and macros shipped with Microsoft Office 2003 are digitally signed by Microsoft. Once you add Microsoft to your list of trusted sources for one of these installed files all subsequent interaction with these files will not generate messages.

### [Clear the list of trusted sources](#)

To perform this procedure, you must have Microsoft Internet Explorer version 4.0 or later installed on your computer.

1. On the **Tools** menu, click **Options**, and then click the **Security** tab.

2. Click **Macro Security**.
3. Click the **Trusted Sources** tab.
4. Click the source you want to remove from the list.
5. Click **Remove**.

[Show All](#)

# Customize how Excel starts

You can find XLStart folders in C:\Documents and Settings\username\Application Data\Microsoft\Excel or in C:\Program Files\Microsoft Office\Office11.

## [Open a workbook automatically when Microsoft Excel starts](#)

1. In Windows Explorer, move the icon of the workbook you want to open to an [alternate startup folder](#).

If you want to keep the workbook in its current location, use the **Create Shortcut** command on the **File** menu to create a shortcut to the workbook, and then move the shortcut to an alternate startup folder.

2. Restart Excel.

### [Tip](#)

To open a group of related workbooks when you start Excel, save the workbooks in a workspace file, and then place the workspace file in an alternate startup folder.

## [Open all files in a folder when Excel starts](#)

**Caution** Because Excel will attempt to open every file in the alternate startup folder, make sure you specify an empty folder or a folder that contains only files that Excel can open.

1. On the **Tools** menu, click **Options**, and then click the **General** tab.
2. In the **At startup, open all files in** box, type the path to the alternate startup folder.

**Note** If a file with the same name is in both the XLStart folder and the alternate startup folder, the file in the XLStart folder opens.

## [Use startup switches when you start Excel](#)

1. On the **Start** menu, point to **Programs**, point to **Accessories**, and then click **Windows Explorer**.
2. In Windows Explorer, go to \Program Files\Microsoft Office\Office11\Shortcut Bar\Office, and then delete the shortcut for Excel.
3. In Windows Explorer, go to \Program Files\Microsoft Office\Office11, right-click EXCEL.exe, and click **Create Shortcut**.
4. Right-click the shortcut you created, click **Properties**, and then modify the path in the **Target** box with switches from the table.

For example, to open the workbook Actuarial Lists.xls, type a space after the path in the **Target** box, and then type:

**C:\Reference Data\Actuarial Lists.xls**

<b>To start Excel and</b>	<b>Type</b>
Open a specific workbook	<i>workbook path/file name</i>
Open a specific workbook as <a href="#">read-only</a>	<i>/r workbook path/file name</i>
Prevent display of the Excel startup screen and a new blank workbook	<i>/e</i>
Specify the working folder	<i>/p folder path/folder name</i>
<b>Note</b> The folder specified in the startup switch is used instead of the location specified in the <b>Default file location</b> box on the <b>General</b> tab ( <b>Tools</b> menu, <b>Options</b> command).	
Specify Office Safe Mode	<i>/safe</i>

5. Click **OK**.
6. Move the shortcut to \Windows\Documents and Settings\Start Menu.

**Note** Your custom shortcut may be replaced by a Windows Installer shortcut if you name the shortcut Microsoft Excel, and either of the following are true:

- You use the Detect and Repair command in Microsoft Office, and you selected the **Repair my shortcuts while repairing** check box.
- You select the **Repair Office** option in Maintenance Mode setup, click the **Repair errors in my Office installation** option, and then select the **Restore My Shortcuts** check box.

If a Windows Installer shortcut replaces your custom shortcut, you must re-create your custom, non-Windows Installer, shortcuts.

### [Stop a workbook from loading when Excel starts](#)

This procedure clears all ways in which a workbook could be loaded.

1. On the **Tools** menu, click **Options**, and then click the **General** tab.
2. Clear the contents of the **At startup, open all files in** box.
3. Remove workbooks stored in the XLStart folder.
4. In Windows Explorer, remove the icon of the workbook you want to open in an alternate startup folder.
5. Remove a startup switch from the Excel icon.
6. Right-click the Excel icon that you want to use to open Excel, and clear the contents of the **Target** box.

### [Start Excel without running automatic macros](#)

Automatic macros, such as Auto\_Open, are designed to run when you start Excel. For more information about these macros, see Microsoft Visual Basic Help.

- To prevent macros from automatically running, hold down SHIFT while you start Excel.

**Note** If you start Excel from the Office Shortcut Bar, click the **Microsoft Excel** button on the Office Shortcut Bar first, and then immediately hold down SHIFT while Excel starts.

### [Save workbook settings you want to use every time you start Excel with a workbook template \(book.xlt\)](#)

### [Settings that can be saved](#)

## Formatting

Cell and sheet formats. Set by using the commands on the **Format** menu.

Page formats and [print area](#) settings for each sheet.

Cell [styles](#).

The number and type of sheets in a workbook.

Protected and hidden areas of the workbook. You can hide sheets, rows, and columns and prevent changes to worksheet cells.

## Text, data, graphics, and formulas

Text you want to repeat, such as page headers and row and column labels.

Data, graphics, formulas, charts, and other information.

Data validation settings.

## Toolbars, automation, and Option settings

Custom toolbars, [macros](#), [hyperlinks](#), and [ActiveX controls](#) on forms. To make a custom toolbar available, attach the toolbar to the template.

Workbook calculation options and window view options. Set with the **Options** command (**Tools** menu).

[Create a template](#)

1. Decide which type of template you want:

### Workbook template

Create a workbook that contains the sheets, default text (such as page headers and column and row labels), formulas, [macros](#), [styles](#), and other formatting you want in new workbooks based on the template.

## Worksheet template

Create a workbook that contains one worksheet. On the worksheet, include the formatting, [styles](#), text, and other information you want to appear on all new sheets of the same type.

2. To display a picture of the first page of a template in the **Preview** box of the **Templates** dialog box (**General Templates...**, **New Workbook** task pane), click **Properties** on the **File** menu, click the **Summary** tab, and then select the **Save preview picture** check box.
3. On the **File** menu, click **Save As**.
4. In the **Save as type** box, click **Template**.
5. In the **Save in** box, select the folder where you want to store the template.
  - To create the [default workbook template](#) or [default worksheet template](#), select either the XLStart folder or the alternate startup folder. The XLStart folder is usually  
  
C:\Program Files\Microsoft Office\Office11\XLStart
  - To create a custom workbook or worksheet template, select the Templates folder, which is usually  
  
C:\Documents and Settings\user\_name\Application Data\Microsoft\Templates
6. Enter the name of the template in the **File name** box. Do one of the following:

## Workbook template

- Type **book** to create the default workbook template.  
  
To create a custom workbook template, type any valid file name.

## Worksheet template

- Type **sheet** to create a template for default worksheets.

To create a custom sheet template, type any valid file name.

7. Click **Save**, and then click **Close** on the **File** menu.

[Show All](#)

# Change the color palette in a workbook

When you change a color in a workbook palette, any element formatted with that color is changed throughout the entire workbook.

## [Change a color in a color palette](#)

1. Switch to the workbook that contains the color palette you want to change.
2. On the **Tools** menu, click **Options**, and then click the **Color** tab.
3. Click the color you want to change, and then click **Modify**.
4. Do one or more of the following:
  - To replace the selected color on the palette with a different standard color, click the **Standard** tab, and then click the color you want.
  - To change the hue or another aspect of the selected color, click the **Custom** tab, and then change the options.

## Notes

- To restore the default color palette, click **Reset** on the **Color** tab.
- If you copy an object or cells with a custom color to another workbook, the custom color is replaced by the color in the corresponding position on the other workbook's color palette. To retain the custom color, either copy the customized color palette to the other workbook or change the corresponding color in the workbook.
- To replace the default color palette in new workbooks, change the color palette in the [default workbook template](#) or in the custom template you use to create workbooks.

## [Copy a color palette to another workbook](#)

1. Open the workbook that contains the color palette you want to copy.
2. Switch to the workbook that you want to copy the color palette to.
3. On the **Tools** menu, click **Options**, and then click the **Color** tab.

4. In the **Copy colors from** box, click the workbook that contains the color palette you want to copy, and then click **OK**.

[Show All](#)

# Attach a custom toolbar to a workbook

1. Create the custom [toolbar](#) you want to attach.

## [How?](#)

1. On the **Tools** menu, click **Customize**.
2. Click the **Toolbars** tab.
3. Click **New**.
4. In the **Toolbar name** box, type the name you want, and then click **OK**.
5. Click the **Commands** tab.
6. Do one of the following:

## [Add a button to the toolbar](#)

1. Click a category in the **Categories** box.
2. Drag the command you want from the **Commands** box to the displayed toolbar.

## [Add a built-in menu to the toolbar](#)

1. In the **Categories** box, click **Built-in Menus**.
2. Drag the menu you want from the **Commands** box to the displayed toolbar.
7. When you have added all the buttons and menus you want, click **Close**.
2. Open the workbook to which you want to attach a toolbar.
3. On the **Tools** menu, click **Customize**, and then click the **Toolbars** tab.
4. Click **Attach**.
5. Click the custom toolbar you want to attach, and then click **Copy**.

**Note** Be sure to save the workbook after attaching a toolbar.

[Show All](#)

# Save more than one toolbar configuration

1. Make any changes you want to the [built-in menu](#) and [toolbars](#), create any custom toolbars you want to save, and then display the toolbars the way you want them to appear.

## [How?](#)

1. On the **Tools** menu, click **Customize**.
2. Click the **Toolbars** tab.
3. Click **New**.
4. In the **Toolbar name** box, type the name you want, and then click **OK**.
5. Click the **Commands** tab.
6. Do one of the following:

## [Add a button to the toolbar](#)

1. Click a category in the **Categories** box.
2. Drag the command you want from the **Commands** box to the displayed toolbar.

## [Add a built-in menu to the toolbar](#)

1. In the **Categories** box, click **Built-in Menus**.
2. Drag the menu you want from the **Commands** box to the displayed toolbar.
7. When you have added all the buttons and menus you want, click **Close**.
2. Quit Excel.
3. Locate the file Excel.xlb.
4. Rename the file, retaining the .xlb extension.

To use a saved configuration, click **Open** on the **File** menu and open the renamed file. When you next quit the program, Excel creates a new

Excel.xlb toolbar settings file.

[Show All](#)

# Use custom toolbars from earlier Excel versions

If you have multiple Microsoft Excel versions on your system, or have [toolbars](#) you want to use on other systems or share with other users, you can merge those custom toolbars into the current version of Excel.

1. On the **File** menu, click **Open**.
2. In the **Files of type** box, click **Toolbars**.
3. Open the toolbar file for the version you want.

Your toolbar settings are stored in the following files and locations:

Excel Version	File Name	Location
Excel 2002	Excel.xlb	C:\Documents and Settings\username\Application Data\Microsoft\Excel
Excel 2000	Excel.xlb	C:\Documents and Settings\username\Application Data\Microsoft\Excel
Excel 97	username8.xlb	Windows folder, unless your administrator specifies a different location
Excel 95	If user profiles are turned on, username.xlb; if user profiles are not turned on, Excel5.xlb	Windows folder
Excel 5	Excel5.xlb	Windows folder
Excel 4	Excel.xlb	Windows folder

4. If your custom toolbar does not appear, point to **Toolbars** on the **View** menu, and then select your toolbar.
5. If you opened an Excel toolbar file from another system, and you want to save the merged toolbars in the current Excel toolbar file, click **Customize** on the **Tools** menu and make at least one change to a merged toolbar (add

or remove a button, for example).

6. To save the merged toolbars in the current Excel toolbar file, click **Exit** on the **File** menu. The next time you run Excel, the merged toolbars will be displayed. If your custom toolbars contain buttons from earlier Excel versions that aren't included in the current version of Excel, these buttons appear as gray boxes. If you click one of these buttons, the **Assign Macro** dialog box appears.
7. If your custom toolbars contain buttons that run macros, you'll also need to copy the macros to any workbooks where you want to use the buttons.

[How?](#)

1. Set the security level to **Medium** or **Low**.

[How?](#)

1. On the **Tools** menu, click **Options**.
2. Click the **Security** tab.
3. Under **Macro Security**, click **Macro Security**.
4. Click the **Security Level** tab, and then select the security level you want to use.
2. Open the workbook that contains the [module](#) you want to copy and the workbook you want to copy the module to.
3. On the **Tools** menu, point to **Macro**, and then click **Visual Basic Editor**.
4. On the **View** menu, click **Project Explorer** .
5. Drag the module you want to copy to the destination workbook.

[Show All](#)

# Troubleshoot toolbars and menus

[I can't find a menu command, toolbar button, or dialog box option.](#)

**The menu might not be expanded** If arrows  appear at the bottom of the [menu](#), the menu item might be available on the expanded menu. Click the arrows, and then click the command you want. You can also double-click the menu to expand it.

**There might not be enough room to display all the buttons** If the [toolbar](#) is on the same row as another toolbar, there might not be enough room to display all the buttons. Click **Toolbar Options** , and then click the button you want.

**You might have a different language setting** The command or control doesn't appear if you don't have editing enabled for the language that the command or control applies to. You need to enable editing for the language you want to work with.

**The Microsoft Office program you're using may not be maximized** Some toolbar buttons may be hidden if your program window is not maximized. Click the **Maximize**  button to enlarge the program window to its fullest extent.

**The toolbar button you want to use may be seldom used** Some toolbar buttons may be hidden if they are seldom used. Click **Customize** on the **Tools** menu, and then click the **Commands** tab to find the button you want to add to the toolbar.

[I created a custom toolbar and shared it with another person, but it looks different on their computer.](#)

The buttons and commands that you share with another person are always available, but whether or not they appear on the short version of the [menu](#), or on the [toolbar](#) when there isn't enough room to display all the buttons, depends on the individual menu and toolbar settings for that person.

Microsoft Office stores the commands and buttons you've used frequently and

recently as your personal menu and toolbar settings. When the **Always show full menus** check box is cleared (**Toolbar Options** arrow , **Add or Remove buttons, Customize** dialog box, **Options** tab), these personalized settings affect the commands that appear on each menu. Additionally, if there isn't enough room on a toolbar to display all the buttons (such as when you position a toolbar on the same row as another toolbar), personalized settings affect which buttons do appear.

[I can't find the \*\*Insert Script, Show All Scripts, or Remove All Scripts\*\* command.](#)

These commands are not included on the default menus in Microsoft Excel. To use these commands, you must first add them to the **Tools** menu.

[Show All](#)

# About add-in programs

Some of the content in this topic may not be applicable to some languages.

Add-ins are programs that add optional commands and features to Microsoft Excel. For example, the Analysis ToolPak [add-in program](#) provides a set of data analysis tools that can save steps when you develop complex statistical or engineering analyses.

Excel has three types of add-in programs: Excel add-ins, custom [Component Object Model \(COM\) add-ins](#), and automation add-ins.

 [Excel add-ins](#)

**Where to get add-ins** A set of add-ins is available when you install Excel, and more add-ins are available from the Microsoft Office Web site.

**Installing add-ins on your computer** Before you can use an add-in, you must first install it on your computer and then load it into Excel. Add-ins (\*.xla files) are installed by default in one of the following places:

- The Library folder or one of its subfolders in the Microsoft Office/Office folder.
- The Documents and Settings/<user name>/Application Data/Microsoft/AddIns folder.

The administrator for your company's network can designate other locations for add-in programs. See your administrator for more information.

**Loading add-ins into Excel** After installing an add-in, you must load it into Excel. Loading an add-in makes the feature available in Excel and adds any associated commands to the appropriate menus.

**Unloading add-ins from Excel** To conserve memory and improve performance, unload add-ins you don't use often. Unloading an add-in removes its features and commands from Excel, but the add-in program remains on your

computer so you can easily reload it. When you unload an add-in program, it remains in memory until you restart Excel.

**Designing custom Excel add-ins** You can use your own [Visual Basic](#) programs as custom add-ins. For information about making a Visual Basic program an add-in, see the *Microsoft Office XP Developer's Guide*, which you can obtain from Microsoft.

## [COM add-ins](#)

COM add-ins are supplemental programs that provide additional functionality in a variety of programming languages, including [Visual Basic](#), Visual C++, and Visual J++.

**Using COM add-ins** The developer of a COM add-in usually provides installation and removal programs for the add-in. Contact the person who provided the add-in to you for instructions on how to install and use it.

**Designing COM add-ins** If you are a developer, you'll find information about designing COM add-ins in [Visual Basic Help](#). While you are developing and testing, you can load or unload a COM add-in in Excel before you have a working installation program for your add-in.

## [Automation add-ins](#)

Automation add-ins allow COM automation functions to be called from a worksheet.

**Using automation add-ins** The developer of an automation add-in usually provides installation and removal programs for the add-in. Contact the person who provided the add-in to you for instructions on how to install and use it. Automation add-ins that have been registered on the system can be accessed through the **Tools** menu.

[Show All](#)

# Add-in programs included with Excel

Some of the content in this topic may not be applicable to some languages.

The [add-in](#) programs listed in the following table are installed by default in one of the following places:

- The Library folder or the Addins folder, or one of their subfolders, in the Microsoft Office\Office folder.
- If the add-in program you want is not in the list under **Add-Ins available** in the **Add-Ins** dialog box, you might be able to install the add-in from the Microsoft Office Web site.

The administrator for your company network can designate other locations for add-in programs. See your administrator for more information.

<b>Add-in</b>	<b>Description</b>
Analysis ToolPak	Adds financial, statistical, and engineering analysis tools and functions.
Analysis ToolPak VBA	Allows developers to publish financial, statistical, and engineering analysis tools and functions using Analysis ToolPak syntax.
Conditional Sum Wizard	Creates a formula that sums data in a range if the data matches criteria you specify.
Euro Currency Tools	Formats values as euros, and provides the EUROCONVERT worksheet function to convert currencies.
Internet Assistant VBA	Allows developers to publish Excel data to the Web by using Internet Assistant syntax.
Lookup Wizard	Creates a formula to look up data in a range by using another known value in the range.
Solver Add-In	Calculates solutions to what-if <a href="#">scenarios</a> based on adjustable cells and constraint cells.

[Show All](#)

# Load or unload add-in programs

Microsoft Excel has three types of add-in programs that provide optional commands and features. Excel [add-ins](#) are available when you install Excel or Microsoft Office and are available from the Microsoft Office Web site. Developers and solution providers usually design custom [Component Object Model \(COM\) add-ins](#) and automation add-ins.

## [Load or unload an Excel add-in program](#)

1. On the **Tools** menu, click **Add-Ins**.

### [Load an add-in](#)

1. If the add-in you want to use is not listed in the **Add-Ins available** box, click **Browse**, and then locate the add-in.
2. In the **Add-Ins available** box, select the check box next to the add-in you want to load, and then click **OK**.
3. If necessary, follow the instructions in setup program.

### [Unload an add-in](#)

1. In the **Add-Ins available** box, clear the check box next to the add-in you want to unload, and then click **OK**.
2. Do one of the following:
  - To remove the add-in from the menu, restart Excel.

**Note** Unloading or removing an add-in doesn't remove the add-in file from your disk.

- To remove the add-in from your disk, uninstall it (**Microsoft Office, Microsoft Excel for Windows, Add-Ins**).

### [How?](#)

If you originally installed your Microsoft Office program from a network file server or from a shared folder, you must install or remove components from that location. If you installed your Office program from a CD-ROM and you've mapped your CD-ROM drive to a new drive letter since installing the Office program, reinstall from the CD-ROM. If you're running any Office program files from the CD-ROM, you must uninstall the Office program and then reinstall it from the CD-ROM.

1. Quit all programs.
2. Double-click the **Add/Remove Programs** icon in the Windows **Control Panel**.
3. Do one of the following:

If you installed your Office program as part of Microsoft Office, click **Microsoft Office** in the **Currently installed programs** box, and then click the **Change** button.

If you installed your Office program individually, click the name of your program in the **Currently installed programs** box, and then click the **Change** button.

4. Follow the instructions on the screen.

 [Load or unload a COM add-in program](#)

**Developers** You can use this procedure to load or unload a COM add-in for testing before you have designed installation and removal programs for your add-in.

**Other users of Microsoft Excel** If you are not a developer, you should not need to use this procedure. Contact the administrator who provided the add-in if you want installation and removal instructions.

- Do one of the following:

 [Load a COM add-in](#)

1. On the **View** menu, point to **Toolbars**, and then click **Customize**.

2. Click the **Commands** tab.
3. Under **Categories**, click **Tools**.
4. Under **Commands**, click **COM Add-Ins** and drag your selection to the toolbar.
5. Click **COM Add-Ins** on the toolbar to see a list of the available add-ins in the **COM Add-Ins** dialog box.

#### [Unload a COM add-in](#)

- Do one of the following:
  - To unload an add-in from memory but keep its name in the list, clear the check box next to its name in the **COM Add-in** dialog box, and then click **OK**.

**Note** Unloading or removing an add-in doesn't remove the add-in file from your computer.

- To remove an add-in from the list and from your disk, click the add-in name, and then click **Remove**.

#### [Load or unload an automation add-in program](#)

**Developers** You can use this procedure to load or unload an automation program before you have designed installation and removal programs for your add-in.

**Other users of Microsoft Excel** If you are not a developer, you should not need to use this procedure. Contact the administrator who provided the add-in if you want installation and removal instructions.

1. On the **Tools** menu, click **Add-Ins**.
2. Do one of the following:

#### [Load an automation add-in](#)

1. Click **Automation** on the **Add-Ins** dialog box.
2. In the **Automation servers available** list, select the add-in you want, and then click **OK**.

**Note** Not all automation servers in the list can be installed as automation add-ins.

3. If the add-in you want isn't in the list, click **Browse**, locate the add-in, and then click **OK**.

[Unload an automation add-in](#)

Automation add-ins must be removed from the registry. See your system administrator for details.

[Show All](#)

# Troubleshoot add-ins

## Microsoft Excel can't find the add-in I want to use.

**Check the add-in file on your computer** The file may have been renamed, moved, or deleted. [Add-ins](#) have an .xla file extension (to see the .xla extension, you may need to turn on the display of extensions in Windows). Add-ins are stored by default in one of the following places:

- The Library folder or one of its subfolders in the Microsoft Office/Office folder.
- The Documents and Settings/<user name>/Application Data/Microsoft/AddIns folder.

The administrator for your company's network can designate other locations for add-in programs. See your administrator for more information.

You can reinstall an Excel add-in by using the program that you used to install Excel. To find and load an add-in that isn't stored in one of the default locations, click **Add-Ins** on the **Tools** menu, and then click **Browse**.

**If the add-in is stored on a network, check the network drive** The network drive may be unavailable. To ensure that you can use the add-in when your network is unavailable or your computer is offline, keep a copy of the add-in on your computer.

**If you are working on a different computer, check your original computer** For the add-in to be available on other computers that you use, you must store it on your original computer in the Documents and Settings/<user name>/Application Data/Microsoft/AddIns folder. Check with the administrator for your company's computer systems for more information about working on other computers.

**Check with your Office or Excel administrator** Your administrator may have decided not to make the add-in available for installation. In this case, you may need to reinstall Office or Excel. Check with your administrator for more

information.

[Show All](#)

# **Upgrading from earlier product versions**

The Microsoft Excel 2003 file format does not differ from the Microsoft Excel 2002, Excel 2000, and Excel 97 file formats, but it does differ from earlier versions.

# Using Excel 2003 files with earlier versions of Excel

## [Opening old workbooks in Excel 2003](#)

**Change the default file format** By default, Excel saves workbooks in the most recent file format, which was introduced with Excel 97. If others you work with use an earlier version of Excel or another spreadsheet program, you can change the default file format that Excel 2003 uses when saving workbooks. For example, if many people in your company use Excel version 5.0, you can save your Excel 2003 workbooks in Microsoft Excel 5.0/95 Workbook format. All workbooks will be saved in this format unless you specify a different file format in the **Save As** dialog box (**File** menu).

**Use the dual file format** If an earlier version of Excel is still widely used in your workplace, and you want to continue to use Excel 2003 format but still share your workbook with others, you can save your Microsoft Excel 2003 workbooks in a special dual file format.

- **What is the dual file format?** The workbook is saved in a single file that includes Excel 97-2000 and Excel 5.0/97 file formats. Users of Excel 2003 can continue to work in a workbook saved in the dual format without losing any features or formatting unique to this version. When users of Excel 95 open the workbook, a message is displayed that recommends they use the file [read-only](#). However, if users ignore the recommendation and save the workbook in a format other than the dual file format, features and formatting that are available only in later versions of Excel are lost.
- **Protect your work** To avoid losing work created in the latest version of Excel, you can protect a workbook from changes by requiring a password to change the workbook or by making the workbook read-only.

You can save specific workbooks in the dual file format by using the **Save As** command on the **File** menu, or you can specify the dual file format as the default file format for saving all of your workbooks. Workbooks saved in the dual file format are larger than those saved in a single format.

## [Opening and using my old macros and custom dialog boxes in Excel 2003](#)

You can open files that were created in earlier versions of Excel directly in Excel 2003. All data, formulas, and formatting that were created in earlier versions are supported by Excel 2003, with the exception of sound notes in cells.

Excel 2003 supports your Excel 2000, Excel 97, and Excel 95 Visual Basic for Applications macros. For information about compatibility issues between Excel 95 and Excel 2003 macros, click **Microsoft Office Online** on the **Help** menu in Excel 2003.

In most cases, you do not need to change your Visual Basic for Applications and XLM macros to run them in Excel 2003. You cannot record new XLM macros in Microsoft Excel 2003. For more information about upgrading macros, see the *Microsoft Office 2003 Resource Kit*.



[How to obtain Microsoft Office 2003 Resource Kit](#)

The *Microsoft Office 2003 Resource Kit* is the definitive guide to installing, configuring, and supporting Microsoft Office in your organization. Designed for system administrators, consultants, and power users, this guide offers complete coverage whether you're running Microsoft Office on Microsoft Windows 98, Windows 2000, or the Macintosh.

You can obtain the Office Resource Kit wherever computer books are sold or order direct from Microsoft Press, or online at the Microsoft Office Resource Kit Web site.

To locate your nearest source for Microsoft Press products worldwide, visit the Microsoft Press Web site or contact your local Microsoft office.

To create new macros in Excel 2003, record them in Visual Basic for Applications, or write them by using the Microsoft [Visual Basic Editor](#).

## **If you used dialog sheets in Excel 95**

In most cases, you do not need to change your dialog sheets to run them in Excel 2003.

To create new custom dialog boxes in Excel 2003, use the **UserForm** command on the **Insert** menu in the Visual Basic Editor. For more information about

creating custom dialog boxes with user forms, see Visual Basic Help.

 [Frequently asked questions about upgrading from Excel 2000](#)

## **What happened to the Map tool?**

The Map tool is no longer available with Excel 2003. You may not be able to open files created with the Map tool unless you have an earlier version of Microsoft Office installed.

## **Has number formatting changed?**

Excel 2003 introduces number formatting for international languages.

## **Where are the old templates?**

Some templates from earlier versions of Excel are available in Template Gallery on the Microsoft Office Web site. Excel 2003 comes with a new set of templates.

## **Why are some of the old add-ins available from the product and others aren't?**

Some add-ins from earlier versions of the product are available for download from the Microsoft Office Web site.

## **Why don't some of my macros run?**

The default security setting for macros has changed to High, which means that unsigned macros will be automatically disabled. You can change your security settings or have the macros signed to run them again.

## **What is the green triangle in the corner of my cell?**

The green triangle is the formula error checker, which appears when you select a cell and a problem is found in a formula. A problem can be resolved using the options that appear, or it can be ignored. If a problem is ignored, it does not appear in further error checks. However, all previously ignored errors can be

reset so that they appear again.

## What is the button that sometimes shows up on my worksheet when I perform certain actions?

At times buttons appear as you work in your document. The **AutoCorrect Options**  button, the **Paste Options**  button, the **Insert Options**  button, and the **Auto Fill Options**  button have options you can choose without clicking a button on a [toolbar](#) or opening a dialog box.

 [Frequently asked questions about upgrading from Excel 97](#)

## What happened to the Office Assistant?

The Office Assistant now floats around your screen outside of a window. The Assistant uses less space on your screen while still providing great help when you need it. If you don't like the Assistant, you can turn it off permanently and use the Help index or table of contents.

## What happened to the menus and toolbars?

Only the items that you use most often are prominently featured on the new personalized menus and toolbars.

You can easily expand menus to reveal all commands. After you click a command, it appears on your personalized menu. If you would like to see all of the commands on menus at first, you can disable the short menus. On the **Tools** menu, click **Customize**. On the **Options** tab, select the **Always show full menus** check box.

Toolbars share space in a single row on the screen, so you have more room for your work. You also have the option of showing the **Formatting** and **Standard** toolbars on two rows. On the **Tools** menu, click **Customize**. On the **Options** tab, select the **Show Standard and Formatting toolbars on two rows** check box. When you click a button on a toolbar, that button is automatically added to the personalized toolbars on your screen. You can easily customize your toolbars by dragging command controls onto the toolbar.

## **Why am I asked whether I want to install some features when I use them?**

To improve performance and save disk space, not all features are installed when you choose the **Install Now** command during setup. As you use Excel 2003, you might see shortcuts, icons, and commands for programs and components that weren't installed. When you need this functionality, you can just click a command, and Excel 2003 installs the program or component for you.

## **What happened to File Open and File Save?**

In the improved **Open** and **Save** dialog boxes, you can see more files at one time. You can use the new **Places Bar** to get to the folders and locations you use the most, click **History** to see the last 20 to 50 documents and folders you have worked with, or click the Back button  on the toolbar to easily return to folders you have recently visited.

## **Why does it take longer to open some files?**

To ensure that your workbooks are properly calculated whenever you work with them, Excel 2003 completely recalculates a workbook each time you open it. This process means that it might take longer to open an earlier version file than you were used to. If you save the workbook as an Excel 2003 workbook, it will open more quickly the next time.

## **Has anything changed in number formatting?**

Additional number formats are available with the euro currency symbol €. Additional date formats include formats that display four-digit years.

## **Why is the selection highlight different?**

When you select cells with colored text, the color remains the same instead of appearing in an inverse color scheme. As you work with the selected range — changing the color of the font or the color of the cell formatting— it's easier for you to view the new color after you've made the change.

## **What happened to the Save as HTML command?**

The **Save as Web Page** command replaces the **Save as HTML** command. When you select the **Save as Web Page** command, you now have the choice of saving the entire workbook as a Web page or saving only a section of the workbook. If you click **Publish**, you are provided with additional options, such as saving the selection as an interactive spreadsheet that can be used on a Web page.

## **What happened to the PivotTable Report Wizard?**

Instead of using a wizard to lay out your PivotTable report, you can now lay out the report directly on your worksheet with the PivotTable and PivotChart Report Wizard by dragging the fields from the toolbar to the drop areas.

## **Why does Excel suddenly enter numbers and formatting for me?**

Excel 2003 automatically extends formatting and formulas in ranges, simplifying this common task.

## **Can I run my Lotus macros in Excel 2003?**

Excel 2003 does not run Lotus 1-2-3 or Quattro Pro macros. You can rewrite any macros that you need in Microsoft Visual Basic for Applications. For information about writing Excel macro code, see Visual Basic Help.



[Frequently asked questions about upgrading from Excel 95](#)

## **How do I insert a chart on its own sheet?**

The **Chart** command on the **Insert** menu now starts the Chart Wizard. In Step 4 of the Chart Wizard, you can specify that the chart be inserted either as an embedded object on a worksheet or on its own chart sheet. You can still create a chart sheet in one step with the default chart type and formatting by pressing the F11 key.

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used to. If you save the workbook as an Excel 2003 workbook, it will open more quickly the next time.

## **Where are the Answer Wizard and TipWizard?**

The Office Assistant replaces the TipWizard from Excel 5.0 and Excel 95 and includes Answer Wizard IntelliSense technology from Excel 95. When you need Help, just click the **Microsoft Excel Help** button  and ask the Assistant a question in your own words. When a yellow light bulb appears with the Assistant, a program tip is available; click the light bulb to see the tip.

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## What happened to cell notes?

Cell notes are now called *comments*. Use the **Comment** command on the **Insert** menu to create a comment. You can view comments the same way you viewed cell notes, by resting the pointer on a cell that has a comment indicator (a red triangle) in the upper-right corner of the cell.

## Where is the Info Window?

The Info Window feature is not available in Microsoft Excel 2003. To locate cells that provide data to formulas, use the **Auditing** toolbar. If you've added a comment to a cell, just rest the pointer on the cell to view the comment.

## The Shared List command is not on the File menu. How do I share a list in Excel 2003?

Excel 95 shared lists provided limited functionality for users who wanted to work simultaneously on workbooks. In Excel 2003, you can use shared workbooks to create and edit formulas, change formatting, create and change charts, and even add sheets. To share a workbook, click **Share Workbook** on the **Tools** menu.

## Has anything changed in number formatting?

Additional number formats are available with the euro currency symbol €. Additional date formats include formats that display four-digit years.

## Why is the selection highlight different?

When you select cells with colored text, the color remains the same instead of

appearing in an inverse color scheme. As you work with the selected range — changing the color of the font or the color of the cell formatting— it's easier to view the new color after you've made the change.

### **Where did my sound notes go?**

Sound notes are not supported in Excel 2003.

### **How do I start the PivotTable Wizard?**

Use the **PivotTable and PivotChart Report** command on the **Data** menu to start the PivotTable and PivotChart Wizard. Instead of using the wizard to lay out your PivotTable report, you can now lay out the report directly on your worksheet by dragging the fields from the toolbar to the drop areas.

### **The View Manager command is not on the View menu. How do I create custom views?**

Use the **Custom Views** command on the **View** menu to save a custom view of a workbook or to switch to a different view. Custom views have been integrated into Excel; this command no longer requires an add-in program.

### **Can I run my Lotus macros in Excel 2003?**

Excel 2003 does not run Lotus 1-2-3 or Quattro Pro macros. You can rewrite any macros that you need in Microsoft Visual Basic for Applications. For information about writing Excel macro code, see Visual Basic Help.

[Show All](#)

# Create a new workbook

Do one of the following:

[Create a new, blank workbook](#)

On the **File** menu, click **New**, and then click **Blank Workbook** on the **New Workbook** [task pane](#).

[Create a new workbook based on the default workbook template](#)

Click **New**  on the **Standard** [toolbar](#).

**Note** The [default workbook template](#) is usually located at C:\Program Files\Microsoft Office\Office11\XLStart.

[Create a workbook based on another template](#)

1. On the **File** menu, click **New**.
2. Click **On my computer** in the **New Workbook** [task pane](#).
3. In the **Templates** dialog box, click the **Spreadsheet Solutions** tab listing your custom templates, and then double-click the template for the type of workbook you want to create.
4. You can also click **Templates on Office Online** to obtain more workbook templates.

**Note** If you don't see the template you want in the **New** dialog box, make sure the template is installed and located in the correct folder.

[Show All](#)

# Troubleshoot opening files

[I can't open a file.](#)

[The file may be damaged](#)

The file you are trying to open may be damaged. Your Microsoft Office program may let you try to recover the text from the damaged file, or if recovery doesn't work, you can delete the damaged file and open a backup copy.

[How?](#)

1. If the Microsoft Office program you are using is not responding, recover the program.

[How?](#)

1. On the Microsoft Windows **Start** menu, point to **Programs**, point to **Microsoft Office Tools**, and then click **Microsoft Office Application Recovery**.
2. In the **Application** list, click the program or document that is not responding.
3. Do one of the following:
  - To attempt to recover the files you were working on, click **Recover Application** or **Restart Application**.
  - If you just want to close the program, and lose recent changes to the files, click **End Application**.
4. The error that caused the problem can be reported to Microsoft for use in improving future versions of the program. Click **Report problem** or **Don't report problem**.

2. Open the Office program.
3. Review the files listed in the **Document Recovery** [task pane](#), and decide which to keep.

[How?](#)

- If a file has [**Recovered**] in the title it is usually a file that contains more recent changes than a file with [**Original**] in the title.
  - If you want to view what repairs were made to a file, point to the file in the **Document Recovery** task pane, click the arrow next to the file's name, and then click **Show Repairs**.
  - If you want to review the versions that were recovered, open all of the versions and save the best one.
4. For each file you want to keep, point to the file in the **Document Recovery** task pane, click the arrow next to the file's name, and then do one of the following:
    - To work with the file, click **Open**.
    - To save the file, click **Save As**, and then enter a name for the file. By default, the file is saved in the same folder as the original file. If you use the same name as the original file, the original is overwritten. When you see a message asking whether you want to replace the existing file (with the changes you made up to the last time you saved the file), click **Yes**.
  5. When you have opened or saved all of the files you want to keep, click **Close** in the **Document Recovery** task pane.

[The file name may be too long](#)

The file name and the path name cannot exceed 223 characters. Do one of the following:

- Shorten the file name.

- Move the file to another folder that will shorten the path name.

Try to open the file again.

[The disk the file is on may be too full](#)

Try moving files to another disk to make more space available.

[The Open dialog box doesn't list the file I'm looking for.](#)

[Check the file type](#)

Make sure you have the correct file type selected in the **Files of type** box. You can also use \*.\* to show all files.

[Conduct a search](#)

In the **Open** dialog box, type the name of the file in the **File name** box, click **Tools**, and then click **Search**. Select criteria and then click **Search**.

[Check the search criteria](#)

- When doing a search, make sure the entries in the **Search** dialog box are appropriate for the files you're searching for. To clear all current search criteria except the file location, and to reset to the default file type, click **Restore**.
- Make sure you're looking on the correct drive and in the correct folder. If you don't know the folder name, you can search all folders and subfolders on the specified drive by selecting the appropriate drive in the **Search in** option.

[Check the network connection](#)

If you're looking for a file on the network and the network drive doesn't appear in the **Open** dialog box under **Look in**, do the following:

1. Click **Tools**, and then click **Map Network Drive**.

2. In the **Drive** box, click the drive letter you want to use to connect to the network.
3. In the **Folder** box, enter the path where the file is located on the network.

[Tip](#)

You can also look for files on a network drive if your network supports the [UNC](#). Just type the UNC path in the **File name** box in the **Open** dialog box — for example, type `\\plans\documents`.

[Look on the network or the Web](#)

If you're looking for files on a [Web server](#), type the folder path in the **File name** box in the **Open** dialog box— for example, type `http://myserver/public`.

[The password I typed to open a file doesn't work.](#)

Make sure you enter the correct username and password and that the CAPS LOCK key is not on. If you still cannot access the network server, consult your network administrator.

[The shortcut to my file doesn't work anymore.](#)

[The file may have been renamed or deleted.](#)

The shortcut will not work if there has been any change to the target file's name or extension. Use the Microsoft Office Search feature to look for files that have similar names or that were created or modified on the same date as the file you are trying to open.

[How?](#)

1. Click **Open** .
2. Click **Tools** in the **Open** dialog box, and then click **Search**.
3. Do one of the following:

## [Search for a file containing specified text](#)

You can find a file containing text in its title, contents, or properties.

1. On the **Basic** tab, in the **Search text** box, type the text to search for in Microsoft Office files, Web pages, and Microsoft Outlook items.

### [Tip](#)

You can use wildcards in the **Search text** box. Type a question mark (?) to match any single character, or type an asterisk (\*) to match any number of characters. For example, s?t finds "sat" and "set"; s\*d finds "sad" and "started."

2. To limit where to search, in the **Search in** box, select one or more drives, folders, Web sites, or Outlook mailboxes. To search everywhere, select **Everywhere**. To specify a single location, type it directly in the **Search in** box.
3. To limit the types of search results, in the **Results should be** box, select the types of items to find. To find all types of files, Web pages, and Outlook items, select **Anything**.
4. Click **Search**.

### [Tip](#)

To view all properties of a found item, click the command button following the item, and then choose **Properties**.

## [Search for a file based on one or more properties](#)

1. On the **Advanced** tab, enter one or more search criteria.

### [How?](#)

1. In the **Property** box, choose a property from the list or type in a property name. The **Property** box displays the properties available in the currently open document.



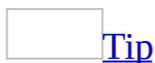
### Tip

You can use wildcards in the **Property** box. Type a question mark (?) to match any single character, or type an asterisk (\*) to match any number of characters. For example, s?t finds "sat" and "set"; s\*d finds "sad" and "started."

2. In the **Condition** box, choose a condition from the list, or type in a condition.
3. In the **Value** box, enter the value to associate with the condition.
4. If previous search criteria exist, click **And** to add a criterion that must be true in addition to previous criteria. Click **Or** to add a criterion that is sufficient regardless of previous criteria.
5. Click **Add** to add the search criterion.

**Note** If the value is invalid for the condition or property, the **Add** button is unavailable.

2. To limit where to search, in the **Search in** box, select one or more drives, folders, Web sites, or Outlook mailboxes. To search everywhere, select **Everywhere**. To specify a single drive, folder, or Web site, type it directly in the **Search in** box.
3. To limit the types of search results, in the **Results should be** box, select the types of files, Web pages, and Outlook items to find. To find all types of files and items, select **Anything**.
4. Click **Search**.



### Tip

To view all properties of a found item, click the command button following the item, and then choose **Properties**.

 [The file may be temporarily unavailable.](#)

- If the file is located on a network server, consult your network administrator to find out if the server drive is unavailable.
- If the file is located on removable media such as a floppy disk, make sure the media with the target file is properly inserted in the drive or device.

[When I open a Web page in Excel, nothing appears.](#)

If you use Microsoft Excel to open a Web page that was not created in Excel, but nothing appears, the Web page might contain a frames page. A single Web page can be divided into sections that each display separate Web pages; each of these sections is called a frame. The container that hosts the group of frames is called a frames page. Excel cannot open a Web page that contains a frames page.

If you know how to work with HTML source code, you can use an HTML editor to copy the information you want, without the frames page code, to a new file, and then open the new file in Excel.

[My workbook opens with a read-only restriction.](#)

One or both of the following may be true.

- The creator of the workbook may have set a restriction so that the workbook can be opened only as read-only. Contact the creator of the workbook for more information.
- If you try to use a version earlier than Microsoft Excel 97 to open a workbook from Excel 2000 or a later version of Excel, the workbook appears to be password-protected so that you can only open it as [read-only](#). To open and save the workbook, use Excel 97 or later.

[When I start Excel by using a shortcut or icon, the default working folder is not correct.](#)

If you start Microsoft Excel by using a [shortcut](#), the working folder you specified for the shortcut might not be used. (This is the location you specified by right-clicking the shortcut icon, clicking **Properties** on the [shortcut menu](#), and filling in the location in the **Start in** box on the **Shortcut** tab.) If a folder is set in the **Default file location** box on the **General** tab in the **Options** dialog box (**Tools** menu), Excel uses this location as the working folder.

# Change the default working folder

This procedure sets the default folder for opening and saving Microsoft Excel files.

1. On the **Tools** menu, click **Options**, and then click the **General** tab.
2. In the **Default file location** box, type the path for the folder you want to display as the default working folder.

For example, type **c:\work**.

# Show, hide, or change the list of recently used workbooks on the File menu

1. On the **Tools** menu, click **Options**, and then click the **General** tab.
2. Select or clear the **Recently used file list** check box.
3. If you want to change the number of files listed on the menu, select the number of entries.

**Note** Only files you open and save after you select the check box are listed on the **File** menu.

[Show All](#)

# Set or clear read-only status for a workbook file

## [Recommend that a file be opened read-only](#)

When you set this option, users get a [read-only](#) recommendation when they open the file. This does not prevent users from opening the file as read-write so that they can edit and save changes.

1. On the **File** menu, click **Save As**.
2. On the **Tools** menu in the **Save As** dialog box, click **General Options**.
3. Select the **Read-only recommended** check box, and then click **OK**.
4. Click **Save**.
5. If prompted, click **Yes** to replace the existing workbook.

## [Make a workbook file read-only](#)

1. On the Windows **Start** menu, point to **Programs**, point to **Accessories**, and then click **Windows Explorer**.
2. In the **Exploring** window, open the drive or folder that contains the file.
3. Click the file name.
4. On the **File** menu, click **Properties**.
5. Click the **General** tab.
6. Select the **Read-only** check box.

## [Make a workbook file read-write](#)

1. On the Windows **Start** menu, point to **Programs**, point to **Accessories**, and then click **Windows Explorer**.
2. In the **Exploring** window, open the drive or folder that contains the file.
3. Click the file name.
4. On the **File** menu, click **Properties**.
5. Click the **General** tab.
6. Clear the **Read-only** check box.

[Show All](#)

# Create custom file properties

## [Create custom file properties for the active workbook](#)

1. On the **File** menu, click **Properties**.
2. Click the **Custom** tab.
3. In the **Name** box, type a name for the custom property, or select a name from the list.
4. In the **Type** box, click the data type for the property you want to add.
5. In the **Value** box, type a value for the property. The value you enter must match the selection in the **Type** box. For example, if you click **Number** in the **Type** box, you must type a number in the **Value** box. Values that don't match the property type are stored as text.
6. Click **Add**.

## [Create custom file properties linked to content in the active workbook](#)

1. You must name the cell or range that you want to link the property to. Otherwise, the **Link to content** check box is unavailable.

## [How?](#)

1. Select the cell, range of cells, or [nonadjacent selections](#) that you want to name.
2. Click the **Name** box at the left end of the [formula bar](#)



1 Name box

3. Type the name for the cells.
4. Press ENTER.

**Note** You cannot name a cell while you are changing the contents of the cell.

2. On the **File** menu, click **Properties**.

3. Click the **Custom** tab.
4. In the **Name** box, type a name for the custom property.
5. Select the **Link to content** check box.
6. In the **Source** box, click the defined content you want to link to, and then click **Add**.

**Note** When a link is broken - for example, when a cell or range name is removed from your workbook - the file property stores the data last saved in the cell or range.

# Change the default file format for saving workbooks

By default, workbooks are saved in the current Microsoft Excel format. If you work with others who use earlier versions of Microsoft Excel or other spreadsheet programs, you can use another format as the default for saving workbooks.

1. On the **Tools** menu, click **Options**, and then click the **Transition** tab.
2. In the **Save Excel files as** box, click the file format you want.

## Notes

- After you set the default file format, all new workbooks are saved in the selected file format unless you specify a different format in the **Save As** dialog box when you save a workbook.
- Some features and formatting might not be available if you save the workbook in the file format of a previous version of Microsoft Excel or another spreadsheet program.

# Display the Properties dialog box when saving workbooks

1. On the **Tools** menu, click **Options**, and then click the **General** tab.
2. Select the **Prompt for workbook properties** check box.

# Save a workbook in another file format

**Important** If you save a Microsoft Excel workbook in a different file format, formats and features unique to Excel will not be retained.

1. Open the workbook you want to save for use in another program.
2. On the **File** menu, click **Save As**.
3. In the **File name** box, type a new name for the workbook.
4. In the **Save as type** list, click a file format that you know you can open in the other program.
5. Click **Save**.

[Show All](#)

# Save workbooks in an arranged workspace

When you open a [workspace file](#), Microsoft Excel opens each workbook saved in the workspace.

1. Open the workbooks you want to save in a workspace.
2. Size and arrange the workbook windows as you want them to appear when you open the workspace.
3. On the **File** menu, click **Save Workspace**.
4. In the **File name** box, type a name for the workspace file.



Tip

To open the workbooks each time you start Excel, save the workspace file in an [alternate startup folder](#). Save only the workspace file, not the workbook files, in the alternate startup folder.

[Show All](#)

# Troubleshoot saving and closing files

[When I save a file, it is saved with an additional file name extension, .xls.](#)

When you save a file with an extension other than the default for that file type, your Microsoft Office program adds the default extension to the file name. For example, a file name for a Microsoft PowerPoint presentation might appear as Budget.abc.ppt. To save a file with an extension other than the default, enclose the entire file name in quotation marks— for example, "Budget.abc".

[The file I saved contains two periods in the file name.](#)

In Microsoft Windows, file names can contain some punctuation characters, such as commas or periods. When you save a file with a name that ends with a period — for example, Sales.— Microsoft Office programs add another period and the default extension to the file name. For example, a Microsoft Word document saved as Sales. will appear as Sales..doc. When you save a file with its default extension, it isn't necessary to type a period following the file name. Office programs automatically add the period when they add the extension.

[The file format I want isn't listed in the \*\*Save As\*\* dialog box.](#)

Make sure that the file format you want is included with Microsoft Excel and is installed on your computer.

[When I try to save changes, I get a message saying the workbook is read-only.](#)

You can't make changes to a read-only file. To save changes, save the file with a new name by using the **Save As** command on the **File** menu. You can use the same name if you save the file in a new or different folder.

[I entered my user name and password but I still can't access a network drive.](#)

Make sure you enter the correct user name and password and that the CAPS

LOCK key is not on. If you still cannot access the network server, consult your network administrator.

[When I save in dBASE format, some of my data is missing.](#)

**Note** When you save a Microsoft Excel worksheet in dBASE (DB2, DB3, or DB4) format and the worksheet contains a range named "Database," only data in the named range is saved in the dBASE file. If you add new records after naming the range, you must redefine the database range to include the new records before you save the sheet in dBASE format.

If there is no range named "Database" on the sheet, only data in the [current region](#) is converted. If the first row of data contains text, Excel uses it as the header row to define field names. If the first row contains all numbers, Excel creates field names such as N1, N2, and so on.

**Make sure character strings are shorter than column width** When saving data in dBASE format, Excel assigns a data type to each field (column of data) that is based on the field data in the first record of the database range or current region.

If a field in the first record contains text, that field is assigned the character data type, and any numbers contained in the field in other rows become character strings. The column width of the field determines the string length; character strings longer than the column width are truncated in dBASE. To prevent losing data, select the range you want to convert in Excel, and apply a monospaced font such as Courier. To size the columns to show all the data, point to **Columns** on the **Format** menu, and then click **AutoFit Selection**. Numeric data fields cannot contain text; any text in a numeric data field becomes null.

**Use a number format other than General** If decimal numbers have the General number format, the decimal places are truncated in dBASE. Before you save the data in dBASE format, apply a different number format to all data in that field. On the **Format** menu, click **Cells**, and then click the **Number** tab. In the **Category** box, click **Number** or **Scientific**, and then specify the number of decimal places you want.

**Change time data to text data** Fields that contain time data cannot be converted. Before you save data in dBASE format, you can change time data to

text data by using the TEXT worksheet function. For example, to change the time 12:34 PM to text data, use the function =TEXT("12:34", "hh:mm AM/PM").



[When I try to save my workbook, I get errors, warnings, and messages about AutoRepublish.](#)

The workbook you are saving is set to automatically republish items to a Web page. A message is displayed to let you know you are republishing to a Web page, and gives you the opportunity to continue or disable AutoRepublish. For more information, click **Help** in the message.

You may also see a message alerting you to warnings and errors associated with the data you are republishing; for example, if you attempt to republish a range that includes external references, you are warned that the values (and not the references) will be republished. For more information on specific errors and warnings, click **Help** in the message.

[Show All](#)

# About enabling and disabling the AutoRepublish feature

Each time you save your workbook, you can automatically republish it to the Web. Check the **AutoRepublish every time this workbook is saved** box in the **Publish as Web Page** dialog box.

There may be times when you don't want to automatically republish items in your workbook. Examples follow:

- When you have entered confidential or sensitive information that should not be published to a public location
- When you're temporarily disconnected from a network or [Web server](#) location
- When you're saving a workbook that was created by someone who is not a trusted source (the workbook could contain macros that collect information from a network location using your credentials, and then publish that information to a public location)

You can disable **AutoRepublish** temporarily (for the current open and close session) or permanently (every time you open, save and close). Or you can continue to **AutoRepublish**.

[Disable AutoRepublish temporarily](#)

1. When you save a workbook and have **AutoRepublish** enabled, a message will appear. Make sure to select the **Disable the AutoRepublish feature while this workbook is open** option.
2. Click **OK**.

**AutoRepublish** is disabled for the current session of the workbook only, or until you close the workbook. The next time you open the workbook, **AutoRepublish** will be enabled.

[Disable AutoRepublish permanently](#)

1. Open the workbook that is set to automatically republish.
2. On the **File** menu, click **Save as Web Page**.
3. Click **Publish**.
4. In the **Choose** list, click **Previously published items**.
5. Select the item that you want to discontinue republishing automatically, and click **Remove**. Repeat for each item you don't want to automatically republish.
6. Click **Close**.
7. Click **Save** on the **File** menu to save the change to your workbook.

[Continue with AutoRepublish](#)

- Click **Enable the AutoRepublish feature** in the message that is displayed each time you save the workbook.

#### **Note**

- You can tell that a workbook is set to **AutoRepublish** when you see *Publishing to Page: filename* in the [status bar](#) during a save.

[Show All](#)

# About Excel templates and forms

**Fill out a form** You can use [templates](#) to automate common tasks like filling in invoices, expense statements, and purchase orders.

**Access the templates** You can access templates on your computer, **My Network Places**, or the Microsoft Office Web site when you create a new workbook.

[Show All](#)

# About templates

To create new workbooks that already have your preferred formatting, you can base the new workbooks on a [template](#). A template can include formatting, [styles](#), standardized text such as page headers and row and column labels, formulas, Visual Basic for Applications [macros](#), and custom toolbars.

 [Workbook and worksheet templates](#)

## Default workbook template

You can create a [default workbook template](#). This template defines the formatting or content of the new workbooks that open when you start Microsoft Excel. Workbooks you create by clicking **New**  are based on the default workbook template. The default template for workbooks is called Book.xlt.

You can create additional custom workbook templates designed for specific tasks and projects.

## Default worksheet template

You can create a [default sheet template](#).

This template defines the formatting and content of the default worksheets you insert with the **Worksheet** command (**Insert** menu). The default template for worksheets is called Sheet.xlt.

If you use a variety of worksheets in your workbooks, you can create additional custom sheet templates.

 [Storing templates](#)

## Storing default workbook and worksheet templates

If you've created a template named Book.xlt or Sheet.xlt and saved it in the XLStart folder, Microsoft Excel uses the template to create new [default](#)

[workbooks](#) or to insert new worksheets. The XLStart folder is usually located at:

C:\Program Files\Microsoft Office\Office11\XLStart

To use template (.xlt) files stored on a network file location, you can specify that location as the [alternate startup folder](#).



### [Sharing templates](#)

You can make a custom template available to others by storing the template on a network location. For example, you might want all users in your workgroup to use a custom template for a special project. Place the template in a folder in a network location that is accessible to all users in your group.



### [Settings saved in a template](#)

# Formatting

Cell and sheet formats. Set by using the commands on the **Format** menu.

Page formats and [print area](#) settings for each sheet.

Cell [styles](#).

The number and type of sheets in a workbook.

Protected and hidden areas of the workbook. You can hide sheets, rows, and columns and prevent changes to worksheet cells.

## **Text, data, graphics, and formulas**

Text you want to repeat, such as page headers and row and column labels.

Data, graphics, formulas, charts, and other information.

Data validation settings.

## Toolbars, automation, and Option settings

Custom toolbars, [macros](#), [hyperlinks](#), and [ActiveX controls](#) on forms. To make a custom toolbar available, attach the toolbar to the template.

Workbook calculation options and window view options. Set with the **Options** command (**Tools** menu).

[Show All](#)

# Create a template

1. Decide which type of template you want:

## Workbook template

Create a workbook that contains the sheets, default text (such as page headers and column and row labels), formulas, [macros](#), [styles](#), and other formatting you want in new workbooks based on the template.

## Worksheet template

Create a workbook that contains one worksheet. On the worksheet, include the formatting, [styles](#), text, and other information you want to appear on all new sheets of the same type.

2. To display a picture of the first page of a template in the **Preview** box of the **Templates** dialog box (**General Templates...**, **New Workbook** task pane), click **Properties** on the **File** menu, click the **Summary** tab, and then select the **Save preview picture** check box.
3. On the **File** menu, click **Save As**.
4. In the **Save as type** box, click **Template**.
5. In the **Save in** box, select the folder where you want to store the template.

- To create the [default workbook template](#) or [default worksheet template](#), select either the XLStart folder or the [alternate startup folder](#). The XLStart folder is usually

C:\Program Files\Microsoft Office\Office11\XLStart

- To create a custom workbook or worksheet template, select the Templates folder, which is usually

C:\Documents and Settings\user\_name\Application Data\Microsoft\Templates

6. Enter the name of the template in the **File name** box. Do one of the following:

### **Workbook template**

- Type **book** to create the default workbook template.

To create a custom workbook template, type any valid file name.

### **Worksheet template**

- Type **sheet** to create a template for default worksheets.

To create a custom sheet template, type any valid file name.

7. Click **Save**, and then click **Close** on the **File** menu.

[Show All](#)

# Settings you can save in a template

## Formatting

- Cell and sheet formats. Set by using the commands on the **Format** menu.
- Page formats and [print area](#) settings for each sheet.
- Cell [styles](#).
- The number and type of sheets in a workbook.
- Protected and hidden areas of the workbook. You can hide sheets, rows, and columns and prevent changes to worksheet cells.

## **Text, data, graphics, and formulas**

- Text you want to repeat, such as page headers and row and column labels.
- Data, graphics, formulas, charts, and other information.
- Data validation settings.

## Toolbars, automation, and Option settings

- Custom toolbars, [macros](#), [hyperlinks](#), and [ActiveX controls](#) on forms. To make a custom toolbar available, attach the toolbar to the template.
- Workbook calculation options and window view options. Set with the **Options** command (**Tools** menu).

[Show All](#)

# Troubleshoot templates

[My template is not listed in the \*\*Templates\*\* dialog box.](#)

Microsoft Excel lists a template in the **Templates** dialog box only if you save the template file in one of the following locations:

- The Templates folder or a subfolder in the Templates folder, which is usually

C:\Documents and Settings\*<user\_name>*\Application Data\Microsoft\Templates

- The XLStart folder, which is usually

C:\Program Files\Microsoft Office\Office11\XLStart

- The location you specified in the **At startup, open all files in** box on the **General** tab in the **Options** dialog box (**Tools** menu)

[How do I restore the original settings for workbooks and new sheets?](#)

1. If you want to keep your Book.xlt or Sheet.xlt files, rename them and save them in the Templates folder, usually located at:

C:\Documents and Settings\*<user\_name>*\Application Data\Microsoft\Templates

2. Do one or more of the following:

- In Microsoft Windows Explorer, remove any template files from the XLStart folder. The XLStart folder is usually located at:

C:\Program Files\Microsoft Office\Office11\XLStart

- If the files aren't in the XLStart folder, look in the folder specified in the **At startup, open all files in** box on the **General** tab in the **Options** dialog box (**Tools** menu).

- To restore original settings for workbooks, remove Book.xlt. To restore original settings for worksheets, remove Sheet.xlt

[A built-in template is missing in my version of Microsoft Excel.](#)

The built-in template may have been deleted. You can re-install it.

[How?](#)

If you originally installed your Microsoft Office program from a network file server or from a shared folder, you must install or remove components from that location. If you installed your Office program from a CD-ROM and you've mapped your CD-ROM drive to a new drive letter since installing the Office program, reinstall from the CD-ROM. If you're running any Office program files from the CD-ROM, you must uninstall the Office program and then reinstall it from the CD-ROM.

1. Quit all programs.
2. On the **Start** menu, click **Control Panel**.
3. Double-click the **Add/Remove Programs** icon.
4. Do one of the following:

If you installed your Office program as part of Microsoft Office, click **Microsoft Office** in the **Currently installed programs** box, and click the **Change** button.

If you installed your Office program individually, click the name of your program in the **Currently installed programs** box, and click the **Change** button.

5. If you are using Microsoft Windows Server 2003, select **Add or Remove Features**.
6. In the Microsoft Office 2003 Setup Wizard, select **Microsoft Office Excel** if you are using Windows Server 2003; otherwise, select **Microsoft Excel**. Select **Choose advanced customization of applications**. Click **Next**.
7. Double-click **Microsoft Excel for Windows**.
8. Select **Spreadsheet Templates**. Click **Update**.

[I saved a file with the .xlt extension, but I can't use it as a template.](#)

Excel does not save a file in template format if you type the .xlt file extension in a file name. To save a file as a template, click **Save As** on the **File** menu. In the **Save as type** box, click **Template**. In the **Save in** list, locate and click the location where you want to save the template. In the **File name** box, enter a file name, and then click **Save**.

Save custom templates in the Templates folder. If you save the file to a different location, you can only open the file, not use it as a template. Save the [default workbook template](#) (Book.xlt) and the [default sheet template](#) (Sheet.xlt) in the XLStart folder or the [alternate startup folder](#). The Templates folder is usually

C:\Documents and Settings\*<user\_name>*\Application Data\Microsoft\Templates  
and the XLStart folder is usually

C:\Program Files\Microsoft Office\Office11\XLStart

[A workbook doesn't use the calculation mode saved in the template it was based on.](#)

Excel uses the same calculation mode for all open workbooks. If you change the calculation mode in one open workbook, the mode is changed for all open workbooks.

[Show All](#)

# About using ink in Excel

If you are using a [Tablet PC](#) and Microsoft Office Excel 2003, you can use the [tablet pen](#) to add ink annotations or drawings to worksheets. You can use [ink](#) to emphasize data in a worksheet or to add handwritten notes to the worksheet.

You can add ink anywhere in your worksheet by using ink annotations to make comments or recommendations. Ink annotations can be shown or hidden. In addition, you can use ink drawing and writing to add a permanent hand-drawn or handwritten piece of ink to a worksheet.

[Show All](#)

# Insert ink in a worksheet

You must be running Microsoft Office Excel 2003 on a [Tablet PC](#) to use this feature.



## [Insert ink annotations you can show and hide](#)

1. If the **Ink Annotations** toolbar isn't visible, tap **Ink Annotations** on the **Insert** menu.
2. On the **Ink Annotations** toolbar, tap the arrow next to *pen name* , where *pen name* describes the color and type of pen, such as **Felt Tip (Blue)**.
3. Select a pen.
4. Write or draw anywhere on the worksheet.

**Note** You can show and hide ink annotations by tapping **Ink Annotations**



on the **Ink Annotations** toolbar.



## [Insert ink drawing or writing](#)

1. If the **Ink Drawing and Writing** toolbar isn't visible, tap **Toolbars** on the **View** menu, and then tap **Ink Drawing and Writing**.
2. On the **Ink Drawing and Writing** toolbar, tap the arrow next to *pen name* , where *pen name* describes the color and type of pen, such as **Felt Tip (Blue)**.
3. Select a pen.
4. Write or draw anywhere on the worksheet.

**Note** You can resize or move the ink on your worksheet. You may want to move or resize the [ink](#) to view data covered by the ink.

[Show All](#)

# Troubleshoot ink in Excel

[I don't see any commands for inserting ink.](#)

You must have a [Tablet PC](#) to use the [ink](#) features in Microsoft Office Excel 2003.

Do one of the following:

- On the **Insert** menu, tap **Ink Annotations**.
- On the **View** menu, tap **Toolbars**, and then tap **Ink Annotations** or **Ink Drawing and Writing**.
- Tap the ink on the worksheet, and the corresponding ink toolbar will appear.

[My data is not visible because it is covered by ink.](#)

You may have to move or resize the ink to view your data.

Do one of the following:

[Move ink](#)

1. If the ink toolbar isn't showing, tap the ink.
2. On the ink toolbar, tap **Select Objects**, and then select the ink.
3. Drag the ink to the new location.

[Resize ink](#)

1. To select [ink](#), do one of the following:

[Select ink on a desktop or laptop computer](#)

- Click the ink.

[Select ink on a Tablet PC](#)

1. On the **Ink Drawing and Writing** or **Ink Annotations** [toolbar](#), tap **Select Objects**.
2. Tap the ink you want to format.

Sizing handles and an outline of the ink shapes indicate that the ink is selected.

2. Rest the pointer on one of the sizing handles until the pointer becomes a double-headed arrow.
3. Drag one of the top or side handles to stretch or shrink the ink vertically or horizontally. Drag a corner handle to make the ink stretch or shrink proportionally.



[I closed an ink toolbar, and now I can't get it back.](#)

Do one of the following:

- Tap ink on the worksheet and the corresponding ink toolbar will appear.
- On the **View** menu, tap **Toolbars**, and then tap **Ink Annotations** or **Ink Drawing and Writing**.

# Delete all ink annotations

1. On the **View** menu, point to **Toolbars**, and click **Reviewing**.
2. On the **Reviewing** toolbar, click **Delete All Ink Annotations** .

[Show All](#)

# About speech playback

Microsoft Excel makes it possible for the computer to audibly read back data entered on a worksheet. You can use the **Text To Speech** [toolbar](#) to read back data you select for verification. Each cell is highlighted as the value is spoken, and when you hear an error, you can stop the sound read back to correct the error in the cell. If you prefer, you can choose to hear the value of the cell spoken immediately after you enter data in each cell by clicking **Speak On Enter** .

**Text to speech** The computer reads what is currently visible on the worksheet. For example, if the worksheet is in formula view, the computer reads formulas. If the data in the spreadsheet is hidden, the computer doesn't read the data.

**Reading order** You can choose whether the computer will read by rows or by columns. By default, the computer reads across a row and then moves down to the next row. If you choose the option of reading by columns, the computer reads a column from top to bottom and then moves to the next column.

Speech, a **Control Panel** application, allows you to choose between different computer-generated voices, and a voice speed setting you can customize.

# Format text by using speech recognition

This feature is available in the Simplified Chinese, English (US), and Japanese language versions of Microsoft Office.

1. On the **Language** bar, click **Microphone**  if the microphone is not already turned on.
2. On the **Language** bar, click **Voice Command** .
3. Select the text you want to format.
4. Say the command you want.
5. For example, say "Bold," or "Underline."

[Show All](#)

# Play back worksheet data

You must have speakers installed to perform this procedure.

## [Play back a group of cells](#)

1. On the **Tools** menu, point to **Speech**, and then click **Show Text To Speech Toolbar**.
2. Select a group of cells to read back.
3. Choose how the computer will read back your data by clicking **By Rows**  or **By Columns**  on the **Text To Speech toolbar**.
4. Click **Speak Cells**  if you want the computer to read back each cell in your selection.
5. To correct an error, click **Stop Speaking** , and use your mouse and keyboard to make the necessary changes.
6. Click **Speak Cells**  to continue having the computer read back your selection.

## [Tip](#)

You can select a specific range of cells for the computer to read back to you, or you can click **Speak Cells**  without selecting any cells and Microsoft Excel will automatically expand the selection to include neighboring cells if there are no empty cells in the range.

## [Play back after every cell entry](#)

1. On the **Tools** menu, point to **Speech**, and then click **Show Text To Speech Toolbar**.
2. On the **Text to Speech toolbar**, click **Speak On Enter** .
3. Enter data in a cell. After you press **Enter**, the computer will read back the data in the cell.

**Note** If you hide the **Text To Speech** toolbar and you have not turned off **Speak On Enter** , the computer continues to read back each cell entry you make. Be

sure to click **Speak On Enter**  to turn it off.

[Show All](#)

# Turn off speech playback

- Do one of the following:
  - To turn off all speech playback, click **Stop Speaking**  on the **Text To Speech** [toolbar](#).
  - To turn on or off the option for the computer voice to read back your data after every entry, click **Speak On Enter** .

**Note** If you do not click **Speak On Enter**  to turn off the feature, the computer voice will continue to read your cell entries even if the toolbar is not visible.

# Change speech playback settings

1. On the Microsoft Windows **Start** menu, point to **Settings**, and click **Control Panel**.
2. Click **Speech**, and click the **Text To Speech** tab.
3. Do one or more of the following:
  - Select a voice from the **Voice selection** box. You can click **Preview Voice** to hear the voice speak.
  - To change the rate at which the speech playback voice speaks, use the slider under **Voice speed**. You can click **Audio Output** to listen to the speed you've chosen.

**Note** You must close and reopen Microsoft Excel for the voice speed option to take effect.

**Note** The available voices depend on your default language installation and any language packs you may have installed.

[Show All](#)

# About printing

## [Viewing your worksheet for printing](#)

Microsoft Excel provides the following ways to view your [worksheet](#) and adjust how it will look printed.

- **Normal view** The default view is best for on-screen viewing and working.
- **Print preview** Shows you the printed page so you can adjust columns and margins. The way pages appear in the preview window depends on the available fonts, the resolution of the printer, and the available colors.
- **Page break preview** Shows you what data will go on each page so you can adjust the [print area](#) and [page breaks](#).

As you make settings that affect how your worksheet will print, you can switch between the different views to see the effects before you send the data to the printer.

## [Preparing to print](#)

Excel provides many optional settings so you can adjust the appearance of the printed page. To make sure you've checked everything likely to affect your printout, do the following:

## [Change the format and layout of the worksheet on-screen](#)

You can set the orientation of the printed worksheet to portrait or landscape.



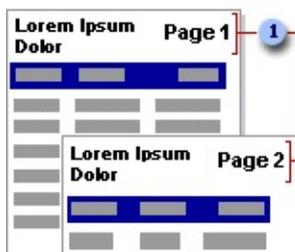
**When to use landscape** Switch to landscape when you need to print many more columns of data than will fit on a portrait page. If you don't want to use landscape, you can change the layout of the printed worksheet to fit the data to the available space, or adjust the margins.

**Making the data fit the page** You can make the printed image fit the page or paper size by shrinking or expanding the image. Other changes you can make to the layout of the printed worksheet include setting the paper size, centering the data on the printed page, and controlling how the pages are numbered. These changes affect only the worksheet's printed appearance, not how it looks on the screen.

**Print partial data** To print only selected parts of the data on a worksheet, you can specify which areas to print.

[Add headers and footers](#)

To put page numbers or other text above or below the worksheet data on each page, you can add [headers or footers](#) to your printed worksheet. Headers print at the top of every page; footers print at the bottom of every page. You can use built-in headers or footers or create your own.



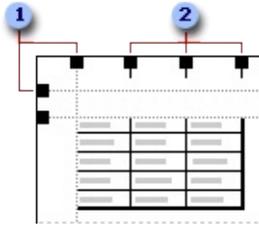
#### 1 Headers

Headers and footers are separate from the data on your worksheet and appear only when you preview and print. In addition to headers and footers, you can repeat worksheet data as [print titles](#) on every page.

[Preview and adjust margins](#)

To see each page exactly as it will print, click **Print Preview** . In print preview, you can see headers, footers, and [print titles](#).

**When to adjust margins** Adjust the margins or columns when your data is too wide to fit across the page and you don't want to shrink it to fit. In print preview, you can change the width of the margins and columns on the worksheet by dragging the sizing handles. Click the **Margins** button to display the handles.



- 1 Margin sizing handles
- 2 Column sizing handles

**Change the size of individual columns and rows** Move the gridlines in the row numbers and column letters areas.

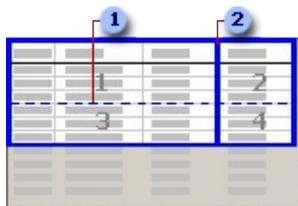
	A	B	C
1	Lorem	Ipsum	Dolor
2	LOREM	Lorem	39.00
3	DOLOR	Ipsum	10.00
4	DOLOR	Dolor	18.40
5	LOREM	Sit Amet	34.00
6	IPSUM	Sed Diam	62.50
7	DOLOR	Duis	18.00

- 1 Column sizing
- 2 Row sizing

**Gridlines, page order, and other settings** In print preview, you can change the way your worksheet prints. With the **Setup** button, you can turn gridlines on or off, print a draft copy of your worksheet, and change the order in which pages are printed.

[Check page breaks](#)

Page break preview shows where [page breaks](#) occur on the worksheet and which area of the worksheet will be printed. Page breaks you set are solid blue lines, and automatic page breaks set by Excel are dashed blue lines.



1 Automatic page breaks

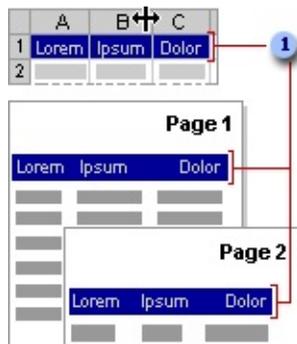
2 Manual page breaks

**When to move page breaks** To fit more rows or columns on the current page, move a horizontal or vertical page break. In **Page break preview**, this automatically shrinks the data to fit on the page. You may want to preview the page again to make sure the font size isn't too small.

**Forcing page breaks** To end a page at a particular point and start a new page, you can set a new page break.

[Repeat titles on every page](#)

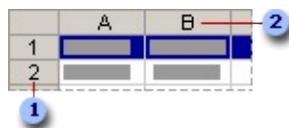
**Repeat row and column labels** If the data on your worksheet has column or row labels (also called print titles), you can have Excel repeat these labels on every page of the printed worksheet.



1 Column labels

The labels don't have to be in the first rows or columns of the worksheet, but they don't begin repeating until after the row or column they originally appeared in has been printed.

**Repeat row and column headings** You can also print the row numbers or column letters for a worksheet (don't confuse these headings with the labels in your data).



1 Row numbers

2 Column letters

You can use any combination of headers and footers, repeating labels, and row and column headings.

 [Previewing specific sheets or pages](#)

**Range of pages** You can preview a specific range of pages.

**Embedded chart** If a worksheet contains an embedded chart, print preview displays both the worksheet and the chart. You can move or resize the chart in normal view or page break preview. If you select an embedded chart before you click **Print Preview** , Excel displays only the embedded chart.

**Page number and total pages** The status bar at the bottom of the screen shows the current page number and the total number of pages to be printed.

 [Speeding up a printing job](#)

**Printing a draft** You can speed up the time it takes to print a worksheet by temporarily changing the print quality. If you know the printer resolution you want to use, you can change the print quality for the printer. If you are unsure of the resolution (or quality), you can print the document in draft quality, which increases printing speed by ignoring formatting and most graphics.

**Printing in black and white** On black-and-white printers, Excel prints colors as gray shades. You can reduce the amount of time it takes Excel to print a worksheet that contains colors by printing colors in black and white. When you print a worksheet by using only black and white, Excel prints fonts and borders formatted in color as black, not as gray shades. Excel also prints cell and AutoShape backgrounds as white and prints other graphics and charts in shades of gray.

**Printing without gridlines** Large worksheets print faster if gridlines are not printed.

 [Using the Report Manager Add-in](#)

You can combine worksheets, [views](#), and [scenarios](#) into reports that can be printed by using the Report Manager [add-in](#). When you add a report, it is saved with the workbook so that you can print the report later.

For example, if you have a Best Case scenario, a Worst Case scenario, and two different custom views— Summary and Details— you can create a report that prints the Best Case scenario with the Details view and another report that prints the Best Case Scenario with the Summary view.

 [Printing to fit a paper width or a certain number of pages](#)

If your work doesn't fit exactly on the number of printed pages you want, you can adjust, or scale, your printed work to fit on more or fewer pages than it would at normal size. You can also specify that you want to print your work on a certain number of pages.

[Show All](#)

# Print

 [Print the selection, the active worksheet\(s\), or a workbook](#)

If the worksheet has a defined print area, Microsoft Excel will print only the print area unless a specific selection is made. For example, if you select a range of cells to print and then click **Selection**, Excel prints the selection and ignores any print area defined for the worksheet.

1. On the **File** menu, click **Print**.
2. Under **Print what**, select an option to print the selection, the active sheet(s), or the entire workbook.

 [Print several worksheets at once](#)

1. Select the worksheets you want to print.

 [How?](#)

When you enter or change data, the changes affect all selected sheets. These changes may replace data on the active sheet and other selected sheets.

## To select

## Do this

Click the sheet tab.



A single sheet

If you don't see the tab you want, click the tab scrolling buttons to display the tab, and then click the tab.



Two or more adjacent sheets

Click the tab for the first sheet, and then hold down SHIFT and click the tab for the last sheet.

Two or more nonadjacent sheets      Click the tab for the first sheet, and then hold down CTRL and click the tabs for the other sheets.

All sheets in a workbook      Right-click a sheet tab, and then click **Select All Sheets** on the [shortcut menu](#).

**Note** If sheet tabs have been color-coded, the sheet tab name will be underlined in a user-specified color when selected. If the sheet tab is displayed with a background color, the sheet has not been selected.

[Cancel a selection of multiple sheets](#)

To cancel a selection of multiple sheets in a workbook, click any unselected sheet.

If no unselected sheet is visible, right-click the tab of a selected sheet. Then click **Ungroup Sheets** on the shortcut menu.

2. On the **File** menu, click **Print**.

[Print several workbooks at once](#)

All workbook files you want to print must be in the same folder.

1. On the **File** menu, click **Open**.
2. Hold down CTRL and click the name of each workbook you want to print.
3. In the **Open** dialog box, click **Tools**, and then click **Print**.

[Print a list](#)

You can print just the data contained in a [list](#).

1. Make the list active by selecting a cell that is within the list.
2. On the **List** toolbar, click **Print List** .

[Show All](#)

# Print preview commands

Button	Action
<b>Next</b>	Displays the next page to be printed. If you have multiple <a href="#">worksheets</a> selected and click <b>Next</b> when the last page of a selected worksheet appears, Excel displays the first page of the next selected worksheet.
<b>Previous</b>	Displays the previous page to be printed. If you have multiple worksheets selected and click <b>Previous</b> when the first page of a selected worksheet appears, Excel displays the last page of the previous selected worksheet.
<b>Zoom</b>	Switches between a full-page view of a sheet and a magnified view. The Zoom feature does not affect printing size. You can also switch between a full-page view and a magnified view of a worksheet by clicking any area of the worksheet.  Depending on the resolution of your monitor, you may not see certain graphics, such as thin borders, in full-page view.
<b>Print Setup</b>	Lets you set printing options and then prints the selected worksheet.
<b>Margins</b>	Lets you set options that control the appearance of printed sheets. Displays or hides margin handles that you can drag to adjust page <a href="#">margins</a> , header and footer margins, and column widths.
<b>Page Break Preview</b>	Switches to <a href="#">page break preview</a> , in which you can adjust the <a href="#">page breaks</a> on the active worksheet. You can also resize the <a href="#">print area</a> and edit the worksheet. The name of the button changes from <b>Page Break Preview</b> to <b>Normal View</b> if you were in page break preview when you clicked <b>Print Preview</b>  .
<b>Normal View</b>	Displays the active worksheet in normal view.
<b>Close</b>	Closes the print preview window and returns to the previous view of the active worksheet.

[Show All](#)

# Troubleshoot printing

## The wrong data prints.

[When I try to print a document, nothing happens.](#)

**Check your printer setup in Windows** Printing from your computer is primarily controlled by settings in Windows. Determine whether your printer setup in Windows is correct by using the Windows Print Troubleshooter.

1. On the Windows **Start** menu, click **Help**.
2. Click Contents, and click Files and Printers.
3. Click Printing, and then follow the instructions in the Troubleshooting topic.

**Check the Microsoft Excel printer settings** If the Windows printer setup looks correct, check the Excel printer settings to make sure that the selected printer matches the printer you're using.

On the **File** menu, click **Print**, and then click the name of the printer you want in the **Name** box under **Printer**.

[Excel prints only a portion of my worksheet.](#)

**Check whether a print area is defined** If the worksheet contains a [print area](#), Excel prints only the print area. To determine whether your worksheet contains a print area, click **Page Break Preview** on the **View** menu. The area of the worksheet that appears with a white background is the area that is printed.

[Excel prints too many rows or columns](#)

- Define a print area

[How?](#)

1. On the **View** menu, click **Page Break Preview**.
2. Select the area you want to print.
3. On the **File** menu, point to **Print Area**, and then click **Set Print Area**.
4. When you save the document, your [print area](#) selection is also saved.

 [Excel added extra rows to my worksheet.](#)

Excel formats empty cells out to the bottom row or last column if you select an entire row or column (click the row number or column letter) before applying formatting. Excel then stores the formatting information for all of the otherwise empty cells and the file gets very large.

To fix this problem, do one of the following:

- If you don't want to start a new worksheet, press F5, click **Special** in the **Go to** dialog box, and then click **Last cell**. Delete all the rows up to your actual data and save the workbook.
- Insert a blank worksheet. On the worksheet you want to print, select only the cells you want to print and copy them to the new blank worksheet.

## The printout doesn't look right.

[My printed header or footer doesn't look the way I want.](#)

You can choose from several headers and footers or create your own. Headers and footers cannot contain graphics or links to specific cells.

**Use black and white only** The text in headers and footers always prints in black. You cannot apply color to the text in headers or footers, even if you have a color printer.

**Use print titles to repeat graphics and linked information** If you want to repeat graphics or linked information at the top of every page, use [print titles](#) instead of a header. For example, to print a company logo and address at the top of every page:

1. Place the logo and address information in the first few rows of the worksheet.
2. On the **File** menu, click **Page Setup**, click the **Sheet** tab, and then enter the rows that contain the logo and address in the **Rows to repeat at top** box.

If you're printing a wide worksheet on multiple pages, be sure to copy the repeating information to additional rows or columns as needed.

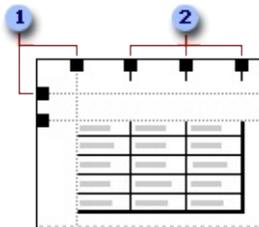
**Use two ampersand (&) characters to print an ampersand** Microsoft Excel uses the ampersand to initiate codes for special formatting in the headers and footers. Therefore, to enter an ampersand in the header or footer, you must enter **&&**. For example, to include "Subcontractors & Services" in a header, enter **Subcontractors && Services**.

[My header and footer margins don't look right.](#)

**Use the existing left and right margins** The left and right header and footer margins are three-quarters (.75) of an inch, regardless of the left and right margins on the page. You can simulate wider margins on a single line header or footer by typing spaces before the text in the **Left section** edit box and after the text in the **Right section** edit box. (To locate these edit boxes, click **Custom**

**Header** or **Custom Footer** in the **Page Setup** dialog box.) The spaces you type in the **Right section** edit box won't appear in the edit box, but will appear in the printed worksheet.

**Adjust the space for the header and footer** You can adjust the distance between the top or bottom of the page and the header or footer. You can also change the distance between the data printed on a page and the header or footer. Click **Print Preview** , click the **Margins** button, and drag the margin handles to adjust the spacing.



- 1 Margin sizing handles
- 2 Column sizing handles

[I want my sheet to print one page wide \(or tall\).](#)

You can prevent columns or rows from spilling over the edge of a page by shrinking the sheet so that it is one page wide or tall.

[How?](#)

1. Click the worksheet.
2. On the **File** menu, click **Page Setup**, and then click the **Page** tab.
3. Under **Scaling**, click **Fit to**.
4. Do one of the following:

[Print a worksheet to fit a paper width](#)

In the first box beside **Fit to**, enter **1** (for 1 page wide).

In the second box beside **Fit to**, delete the value so that the number of pages tall is unspecified.

[Print a worksheet on a specified number of pages](#)

In the boxes beside **Fit to**, enter the number of pages on which you want to print the work.

## Notes

- Microsoft Excel ignores manual page breaks when you use the **Fit to** option.
- When you change the values for **Fit to**, Excel shrinks the printed image or expands it up to 100 percent, as necessary. To see the how much the image will be adjusted for your new values, click **OK**, and then click **Page Setup** on the **File** menu. The **Adjust to** box on the **Page** tab shows the percentage that the printed size will be adjusted.
- Printed data does not exceed the specified number of pages. Excel does not enlarge the data to fill the pages.

[I can't scale a chart to print the size I want or print multiple charts on a single page.](#)

**For chart sheets, set the print size** If the chart is on a [chart sheet](#), you can scale it when you print it.

1. [Activate](#) the chart sheet, click **Page Setup** on the **File** menu, and then click the **Chart** tab.
2. Under **Printed chart size**, click the scaling option you want.

If you click **Custom**, the chart will be printed at the size you make it when you drag its [selection handles](#).

**For embedded charts, drag to resize** If the chart is an [embedded chart](#) on a worksheet, resize the chart by clicking it and then dragging its selection handles.

**To print charts together on a page, embed them** You cannot print multiple

chart sheets on a single page. To print two or more charts on a page, create embedded charts, and then resize them to fit on a single page. You can use the **Page Break Preview** command on the **View** menu to examine the location of the charts in the print area.

### [My print titles don't appear on some pages.](#)

Excel prints repeating row and column labels only on the pages that include the labeled rows or columns. For example, if you select cells A1:A5 as repeating row labels, Excel does not print these labels on pages that contain only rows below row 5. If you select cells A1:E1 as repeating column labels, Excel does not print these labels on pages that contain only columns to the right of column E. To have Excel print labels on the additional pages, copy the labels to the additional rows or columns.

### [Copy row labels to the additional rows](#)

1. Select the cells you want to repeat as row labels, and then click **Copy**  on the **Standard toolbar**.
2. Select cells in the same columns of the additional rows where you want the row labels to print, and then click **Paste** .
3. On the **File** menu, click **Page Setup**, and then click the **Sheet** tab.
4. Click **Columns to repeat at left**, and then enter the entire columns that contain the row labels. For example, to repeat row labels that you copied to cells in column A, enter **\$A:\$A**.

### [Copy column labels to the additional columns](#)

1. Select the cells you want to repeat as column labels, and then click **Copy**  on the **Standard toolbar**.
2. Select cells in the same rows of the additional columns where you want the column labels to print, and then click **Paste** .
3. On the **File** menu, click **Page Setup**, and then click the **Sheet** tab.

4. Click **Rows to repeat at top**, and then enter the rows that contain the column labels. For example, to repeat column labels that you copied to cells in rows 1 and 2, enter **\$1:\$2**.



[The worksheet background did not print.](#)

Background patterns that are added to worksheets by using the **Background** command on the **Format** menu are not printed. However, graphics added to a worksheet by using the **Picture** command on the **Insert** menu are printed, as are cells with patterns or shading that are added by using the **Cells** command on the **Format** menu.

## Pagination is wrong.

 [Excel ignores the page breaks I set.](#)

If your workbook is set up so that Excel fits your printed work on a specific number of pages, Excel ignores the manual page breaks you've set and reduces the size of the printed worksheet. (To see whether this is the case, click **Page Setup** on the **File** menu, click the **Page** tab, and check the **Fit to** option under **Scaling**.)

**Use Adjust To instead of Fit To** To fit the worksheet to the specified number of pages and use the manual page breaks you inserted, click **Page Setup** on the **File** menu, click the **Page** tab, and then click **Adjust to**.

**Set each page as a separate print range** If **Adjust to** doesn't produce the results you want, you can set a print area with each page selected as a separate range. Excel prints nonadjacent ranges in a print area on separate pages.

1. Insert a blank row or column in each location where you want a manual page break.
2. Select the range you want to include as the entire first page, omitting the blank row or column.
3. Hold down CTRL and select the range for the second page, omitting the blank rows or columns. Continue until you've selected all pages that you want to print.
4. On the **File** menu, point to **Print Area**, and then click **Set Print Area**.
5. On the **File** menu, click **Page Setup**, click the **Page** tab, click **Fit to**, and enter the number of pages you want.

 [Some columns and rows printed on the wrong page.](#)

Column widths, row heights, page margins, and page breaks determine the number of columns and rows that print on a page.

**Make margins smaller** If some columns or rows print on the next page, try decreasing the size of the **Top**, **Bottom**, **Left**, and **Right** margins.

[How?](#)

1. Select the worksheet or worksheets you want to print.

[How?](#)

When you enter or change data, the changes affect all selected sheets. These changes may replace data on the active sheet and other selected sheets.

**To select**

**Do this**

Click the sheet tab.



A single sheet

If you don't see the tab you want, click the tab scrolling buttons to display the tab, and then click the tab.



Two or more adjacent sheets

Click the tab for the first sheet, and then hold down SHIFT and click the tab for the last sheet.

Two or more nonadjacent sheets

Click the tab for the first sheet, and then hold down CTRL and click the tabs for the other sheets.

All sheets in a workbook

Right-click a sheet tab, and then click **Select All Sheets** on the [shortcut menu](#).

**Note** If sheet tabs have been color-coded, the sheet tab name will be underlined in a user-specified color when selected. If the sheet tab is displayed with a background color, the sheet has not been selected.

[Cancel a selection of multiple sheets](#)

To cancel a selection of multiple sheets in a workbook, click any unselected sheet.

If no unselected sheet is visible, right-click the tab of a selected sheet. Then

click **Ungroup Sheets** on the shortcut menu.

2. On the **File** menu, click **Page Setup**, and then click the **Margins** tab.

3. Do one of the following:

[Set page margins](#)

- In the **Top**, **Bottom**, **Left**, and **Right** boxes, enter the [margin](#) size you want.

To apply the same page margins to new worksheets or workbooks, you can create a worksheet or workbook template.

[Set header or footer margins](#)

- To change the distance from the top edge to the header, enter a new margin size in the **Header** box.
- To change the distance from the bottom edge to the footer, enter a new margin size in the **Footer** box.

These settings should be smaller than your top and bottom margin settings, and larger than or equal to the minimum printer margins.

[Tip](#)

To see how the margins will affect the printed document, click **Print Preview**  before the document is printed. To adjust the margins in print preview, click **Margins**, and then drag the black margin handles on either side and at the top of the page.

**Adjust page breaks** You can move page breaks before you print your document. On the **View** menu, click **Page Break Preview**. Excel displays manual page breaks as thick blue lines; automatic page breaks appear as dashed lines. You can move page breaks by dragging them left, right, up, or down.

If a column prints on the wrong page— for example, on the second page instead of the first page— drag the page break that is to the left of the column one

column to the right. If a row prints on the page that follows the page where you want it to print, drag the page break that is above the row to a position below the row. Excel automatically scales the worksheet to fit the columns and rows to the page.

**Make the sheet print one page wide** If you want the worksheet to be only one page wide, regardless of the number of pages, you can restrict it to the width of a single page.

[How?](#)

1. Click the worksheet.
2. On the **File** menu, click **Page Setup**, and then click the **Page** tab.
3. Under **Scaling**, click **Fit to**.
4. Do one of the following:

[Print a worksheet to fit a paper width](#)

In the first box beside **Fit to**, enter **1** (for 1 page wide).

In the second box beside **Fit to**, delete the value so that the number of pages tall is unspecified.

[Print a worksheet on a specified number of pages](#)

In the boxes beside **Fit to**, enter the number of pages on which you want to print the work.

## Notes

- Microsoft Excel ignores manual page breaks when you use the **Fit to** option.
- When you change the values for **Fit to**, Excel shrinks the printed image or expands it up to 100 percent, as necessary. To see the how much the image will be adjusted for your new values, click **OK**, and then click **Page Setup**

on the **File** menu. The **Adjust to** box on the **Page** tab shows the percentage that the printed size will be adjusted.

- Printed data does not exceed the specified number of pages. Excel does not enlarge the data to fill the pages.

**Change the paper orientation** If you need a few more columns to print on the same page, change the orientation to landscape.

[How?](#)

1. Click the worksheet.
2. On the **File** menu, click **Page Setup**, and then click the **Page** tab.
3. Under **Orientation**, click **Portrait** or **Landscape**.
4. Click **Print**.

[Excel won't print multiple print areas on the same page.](#)

If a print area contains nonadjacent areas of a worksheet, Excel prints each area on a separate page by default. However, you can specify that separate parts of a worksheet print on the same page by using one of the following methods.

[Print nonadjacent columns side by side](#)

1. Select the columns you don't want to print, point to **Column** on the **Format** menu, and then click **Hide**.
2. Set one print area that contains all of the columns, including the hidden columns.

[Print nonadjacent rows above and below each other](#)

1. Select the rows you don't want to print, point to **Row** on the **Format** menu, and then click **Hide**.
2. Set one print area that contains all of the rows, including the hidden rows.

[Show All](#)

# Print

Use the **Print** dialog box to set up printer options and preview a document before printing.

[Printer](#)

Select a printer. The information about the selected printer is displayed.

[Properties](#)

Click **Properties** to change the options for the selected printer. In most cases, the settings you specify apply only to the active worksheet. An exception to this is the **Default folder** setting for the Microsoft Office Document Image Writer; changes to this setting will affect the same setting in other Microsoft Office applications.

[Find Printer](#)

Allows you to select a printer on your network that is not listed here. When you have selected the printer you want to use, click **OK** to return to this menu and print the document.

[Print to file](#)

Displays the **Print To File** dialog box when you click **OK**. Prints your document to a file instead of to a printer.

[Print range](#)

Indicates the pages of the document you want to print. If you click **Pages**, you must also enter the page numbers you want.

[Copies](#)

Specifies the number of copies you want to print.

**Collate**

Organizes numbered pages when you print multiple copies of a document. A complete copy of the document is printed before the first page of the next copy is printed.

**Print what**

Indicates the portion of the document you want to print.

**Selection**

Prints only the cells and objects selected on the worksheet.

**Entire workbook**

Prints all sheets in the active workbook that contain any data. If a sheet has a print area, only the print area is printed.

**Active sheets**

Prints each of the selected sheets. Each sheet in the workbook starts on a new page. If a sheet has a print area, only the print area is printed. If a chart object is selected, this option changes to Selected chart.

**List**

Prints only the selected list on the worksheet.

**Preview**

Shows how your document will look with the selected options.

[Show All](#)

# Print a worksheet to fit a paper width or a number of pages

1. Click the worksheet.
2. On the **File** menu, click **Page Setup**, and then click the **Page** tab.
3. Under **Scaling**, click **Fit to**.
4. Do one of the following:

[Print a worksheet to fit a paper width](#)

In the first box beside **Fit to**, enter **1** (for 1 page wide).

In the second box beside **Fit to**, delete the value so that the number of pages tall is unspecified.

[Print a worksheet on a specified number of pages](#)

In the boxes beside **Fit to**, enter the number of pages on which you want to print the work.

## Notes

- Microsoft Excel ignores manual page breaks when you use the **Fit to** option.
- When you change the values for **Fit to**, Excel shrinks the printed image or expands it up to 100 percent, as necessary. To see the how much the image will be adjusted for your new values, click **OK**, and then click **Page Setup** on the **File** menu. The **Adjust to** box on the **Page** tab shows the percentage that the printed size will be adjusted.
- Printed data does not exceed the specified number of pages. Excel does not enlarge the data to fill the pages.

# Print in black and white

1. Click the worksheet.
2. On the **File** menu, click **Page Setup**, and then click the **Sheet** tab.
3. Under **Print**, select the **Black and white** check box.
4. Click **Print**.

# Print landscape or portrait

1. Click the worksheet.
2. On the **File** menu, click **Page Setup**, and then click the **Page** tab.
3. Under **Orientation**, click **Portrait** or **Landscape**.
4. Click **Print**.

# Print with or without cell gridlines

1. Click the worksheet.
2. On the **File** menu, click **Page Setup**, and then click the **Sheet** tab.
3. Select or clear the **Gridlines** check box.
4. Click **Print**.

**Note** Worksheets print faster if you print without gridlines.

# Set paper size for printing

1. Click the worksheet.
2. On the **File** menu, click **Page Setup**, and then click the **Page** tab.
3. In the **Paper size** box, click the size of paper you want to use.

[Show All](#)

# Set print resolution and quality

1. Click the worksheet.
2. Do one of the following:

[Set a specific print resolution](#)

1. On the **File** menu, click **Page Setup**, and then click the **Page** tab.
2. In the **Print quality** box, click the resolution you want to use.

[Specify draft quality printing](#)

1. On the **File** menu, click **Page Setup**, and then click the **Sheet** tab.
2. Select the **Draft quality** check box.

# Set the printing order of pages

1. Click the worksheet.
2. On the **File** menu, click **Page Setup**, and then click the **Sheet** tab.
3. Under **Page order**, click an option to print the pages top to bottom or left to right.

# Add, delete, or move page breaks

1. On the **View** menu, click **Page Break Preview**.
2. Do one of the following:

**View page breaks** Manually inserted page breaks appear as solid lines. Dashed lines indicate where Microsoft Excel will break pages automatically.

**Move a page break** Drag the page break to a new location. Moving an automatic page break changes it to a manual page break.

**Insert vertical or horizontal page breaks** Select a row or column below or to the right of where you want to insert a horizontal or vertical page break, right-click, and then click **Insert Page Break**.

**Remove page breaks** Drag the page break outside of the print area. To remove all manual page breaks, right-click any cell on the worksheet, and then click **Reset All Page Breaks**.

[Show All](#)

# Define what part of the worksheet to print

## [Print a selected area of a worksheet](#)

1. On the **View** menu, click **Page Break Preview**.
2. Select the area you want to print.
3. On the **File** menu, point to **Print Area**, and then click **Set Print Area**.

When you save the document, your [print area](#) selection is also saved.

## [Add cells to an existing print area](#)

1. On the **View** menu, click **Page Break Preview**.
2. Select the cells you want to add to the print area.
3. Right-click within the selection, and then click **Add to Print Area**.

## [Center worksheet data on the printed page](#)

1. Click the worksheet.
2. On the **File** menu, click **Page Setup**, and then click the **Margins** tab.
3. To center worksheet data horizontally on the page between the left and right margins, select the **Horizontally** check box under **Center on page**.

To center worksheet data vertically on the page between the top and bottom margins, select the **Vertically** check box under **Center on page**.

## [Clear a print area](#)

- On the **File** menu, point to **Print Area**, and click **Clear Print Area**.

[Show All](#)

# Set margins for printing

1. Select the worksheet or worksheets you want to print.

[How?](#)

When you enter or change data, the changes affect all selected sheets. These changes may replace data on the active sheet and other selected sheets.

## To select

## Do this

Click the sheet tab.



A single sheet

If you don't see the tab you want, click the tab scrolling buttons to display the tab, and then click the tab.



Two or more adjacent sheets

Click the tab for the first sheet, and then hold down SHIFT and click the tab for the last sheet.

Two or more nonadjacent sheets

Click the tab for the first sheet, and then hold down CTRL and click the tabs for the other sheets.

All sheets in a workbook

Right-click a sheet tab, and then click **Select All Sheets** on the [shortcut menu](#).

**Note** If sheet tabs have been color-coded, the sheet tab name will be underlined in a user-specified color when selected. If the sheet tab is displayed with a background color, the sheet has not been selected.

[Cancel a selection of multiple sheets](#)

To cancel a selection of multiple sheets in a workbook, click any unselected

sheet.

If no unselected sheet is visible, right-click the tab of a selected sheet. Then click **Ungroup Sheets** on the shortcut menu.

2. On the **File** menu, click **Page Setup**, and then click the **Margins** tab.
3. Do one of the following:

[Set page margins](#)

- In the **Top**, **Bottom**, **Left**, and **Right** boxes, enter the [margin](#) size you want.

To apply the same page margins to new worksheets or workbooks, you can create a worksheet or workbook template.

[Set header or footer margins](#)

- To change the distance from the top edge to the header, enter a new margin size in the **Header** box.
- To change the distance from the bottom edge to the footer, enter a new margin size in the **Footer** box.

These settings should be smaller than your top and bottom margin settings, and larger than or equal to the minimum printer margins.

[Tip](#)

To see how the margins will affect the printed document, click **Print Preview**  before the document is printed. To adjust the margins in print preview, click **Margins**, and then drag the black margin handles on either side and at the top of the page.

[Show All](#)

# Print row and column headings or labels on every page

Row headings are the row numbers to the left of the worksheet; column headings are the letters or numbers that appear at the top of the columns on a worksheet.

1. Click the worksheet.
2. On the **File** menu, click **Page Setup**, and then click the **Sheet** tab.
3. Do one of the following:

[Print row and column headings](#)

- Select the **Row and column headings** check box, and click **Print**.

[Print row and column labels on every page](#)

- To print column labels on every page, under **Print titles** in the **Rows to repeat at top** box, enter the rows that contain the column labels, and then click **Print**.
- To print row labels on every page, under Print titles in the **Columns to repeat at left** box, enter the columns that contain the row labels, and then click **Print**.

# Replace error values when printing

1. Select the worksheet with the error you don't want to print.
2. On the **File** menu, click **Page Setup**, and then click the **Sheet** tab.
3. Under **Print** in the **Cell errors as** box, click **<blank>**, **--**, or **#N/A**.

# Print a workbook to a file

1. On the **File** menu, click **Print**.
2. In the **Printer** box, click the printer on which you want to print the file.
3. Select the **Print to file** check box, and then click **OK**.
4. Under **Output File Name** in the **Print to file** dialog box, type a name for the file you want to print.

**Note** If you print a workbook to a file so that you can later print the file on a different type of printer than the one used to create the document, the page breaks and font spacing may change.

[Show All](#)

# Print a worksheet with formulas displayed

1. Display formulas on your worksheet.

[How?](#)

- On the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode** .
2. On the **File** menu, click **Print**.
  3. Under **Print what**, select an option to print the selection, the active sheet(s), or the entire workbook.

[Tip](#)

If you want to print more than one worksheet at the same time, select the worksheets before you print.

[Show All](#)

# Add headers and footers for printing

## [Add a header or footer](#)

1. Click the worksheet.
2. On the **View** menu, click **Header and Footer**.
3. In the **Header** or **Footer** box, click the header or footer you want.

## [Create custom headers and footers](#)

You can have only one custom header and one custom footer on each worksheet. If you create a new custom header or footer, it replaces any other custom header or footer on the worksheet.

1. Click the worksheet.
2. On the **View** menu, click **Header and Footer**.
3. To base a custom header or footer on an existing header or footer, click the header or footer in the **Header** or **Footer** box.
4. Click **Custom Header** or **Custom Footer**.
5. Click in the **Left section**, **Center section**, or **Right section** box, and then click the buttons to insert the header or footer information you want in that section.
6. Do one or more of the following:
  - To enter additional text for the header or footer, enter the text in the **Left section**, **Center section**, or **Right section** box.
  - To start a new line in one of the section boxes, press ENTER.
  - To delete a section of a header or footer, select the section that you want to delete in the section box, and then press BACKSPACE.

### Notes

- You can use the buttons in the **Header** or **Footer** dialog boxes to format or further customize your headers and footers.
- Make sure the header or footer margin allows enough space for the

custom header or footer.

 **Tips**

- To include a single ampersand (&) within the text of a header or footer, use two ampersands. For example, to include "Subcontractors & Services" in a header, type **Subcontractors && Services**.
- To start numbering pages with a number other than 1, specify the first page number, and then use **&[Page]** in the header or footer. To specify the first page number:
  1. On the **File** menu, click **Page Setup**.
  2. In the **First page number** box, type the first page number.

# Change the font in header and footer text

1. On the **View** menu, click **Header and Footer**.
2. Click **Custom Header** or **Custom Footer**.
3. Select the text in the **Left section**, **Center section**, or **Right section** box, and then click **Font** .
4. Select the options you want.

**Note** You cannot change the color of header and footer text.

# Change the page number for the first page

1. Click the worksheet.
2. On the **File** menu, click **Page Setup**, and then click the **Page** tab.
3. In the **First page number** box, type the page number you want to appear on the first page of the worksheet.

To have Microsoft Excel automatically number the pages of the worksheet, type the word **Auto** in the **First page number** box.

**Note** Excel prints page numbers only if you include page numbers in the header or footer.

# Insert date and time in a header or footer

1. On the **View** menu, click **Header and Footer**.
2. Click **Custom Header** or **Custom Footer**.
3. Click in the **Left section**, **Center section**, or **Right section** box.
4. On the row of buttons in the **Header** or **Footer** dialog box, click **Date**  or **Time** .
5. If you want, do one or more of the following:
  - To start a new line, press ENTER.
  - To delete a date or time from a header or footer, select **&[Date]** or **&[Time]** and then press DELETE.

**Note** Make sure the header or footer margin allows enough space for the custom header or footer.

# Insert a graphic in a header or footer

1. On the **View** menu, click **Header and Footer**.
2. Click **Custom Header** or **Custom Footer**.
3. Click in the **Left section**, **Center section**, or **Right section** box.
4. On the row of buttons in the **Header** or **Footer** dialog box, click **Insert Picture**  and then find the graphic you want to insert.
5. Double-click the graphic to insert it in the header or footer section box.
6. If you want, do one or more of the following:
  - To make changes to the graphic, click **Format Picture**  on the row of buttons in the **Header** or **Footer** dialog box.
  - To replace a graphic, select **&[Picture]**, click **Insert Picture** , and then click **Replace**.
  - To start a new line in one of the section boxes, press ENTER.
  - To delete a graphic, select **&[Picture]** and then press DELETE.

## Notes

- Changes to the graphic or graphic format take place immediately and can't be undone.
- Make sure the header or footer margin allows enough space for the custom header or footer.

# Insert a file name in a header or footer

1. On the **View** menu, click **Header and Footer**.
2. Click **Custom Header** or **Custom Footer**.
3. Click in the **Left section**, **Center section**, or **Right section** box.
4. On the row of buttons in the **Header** or **Footer** dialog box, click **File Name** .
5. If you want, do one or more of the following:
  - To insert a path and file name or a worksheet tab, click **Path & File**  or **Sheet Name**  on the row of buttons in the **Header** or **Footer** dialog box.
  - To start a new line, press ENTER.
  - To delete a file name from a header or footer, select **&[File]** and then press DELETE.

**Note** Make sure the header or footer margin allows enough space for the custom header or footer.

[Show All](#)

# Troubleshoot workbooks and worksheets

[There is a ":1" or ":2" in my workbook title.](#)

You have more than one window open for the active workbook. Switch to the window you want to close, and then click **Close Window**  in the upper-right corner of the workbook window.

**Note** If you save a workbook while more than one window is open and then close the workbook, the same number of windows will open the next time you open the workbook. If you want to only one window the next time you open the workbook, close all but one window before you save and close the workbook.

[My module sheets are missing.](#)

**The sheets are from earlier versions of Microsoft Excel** Excel 2000 and later versions of Excel preserve Excel version 4.0 macro sheets and Excel version 5.0 dialog sheets. The module sheets are converted into modules in the workbook's Visual Basic for Applications project.

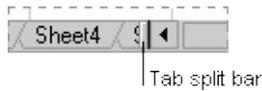
**To run, view, and modify these sheets** To edit converted macro sheets and dialog sheets in Excel 2000 or a later version of Excel, run the [Visual Basic Editor](#).

[I can't rename a sheet.](#)

**Display the sheet tabs** If sheet tabs aren't displayed, click **Options** on the **Tools** menu, click the **View** tab, and then select the **Sheet tabs** check box under **Window options**.

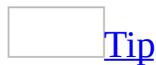
**Shrink the horizontal scroll bar** The sheet tabs could be covered by the scroll bar. To shrink the scroll bar area, look for the tab split bar at the far left side of the screen beside the scroll bar.

1. Point to the tab split bar.



2. When the pointer changes to a split pointer  $\leftrightarrow$ , drag the tab split bar to the right or left.

If you want to return the tab split bar to its original position, double-click the tab split bar.



You can activate a sheet by right-clicking any tab scrolling button and then selecting the sheet you want from the shortcut menu.

Point to the tab split bar, and when the pointer changes to a split pointer  $\leftrightarrow$ , drag the tab split bar to the right until the sheet tabs appear.

**Check to see whether the workbook is protected** To rename the sheet, first turn off the protection.

1. On the **Tools** menu, point to **Protection**, and then click **Unprotect Workbook**.
2. If prompted, enter the password assigned when the workbook was protected. Passwords are case sensitive. You must type the password exactly as it was created, including uppercase and lowercase letters.



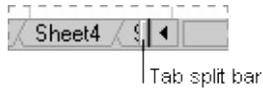
## Display or hide all sheet tabs

1. On the **Tools** menu, click **Options**, and then click the **View** tab.
2. Select or clear the **Sheet tabs** check box. When displaying sheet tabs, you may also need to expand the tab scrolling area.



## Display more or fewer sheet tabs

1. Point to the tab split bar.



2. When the pointer changes to a split pointer  $\leftrightarrow$ , drag the tab split bar to the right or left.

If you want to return the tab split bar to its original position, double-click the tab split bar.



You can activate a sheet by right-clicking any tab scrolling button and then selecting the sheet you want from the shortcut menu.



Increase the scroll bar height. In the Microsoft Windows Control Panel, double-click the **Display** icon, click the **Appearance** tab, click **Scrollbar** in the **Item** list, and then increase the number in the **Size** box.

[Show All](#)

# Change the color of cell gridlines

1. Select the sheets on which you want to change the gridline color.

[How?](#)

When you enter or change data, the changes affect all selected sheets. These changes may replace data on the active sheet and other selected sheets.

## To select

## Do this

Click the sheet tab.



A single sheet

If you don't see the tab you want, click the tab scrolling buttons to display the tab, and then click the tab.



Two or more adjacent sheets

Click the tab for the first sheet, and then hold down SHIFT and click the tab for the last sheet.

Two or more nonadjacent sheets

Click the tab for the first sheet, and then hold down CTRL and click the tabs for the other sheets.

All sheets in a workbook

Right-click a sheet tab, and then click **Select All Sheets** on the [shortcut menu](#).

**Note** If sheet tabs have been color-coded, the sheet tab name will be underlined in a user-specified color when selected. If the sheet tab is displayed with a background color, the sheet has not been selected.

[Cancel a selection of multiple sheets](#)

To cancel a selection of multiple sheets in a workbook, click any unselected

sheet.

If no unselected sheet is visible, right-click the tab of a selected sheet. Then click **Ungroup Sheets** on the shortcut menu.

2. On the **Tools** menu, click **Options**, and then click the **View** tab.
3. Under **Window options**, click the color you want in the **Color** box.

To use the default gridline color, click **Automatic**.

[Show All](#)

# Delete sheets

1. Select the sheets you want to delete.

[How?](#)

When you enter or change data, the changes affect all selected sheets. These changes may replace data on the active sheet and other selected sheets.

## To select

## Do this

Click the sheet tab.



A single sheet

If you don't see the tab you want, click the tab scrolling buttons to display the tab, and then click the tab.



Two or more adjacent sheets

Click the tab for the first sheet, and then hold down SHIFT and click the tab for the last sheet.

Two or more nonadjacent sheets

Click the tab for the first sheet, and then hold down CTRL and click the tabs for the other sheets.

All sheets in a workbook

Right-click a sheet tab, and then click **Select All Sheets** on the [shortcut menu](#).

**Note** If sheet tabs have been color-coded, the sheet tab name will be underlined in a user-specified color when selected. If the sheet tab is displayed with a background color, the sheet has not been selected.

[Cancel a selection of multiple sheets](#)

To cancel a selection of multiple sheets in a workbook, click any unselected

sheet.

If no unselected sheet is visible, right-click the tab of a selected sheet. Then click **Ungroup Sheets** on the shortcut menu.

2. On the **Edit** menu, click **Delete Sheet**.

[Show All](#)

# Display or hide a workbook or sheet

Do one or more of the following:

## [Display a hidden workbook](#)

1. On the **Window** menu, click **Unhide**.

If the **Unhide** command is unavailable, the workbook does not contain hidden sheets. If both the **Rename** and **Hide** commands are unavailable, the workbook is protected from structural changes. You'll need to remove protection from the workbook to determine whether sheets are hidden; removing protection may require a password.

## [How?](#)

On the **Tools** menu, point to **Protection**, and then click **Unprotect Workbook**.

If prompted, enter the password assigned when the workbook was protected. Passwords are case sensitive. You must type the password exactly as it was created, including uppercase and lowercase letters.

2. In the **Unhide workbook** box, double-click the name of the hidden workbook you want to display.

## [Display a hidden sheet](#)

1. On the **Format** menu, point to **Sheet**, and then click **Unhide**.

If sheets are hidden by a Microsoft Visual Basic for Applications program that assigns the property **xlSheetVeryHidden**, you cannot use the **Unhide** command to display the sheets. If you are using a workbook with Visual Basic macros and have problems with hidden sheets, contact the owner of the workbook for more information.

2. In the **Unhide sheet** box, double-click the name of the hidden sheet you

want to display.

### [Hide a workbook window](#)

1. Open the workbook.
2. On the **Window** menu, click **Hide**.
3. When you quit Microsoft Excel, you will be asked if you want to save changes to the hidden workbook. Click **Yes** if you want the workbook window to be hidden the next time you open the workbook.

### [Hide a sheet](#)

1. Select the sheets you want to hide.

### [How?](#)

When you enter or change data, the changes affect all selected sheets. These changes may replace data on the active sheet and other selected sheets.

#### **To select**

#### **Do this**

Click the sheet tab.



A single sheet

If you don't see the tab you want, click the tab scrolling buttons to display the tab, and then click the tab.



Two or more adjacent sheets

Click the tab for the first sheet, and then hold down SHIFT and click the tab for the last sheet.

Two or more nonadjacent sheets

Click the tab for the first sheet, and then hold down CTRL and click the tabs for the other sheets.

All sheets in a workbook

Right-click a sheet tab, and then click **Select All Sheets** on the [shortcut menu](#).

**Note** If sheet tabs have been color-coded, the sheet tab name will be underlined in a user-specified color when selected. If the sheet tab is displayed with a background color, the sheet has not been selected.

### [Cancel a selection of multiple sheets](#)

To cancel a selection of multiple sheets in a workbook, click any unselected sheet.

If no unselected sheet is visible, right-click the tab of a selected sheet. Then click **Ungroup Sheets** on the shortcut menu.

2. On the **Format** menu, point to **Sheet**, and then click **Hide**.

### [Display or hide multiple workbooks on the Microsoft Windows taskbar](#)

1. On the **Tools** menu, click **Options**, and then click the **View** tab.
2. Select or clear the **Windows in taskbar** check box.

[Show All](#)

# Display or hide rows or columns

## Display a hidden row or column

1. Select a row or column on each side of the hidden rows or columns you want to display.
2. On the **Format** menu, point to **Row** or **Column**, and then click **Unhide**.

 [Tip](#)

If the first row or column of a worksheet is hidden, click **Go To** on the **Edit** menu. Type **A1** in the **Reference** box, and click **OK**. Point to **Row** or **Column** on the **Format** menu, and then click **Unhide**.

Also, the row or column may have had the height or width set to zero. Point to

the border of  until the cursor changes to  or , and drag to widen the row or column.

## Hide a row or column

1. Select the rows or columns you want to hide.

 [How?](#)

### To select

### Do this

**Text in a cell** If editing in a cell is turned on, select the cell, double-click in it, and then select the text in the cell.

**Text in a cell** If editing in a cell is turned off, select the cell, and then select the text in the formula bar.



**A single cell** Click the cell, or press the arrow keys to move to the cell.

**A [range](#) of** Click the first cell of the range, and then drag to the last

cells cell.

A large range of cells

Click the first cell in the range, and then hold down SHIFT and click the last cell in the range. You can scroll to make the last cell visible.

Click the **Select All** button.

All cells on a worksheet

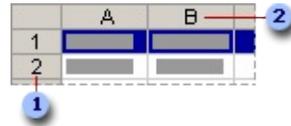


Nonadjacent cells or cell ranges

Select the first cell or range of cells, and then hold down CTRL and select the other cells or ranges.

Click the row or column heading.

An entire row or column



Adjacent rows or columns

Drag across the row or column headings. Or select the first row or column; then hold down SHIFT and select the last row or column.

Nonadjacent rows or columns

Select the first row or column, and then hold down CTRL and select the other rows or columns.

More or fewer cells than the active selection

Hold down SHIFT and click the last cell you want to include in the new selection. The rectangular range between the [active cell](#) and the cell you click becomes the new selection.

Cancel a selection of cells

Click any cell on the worksheet.

2. On the **Format** menu, point to **Row** or **Column**, and then click **Hide**.

# Display or hide scroll bars

1. On the **Tools** menu, click **Options**, and then click the **View** tab.
2. Select or clear the **Horizontal scroll bar** check box and **Vertical scroll bar** check box.

[Show All](#)

# Display or hide sheet tabs

## Display or hide all sheet tabs

1. On the **Tools** menu, click **Options**, and then click the **View** tab.
2. Select or clear the **Sheet tabs** check box. When displaying sheet tabs, you may also need to expand the tab scrolling area.



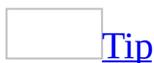
## Display more or fewer sheet tabs

1. Point to the tab split bar.



2. When the pointer changes to a split pointer  $\pm$ , drag the tab split bar to the right or left.

To return the tab split bar to its original position, double-click the tab split bar.



**Tip**

You can activate a sheet by right-clicking any tab scrolling button and then selecting the sheet you want from the shortcut menu.



[If the sheet names are cut off or difficult to read](#)

Increase the scroll bar height. In the Microsoft Windows Control Panel, double-click the **Display** icon, click the **Appearance** tab, click **Scrollbar** in the **Item** list, and then increase the number in the **Size** box.

[Show All](#)

# Add color to sheet tabs



1. Select the sheets you want to color.

[How?](#)

When you enter or change data, the changes affect all selected sheets. These changes may replace data on the active sheet and other selected sheets.

## To select

## Do this

Click the sheet tab.



A single sheet

If you don't see the tab you want, click the tab scrolling buttons to display the tab, and then click the tab.



Two or more adjacent sheets

Click the tab for the first sheet, and then hold down SHIFT and click the tab for the last sheet.

Two or more nonadjacent sheets

Click the tab for the first sheet, and then hold down CTRL and click the tabs for the other sheets.

All sheets in a workbook

Right-click a sheet tab, and then click **Select All Sheets** on the [shortcut menu](#).

**Note** If sheet tabs have been color-coded, the sheet tab name will be underlined in a user-specified color when selected. If the sheet tab is displayed with a background color, the sheet has not been selected.

[Cancel a selection of multiple sheets](#)

To cancel a selection of multiple sheets in a workbook, click any unselected sheet.

If no unselected sheet is visible, right-click the tab of a selected sheet. Then click **Ungroup Sheets** on the shortcut menu.

2. On the **Format** menu, point to **Sheet**, and then click **Tab Color**. You can also right-click on the sheet tab and then click **Tab Color**.
3. Click on the color you want and click **OK**.

# Display or hide the status bar

1. On the **Tools** menu, click **Options**, and then click the **View** tab.
2. Select or clear the **Status bar** check box.

[Show All](#)

# Hide cell gridlines

1. Select the sheets on which you want to hide the gridlines.

[How?](#)

When you enter or change data, the changes affect all selected sheets. These changes may replace data on the active sheet and other selected sheets.

## To select

## Do this

Click the sheet tab.



A single sheet

If you don't see the tab you want, click the tab scrolling buttons to display the tab, and then click the tab.



Two or more adjacent sheets

Click the tab for the first sheet, and then hold down SHIFT and click the tab for the last sheet.

Two or more nonadjacent sheets

Click the tab for the first sheet, and then hold down CTRL and click the tabs for the other sheets.

All sheets in a workbook

Right-click a sheet tab, and then click **Select All Sheets** on the [shortcut menu](#).

**Note** If sheet tabs have been color-coded, the sheet tab name will be underlined in a user-specified color when selected. If the sheet tab is displayed with a background color, the sheet has not been selected.

[Cancel a selection of multiple sheets](#)

To cancel a selection of multiple sheets in a workbook, click any unselected

sheet.

If no unselected sheet is visible, right-click the tab of a selected sheet. Then click **Ungroup Sheets** on the shortcut menu.

2. On the **Tools** menu, click **Options**, and then click the **View** tab.
3. Under **Window options**, clear the **Gridlines** check box.

[Show All](#)

# Insert a new worksheet

## Add a single worksheet

- Click **Worksheet** on the **Insert** menu.

## Add multiple worksheets

Determine the number of worksheets you want to add.

1. Hold down SHIFT, and then select the same number of existing worksheet tabs that you want to add in the open workbook.

Example: If you want to add three new worksheets, select three existing worksheet tabs.

2. Click **Worksheet** on the **Insert** menu.

## Insert a new sheet that's based on a custom template

You must have already created a custom sheet template.



1. Decide which type of template you want:

### **Workbook template**

Create a workbook that contains the sheets, default text (such as page headers and column and row labels), formulas, [macros](#), [styles](#), and other formatting you want in new workbooks based on the template.

### **Worksheet template**

Create a workbook that contains one worksheet. On the worksheet, include the formatting, [styles](#), text, and other information you want to appear on all new sheets of the same type.

2. To display a picture of the first page of a template in the **Preview** box of the **Templates** dialog box (**General Templates...**, **New Workbook** task pane), click **Properties** on the **File** menu, click the **Summary** tab, and then select the **Save preview picture** check box.
3. On the **File** menu, click **Save As**.
4. In the **Save as type** box, click **Template**.
5. In the **Save in** box, select the folder where you want to store the template.

- To create the [default workbook template](#) or [default worksheet template](#), select either the XLStart folder or the [alternate startup folder](#). The XLStart folder is usually

C:\Program Files\Microsoft Office\Office11\XLStart

- To create a custom workbook or worksheet template, select the Templates folder, which is usually

C:\Documents and Settings\user\_name\Application Data\Microsoft\Templates

6. Enter the name of the template in the **File name** box. Do one of the following:

### **Workbook template**

- Type **book** to create the default workbook template.

To create a custom workbook template, type any valid file name.

### **Worksheet template**

- Type **sheet** to create a template for default worksheets.

To create a custom sheet template, type any valid file name.

7. Click **Save**, and then click **Close** on the **File** menu.

1. Right-click a sheet tab, and then click **Insert**.

2. Double-click the template for the type of sheet you want.

[Show All](#)

# Name cells in a workbook

You can use the labels of columns and rows on a worksheet to refer to the cells within those columns and rows. Or you can create descriptive [names](#) to represent cells, ranges of cells, formulas, or [constant](#) values. Labels can be used in formulas that refer to data on the same worksheet; if you want to represent a range on another worksheet, use a name.

You can also create 3-D names that represent the same cell or range of cells across multiple worksheets.

[Use labels as references](#)

This option must be set when you first create a workbook, or you will need to re-enter the formulas that use labels.

1. Click **Options** on the **Tools** menu, and then click the **Calculation** tab.
2. Under **Workbook options**, select the **Accept labels in formulas** check box.
3. To re-enter a formula that used a label before setting this option, select the cell that contains the formula, press F2, and then press ENTER.

**Note** To have this option recognized by default for all new workbooks, create a new workbook, follow the procedure above, and save the setting in the template book.xlt.

[How?](#)

1. Decide which type of template you want:

## **Workbook template**

Create a workbook that contains the sheets, default text (such as page headers and column and row labels), formulas, [macros](#), [styles](#), and other formatting you want in new workbooks based on the template.

## **Worksheet template**

Create a workbook that contains one worksheet. On the worksheet, include the formatting, [styles](#), text, and other information you want to appear on all new sheets of the same type.

2. To display a picture of the first page of a template in the **Preview** box of the **Templates** dialog box (**General Templates...**, **New Workbook** task pane), click **Properties** on the **File** menu, click the **Summary** tab, and then select the **Save preview picture** check box.
3. On the **File** menu, click **Save As**.
4. In the **Save as type** box, click **Template**.
5. In the **Save in** box, select the folder where you want to store the template.
  - To create the [default workbook template](#) or [default worksheet template](#), select either the XLStart folder or the [alternate startup folder](#). The XLStart folder is usually

C:\Program Files\Microsoft Office\Office11\XLStart

- To create a custom workbook or worksheet template, select the Templates folder, which is usually

C:\Documents and Settings\user\_name\Application  
Data\Microsoft\Templates

6. Enter the name of the template in the **File name** box. Do one of the following:

#### **Workbook template**

- Type **book** to create the default workbook template.

To create a custom workbook template, type any valid file name.

#### **Worksheet template**

- Type **sheet** to create a template for default worksheets.

To create a custom sheet template, type any valid file name.

7. Click **Save**, and then click **Close** on the **File** menu.

### [Name a cell or a range of cells](#)

1. Select the cell, range of cells, or [nonadjacent selections](#) that you want to name.
2. Click the **Name** box at the left end of the [formula bar](#) .



 Name box

3. Type the name for the cells.
4. Press ENTER.

**Note** You cannot name a cell while you are changing the contents of the cell.

### [Convert existing row and column labels to names](#)

1. Select the range you want to name, including the row or column labels.
2. On the **Insert** menu, point to **Name**, and then click **Create**.
3. In the **Create names in** box, designate the location that contains the labels by selecting the **Top row**, **Left column**, **Bottom row**, or **Right column** check box.

**Note** A name created by using this procedure refers only to the cells that contain values and does not include the existing row and column labels.

**Specifying labels** When you select cells in labeled ranges to create formulas, Microsoft Excel can insert the labels in place of the cell references in your formulas. Using labels can make it easier to see how a formula is constructed. You can use the **Label Ranges** dialog box (**Insert** menu, **Name** submenu, **Label** command) to specify the ranges that contain column and row labels on your worksheet.

### [Name cells on more than one worksheet by using a 3-D reference](#)

This is also called a [3-D reference](#).

1. On the **Insert** menu, point to **Name**, and then click **Define**.
2. In the **Names in workbook** box, type the name.
3. If the **Refers to** box contains a reference, select the equal sign (=) and the reference and press BACKSPACE.
4. In the **Refers to** box, type = (equal sign).
5. Click the tab for the first worksheet to be referenced.
6. Hold down SHIFT and click the tab for the last worksheet to be referenced.
7. Select the cell or range of cells to be referenced.

[Show All](#)

# Move or copy sheets

**Caution** Be careful when you move or copy sheets. Calculations or charts based on worksheet data might become inaccurate if you move the worksheet. Similarly, if you insert a worksheet between sheets that are referred to by a [3-D formula reference](#), data on that worksheet might be included in the calculation.

1. To move or copy sheets to another workbook, open the workbook that will receive the sheets.
2. Switch to the workbook that contains the sheets you want to move or copy, and then select the sheets.

 [How?](#)

When you enter or change data, the changes affect all selected sheets. These changes may replace data on the active sheet and other selected sheets.

## To select

## Do this

Click the sheet tab.



A single sheet

If you don't see the tab you want, click the tab scrolling buttons to display the tab, and then click the tab.



Two or more adjacent sheets

Click the tab for the first sheet, and then hold down SHIFT and click the tab for the last sheet.

Two or more nonadjacent sheets

Click the tab for the first sheet, and then hold down CTRL and click the tabs for the other sheets.

All sheets in a workbook

Right-click a sheet tab, and then click **Select All Sheets** on the [shortcut menu](#).

**Note** If sheet tabs have been color-coded, the sheet tab name will be underlined in a user-specified color when selected. If the sheet tab is displayed with a background color, the sheet has not been selected.

[Cancel a selection of multiple sheets](#)

To cancel a selection of multiple sheets in a workbook, click any unselected sheet.

If no unselected sheet is visible, right-click the tab of a selected sheet. Then click **Ungroup Sheets** on the shortcut menu.

3. On the **Edit** menu, click **Move or Copy Sheet**.
4. In the **To book** box, click the workbook to receive the sheets.

To move or copy the selected sheets to a new workbook, click **new book**.

5. In the **Before sheet** box, click the sheet before which you want to insert the moved or copied sheets.
6. To copy the sheets instead of moving them, select the **Create a copy** check box.

[Tip](#)

To move sheets within the current workbook, you can drag the selected sheets along the row of sheet tabs. To copy the sheets, hold down CTRL, and then drag the sheets; release the mouse button before you release the CTRL key.

# Rename a sheet

1. To rename the active sheet, on the **Format** menu, point to **Sheet** and then click **Rename**.



2. Type the new name over the current name.

[Show All](#)

# Troubleshoot formatting worksheets

## Formatting numbers, dates, and times

[Decimal points are added to all the numbers I enter.](#)

On the **Tools** menu, click **Options**, click the **Edit** tab, and then clear the **Fixed Decimal** check box.

To remove decimal points from numbers you've already entered, you can multiply the numbers by a power of 10. In an empty cell, enter a number such as **10**, **100**, or **1,000**, depending upon the number of decimal places you want to remove. For example, enter **100** in the cell if the numbers contain two decimal places and you want whole numbers. Copy the cell to the Clipboard and select a range of adjacent cells that contain numbers with decimal places. On the **Edit** menu, click **Paste Special**, and then click **Multiply**.

[Numbers aren't displayed or calculated as numeric values.](#)

If the numbers are aligned to the left of the cell and if you have not changed the default alignment (General), the numbers are formatted or entered as text. To change them to numbers, do the following:

1. Select a blank cell that you know has the General number format.

If you aren't sure of the cell format, click **Cells** on the **Format** menu, and then click the **Number** tab. In the **Category** box, click **General**, and then click **OK**.

2. In the cell, type **1** and then press ENTER.
3. Click the cell, and then click **Copy**  on the **Standard toolbar**.
4. Select the range of cells that contain the "text" numbers.
5. On the **Edit** menu, click **Paste Special**, click **Multiply**, and then click **OK**.

[The number in a worksheet cell isn't the same as the number in the formula bar.](#)

The number format applied to a cell determines the way Microsoft Excel displays a number in that cell on the worksheet. The format does not affect the cell value used in calculations, which is displayed in the [formula bar](#) when the cell is active.

To remove number formats that may affect the displayed value, select the cells.

1. On the **Format** menu, click **Cells**, and then click the **Number** tab.
2. In the **Category** box, click **General**.



[No more custom number formats can be added.](#)

The number of custom number formats has been exceeded. You must delete one or more of the existing custom number formats in order to add new ones.

1. On the **Format** menu, click **Cells**, and then click the **Number** tab.
2. In the **Category** list, click **Custom**.
3. At the bottom of the **Type** box, click the custom format you want to delete. Click **Delete**.

## Formatting text

[Formats such as font color and cell shading automatically change.](#)

If [conditional formats](#) have been applied to a cell, Microsoft Excel applies the formats depending on whether the cell value or other evaluated data meets a condition you specified.

- If you base the formatting condition on the value of the selected cells, cells that contain text are evaluated as ASCII strings. Formats such as bold or the font color may change if you change the text.
- Conditional formats have priority over formats that you apply directly to a cell by using the **Cells** command (**Format** menu) or a **Formatting toolbar** button. If a specified condition is true, the formats for that condition override the manual formatting.

[Rotated text isn't displayed at the correct angle.](#)

If you've saved a workbook in another file format, the rotated text format might be lost. Most file formats do not support rotation within the full 180 degrees (+90 through – 90 degrees), which is possible in the current version of Microsoft Excel. Earlier versions of Excel can rotate text only at angles of +90, 0 (zero), or – 90 degrees. If the specified angle of rotation cannot be maintained in the other file format, the text is not rotated.

[Text or other data I enter isn't displayed in the cells.](#)

**Reset the number format** The cells may be formatted so that data in the cells is hidden. To remove specific number formats that may be affecting the displayed value, select the cells. On the **Format** menu, click **Cells**, and then click the **Number** tab. In the **Category** list, click **General**.

**Check the color of text and the background** If text in a cell is the same color as the background, nothing appears in the cell. You can change the color of the background or change the color of the text.

[The rotate text option doesn't work or isn't available.](#)

Microsoft Excel cannot rotate indented cells or cells that are formatted with the **Center Across Selection** or **Fill** alignment options in the **Horizontal** box of the **Alignment** tab (**Cells** command, **Format** menu). If all selected cells have these conflicting alignment formats, the text rotation options under **Orientation** are not available. If the selection includes cells that are formatted with other, non-conflicting alignment options, the rotation options are available. However, cells formatted with a conflicting alignment format are not rotated.

[Apostrophe \('\), a caret \(^\), a quotation mark \("\), or a backslash \(\\) appears in the formula bar but not in the cells](#)

These characters are formatting codes, which may be displayed in documents created in Lotus 1-2-3 or if you are working with keys that are used for navigation in Lotus 1-2-3. In Lotus 1-2-3 formats, an apostrophe (') indicates left-aligned text, a quotation mark (") indicates right-aligned text, a caret (^) indicates centered text, and a backslash (\) indicates text that is formatted to fill the cell.

To hide formatting codes in the formula bar, click **Options** on the **Tools** menu, click the **Transition** tab, and then clear the **Transition navigation keys** check box.

**Note** You can only hide codes that have been implicitly added, such as formatting codes. You cannot hide codes that have been explicitly added.

# Conditional formatting

[Conditional formats are not applied correctly.](#)

- **Check for multiple conditions** If you specify multiple conditions and more than one condition is met, Microsoft Excel applies only the formats for the first true condition.
- **See whether conditions overlap** If you specify conditions that overlap, Excel applies only the format of the first true condition. For example, if you specify a condition that applies yellow shading to cell values between 100 and 200, inclusive, and then you specify a second condition that applies red shading to cell values below 120, the cell values of 100 through 119.999999999999 will appear with yellow shading. It's best to avoid overlapping conditions.
- **Check cell references** If you used a formula as the formatting criteria, the [cell references](#) in the formula might not be correct.

[The settings I applied in the Conditional Formatting dialog box are now blank.](#)

The current selection might include cells that have two or more types of conditional formatting. The dialog box can display only one set of conditional formatting criteria and cell formats at a time.

Select different cells and check the settings again.

[I can't use some formats as conditional formats.](#)

Cell formats that can change the row height or column width cannot be used as conditional formats.

## Text positioning

 [Diagonal borders are displayed over rotated text.](#)

Do not use the diagonal borders buttons  and  in the **Border** tab (**Cells** dialog box, **Format** menu) to apply borders to cells that contain rotated text. Remove the diagonal borders by selecting the cells and clicking **None**  on the **Border** tab under **Presets**. Then click the **Inside**  and **Outline**  buttons under **Presets**. The borders are applied to the edges of the cells, which are rotated to the same degree as the rotated text.

## Borders and shading

 [Borders aren't displayed the way I want.](#)

**Look at adjacent cells** If you apply borders to a selected cell, the border is also applied to adjacent cells that share a bordered cell boundary. For example, if you apply a box border enclosing the range B1:C5, the cells D1:D5 acquire a left border.

**Check which border was last applied** If you apply two different types of borders to a shared cell boundary, the most recently applied border is displayed.

**Choose the appropriate border type** A selected range of cells is formatted as a single block of cells. If you apply a right border to the range of cells B1:C5, the border is displayed only on the right edge of the cells C1:C5. To display interior borders, use the  button on the **Borders** palette.

**See if borders are separated by a page break** If you want to print the same border on cells that are separated by a page break, but the border appears on only one page, use the **Cells** command (**Format** menu) to apply an inside border. For example, suppose you want to print a border at the bottom of the last row of one page and to use the same border at the top of the first row on the next page. Select the rows on both sides of the page break, and then click **Cells** on the **Format** menu. Click the **Border** tab, and then click the **Inside** button  under **Presets**. Under **Border**, remove the vertical border by clicking it in the preview diagram.

[Show All](#)

# Page Setup

Use the **Page Setup** dialog box to set up layout and print options of a page.

[Page](#)

[Orientation](#)

Choose between landscape and portrait.

[Scaling](#)

Enlarges or reduces the worksheet or selection when you print so that it fits on the specified number of pages. Select the **Fit to** check box, enter a number in the page(s) wide by box, and enter a number in the **tall** box. To fill the paper width and use as many pages as necessary, type 1 in the **pages(s) wide by** box and leave the **tall** box blank.

[Paper size](#)

Click **Letter**, **Legal**, or other size options to indicate the size you want your document or envelope printed.

[Print quality](#)

Click the resolution you want to specify print quality for the active worksheet. Resolution is the number of dots per linear inch (dpi) that appear on the printed page. Higher resolution produces better quality printing in printers that support high-resolution printing.

[First page number](#)

Enter **Auto** to start numbering pages at "1" (if it is the first page of the print job) or at the next sequential number (if it is not the first page of the print job). Enter a number to specify a starting page number other than "1."

[Margin](#)

Enter margin settings and see results in the **Preview** box. Adjust measurements in the **Top**, **Bottom**, **Left**, and **Right** boxes to specify the distance between your data and the edge of the printed page.

[Header or Footer](#)

Enter a number in the **Header** or **Footer** box to adjust the distance between the header and the top of the page or between the footer and the bottom of the page. The distance should be smaller than the margin settings to prevent the header or footer from overlapping the data.

[Center on page](#)

Center the data on the page within the margins by selecting the **Vertically** check box, the **Horizontally** check box, or both.

[Header/Footer](#)

[Header](#)

Click a built-in header in the **Header** box, and then click **Custom Header** to create a custom header for your worksheet. The built-in header is copied to the **Header** dialog box, where you can format or edit the selected header.

[Footer](#)

Click a built-in footer in the **Footer** box, and then click **Custom Footer** to create a custom footer for your worksheet. The built-in footer is copied to the **Footer** dialog box, where you can format or edit the selected footer.

[Sheet](#)

[Print area](#)

Click the **Print area** box to select a worksheet range to print, and then drag through the worksheet areas that you want to print. The **Collapse Dialog** button

at the right end of this box temporarily moves the dialog box so that you enter the range by selecting cells in the worksheet. When you finish, you can click the button again to display the entire dialog box.

[Print titles](#)

Select an option under **Print titles** to print the same columns or rows as titles on every page of a printed worksheet. Select **Rows to repeat** at top if you want specific rows as your horizontal title for each page. Select **Columns to repeat** at left if you want vertical titles on each page. Then on the worksheet, select a cell or cells in the title columns or rows you want. The **Collapse Dialog** button at the right end of this box temporarily moves the dialog box so that you enter the range by selecting cells in the worksheet. When you finish, you can click the button again to display the entire dialog box.

[Print](#)

Specifies what is printed from your worksheet, whether the printout is in color or black and white, and what the print quality is.

[Page order](#)

Click **Down, then over** or **Over, then down** to control the order in which data is numbered and printed when it does not fit on one page. The sample picture previews the direction your document will print when you choose one of these options.

[Show All](#)

# About viewing workbooks and worksheets

A Microsoft Excel workbook is a file that contains one or more [worksheets](#), which you can use to organize various kinds of related information. You can enter and edit data on several worksheets simultaneously and perform calculations based on data from more than one worksheet. When you create a chart, you can place the chart on the same worksheet as its related data or on a separate [chart sheet](#).

You can move from one worksheet or chart sheet to another by clicking the sheet tabs at the bottom of the workbook window. You can color-code your sheet tabs to make them easier to recognize. The tab for the active sheet is underlined in the color you choose; tabs for inactive sheets are fully colored.



## [Viewing different parts of a worksheet at the same time](#)

**Split a worksheet** To view and scroll independently in different parts of a worksheet, you can split a worksheet horizontally and vertically into separate [panes](#). Splitting a worksheet into panes allows you to view different parts of the same worksheet side by side and is useful, for example, when you want to paste data between different areas of a large worksheet. In the following example, you can view the rows for different cities in the upper panes while keeping the February totals visible in the lower panes.

	A	B	C
1	<b>City</b>	<b>Date</b>	<b>Books Sold</b>
2	Chicago	Feb	73
3	Detroit	Feb	58
4	Atlanta	Feb	95
36	Portland	Mar	33
37	Boise	Feb	64
38	Dallas	Feb	18
39	Miami	Feb	41
40	<b>Feb Totals</b>		624

The two right panes scroll together, as do the two lower panes.

**Keep labels or data visible** To keep row and column labels or other data visible as you scroll through a sheet, you can "freeze" the top rows and/or left columns. The frozen rows and columns don't scroll but remain visible as you move through the rest of the worksheet.



	A	B	C
1	<b>City</b>	<b>Date</b>	<b>Books Sold</b>
7	Boise	Mar	84
8	Denver	Mar	38
9	Chicago	Feb	60
10	Dallas	Feb	72
11	Santa Fe	Mar	154

The labels in the first row remain fixed while you scroll the rest of the worksheet vertically.

You cannot both split a worksheet and freeze parts of a worksheet at the same time.

**Note** Split or frozen panes do not automatically show up on each page when the sheet is printed. You must specify any labels you want to print.

### [Creating custom views](#)

You can save a set of display and print settings as a custom view, then apply your custom view at any time. For example, you have a worksheet that contains data about four different sales regions. You can set up a view of each region's data and then save them. When you open the worksheet you can then request a certain view and the data is displayed.

**What can be stored in custom views?** The stored settings include display options, window size and position on the screen, window splits or frozen panes, the sheet that is active, and the cells that are selected at the time the [view](#) is created. You can also optionally save hidden rows, hidden columns, filter settings, and print settings.

The custom view includes the entire workbook. If you hide a sheet before a view is added, Excel hides the sheet when you show the view.

## [Hiding all or part of a workbook](#)

When you hide parts of a workbook, the data is removed from view but is not deleted from the workbook. If you save and close the workbook, the hidden data remains hidden the next time the workbook is opened. If you print the workbook, Microsoft Excel does not print the hidden parts. To prevent others from displaying hidden sheets, rows, or columns, you can protect the workbook or sheet with a password.

**Hide workbooks and sheets** You can hide workbooks and sheets to reduce the number of windows and sheets on the screen and to prevent unwanted changes. For example, you can hide sheets that contain sensitive data, or you can hide a workbook containing [macros](#) so that the macros are available to run but no window appears for the macro workbook. The hidden workbook or sheet data is accessible, and other documents can use the information.

**Hide rows and columns** You can also hide selected rows and columns of data that you aren't using or that you don't want others to see.

**Hide window elements** You can hide most window elements in order to use as much of your screen as possible to display worksheet data. These window elements include the Microsoft Windows taskbar and the Excel title bar, toolbars, formula bar, and status bar. These elements remain hidden only as long as the workbook is open; they are redisplayed when you close the workbook and open it again.

# Change the number of worksheets in a new workbook

1. On the **Tools** menu, click **Options**, and then click the **General** tab.
2. In the **Sheets in new workbook** box, enter the number of sheets you want added by default when you create a new workbook.

# Close workbook windows

To close	Do this
The active workbook window	Click <b>Close</b>  in the upper-right corner of the window. If the window is the only open window of the workbook, the workbook is closed.
All open windows of a workbook	On the <b>File</b> menu, click <b>Close</b>  .
All open workbooks	Hold down SHIFT, and then click <b>Close All</b> on the <b>File</b> menu.

[Show All](#)

# Remove the split from a window or unfreeze a pane

- To restore a window that has been split into two scrollable areas, double-click any part of the split bar that divides the [panes](#).
- To remove non-scrolling "frozen" panes, click **Unfreeze Panes** on the **Window** menu.

# Reset workbook and worksheet settings

1. If you want to keep your Book.xlt or Sheet.xlt files, rename them and save them in the Templates folder, usually located at:

C:\Documents and Settings\*user\_name*\Application Data\Microsoft\Templates

2. Do one or more of the following:
  - In Microsoft Windows Explorer, remove any template files from the XLStart folder. The XLStart folder is usually located at:

C:\Program Files\Microsoft Office\Office11\XLStart

- If the files aren't in the XLStart folder, look in the folder specified in the **At startup, open all files in** box on the **General** tab in the **Options** dialog box (**Tools** menu).
- To restore original settings for workbooks, remove Book.xlt

To restore original settings for worksheets, remove Sheet.xlt

[Show All](#)

# Switch to full or normal screen view

## Switch to full screen view

On the **View** menu, click **Full Screen**.

## Switch back to normal view

On the **Full Screen** [toolbar](#), click **Close Full Screen**.

**Note** If you've hidden the **Full Screen** toolbar, you can restore the toolbars and hidden elements by clicking **Full Screen** on the **View** menu.

[Show All](#)

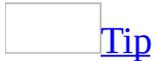
# View multiple sheets or workbooks at the same time

1. Open the workbooks you want to view.

To view multiple sheets in the active workbook, click **New Window** on the **Window** menu. Switch to the new window, and then click a sheet you want to view. Repeat for each sheet you want to view.

2. On the **Window** menu, click **Arrange**.
3. Under **Arrange**, click the option you want.

To view sheets in only the active workbook, select the **Windows of active workbook** check box.



To restore a workbook window to full size, click **Maximize**  at the upper-right corner of the workbook window.

[Show All](#)

# View two parts of a sheet by splitting or freezing panes

## Split panes

1. At the top of the vertical scroll bar or at the right end of the horizontal scroll bar, point to the split box.



2. When the pointer changes to a split pointer  $\frac{\updownarrow}{\leftarrow\rightarrow}$ , drag the split box down or to the left to the position you want.

## Freeze panes

Freezing [panes](#) allows you to select data that remains visible when scrolling in a sheet. For example, keeping row and column labels visible as you scroll.

	A	B	C	
1	<b>City</b>	<b>Date</b>	<b>Books Sold</b>	
7	Boise	Mar	84	
8	Denver	Mar	38	
9	Chicago	Feb	60	
10	Dallas	Feb	72	
11	Santa Fe	Mar	154	

1. To freeze a pane, do one of the following:

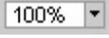
**The top horizontal pane** Select the row below where you want the split to appear.

**The left vertical pane** Select the column to the right of where you want the split to appear.

**Both the upper and left panes** Click the cell below and to the right of where you want the split to appear.

2. On the **Window** menu, click **Freeze Panes**.

# Zoom the display

In the **Zoom** box , click the size you want, or enter a number from 10 to 400.

To enlarge the selected area to fill the window, click **Selection**.

**Note** Zooming in or out does not affect printing. Sheets are printed at 100 percent unless you change the scaling on the **Page** tab of the **Page Setup** dialog box (**File** menu).

[Show All](#)

# Compare workbooks side by side

1. Open the workbooks you want to compare side by side.
2. On the **Window** menu, click **Compare Side by Side with**.
3. On the **Compare Side by Side toolbar**, do any of the following:
  - If you want to scroll through the workbooks at the same time, click **Synchronous Scrolling** .
  - If you want to reset the workbook windows to the positions they were in when you first started comparing workbooks, click **Reset Window Position** .
4. Click **Close Side by Side** to stop comparing workbooks.

**Note** If you open two workbooks, the command on the **Window** menu will include the filename of one of those workbooks. For example, you open "workbook1.xls" and "workbook2.xls". While viewing "workbook1.xls", the **Window** menu shows the command as **Compare Side by Side with workbook2.xls**.



If you've closed the **Compare Side by Side** toolbar but you want to show it again, click **Customize** on the **Tools** menu, click the **Toolbars** tab, and then select **Compare Side by Side** in the **Toolbars** list.

[Show All](#)

# Create or delete custom views

**Before you create a view** Set up the workbook to appear the way you want to view and print it. If you include print settings in a view, the view includes the defined [print area](#), or the entire worksheet if the sheet has no defined print area.

## [Create a custom view](#)

1. Change the settings that you want to save in the view.
2. On the **View** menu, click **Custom Views**.
3. Click **Add**.
4. In the **Name** box, type a name for the [view](#).

Make sure to include the active sheet name in the name of a view to make it easier to identify. When you display a view, Microsoft Excel switches to the sheet that was active when you created the view. Excel lists all views in the workbook in the **Custom Views** dialog box.

5. Under **Include in view**, select the options you want.

## [Delete a custom view](#)

1. On the **View** menu, click **Custom Views**.
2. In the **Views** box, click the name of the [view](#) you want, and then click **Delete**.

[Show All](#)

# Display a custom view

1. On the **View** menu, click **Custom Views**.
2. In the **Views** box, click the name of the [view](#) you want.
3. Click **Show**.

[Show All](#)

# Print a custom view

1. On the **View** menu, click **Custom Views**.
2. In the **Views** box, click the name of the [view](#) you want to print.
3. Click **Show**.
4. Click **Print** .

**Note** Microsoft Excel saves previously defined [print areas](#) for each sheet in the workbook with your view. If a sheet has no defined print areas, Microsoft Excel prints the entire worksheet.

# About filling in data based on adjacent cells

You can quickly fill in several types of data series by selecting cells and dragging the fill handle or by using the **Series** command (point to **Fill** on the **Edit** menu, and then click **Series**).



**Copy data within a row or column** By dragging the fill handle of a cell, you can copy the contents of a cell to other cells in the same row or column.

**Fill in a series of numbers, dates, or other items** Microsoft Excel can automatically continue a series of numbers, number/text combinations, dates, or time periods based on a pattern you establish. For example, the initial selections in the following table are extended as shown. Items separated by commas are in adjacent cells.

<b>Initial selection</b>	<b>Extended series</b>
1, 2, 3	4, 5, 6
9:00	10:00, 11:00, 12:00
Mon	Tue, Wed, Thu
Monday	Tuesday, Wednesday, Thursday
Jan	Feb, Mar, Apr
Jan, Apr	Jul, Oct, Jan
Jan-99, Apr-99	Jul-99, Oct-99, Jan-00
15-Jan, 15-Apr	15-Jul, 15-Oct
1999, 2000	2001, 2002, 2003
1-Jan, 1-Mar	1-May, 1-Jul, 1-Sep,...
Qtr3 (or Q3 or Quarter3)	Qtr4, Qtr1, Qtr2,...
text1, textA	text2, textA, text3, textA,...
1st Period	2nd Period, 3rd Period,...
Product 1	Product 2, Product 3,...

If the selection contains numbers, you can control whether to create a linear series or a growth series.

**Create a custom fill series** You can create a custom fill series for frequently used text entries, such as your company's sales regions.

[Show All](#)

# Create, change, or delete a custom fill series

A custom fill series is a set of data that is used to fill a column in a repeating pattern; for example, North, South, East, West. You can create a custom fill series from existing items that you've listed on a worksheet, or you can type the list from scratch.

## [Create a custom fill series](#)

1. If you've already entered the list of items you want to use as a series, select the list on the worksheet.
2. On the **Tools** menu, click **Options**, and then click the **Custom Lists** tab.
3. Do one of the following:
  - To use the selected list, click **Import**.
  - To type a new list, select **New list** in the **Custom lists** box, and then type the entries in the **List entries** box, beginning with the first entry. Press ENTER after each entry. When the list is complete, click **Add**.

**Note** A custom list can contain text or text mixed with numbers. To create a custom list that contains only numbers, such as 0 through 100, first select enough empty cells to contain the list. On the **Format** menu, click **Cells**, and then click the **Number** tab. Apply the **Text** format to empty cells, and then type the list of numbers in the formatted cells. Select the list and then import the list.

## [Change or delete a custom fill series](#)

You cannot edit or delete the built-in lists for months and days.

1. On the **Tools** menu, click **Options**, and then click the **Custom Lists** tab.
2. In the **Custom lists** box, select the list you want.
3. Do one of the following:

To edit the list, make the changes you want in the **List entries** box, and then click **Add**.

To delete the list, click **Delete**.

# Change which cell is selected next

When you press ENTER to finish working in a cell, Microsoft Excel moves you to an adjacent cell or leaves you in the current cell.

1. On the **Tools** menu, click **Options**, and then click the **Edit** tab.
2. To move to an adjacent cell, select the **Move selection after Enter** check box, and then select a direction in the **Direction** box. To stay in the current cell, clear the check box.

[Show All](#)

# Insert a symbol

You can use the **Symbol** dialog box to enter symbols that are not on your keyboard, as well as [Unicode](#) characters.

If you're using an expanded font, such as Arial or Times New Roman, the **Subset** list appears. Use this list to choose from an extended list of language characters, including Greek and Russian (Cyrillic), if available.

[Insert a symbol](#)

1. Click where you want to insert the symbol.
2. On the **Insert** menu, click **Symbol**, and then click the **Symbols** tab.
3. In the **Font** box, click the font that you want.
4. Double-click the symbol that you want to insert.
5. Click **Close**.

[Insert a Unicode character](#)

When you select a Unicode character in the **Symbol** dialog box, its character code appears in the **Character code** box. If you already know the character code, you can type it directly into the **Character code** box to find the Unicode character.

The name displayed before the **Character code** box is the official character name in the Unicode 3.0 standard.

1. Click where you want to insert the Unicode character.
2. On the **Insert** menu, click **Symbol**, and then click the **Symbols** tab.
3. In the **Font** box, click the font that you want.
4. In the **From** box, click **Unicode**.

The set of characters is limited if you select something other than Unicode in the **From** box. For example, if you select a local code page rather than Unicode, you will see a correspondingly reduced set of characters in the **Symbol** dialog box.

5. If the **Subset** box is available, click a subcategory.
6. Double-click the symbol that you want to insert.
7. Click **Close**.

## Notes

- You can increase or decrease the size of the **Symbol** dialog box. Move the pointer to the lower-right corner of the dialog box until it changes into a double-headed arrow, and then drag to the desired size.
- You can quickly insert a recently used symbol by double-clicking a symbol in the **Recently used symbols** box, and then clicking **Close**.

[Show All](#)

# Stop automatically completing file names and URLs

If you have [Microsoft Internet Explorer](#) 4.0 or later, you can turn off the feature that automatically suggests a match for file names and [URLs](#) as you type them. This affects entries in the **Insert Hyperlink** and **Open** dialog boxes in Microsoft Excel and also URLs in Internet Explorer and any other Microsoft Office programs you have.

1. Start Internet Explorer.
2. On the **Tools** menu, click **Internet Options**, and then click the **Advanced** tab.
3. Under **Browsing**, clear one of the following check boxes:
  - If you have Internet Explorer 4, clear the **Use AutoComplete** check box.
  - If you have Internet Explorer 5, clear the **Use inline AutoComplete in integrated shell** check box.
  - If you have Internet Explorer 6, clear the **Use inline AutoComplete** check box.

# Turn on or off automatic completion of cell entries

1. On the **Tools** menu, click **Options**, and then click the **Edit** tab.
2. Select or clear the **Enable AutoComplete for cell values** check box.

# Turn on or off drag-and-drop editing

1. On the **Tools** menu, click **Options**, and then click the **Edit** tab.
2. Select or clear the **Allow cell drag and drop** check box.

# Turn on or off the message about overwriting non-blank cells

1. On the **Tools** menu, click **Options**, and then click the **Edit** tab.
2. To display a message, if dragging a selection or its fill handle would result in the loss of existing data, select the **Alert before overwriting cells** check box.

To suppress the message, clear the check box.

[Show All](#)

# Troubleshoot entering and selecting data

## Entering data

[Numbers, dates, and times aren't displayed correctly.](#)

**Number formats** Microsoft Excel displays numbers, dates, and times on a worksheet according to the number format applied to the cells. To change the number format, select the cells. On the **Format** menu, click **Cells**, click the **Number** tab, and then click the category and format you want. To use the default date format, click the cell and press CTRL+SHIFT+#. To use the default time format, press CTRL+SHIFT+@.

**Regional settings** Options you select in the Regional Settings of Control Panel determine the default format for currency, dates, times, and numbers.

[The symbols ##### appear in place of a number.](#)

A ##### error value occurs when the cell contains a number, date, or time that is wider than the cell or when the cell contains a date or time formula that produces a negative result. Try increasing the width of the column.

[The dates on my worksheet don't all look the same.](#)

When a date is entered in a cell, the date appears in either a default date format or in a format that was applied to the cell before the date was entered. The default date format is based on settings on the **Date** tab in the **Regional Settings** dialog box (Microsoft Windows Control Panel). If these date settings have changed, any existing dates in your workbooks that have not been formatted with the **Format Cells** command also change.

[Some of the text I type in a cell doesn't show.](#)

To display multiple lines of text inside selected cells, click **Cells** on the **Format** menu, click the **Alignment** tab, and then select the **Wrap text** check box. If the text is a single long word, the characters won't wrap; you can widen the column or shrink the font size to see all the text.

 [Microsoft Excel doesn't always complete my column entries.](#)

**Make sure AutoComplete is turned on** On the **Tools** menu, click **Options**, click the **Edit** tab, and then make sure the **Enable AutoComplete for cell values** check box is selected.

**Check where you last clicked** Click after the last character in the cell. Excel completes an entry only when the insertion point is at the end of the current cell contents.

**Make sure entries match** The characters you typed might not match an existing entry in the column, or the characters might match two or more entries. For example, if you type **AXY** and the possible entries are "AXY1" and "AXY2," Microsoft Excel does not complete the entry.

**Select the correct entry** To select the entry you want, press ALT+DOWN ARROW and select an entry from the list, or right-click the cell and then click **Pick from list** on the [shortcut menu](#).

**Entries in a row** Excel bases the list of potential entries on the column that contains the [active cell](#). If your entries are repeated within a row, not a column, the entries are not completed.

**Numbers, dates, and times** Excel completes only text entries. Entries that contain only numbers, dates, and times are not completed.

**The current data region** Check the location of the active cell; it may be outside the current [data region](#). For example, if the data region is the range of cells A1:E10, Excel completes an entry typed in cell A11, even if the cell A10 above it is blank. However, Excel does not complete an entry in cell A12, because that cell is outside the data region.

**Long lists** If you are working in a large list, you may need to pause a moment to allow Excel time to complete an entry.

[The fill handle is missing.](#)

On the **Tools** menu, click **Options**, click the **Edit** tab, and then make sure the **Allow cell drag and drop** check box is selected. If the entire row or column is selected, Excel displays the fill handle at the beginning of the row or column.

[I wanted to copy a value, not extend a series.](#)

If you copy types of data that Excel can extend in a series, such as numbers, dates, or items in a custom fill series, the values are incremented instead of copied through the selected range. If this occurs, select the original values again, and then hold down CTRL as you drag the fill handle.

[Information is deleted when I drag the fill handle.](#)

If you drag the fill handle up or to the left of a selection and stop in the selected cells without going past the first column or the top row in the selection, Excel deletes data within the selection. You must drag the fill handle out of the selected area before releasing the mouse button.

[When I apply the Text format to numbers, the numbers don't change to text.](#)

If you've already entered the numbers and applied the Text format to the cells, click each cell, press F2, and then press ENTER to reenter the numbers as text. To enter numbers as text, first apply the Text format to empty cells, and then enter the numbers in the formatted cells.

## Selecting and moving data

[Sheet tabs aren't listed across the bottom of the screen.](#)

### Display or hide all sheet tabs

1. On the **Tools** menu, click **Options**, and then click the **View** tab.
2. Select or clear the **Sheet tabs** check box. When displaying sheet tabs, you may also need to expand the tab scrolling area.



### Display more or fewer sheet tabs

1. Point to the tab split bar.



2. When the pointer changes to a split pointer  $\leftrightarrow$ , drag the tab split bar to the right or left.

To return the tab split bar to its original position, double-click the tab split bar.

[Tip](#)

You can activate a sheet by right-clicking any tab scrolling button and then selecting the sheet you want from the shortcut menu.

[If the sheet names are cut off or difficult to read](#)

Increase the scroll bar height. In the Microsoft Windows Control Panel, double-click the **Display** icon, click the **Appearance** tab, click **Scrollbar** in the **Item** list, and then increase the number in the **Size** box.

[Arrow keys and keys such as PAGE UP, HOME, and SHIFT+TAB don't do what I expect.](#)

The keys may be performing the equivalent action in Lotus 1-2-3. On the **Tools** menu, click **Options**, and then click the **Transition** tab. Clear the **Transition navigation keys** check box, and then try to use the keys again.

If you want the active selection to move as you scroll through a worksheet, make sure [scroll lock](#) is off. If scroll lock is on, you can use the navigation keys without affecting the current selection.

Make sure that End mode is off. END appears in the status line when the End mode is on.

[More than one sheet is selected. How do I select only one?](#)

When you enter or change data, the changes affect all selected sheets. These changes may replace data on the active sheet and other selected sheets.

### To select

### Do this

Click the sheet tab.



A single sheet

If you don't see the tab you want, click the tab scrolling buttons to display the tab, and then click the tab.



Two or more adjacent sheets

Click the tab for the first sheet, and then hold down SHIFT and click the tab for the last sheet.

Two or more nonadjacent sheets

Click the tab for the first sheet, and then hold down CTRL and click the tabs for the other sheets.

All sheets in a workbook

Right-click a sheet tab, and then click **Select All Sheets** on the [shortcut menu](#).

**Note** If sheet tabs have been color-coded, the sheet tab name will be underlined in a user-specified color when selected. If the sheet tab is displayed with a background color, the sheet has not been selected.

[Cancel a selection of multiple sheets](#)

To cancel a selection of multiple sheets in a workbook, click any unselected sheet.

If no unselected sheet is visible, right-click the tab of a selected sheet. Then click **Ungroup Sheets** on the shortcut menu.

[When I try to add cells to my selection, my original selection is cancelled.](#)

Hold down SHIFT and click the last cell you want to include in the new selection. The rectangular range between the [active cell](#) and the cell you click becomes the new selection.

To select additional nonadjacent cells or cell ranges, hold down CTRL and click or drag over the cells.

[The selected area grows when I click a cell or press keys to move around.](#)

If "EXT" appears in the [status bar](#), press F8 to turn off the extend-selection option.

[When I press ENTER, the wrong data is inserted.](#)

If you've recently used the **Copy** command on the **Edit** menu or the **Copy** button , check if a [moving border](#) still surrounds the [copy area](#). If so, Microsoft Excel inserted them at the [active cell](#) when you pressed ENTER. To remove the moving border, press ESC.

# About single-mapped cells

**Note** XML features, except for saving files in the XML Spreadsheet format, are available only in Microsoft Office Professional Edition 2003 and Microsoft Office Excel 2003.

A single-mapped cell is cell that has been mapped to an non-repeating XML element.

## **Create a single-mapped cell**

A single-mapped cell is created by dragging a non-repeating XML element from the XML Source task pane onto your worksheet.

When you drag a non-repeating XML element onto the worksheet, you can choose to include the element name as a heading above or just to the left of the single-mapped cell. Or, you can use an existing cell value as a heading.

## Use a Formula in an single-mapped cell

You can use a formula in an single-mapped cell if the cell is mapped to an XML element with an XML Schema Definition (XSD) data type that Excel interprets as a number, date, or time. See [XML Schema Definition \(XSD\) data type support](#) for more information about how Microsoft Excel supports XSD data types.

## Hide the border of a single-mapped cell

By default, a single-mapped cell is displayed with a border. To turn off the border, click **List** on the **Data** menu, and then click **Hide Border of Inactive Lists**.

**Note** This setting affects all Excel lists, XML lists, and single-mapped cells in the workbook. You cannot hide the border of a particular single-mapped cell.

[Show All](#)

# Format Cells

Use the **Format Cells** dialog box to format a selected cell.

[Number](#)

[Category](#)

Click an option in the **Category** box, and then select the options that you want to specify a number format. The **Sample** box shows how selected cells will look with the formatting you choose. Click **Custom** if you want to create your own custom formats for numbers, such as product codes.

[Sample](#)

Shows how your document will look with the options you select.

[Alignment](#)

[Horizontal](#)

Select an option in the **Horizontal** list box to change the horizontal alignment of cell contents. By default, Microsoft Excel aligns text to the left, numbers to the right, and logical and error values are centered. The default horizontal alignment is **General**. Changing the alignment of data does not change the data type.

[Vertical](#)

Select an option in the **Vertical** box to change the vertical alignment of cell contents. By default, Microsoft Excel aligns text vertically on the bottom of a cell. The default horizontal alignment is **General**.

[Indent](#)

Indents cell contents from any edge of the cell, depending on your choice under

**Horizontal** and **Vertical**. Each increment in the **Indent** box is equivalent to the width of one character.

[\*\*Orientation\*\*](#)

Select an option under **Orientation** to change the orientation of text in selected cells. Rotation options may not be available if other alignment options are selected.

[\*\*Degrees\*\*](#)

Sets the amount of text rotation in the selected cell. Use a positive number in the **Degree** box to rotate the selected text from lower left to upper right in the cell. Use negative degrees to rotate text from upper left to lower right in the selected cell.

[\*\*Text control\*\*](#)

Select options under **Text** control to adjust how you want text to appear in a cell.

[\*\*Wrap text\*\*](#)

Wraps text into multiple lines in a cell. The number of wrapped lines is dependent on the width of the column and the length of the cell contents.

[\*\*Shrink to fit\*\*](#)

Reduces the apparent size of font characters so that all data in a selected cell fits within the column. The character size is adjusted automatically if you change the column width. The applied font size is not changed.

[\*\*Merge cells\*\*](#)

Combines two or more selected cells into a single cell. The cell reference for a merged cell is the upper-left cell in the original selected range.

[\*\*Right-to-left\*\*](#)

Select an option in the **Text** direction box to specify reading order and alignment.

[Font](#)

Select the font type, font style, font size, other formatting options for the selected text.

[Size](#)

You can type any number between 1 and 1638. The sizes in the **Size** list depend on the selected font and active printer.

[Normal font](#)

Select the **Normal Font** check box to reset the font, font style, size, and effects to the **Normal** (default) style.

[Border](#)

[Presets](#)

Select border options under **Presets** to apply borders to or remove borders from selected cells.

[Line](#)

Select an option under **Style** to specify the line size and style for a border. If you want to change a line style on a border that already exists, select the line style option you want, and then click the area of the border in the **Border** model where you want the new line style to appear.

[Color](#)

Select a color from the list to change the color of the selected text or object.

[Border](#)

Click a line style in the **Style** box, and then click the buttons under **Presets** or **Border** to apply borders to the selected cells. To remove all borders, click the **None** button. You can also click areas in the text box to add or remove borders.

[Pattern](#)

[Cell shading](#)

Select a background color in the **Color** box, then select a pattern in the **Pattern** box to format the selection with color patterns.

[Protection](#)

[Locked](#)

Prevents selected cells from being changed, moved, resized, or deleted. Locking cells has no effect unless the sheet is protected. To protect a sheet, point to **Protection** on the **Tools** menu, click **Protect sheet**, and then select the **Contents** check box.

[Hidden](#)

Hides a formula in a cell so that it doesn't appear in the formula bar when the cell is selected. If you select this option, it has no effect unless the sheet is protected. To protect a sheet, point to **Protection** on the **Tools** menu, click **Protect sheet**, and then select the **Contents** check box.

[Show All](#)

# Enter data in worksheet cells

## [Enter numbers, text, a date, or a time](#)

1. Click the cell where you want to enter data.
2. Type the data and press ENTER or TAB.

### Numbers and text in a list

1. Enter data in a cell in the first column, and then press TAB to move to the next cell.
2. At the end of the row, press ENTER to move to the beginning of the next row.
3. If the cell at the beginning of the next row doesn't become active, click **Options** on the **Tools** menu, and then click the **Edit** tab. Under **Settings**, select the **Move selection after Enter** check box, and then click **Down** in the **Direction** box.

**Dates** Use a slash or a hyphen to separate the parts of a date; for example, type **9/5/2002** or **5-Sep-2002**. To enter today's date, press CTRL+; (semicolon).

**Times** To enter a time based on the 12-hour clock, type a space and then **a** or **p** after the time; for example, **9:00 p**. Otherwise, Microsoft Excel enters the time as AM. To enter the current time, press CTRL+SHIFT+: (colon).

## [Enter numbers with a fixed number of decimal places or trailing zeros](#)

1. On the **Tools** menu, click **Options**, and then click the **Edit** tab.
2. Select the **Fixed decimal** check box.
3. In the **Places** box, enter a positive number of digits to the right of the decimal point or a negative number for digits to the left of the decimal point.

For example, if you enter **3** in the **Places** box and then type 2834 in the cell, the value will be 2.834. If you enter **-3** in the **Places** box and then type 283, the value will be 283000.

Data you entered before selecting the **Fixed decimal** option is not affected.

 [Tip](#)

To temporarily override the **Fixed decimal** option, type a decimal point when you enter the number.

 [Enter the same data into several cells at once](#)

1. Select the cells where you want to enter data. The cells do not have to be adjacent.
2. Type the data and press CTRL+ENTER.

 [Enter or edit the same data on multiple worksheets](#)

When you select a group of sheets and then change data on one of them, the same changes are applied to all the selected sheets. Data may be replaced in the process.

1. Select the worksheets where you want to enter data.

 [How?](#)

When you enter or change data, the changes affect all selected sheets. These changes may replace data on the active sheet and other selected sheets.

**To select**

**Do this**

Click the sheet tab.



A single sheet

If you don't see the tab you want, click the tab scrolling buttons to display the tab, and then click the tab.



Two or more

Click the tab for the first sheet, and then hold down

adjacent sheets	SHIFT and click the tab for the last sheet.
Two or more nonadjacent sheets	Click the tab for the first sheet, and then hold down CTRL and click the tabs for the other sheets.
All sheets in a workbook	Right-click a sheet tab, and then click <b>Select All Sheets</b> on the <a href="#">shortcut menu</a> .

**Note** If sheet tabs have been color-coded, the sheet tab name will be underlined in a user-specified color when selected. If the sheet tab is displayed with a background color, the sheet has not been selected.

### [Cancel a selection of multiple sheets](#)

To cancel a selection of multiple sheets in a workbook, click any unselected sheet.

If no unselected sheet is visible, right-click the tab of a selected sheet. Then click **Ungroup Sheets** on the shortcut menu.

2. Select the cell or cell range where you want to enter data.
3. Type or edit the data in the first selected cell.
4. Press ENTER or TAB.

**Note** To cancel a selection of multiple sheets, click any unselected sheet. If no unselected sheet is visible, right-click the tab of a selected sheet, and then click **Ungroup Sheets** on the [shortcut menu](#).

### [Automatically fill in repeated entries in a column](#)

If the first few characters you type in a cell match an existing entry in that column, Microsoft Excel fills in the remaining characters for you. Excel completes only those entries that contain text or a combination of text and numbers; entries that contain only numbers, dates, or times are not completed.

- To accept the proposed entry, press ENTER. The completed entry exactly matches the pattern of uppercase and lowercase letters of the existing entries.
- To replace the automatically entered characters, continue typing.
- To delete the automatically entered characters, press BACKSPACE.

- To select from a list of entries already in the column, right-click the cell, and then click **Pick from List** on the [shortcut menu](#).

### [Fill in a series of numbers, dates, or other items](#)

1. Select the first cell in the range you want to fill.
2. Enter the starting value for the series.
3. Enter a value in the next cell to establish a pattern.

### [How?](#)

- If you want the series 2, 3, 4, 5..., enter 2 and 3 in the first two cells. If you want the series 2, 4, 6, 8..., enter 2 and 4. If you want the series 2, 2, 2..., you can leave the second cell blank.
  - To specify the type of series, use the right mouse button to drag the fill handle over the range, and then click the appropriate command on the [shortcut menu](#). For example, if the starting value is the date JAN-2002, click **Fill Months** for the series FEB-2002, MAR-2002, and so on; or click **Fill Years** for the series JAN-2003, JAN-2004, and so on.
  - To manually control how the series is created, or use the keyboard to fill in a series, use the **Series** command on the shortcut menu.
4. Select the cell or cells that contain the starting values.
  5. Drag the fill handle over the range you want to fill.



To fill in increasing order, drag down or to the right.

To fill in decreasing order, drag up or to the left.

### [Enter the same data in other worksheets](#)

If you've already entered data on one worksheet, you can quickly copy the data to corresponding cells on other sheets.

1. Select the sheet that contains the data and the sheets to which you want to copy the data.
2. Select the cells that contain the data you want to copy.

3. On the **Edit** menu, point to **Fill**, and then click **Across Worksheets**.

[Show All](#)

# Allow editing directly in a cell or restrict editing to the formula bar

1. On the **Tools** menu, click **Options**, and then click the **Edit** tab.
2. To allow editing and typing data in cells, select the **Edit directly in cell** check box.

To allow editing and typing data only in the [formula bar](#), clear the check box.

[Show All](#)

# Scroll through a worksheet

To move between cells on a worksheet, click any cell or use the arrow keys. When you move to a cell, it becomes the [active cell](#). To see a different area of the sheet, use the scroll bars.

<b>To scroll</b>	<b>Do this</b>
One row up or down	Click the arrows in the vertical scroll bar.
One column left or right	Click the arrows in the horizontal scroll bar.
One window up or down	Click above or below the scroll box in the vertical scroll bar.
One window left or right	Click to the left or right of the scroll box in the horizontal scroll bar.
A large distance	Drag the scroll box to the approximate relative position. In a very large worksheet, hold down SHIFT while dragging.

**Note** The size of a scroll box indicates the proportional amount of the used area of the sheet that is visible in the window. The position of a scroll box indicates the relative location of the visible area within the worksheet.

## [Scroll and zoom with the mouse](#)

You can move around and zoom on your worksheet or chart sheet by using the Microsoft IntelliMouse pointing device. For information about changing options and viewing troubleshooting tips for the Microsoft IntelliMouse, see the IntelliPoint Online User's Guide. (Click the Microsoft Windows **Start** button, point to **Programs**, and then point to **Microsoft Input Devices**.)

<b>To</b>	<b>Do this</b>
Scroll up or down a few rows at a time	Rotate the wheel forward or back.

Pan through a worksheet	Hold down the wheel button, and drag the pointer away from the origin mark  in the direction you want to scroll. To speed up scrolling, drag away from the origin mark; to slow down scrolling, drag toward the origin mark.
Pan through a worksheet automatically	Click the wheel button, and then move the mouse in the direction you want to scroll. To speed up scrolling, drag away from the origin mark; to slow down scrolling, drag toward the origin mark. To stop automatic scrolling, click any mouse button.
Zoom in or out	Hold down CTRL, and then rotate the IntelliMouse wheel forward or back.
Show detail in <a href="#">outlines</a>	Point to a cell that summarizes data in the outline, hold down SHIFT, and then roll the wheel forward.
Hide detail in outlines	Point to any cell that contains detail data, hold down SHIFT, and then roll the wheel back.

 [Tip](#)

If you use the Microsoft IntelliMouse pointing device to zoom more often than you use it to scroll on a sheet, you can set the wheel button to zoom instead of scroll. On the **Tools** menu, click **Options**, click the **General** tab, and then select the **Zoom on roll with IntelliMouse** check box.

[Show All](#)

# Select data or cells

## To select

## Do this

Text in a cell

If editing in a cell is turned on, select the cell, double-click in it, and then select the text in the cell.

If editing in a cell is turned off, select the cell, and then select the text in the formula bar.



A single cell

Click the cell, or press the arrow keys to move to the cell.

A [range](#) of cells

Click the first cell of the range, and then drag to the last cell.

A large range of cells

Click the first cell in the range, and then hold down SHIFT and click the last cell in the range. You can scroll to make the last cell visible.

Click the **Select All** button.

All cells on a worksheet

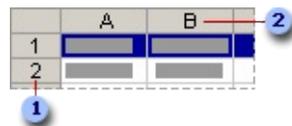


Nonadjacent cells or cell ranges

Select the first cell or range of cells, and then hold down CTRL and select the other cells or ranges.

Click the row or column heading.

An entire row or column



Adjacent rows or columns

Drag across the row or column headings. Or select the first row or column; then hold down SHIFT and select the last row or column.

Nonadjacent rows or

Select the first row or column, and then hold down CTRL and

columns            select the other rows or columns.

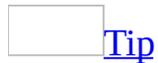
More or fewer    Hold down SHIFT and click the last cell you want to include in  
cells than the    the new selection. The rectangular range between the [active cell](#)  
active selection and the cell you click becomes the new selection.

Cancel a  
selection of        Click any cell on the worksheet.  
cells

[Show All](#)

# Select named ranges or cell references

To select	Do this
A named <a href="#">range</a> of cells	In the <a href="#">Name box</a> , select the range.
Two or more named ranges	In the <b>Name</b> box, select the first range, and then hold down CTRL and select the other ranges.
Specific cells not in a named range	On the <b>Edit</b> menu, click <b>Go To</b> . In the <b>Reference</b> box, type the <a href="#">cell reference</a> for the cell or range of cells.



Microsoft Excel keeps track of the named ranges you have selected. To return to a previous selection, click **Go To** on the **Edit** menu, and then double-click the cell reference in the **Go To** box.

[Show All](#)

# Select sheets

When you enter or change data, the changes affect all selected sheets. These changes may replace data on the active sheet and other selected sheets.

## To select

## Do this

Click the sheet tab.



A single sheet

If you don't see the tab you want, click the tab scrolling buttons to display the tab, and then click the tab.



Two or more adjacent sheets

Click the tab for the first sheet, and then hold down SHIFT and click the tab for the last sheet.

Two or more nonadjacent sheets

Click the tab for the first sheet, and then hold down CTRL and click the tabs for the other sheets.

All sheets in a workbook

Right-click a sheet tab, and then click **Select All Sheets** on the [shortcut menu](#).

**Note** If sheet tabs have been color-coded, the sheet tab name will be underlined in a user-specified color when selected. If the sheet tab is displayed with a background color, the sheet has not been selected.



## [Cancel a selection of multiple sheets](#)

To cancel a selection of multiple sheets in a workbook, click any unselected sheet.

If no unselected sheet is visible, right-click the tab of a selected sheet. Then click **Ungroup Sheets** on the shortcut menu.

[Show All](#)

# Select cells containing specific data

1. To select all cells of this type on the active worksheet, click any cell.

Select the [range](#) that includes the type of cells you want to select.

2. On the **Edit** menu, click **Go To**.
3. Click **Special**.
4. Do one of the following:
  - To select blank cells, click **Blanks**.
  - To select cells that contain comments, click **Comments**.
  - To select cells that contain [constants](#), click **Constants**.
  - To select only cells that are visible in a range that crosses hidden rows or columns, click **Visible cells only**.
  - To select the [current region](#), such as an entire list, click **Current region**.

[To select a range of filled-in cells in a row or column](#)

1. Click the first or last cell in the range.
2. Hold down SHIFT and double-click the side of the [active cell](#) in the direction that you want to select.

For example, to select the range of filled-in cells above the active cell, double-click the top of the cell. The selection extends only to the next blank cell in the row or column.

[To select named ranges or cell references](#)

To select	Do this
A named <a href="#">range</a> of cells	In the <a href="#">Name box</a> , select the range.
Two or more named ranges	In the <b>Name</b> box, select the first range, and then hold down CTRL and select the other ranges.
Specific cells not in a named range	On the <b>Edit</b> menu, click <b>Go To</b> . In the <b>Reference</b> box, type the <a href="#">cell reference</a> for the cell or range of cells.



Tip

Microsoft Excel keeps track of the named ranges you have selected. To return to a previous selection, click **Go To** on the **Edit** menu, and then double-click the cell reference in the **Go To** box.

# Show or hide the total row in a list

- Click **Toggle Total Row**  on the **List** toolbar. This will display the total row if it is not displayed and will hide the total row if it is displayed in the list.

# Change the separator for thousands and decimals

1. On the **Tools** menu, click **Options**, and then click the **International** tab.
2. Under **Number Handling**, clear the **Use system separators** check box.
3. Type new separators in the **Decimal separator** and **Thousands separator** boxes.

# Clear cell formats or contents

When you clear cells, you remove the cell contents (formulas and data), formats (including number formats, conditional formats, and borders), or comments, but you leave the blank cells on the worksheet. When you delete cells by clicking **Delete** on the **Edit** menu, Microsoft Excel removes them from the worksheet and shifts the surrounding cells to fill the space.

1. Select the cells, rows, or columns you want to clear of formats or contents.
2. On the **Edit** menu, point to **Clear**, and then click **Formats** or **Contents**.

You can clear formats and contents by clicking **All**. This also removes any cell comments and data validation.

## Notes

- If you click a cell and then press **DELETE** or **BACKSPACE** on the keyboard, Excel removes the cell contents but does not remove comments or cell formats.
- If you clear a cell, the value of a cleared cell is 0 (zero), and a formula that refers to that cell receives a value of 0.

[Show All](#)

# Delete cells, rows, or columns

1. Select the cells, rows, or columns you want to delete.
2. On the **Edit** menu, click **Delete**.
3. If you are deleting a [range](#) of cells, click **Shift cells left**, **Shift cells up**, **Entire row**, or **Entire column** in the **Delete** dialog box.

**Note** Microsoft Excel keeps formulas up to date by adjusting references to the shifted cells to reflect their new locations. However, a formula that refers to a deleted cell displays the #REF! error value.

[Show All](#)

# Edit cell contents

1. Double-click the cell that contains the data you want to edit.
2. Edit the cell contents.
3. To enter or cancel your changes, press ENTER or ESC.

## Tips

- To turn editing directly in cells on or off, click **Options** on the **Tools** menu, click the **Edit** tab, and then select or clear the **Edit directly in cell** check box. You can edit in the formula bar when the **Edit directly in cell** check box is cleared.
- To move your cursor to the end of the cell contents, select the cell and press F2.

[Show All](#)

# Insert blank cells, rows, or columns

1. Do one of the following:

**Insert new blank cells** Select a [range](#) of cells where you want to insert the new blank cells. Select the same number of cells as you want to insert.

**Insert a single row** Click a cell in the row immediately below where you want the new row. For example, to insert a new row above row 5, click a cell in row 5.

**Insert multiple rows** Select rows immediately below where you want the new rows. Select the same number of rows as you want to insert.

**Insert a single column** Click a cell in the column immediately to the right of where you want to insert the new column. For example, to insert a new column to the left of column B, click a cell in column B.

**Insert multiple columns** Select columns immediately to the right of where you want to insert the new columns. Select the same number of columns as you want to insert.

2. On the **Insert** menu, click **Cells**, **Rows**, or **Columns**.
3. If you are moving or copying a range of cells, and not a row or column, in the **Insert Paste** dialog box, click the direction to shift the surrounding cells.



If there is formatting, you can use **Insert Options**  to choose how to set the formatting of the inserted cells, rows, or columns.

# Stop automatic corrections

1. On the **Tools** menu, click **AutoCorrect Options**.
2. To prevent all automatic corrections, on the **AutoCorrect** tab, clear the **Replace text as you type** check box.

To prevent specific corrections, clear the corresponding check box for the option.

# Turn on or off Insert Options

1. Click **Options** on the **Tools** menu, and click the **Edit** tab.
2. Select or clear **Show Insert Options buttons**.

[Show All](#)

# Transpose rows and columns

Data from the top row of the [copy area](#) appears in the left column of the [paste area](#), and data from the left column appears in the top row.

1. Select the cells that you want to switch.
2. Click **Copy** .
3. Select the upper-left cell of the paste area. The paste area must be outside the copy area.
4. Click the arrow to the right of **Paste**  and then click **Transpose**.

# Undo or redo an action

1. Do one or more of the following:
  - To undo recent actions one at a time, click **Undo** .
  - To undo several actions at once, click the arrow next to **Undo**  and select from the list. Microsoft Excel reverses the selected action and all actions above it.
  - To cancel an entry in a cell or the formula bar before you press ENTER, press ESC.
2. If you change your mind, click **Redo**  or click the arrow next to **Redo**  and select from the list.

[Show All](#)

# Use a data entry form to edit a range or list

A data form is a dialog box that gives you a convenient way to enter or display one complete row of information, or record, in a range or list at one time.

Before you can use a data form to add a record to a new range or list, the range or list must have labels at the top of each column. Microsoft Excel uses these labels to create fields on the form.

1. Click a cell in the range or list you want to add the record to.
2. On the **Data** menu, click **Form**.
3. Do one or more of the following:

## [Add a record](#)

1. Click **New**.
2. Type the information for the new record.
3. When you finish typing data, press ENTER to add the record.
4. When you finish adding records, click **Close** to add the new record and close the data form.

## [Change a record](#)

1. Find the record you want to change.

## [How?](#)

- To move through records one at a time, use the scroll bar arrows in the dialog box. To move through 10 records at a time, click the scroll bar between the arrows.
- To move to the next record in the range or list, click **Find Next**. To move to the previous record in the range or list, click **Find**

**Prev.**

- To set search conditions, or [comparison criteria](#), click **Criteria**, then enter the criteria into the data form. To find records that match the criteria, click **Find Next** or **Find Prev**. To return to the data form without searching for records based on the criteria you specified, click **Form**.

[Wildcard characters you can use as criteria](#)

The following wildcard characters can be used as comparison [criteria](#) for filters, and when searching and replacing content.

Use	To find
? (question mark)	Any single character For example, sm?th finds "smith" and "smyth"
* (asterisk)	Any number of characters For example, *east finds "Northeast" and "Southeast"
~ (tilde) followed by ?, *, or ~	A question mark, asterisk, or tilde For example, fy91~? finds "fy91?"

2. Change the information in the record.

- Fields that contain [formulas](#) display the results of the formula as a label. The label cannot be changed in the data form.
  - If you change a record that contains a formula, the formula is not calculated until you press ENTER or click **Close** to update the record.
3. To move to the next field, press TAB. To move to the previous field, press SHIFT+TAB.
  4. When you finish changing data, press ENTER to update the record and move to the next record.
  5. When you finish changing records, click **Close** to update the displayed record and close the data form.

[Delete a record](#)

1.  [Find the record you want to delete.](#)
  - To move through records one at a time, use the scroll bar arrows in the dialog box. To move through 10 records at a time, click the scroll bar between the arrows.
  - To move to the next record in the range or list, click **Find Next**. To move to the previous record in the range or list, click **Find Prev**.
  - To set search conditions, or [comparison criteria](#), click **Criteria**, then enter the criteria into the data form. To find records that match the criteria, click **Find Next** or **Find Prev**. To return to the data form without searching for records based on the criteria you specified, click **Form**.

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~ (tilde) followed by ?, *, or ~	A question mark, asterisk, or tilde For example, fy91~? finds "fy91?"

2. Click **Delete**.

## Notes

- Data forms can display a maximum of 32 fields at one time.
- While you are adding or changing a record, you can undo changes by clicking **Restore** as long as the record is the active record in the data form.

[Show All](#)

# Troubleshoot editing data

[Cell references are wrong after I move or copy cells.](#)

**Absolute or relative cell references** If the copied formulas contain relative cell references, Microsoft Excel adjusts the references (and the relative parts of mixed cell references) in the duplicate formulas. For example, suppose cell B8 contains the formula =SUM(B1:B7). If you copy the formula to the cell C8, the duplicate formula refers to the corresponding cells in that column: =SUM(C1:C7). If the copied formulas contain [absolute cell references](#), the references in the duplicate formulas are not changed.

**When you need to redo the move or copy** If you did not get the results you want, change the references in the original formulas to either relative or absolute cell references. Then recopy the cells.

[The Find and Replace commands don't find data.](#)

**Match entire cells only** On the **Edit** menu, click **Find** or **Replace**. Clear the **Match entire cell contents** check box, and then try the search again. When this check box is selected, the **Find** and **Replace** commands find only cells that contain the characters specified in the **Find what** box. Cells that contain additional characters are not found.

**Clear Find or Replace format settings** To search for unformatted text or numbers, make sure to clear any format settings in the **Find Format** dialog box before you begin your search.

**Check the entire worksheet or workbook** Microsoft Excel searches only within the selected range of cells.

- To search the entire sheet, click any cell to cancel the active selection before you use the **Find** or **Replace** command.
- To search an entire workbook, click **Find** on the **Edit** menu, click **Options**, and then select **Workbook** in the **Within** box.

**Check in formulas and comments** If the characters you want to search for are a constant value or a value that results from a formula, click **Options** in the **Find** dialog box, and then click **Values** in the **Look in** box. If the characters are in a formula or in cell comments, click **Formulas** or **Comments** in the **Look in** box.

**Note** When you use the **Replace** tab in the **Find and Replace** dialog box, Excel looks in formula only, therefore the **Look in** box is not available under **Replace**.

**Hide special characters** If an asterisk (\*), caret (^), quotation mark ("), or backslash (\) appears in the formula bar but not in the worksheet cells, the character is a formatting code. Because such characters are not actual data, you cannot use the **Find** and **Replace** commands to locate them.

### To hide the characters

- Click **Options** on the **Tools** menu, click the **Transition** tab, and then clear the **Transition navigation keys** check box.

[I can't undo the last action.](#)

Some actions can't be undone, such as any command on the **File** menu. The **Undo** command is available for each action you can undo.

**Note** Macros can clear all items from the undo list.

[When I copy and paste, the selection becomes unselected.](#)

You can copy and paste only one selection at a time. To ensure that the selection you are copying stays selected, do not copy any other selection.

**Note** You can use the Microsoft Office Clipboard to collect various items and then paste them.

[When I try to copy numbers, they increment through the range.](#)

If values such as numbers or dates are incremented through the selected range instead of copied when you drag the [fill handle](#), click **Auto Fill Options**  and click **Copy Cells**.

[Show All](#)

# Troubleshoot automatic corrections

[Microsoft Excel won't stop correcting my data automatically.](#)

To stop automatic corrections:

1. On the **Tools** menu, click **AutoCorrect Options**.
2. To prevent all automatic corrections, on the **AutoCorrect** tab, clear the **Replace text as you type** check box.

To prevent specific corrections, clear the corresponding check box for the option.

**Note** You can also stop AutoComplete, the feature that finishes typing a word that is used repeatedly in a column of a list after you type a few letters of the word or phrase.

Click **Options** on the **Tools** menu, click the **Edit** tab, and then clear the **Enable AutoComplete for cell values** check box.

[AutoCorrect keeps capitalizing words that follow an abbreviation.](#)

To exclude specified text from automatic corrections, do the following:

1. On the **Tools** menu, click **AutoCorrect Options**.
2. On the **AutoCorrect** tab, click **Exceptions**.
3. To prevent Excel from automatically capitalizing any word that is typed after an abbreviation, click the **First Letter** tab and type the abbreviation, including the period, in the **Don't capitalize after** box. The new abbreviation will appear in the list.

To prevent Excel from automatically correcting a word that contains a mixture of uppercase and lowercase letters, click the **INitial CAPs** tab, and then type the word in the **Don't correct** box.

4. Click **Add**, and then click **OK**.

[Excel isn't correcting entries I want corrected automatically.](#)

To add AutoCorrect entries:

1. Click **Spelling** .
2. When the spell checker stops at an entry that is not in the dictionary, choose the correct spelling of the word, and then click **AutoCorrect**.

Excel corrects every occurrence of the misspelling automatically.

[Show All](#)

# Troubleshoot data validation

[My validation message doesn't appear when invalid data is entered.](#)

Messages appear only when data is typed directly into the cells. Your message won't appear:

- When a user enters data in the cell by copying or filling.
- When a formula in the cell calculates a result that isn't valid.
- When a [macro](#) enters invalid data in the cell.

To identify cells that contain invalid data regardless of how the data was entered, point to **Formula Auditing** on the **Tools** menu, click **Show Formula Auditing Toolbar**, and then click **Circle Invalid Data** .

## Notes

- To cycle through all the invalid cells in your worksheet, click **Error Checking** on the **Tools** menu.
- To see data errors in [lists](#), select the **List data validation error** checkbox on the **Error Checking** tab of the **Options** dialog box. To display the **Options** dialog box, click **Options** on the **Tools** menu. Select this checkbox to display a green triangle in cells within a list that contain errors. Clicking cells with errors will display a smart tag that you can use to display the validation restrictions for the active cell.

[My data validation doesn't work.](#)

**Is validation applied to the cells?** Find the cells on the worksheet that have data validation: click **Go To** on the **Edit** menu, click **Special**, click **Data validation**, and then click **All**.

**Are users entering data by typing?** Make sure users click each cell and then type the data. If users copy or fill data in validated cells, validation messages don't appear, and entry of invalid data isn't prevented.

**Is manual recalculation turned on?** If so, uncalculated cells may prevent

data from being validated properly. To turn off manual recalculation, click **Options** on the **Tools** menu, click the **Calculation** tab, and then click **Automatic** under **Calculation**.

**Are formulas error free?** Make sure formulas in validated cells don't result in errors, such as #REF! or #DIV/0!. Microsoft Excel ignores the data validation until you correct the error.

**Are cells referenced in formulas correct?** If a referenced cell changes so that a formula in a validated cell calculates an invalid result, the validation message for the cell won't appear.

**Are the referenced cells on the same worksheet or a different workbook?** Cell references have to be to cells on the same worksheet. If you have to refer to a different worksheet or a different workbook, use a defined name and make sure the workbook is already open.

[Copying, filling, and calculating by formula override my data validation.](#)

Data validation is designed to display messages and prevent invalid entries only when users type data directly in a cell. When data is copied, filled, or calculated by a formula, the messages don't appear.

**Note** You cannot override data validation for [lists](#) that are linked to a SharePoint site.

Try the following:

- **If a worksheet has data validation** Tell users to type data one cell at a time.
- **To prevent users from filling and copying data using cell drag and drop** Click **Options** on the **Tools** menu, click the **Edit** tab, and then clear the **Allow cell drag and drop** check box. Then protect the data validation settings.

[How?](#)

**Protect worksheet elements**

## [Protect worksheet elements from all users](#)

1. Switch to the worksheet you want to protect.
2. Unlock any cells you want users to be able to change: select each cell or range, click **Cells** on the **Format** menu, click the **Protection** tab, and then clear the **Locked** check box.
3. Hide any formulas that you don't want to be visible: select the cells with the formulas, click **Cells** on the **Format** menu, click the **Protection** tab, and then select the **Hidden** check box.
4. Unlock any graphic objects you want users to be able to change.

## [How?](#)

You don't need to unlock buttons or controls for users to be able to click and use them. You can unlock embedded charts, text boxes, and other objects created with the drawing tools that you want users to be able to modify. To see which elements on a worksheet are graphic objects, click **Go To** on the **Edit** menu, click **Special**, and then click **Objects**.

1. Hold down CTRL and click each object that you want to unlock.
  2. On the **Format** menu, click the command for the object you selected: **AutoShape**, **Object**, **Text Box**, **Picture**, **Control**, or **WordArt**.
  3. Click the **Protection** tab.
  4. Clear the **Locked** check box, and if present, clear the **Lock text** check box.
5. On the **Tools** menu, point to **Protection**, and then click **Protect Sheet**.
  6. Type a [password](#) for the sheet.

**Note** The password is optional; however, if you don't supply a password, any user will be able to unprotect the sheet and change the protected elements. Make sure you choose a password you can remember, because if you lose the password, you cannot gain access to

the protected elements on the worksheet.

7. In the **Allow all users of this worksheet to** list, select the elements that you want users to be able to change.
8. Click **OK**, and if prompted retype the password.

#### [Give specific users access to protected ranges](#)

You must have Windows 2000 to give specific users access to ranges.

1. On the **Tools** menu, point to **Protection**, and then click **Allow Users to Edit Ranges**. (This command is available only when the worksheet is not protected.)
2. Click **New**.
3. In the **Title** box, type a title for the range you're granting access to.
4. In the **Refers to cells** box, type an equal sign (=), and then type a reference or select the range.
5. In the **Range password** box, type a [password](#) to access the range.  
  
The password is optional; if you don't supply a password, any user will be able to edit the cells.
6. Click **Permissions**, and then click **Add**.
7. Locate and select the users to whom you want to grant access. If you want to select multiple users, hold down CTRL while you click the names.
8. Click **OK** twice, and if prompted retype the password.
9. Repeat the previous steps for each range for which you're granting access.
10. To retain a separate record of the ranges and users, select the **Paste permissions information into a new workbook** check box.

11. Protect the worksheet: On the **Tools** menu, point to **Protection**, click **Protect Sheet**, make sure the **Protect worksheet and contents of locked cells** check box is selected, type a password for the worksheet, click **OK**, and retype the password to confirm.

**Note** A sheet password is required to prevent other users from being able to edit your designated ranges. Make sure you choose a password you can remember, because if you lose the password, you cannot gain access to the protected elements on the worksheet.

## Help protect workbook elements and files

### [Protect workbook elements](#)

1. On the **Tools** menu, point to **Protection**, and then click **Protect Workbook**.
2. Do one or more of the following:
  - To protect the structure of a workbook so that worksheets in the workbook can't be moved, deleted, hidden, unhidden, or renamed, and new worksheets can't be inserted, select the **Structure** check box.
  - To use windows of the same size and position each time the workbook is opened, select the **Windows** check box.
  - To prevent others from removing workbook protection, type a [password](#), click **OK**, and then retype the password to confirm it.

### [Protect a shared workbook](#)

1. If the workbook is already shared, and you want to assign a [password](#) to protect the sharing, unshare the workbook.

### [How?](#)

1. Have all other users save and close the [shared workbook](#). If other users are editing, they will lose any unsaved work.

2. Unsharing the workbook deletes the [change history](#). If you want to keep a copy of this information, print out the [History worksheet](#) or copy it to another workbook.

[How?](#)

1. On the **Tools** menu, point to **Track Changes**, and then click **Highlight Changes**.
2. In the **When** box, click **All**.
3. Clear the **Who** and **Where** check boxes.
4. Select the **List changes on a new sheet** check box, and then click **OK**.
5. Do one or more of the following:
  - To print the History worksheet, click **Print** .
  - To copy the history to another workbook, select the cells you want to copy, click **Copy** , switch to another workbook, click where you want the copy to go, and click **Paste** .

**Note** You may also want to save or print the current version of the workbook, because this history might not apply to later versions. For example, cell locations, including row numbers, in the copied history may no longer be current.

3. On the **Tools** menu, click **Share Workbook**, and then click the **Editing** tab.
4. Make sure that you are the only person listed in the **Who has this workbook open now** box.
5. Clear the **Allow changes by more than one user at the same time** check box.

If this check box is not available, you must unprotect the workbook before clearing the check box.

[How?](#)

1. Click **OK**, point to **Protection** on the **Tools** menu, and then click **Unprotect Shared Workbook**.
2. Enter the [password](#) if prompted, and then click **OK**.

3. On the **Tools** menu, click **Share Workbook**, and then click the **Editing** tab.
6. When prompted about the effects on other users, click **Yes**.
2. Set other types of protection if you want: Give specific users access to ranges, protect worksheets, protect workbook elements, and set passwords for viewing and editing.
3. On the **Tools** menu, point to **Protection**, and then click **Protect Shared Workbook** or **Protect and Share Workbook**.
4. Select the **Sharing with track changes** check box.
5. If you want to require other users to supply a password to turn off the [change history](#) or remove the workbook from shared use, type the password in the **Password** box, and then retype the password when prompted.
6. If prompted, save the workbook.

[Protect a workbook file from viewing or editing](#)

1. On the **File** menu, click **Save As**.
2. On the **Tools** menu, click **General Options**.
3. Do either or both of the following:
  - If you want users to enter a [password](#) before they can view the workbook, type a password in the **Password to open** box, and then click **OK**.
  - If you want users to enter a password before they can save changes to the workbook, type a password in the **Password to modify** box, and then click **OK**.
4. When prompted, retype your passwords to confirm them.
5. Click **Save**.

6. If prompted, click **Yes** to replace the existing workbook.

- **To identify cells in which invalid data was copied, filled, or calculated** Point to **Formula Auditing** on the **Tools** menu, click **Show Formula Auditing Toolbar**, and then click **Circle Invalid Data** .

[The \*\*Validation\*\* command is unavailable.](#)

**The list may be linked to a SharePoint site** You cannot add data validation to a [list](#) that is linked to a SharePoint site. To add data validation, you must unlink the list or convert the list to a range.

**You may be currently entering data** The **Validation** command is not available on the **Data** menu while you are entering data in a cell. To finish entering, press ENTER or ESC.

**The worksheet might be protected** To remove the protection, point to **Protection** on the **Tools** menu and then click **Unprotect Sheet**.

**The workbook might be shared** In a [shared workbook](#), Microsoft Excel can validate data, but you can't change the settings. To make the **Validation** command available, stop sharing the workbook.

[How?](#)

1. Have all other users save and close the [shared workbook](#). If other users are editing, they will lose any unsaved work.
2. Unsharing the workbook deletes the [change history](#). If you want to keep a copy of this information, print out the [History worksheet](#) or copy it to another workbook.

[How?](#)

1. On the **Tools** menu, point to **Track Changes**, and then click **Highlight Changes**.
2. In the **When** box, click **All**.
3. Clear the **Who** and **Where** check boxes.
4. Select the **List changes on a new sheet** check box, and then click **OK**.
5. Do one or more of the following:

- To print the History worksheet, click **Print** .
- To copy the history to another workbook, select the cells you want to copy, click **Copy** , switch to another workbook, click where you want the copy to go, and click **Paste** .

**Note** You may also want to save or print the current version of the workbook, because this history might not apply to later versions. For example, cell locations, including row numbers, in the copied history may no longer be current.

3. On the **Tools** menu, click **Share Workbook**, and then click the **Editing** tab.
4. Make sure that you are the only person listed in the **Who has this workbook open now** box.
5. Clear the **Allow changes by more than one user at the same time** check box.

If this check box is not available, you must unprotect the workbook before clearing the check box.

[How?](#)

1. Click **OK**, point to **Protection** on the **Tools** menu, and then click **Unprotect Shared Workbook**.
  2. Enter the [password](#) if prompted, and then click **OK**.
  3. On the **Tools** menu, click **Share Workbook**, and then click the **Editing** tab.
6. When prompted about the effects on other users, click **Yes**.

[Show All](#)

# Add or delete rows or columns to a list

Once you have created a list in your worksheet, there are several methods to add a row or column to your list. It is important to note that if your list is linked to a Microsoft Windows SharePoint Services list, you cannot add or delete a columns from the list, you may only add or delete rows.

## [Using the list border to expand your list](#)

- Click and drag the lower right corner to include columns or rows to include or remove in your list. You cannot add both rows and columns at the same time. If your columns or rows have data, it will be incorporated into the list.

## [Using the \*\*Resize List\*\* command on the \*\*List\*\* submenu](#)

1. In the **Resize List** dialog box, click **OK**.
2. On the **List** submenu of the **List** toolbar, click **Resize List**.
3. On the worksheet select the area that you want to add or remove from the list.

### **Notes**

- The headers must remain in the same row, and the resulting list must overlap part of the original list.
  - If the selection includes cells which contain data, the data will remain in the cells within the list.
4. Select a cell within the list.

## [Using the \*\*Insert\*\* or \*\*Delete\*\* command on the \*\*List\*\* submenu](#)

1. Click a cell within the list where you want to add or delete a row or column.
2. On the **List** submenu of the **List** toolbar, click **Insert** and click either **Row** or **Column**. To remove a row or column, On the **List** submenu of the **List**

toolbar, click **Delete** and click either **Row** or **Column**.

#### [Adding a row using the insert row](#)

- Type a value in one of the cells of the insert row to quickly add data. This will automatically add the row to the end of the list and specify the next row as the insert row.

#### [Adding a row or column using auto-expansion](#)

- If you type in a empty row or column that is adjacent to the list, the list will automatically expand to integrate the row or column into the list.

#### **Notes**

- You can turn off auto-expansion by unchecking the **Include new rows and columns in list** option on the **AutoFormat As You Type** tab of the AutoCorrect dialog box. This dialog box can be displayed by clicking **AutoCorrect Options** on the **Tools** menu.
- The list will not automatically expand if you type in a row below the list if you have the total row displayed.

# Create a list

1. Highlight the range of data that you want make into a list.

**Note** You can also select the range of cells to be specified as a list by selecting the range of cells from the **Create List** dialog box.

2. On the **Data** menu, point to **List**, and then click **Create List**.
3. If the selected data has headers, select the **My list has headers** check box and click **OK**.

The selected range of data is highlighted by the list indicator, and the most common list related functionality is made available on the **List** toolbar.

**Note** If you don't see the **List** toolbar, on the **View** menu point to **Toolbars**, and then click **List**.

After the list has been created, it will be identified by a blue border. In addition, AutoFilter drop-downs will be automatically enabled for each column in the list and the insert row will be added as the last row of the list. If you choose to add a total row by clicking **Toggle Total Row**  on the **List** toolbar, a total row will be displayed under the insert row.

When you select a cell, row, or column outside of the list, the list becomes inactive. An inactive list is surrounded by a blue border and does not display the insert row or AutoFilter drop-downs.

**Note** The border will not be displayed if you clicked **Hide Border of Inactive Lists** on the **List** menu.

[Show All](#)

# Find and Replace

Use the **Find and Replace** dialog box to search and optionally replace a string with another string.

[Find](#)

[Find what](#)

Enter the information you want to search for. You can use a question mark (?) to match any single character or an asterisk (\*) to match any string of characters. For example, sm?th finds "smith" and "smyth" and \*east finds "Northeast" and "Southeast."

[Preview or No Format Set](#)

Previews what data might look like that meets the parameters specified using the **Format** button. **Preview\*** indicates that a preview cannot be shown. **No Format Set** indicates that no formatting parameters have been specified.

[Format](#)

Select **Format** to base searches on the formatting properties of the cells. **Choose Format From Cell** allows you to click on a cell that meets the formatting criteria you wish to use in this search. **Clear Find Format** allows you to remove previous search criteria.

[Within](#)

Select **Sheet** to restrict your search to the active worksheet. Select **Workbook** to search all sheets in the active workbook.

[Search](#)

Click the direction you want to search: down through columns by using **By columns** or to the right across rows by using **By rows**. To search up in columns

or to the left across rows, hold down SHIFT and click **Find Next**. In most cases, it is faster to select **By columns**.

[Look in](#)

Specifies whether you want to search the value of the cells or their underlying formulas. For instance, a cell could show on the sheet “11” but actually contain a formula =”1”&”1”. **Look in: Values** would find this cell when searching for "11". **Look in: Formulas** would not. You can also choose to search comments attached to cells. On the **Replace** tab, **Look in: Formulas** is the only option.

[Match case](#)

Distinguishes between uppercase and lowercase characters.

[Match entire cell contents](#)

Searches for an exact and complete match of characters specified in the **Find what** box.

[Options](#)

Displays advanced search options. This button changes to **Options <<** while these advanced options are displayed. Click **Options <<** to hide the advanced options.

[Find All](#)

Finds all occurrences of the search criteria in your document. If you want to find and review each occurrence separately, click **Find Next** instead of **Find All**.

[Find Next](#)

Searches for the next occurrence of the characters specified in the **Find what** box. To find the previous occurrence, hold down SHIFT and click **Find Next**.

[Close](#)

Closes the **Find** or **Replace** dialog box when you've completed your search.

[Replace](#)

The **Replace** tab has most of the same fields as the **Find** tab, with the following extra ones.

[Replace with](#)

Type the replacement characters you want to use to replace the characters in the **Find what** box. To delete the characters in the **Find what** box from your document, leave the **Replace with** box blank.

[Replace All](#)

Replaces all occurrences of the search criteria in your document. If you want to review and selectively replace each occurrence, click **Replace** instead of **Replace All**.

[Replace](#)

Replaces the selected occurrence of the criteria in the **Find what** box, finds the next occurrence, and then stops. If you want to automatically replace all occurrences of the search criteria in your document, click **Replace All**.

# About checking and correcting spelling

**Check spelling** When you check spelling, Microsoft Excel checks the entire active worksheet, including cell values, cell comments, embedded charts, text boxes, buttons, and headers and footers. However, Excel does not check protected worksheets, formulas, or text that results from a formula.

If the formula bar is active when you check spelling, Excel checks only the contents of the formula bar. If you have a range selected, only the range is checked.

**Correct spelling and typing errors as you type** The AutoCorrect feature in Excel can correct common typing errors as you work. For example, you can specify that Excel change "adn" to "and" and change "their is" to "there is."

**Note** Don't confuse the AutoCorrect feature with AutoComplete. The AutoComplete feature finishes typing a word that is used repeatedly in a column of a list after you type a few letters of the word or phrase. You can turn off both the AutoCorrect and the AutoComplete behaviors.

**Add an AutoCorrect entry during a spelling check** If you misspell a word consistently, you can add the common misspelling as an AutoCorrect entry. The common misspelling is automatically corrected.

**Add words to a custom spelling dictionary** If you use words that aren't in the main dictionary, such as acronyms or proper names, you can add the words to a custom dictionary so Excel questions the words only if they're misspelled.

**Note** Excel shares spelling dictionaries and AutoCorrect entries with other Microsoft Office programs that you might use.

[Show All](#)

# Check spelling

1. Select the range of cells you want to check.

If you want to check the entire worksheet, click any cell.

2. Click **Spelling**  on the **Standard toolbar**.
3. When the spelling checker identifies a word that is not in the dictionary, make your changes by using the options in the **Spelling** dialog box.
4. If you want to check the spelling of text in another language, in the **Dictionary language** box, click the language whose dictionary you want to use.

**Note** If the **Spelling** dialog box is not available, you can change the language by using the **Dictionary language** box on the **Spelling** tab of the **Options** dialog box (**Tools** menu).



Tip

If you want to add a word to the list of automatic corrections, in the **Spelling** dialog box, select the word you want to add from the **Suggestions** list, and then click **AutoCorrect**.

[Show All](#)

# Create a custom dictionary

## [Create a custom dictionary](#)

1. Click **Spelling**  on the **Standard toolbar**.
2. When you identify a word that you want to add to a custom dictionary, click **Options** in the **Spelling** dialog box.
3. In the **Add words to** box, type a name for your new custom dictionary.

The following are default locations for custom dictionaries.

## [In Microsoft Windows 2000 or later](#)

Custom dictionaries are stored by default in the G:\Documents and Settings\  
<username>\Application Data\Microsoft\Proof folder.

## [In Microsoft Windows Millennium Edition or Microsoft Windows 98](#)

Custom dictionaries are stored by default in either the  
C:\Windows\_folder\Application Data\Microsoft\Proof folder or the  
C:\Windows\_folder\Profiles\User\_name\Application Data\Microsoft\Proof  
folder.

## [In Microsoft Windows NT 4.0](#)

Custom dictionaries are stored by default in the  
C:\Windows\_folder\Profiles\User\_name\Application Data\Microsoft\Proof  
folder.

## [Add a word to a custom dictionary](#)

1. Click **Spelling**  on the **Standard toolbar**.
2. When you identify a word that you want to add to a custom dictionary, click **Options** in the **Spelling** dialog box.
3. In the **Add words to** box, click the name of the custom dictionary, and then click **OK**.

**Note** If you want to use a custom dictionary from an earlier version of Microsoft Excel, type the name of the dictionary in the **Add words to** box to register the dictionary with the current version of Excel.

[Show All](#)

# Troubleshoot spelling

[I added words to a custom dictionary, but Microsoft Excel still questions them.](#)

- If Excel questions a word when it appears with mixed lowercase and capital letters, reenter the word in the custom dictionary in all lowercase letters. Various formats of the word are then recognized.
- The word may be in a different custom dictionary. Excel can consult only one custom dictionary at a time. When Excel questions a word during a spelling check, make sure the correct custom dictionary is selected in the **Add words to** box on the **Spelling** tab of the **Options** dialog box (**Tools** menu).
- A custom dictionary might contain a nonprintable character or a misspelled word. Use the Notepad accessory program to open the custom dictionary that you use with Excel. Correct any words and delete any nonprintable characters, which are usually displayed as small boxes, and then save the dictionary in the folder that contains the main spelling dictionary. If you use Microsoft Word or another program to edit a custom dictionary, save the dictionary in Text Only format with a .dic file extension.

[The spelling checker checked only part of my worksheet.](#)

If you've selected a range of cells, Excel checks only the selected range. To check the entire sheet, click any cell, and then repeat the spelling check.

[Excel did not change every occurrence of a misspelled word, even though I chose the \*\*Change All\*\* button.](#)

- If you close the **Spelling** dialog box before Excel finishes checking the entire worksheet, errors in the unchecked portion are not corrected.
- If you've selected a range of cells, Excel checks only the selected range. To check the entire sheet, click any cell, and then repeat the spelling check.

[I checked spelling in another language, and now I can't check spelling in the default language.](#)

You can restore your default spelling checker by setting the **Dictionary language** on the **Spelling** tab of the **Options** dialog box (**Tools** menu).

[Show All](#)

# About moving and copying data

When you copy a cell by dragging or by clicking **Cut**  or **Copy** , and **Paste** , Microsoft Excel copies the entire cell, including formulas and their resulting values, comments, and cell formats.

If the selected [copy area](#) includes hidden cells, Excel also copies the hidden cells. If the [paste area](#) contains hidden rows or columns, you might need to unhide the paste area to see all of the copied cells.

Instead of copying entire cells, you can copy specified contents from the cells. For example, you can copy the resulting value of a formula without copying the formula itself or you can copy only the formula. You can also change what part of the cell you pasted by clicking **Paste Options**  in the lower right corner of your pasted selection.

**Note** **Paste Options**  is available only after you copy a selection, not after you cut or move a selection.

[Show All](#)

# Create a consecutive list of dates

1. Type the first day or date in the list, for example Monday or 6/13/08, in a cell.
2. Select the cell and use the [fill handle](#) to fill a list of consecutive days.

**Note** If you want only weekdays in your list, click **Auto Fill Options**  and then select **Fill Weekdays** only.

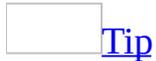
# Display or hide the fill handle

1. Click **Options** on the **Tools** menu and click the **Edit** tab.
2. Select or clear the **Allow cell drag and drop** check box.

[Show All](#)

# Fill data within a row or column

1. Select the cells you want to copy.
2. Drag the [fill handle](#) across the cells you want to fill, and then release the mouse button.



To fill in the active cell with the contents of the cell above it (fill downward), press CTRL+D. To fill in with contents of the cell to the left (fill to the right), press CTRL+R.

**Note** You can use **Auto Fill Options**  to choose options for how to fill the selection. For example, you can choose to **Fill Formatting Only** or **Fill Without Formatting**.

# Find cells that match a format

1. Click **Find** on the **Edit** menu.
2. Clear the **Find what** box.
3. Do one of the following:
  - If you want to specify format, click **Options**, click **Format**, and then set your options in the **Find Format** dialog box.
  - If you want to point to a specific cell format as an example, click the arrow next to **Format**, click **Choose Format From Cell**, and then click the cell.

**Note** The format for the search is displayed in the **Preview** box.

4. Click **Find All** or **Find Next**.

**Find All** lists every occurrence of the item you are searching for and allows you to make a cell active by selecting a specific occurrence. You can sort the results of a **Find All** search by clicking a header.

[Show All](#)

# Find text or numbers

1. Select the [range](#) of cells you want to search.

If you want to search the entire worksheet, click any cell.

2. On the **Edit** menu, click **Find**.
3. In the **Find what** box, enter the text or numbers you want to search for or choose a recent search from the **Find what** drop down box.

**Note** You can use wildcard characters in your search criteria.

4. If you want to specify a format for your search, click **Format** and make your selections in the **Find Format** dialog box.

If **Format** is not available in the **Find and Replace** dialog box, click **Options** and then click **Format**.

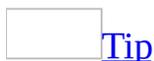
5. Click **Options** to further define your search. For example, you can search for all of the cells that contain the same kind of data, such as formulas.

In the **Within** box, you can select **Sheet** or **Workbook** to search a worksheet or an entire workbook.

6. Click **Find All** or **Find Next**.

**Find All** lists every occurrence of the item you are searching for and allows you to make a cell active by selecting a specific occurrence. You can sort the results of a **Find All** search by clicking a header.

**Note** To cancel a search in progress, press ESC.



Tip

Another way to find data in a [list](#) is to use filters to display only the rows that contain the desired data. For example, in a list that includes international sales data, you can display only domestic sales.

[Show All](#)

# Move or copy cells

## Moving and copying cells

 [Move or copy cells](#)

1. Select the cells you want to move or copy.

 [How?](#)

### To select

### Do this

- |                |   |
|----------------|---|
|                | If editing in a cell is turned on, select the cell, double-click in it, and then select the text in the cell. |
| Text in a cell | If editing in a cell is turned off, select the cell, and then select the text in the formula bar.             |



- |                                  |  |
|----------------------------------|--|
| A single cell                    | Click the cell, or press the arrow keys to move to the cell.   |
| A <a href="#">range</a> of cells | Click the first cell of the range, and then drag to the last cell.   |
| A large range of cells           | Click the first cell in the range, and then hold down SHIFT and click the last cell in the range. You can scroll to make the last cell visible.<br>Click the <b>Select All</b> button. |

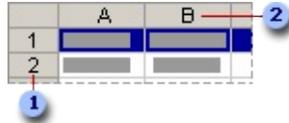
All cells on a worksheet



Nonadjacent cells or cell ranges

- Select the first cell or range of cells, and then hold down CTRL and select the other cells or ranges.
- Click the row or column heading.

An entire row or column



Adjacent rows or columns

Drag across the row or column headings. Or select the first row or column; then hold down SHIFT and select the last row or column.

Nonadjacent rows or columns

Select the first row or column, and then hold down CTRL and select the other rows or columns.

More or fewer cells than the active selection

Hold down SHIFT and click the last cell you want to include in the new selection. The rectangular range between the [active cell](#) and the cell you click becomes the new selection.

Cancel a selection of cells

Click any cell on the worksheet.

2. Do one of the following:

**Move cells** Click **Cut**  on the **Standard toolbar** and select the upper-left cell of the [paste area](#).

**Copy cells** Click **Copy**  and select the upper-left cell of the paste area.

**Move or copy a selection to a different worksheet** Click **Cut**  or **Copy** , click the new worksheet tab, and select the upper-left cell of the paste area.

**Move or copy cells to a different workbook** Click **Cut**  or **Copy** , switch to the other workbook, and select the upper-left cell of the paste area.

3. Click the arrow next to **Paste**  and choose from the options on the list.

**Note** Microsoft Excel replaces data in the paste area when you move cells.

[Insert moved or copied cells between existing cells](#)

1. Select the cells that contain the data you want to move or copy.
2. To move or copy the selection, click **Cut**  or **Copy**  on the **Standard toolbar**.
3. Select the upper-left cell of the [paste area](#).
4. On the **Insert** menu, click **Cut Cells** or **Copied Cells**.
5. If you are moving or copying a [range](#) of cells, and not a row or column, in the **Insert Paste** dialog box, click the direction to shift the surrounding cells.

### [Copy only visible cells](#)

If some cells, rows, or columns on your worksheet are not displayed, you have the option of copying all cells or only the visible cells. For example, you can choose to copy only the displayed summary data on an [outlined](#) worksheet.

1. Select the cells you want to copy.
2. On the **Edit** menu, click **Go To**.
3. Click **Special**.
4. Click **Visible cells only**, and then click **OK**.
5. Click **Copy**  on the **Standard toolbar**.
6. Select the upper-left cell of the [paste area](#).
7. Click **Paste** .

### Notes

- Microsoft Excel pastes the copied data into consecutive rows or columns. If the paste area contains hidden rows or columns, you might need to unhide the paste area to see all of the copied cells.
- If you click the arrow next to **Paste** , you can choose from several paste options to apply to your selection.
- When you copy or paste hidden or [filtered](#) data to another application or another instance of Excel, only visible cells are copied.

## Moving and copying cell data

### [Move or copy cell contents](#)

1. Double-click the cell that contains the data you want to move or copy.
2. In the cell, select the characters to move or copy.
3. To move or copy the selection, click **Cut**  or click **Copy**  on the **Standard toolbar**.
4. In the cell, click where you want to paste the characters or double-click another cell to move or copy the data.
5. Click **Paste** .
6. Press ENTER.

**Note** When you double-click a cell or press F2 to edit a cell, the arrow keys work only within that cell. To use the arrow keys to move to another cell, first press ENTER to complete your editing changes to the active cell.

### [Copy cell values](#)

These steps convert any formulas in the cell to the calculated values, and the existing formatting is not overwritten.

1. Select the cells you want to copy.
2. Click **Copy**  on the **Standard toolbar**.
3. Select the upper-left cell of the [paste area](#).
4. Click the arrow to the right of **Paste** , and click **Values**.

### [Copy cell formats](#)

These steps copy only cell formatting such as font color or fill color, and not the contents of the cells.

1. Select the cells you want to copy.
2. Click **Copy**  on the **Standard toolbar**.
3. Select the upper-left cell of the [paste area](#).
4. Click the arrow to the right of **Paste** , and click **Paste Special**.
5. Click **Formats**.

## [Copy formulas](#)

1. Select the cell containing the formula you want to copy.
2. Click **Copy**  on the **Standard toolbar**.
3. Select the cell you want to paste the formula in.
4. Click the arrow to the right of **Paste** , and click **Formulas**.

**Note** To cancel the [moving border](#) after you finish copying, press ESC.

[Show All](#)

# Move rows or columns

1. Select the row or column you want to move.

[How?](#)

## To select

## Do this

If editing in a cell is turned on, select the cell, double-click in it, and then select the text in the cell.

Text in a cell

If editing in a cell is turned off, select the cell, and then select the text in the formula bar.



A single cell

Click the cell, or press the arrow keys to move to the cell.

A [range](#) of cells

Click the first cell of the range, and then drag to the last cell.

A large range of cells

Click the first cell in the range, and then hold down SHIFT and click the last cell in the range. You can scroll to make the last cell visible.

Click the **Select All** button.

All cells on a worksheet

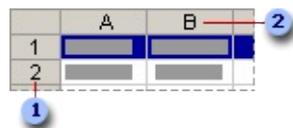


Nonadjacent cells or cell ranges

Select the first cell or range of cells, and then hold down CTRL and select the other cells or ranges.

Click the row or column heading.

An entire row or column



Drag across the row or column headings. Or select the first

Adjacent rows or columns    row or column; then hold down SHIFT and select the last row or column.

Nonadjacent rows or columns    Select the first row or column, and then hold down CTRL and select the other rows or columns.

More or fewer cells than the active selection    Hold down SHIFT and click the last cell you want to include in the new selection. The rectangular range between the [active cell](#) and the cell you click becomes the new selection.

Cancel a selection of cells    Click any cell on the worksheet.

You can choose to move multiple adjacent rows or columns.

2. Click **Cut** .
3. Select a row or column below or to the right of where you want to move your selection.
4. On the **Insert** menu, click **Cut Cells**.

[Show All](#)

# Prevent copied blank cells from replacing data

1. Select the [range](#) of cells you want to copy.
2. Click **Copy** .
3. Select the upper-left cell of the [paste area](#).
4. Click the arrow to the right of **Paste**  and then click **Paste Special**.
5. Select the **Skip blanks** check box.

[Show All](#)

# Replace text or numbers

1. Select the [range](#) of cells you want to search.

If you want to search the entire worksheet, click any cell in the worksheet.

2. On the **Edit** menu, click **Replace**.
3. In the **Find what** box, enter the text or numbers you want to search for or choose a recent search from the **Find what** drop down box.

**Note** You can use wildcard characters in your search criteria.

4. If you want to specify a format for your search, click **Format** and make your selections in the **Find Format** dialog box.

If **Format** is not available in the **Find and Replace** dialog box, click **Options** and then click **Format**.

5. Click **Options** to further define your search. For example, you can search for all of the cells that contain the same kind of data, such as formulas.

In the **Within** box, you can select **Sheet** or **Workbook** to search a worksheet or an entire workbook.

6. In the **Replace with** box, enter the replacement characters and specific formats if necessary.

If you want to delete the characters in the **Find what** box, leave the **Replace with** box blank.

7. Click **Find Next**.
8. To replace the highlighted occurrence or all occurrences of the found characters, click **Replace** or **Replace All**.

**Note** To cancel a search in progress, press ESC.

# Turn on or off Paste Options

1. Click **Options** on the **Tools** menu, and click the **Edit** tab.
2. Select or clear the **Show Paste Options buttons** check box.

[Show All](#)

# Paste Special when copying from applications other than Excel

You can use the **Paste Special** dialog to copy complex items from an application other than Excel and paste them into an Excel worksheet.

[Source](#)

Displays the name of the source data and its location. If you copied the data from an application that did not provide the source data and its location to the Clipboard, the source is identified as "Unknown."

[Paste or Paste link](#)

Inserts or embeds the Clipboard contents at the insertion point in the format specified in the As box. When you select this option, the Clipboard contents are pasted or embedded, but no link is created. Select the **Paste link** check box to link the pasted data to its source document.

[As](#)

Specifies the type of information you want to paste from the Clipboard.

[Display as icon](#)

Displays the Clipboard contents as an icon. Use this option if you do not want linked data to be displayed in your file.

[Show All](#)

# About filtering

Filtering is a quick and easy way to find and work with a subset of data in a range. A filtered range displays only the rows that meet the [criteria](#) you specify for a column. Microsoft Excel provides two commands for filtering ranges:

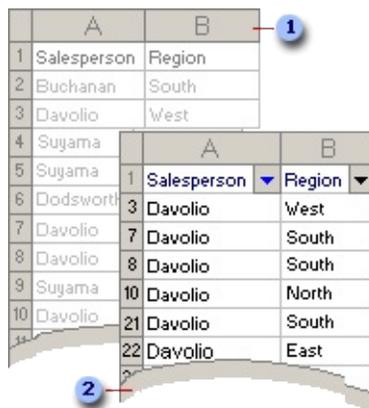
- **AutoFilter**, which includes filter by selection, for simple criteria
- **Advanced Filter**, for more complex criteria

Unlike sorting, filtering does not rearrange a range. Filtering temporarily hides rows you do not want displayed.

When Excel filters rows, you can edit, format, chart, and print your range subset without rearranging or moving it.



When you use the **AutoFilter** command, AutoFilter arrows  appear to the right of the column labels in the filtered range.



	A	B
1	Salesperson	Region
2	Buchanan	South
3	Davolio	West
4	Suyama	
5	Suyama	
6	Dodsworth	
7	Davolio	
8	Davolio	
9	Suyama	
10	Davolio	
11	Davolio	
12	Davolio	
13	Davolio	
14	Davolio	
15	Davolio	
16	Davolio	
17	Davolio	
18	Davolio	
19	Davolio	
20	Davolio	
21	Davolio	
22	Davolio	

1 Unfiltered range

2 Filtered range

Microsoft Excel indicates the filtered items with blue.

You use custom AutoFilter to display rows that contain either one value or

another. You can also use custom **AutoFilter** to display rows that meet more than one condition for a column; for example, you might display rows that contain values within a specific range (such as a value of Davolio).

[Advanced Filter](#)

The **Advanced Filter** command can filter a range in place like the **AutoFilter** command, but it does not display drop-down lists for the columns. Instead, you type the [criteria](#) you want to filter by in a separate criteria range above the range. A criteria range allows for more complex criteria to be filtered.

[Examples of complex criteria](#)

[Multiple conditions in a single column](#)

If you have two or more conditions for a single column, type the criteria directly below each other in separate rows. For example, the following criteria range displays the rows that contain either "Davolio," "Buchanan," or "Suyama" in the Salesperson column.

### **Salesperson**

Davolio

Buchanan

Suyama

[One condition in two or more columns](#)

To find data that meets one condition in two or more columns, enter all the criteria in the same row of the criteria range. For example, the following criteria range displays all rows that contain "Produce" in the Type column, "Davolio" in the Salesperson column, and sales values greater than \$1,000.

### **Type Salesperson Sales**

Produce Davolio >1000

[One condition in one column or another](#)

To find data that meets either a condition in one column or a condition in another column, enter the criteria in different rows of the criteria range. For example, the following criteria range displays all rows that contain either "Produce" in the Type column, "Davolio" in the Salesperson column, or sales values greater than \$1,000.

Type	Salesperson	Sales
Produce		
	Davolio	
		>1000

[One of two sets of conditions for two columns](#)

To find rows that meet one of two sets of conditions, where each set includes conditions for more than one column, type the criteria in separate rows. For example, the following criteria range displays the rows that contain both "Davolio" in the Salesperson column and sales values greater than \$3,000, and also displays the rows for salesperson Buchanan with sales values greater than \$1,500.

Salesperson	Sales
Davolio	>3000
Buchanan	>1500

[More than two sets of conditions for one column](#)

To find rows that meet greater than two sets of conditions, include multiple columns with the same column heading. For example, the following criteria range displays sales that are between 5,000 and 8,000 in addition to sales that are less than 500.

Sales	Sales
>5000	<8000
<500	

[Conditions created as the result of a formula](#)

You can use a calculated value that is the result of a [formula](#) as your criterion. When you use a formula to create a criterion, do not use a column label for a criteria label; either keep the criteria label blank or use a label that is not a column label in the range. For example, the following criteria range displays rows that have a value in column C greater than the average of cells C7:C10.

```
=C7>AVERAGE($C$7:$C$10)
```

## Notes

- The formula you use for a condition must use a [relative reference](#) to refer to the column label (for example, Sales) or the corresponding field in the first record. All other references in the formula must be [absolute references](#), and the formula must evaluate to TRUE or FALSE. In the formula example, "C7" refers to the field (column C) for the first record (row 7) of the range.
- You can use a column label in the formula instead of a relative cell reference or a range name. When Microsoft Excel displays an error value such as #NAME? or #VALUE! in the cell that contains the criterion, you can ignore this error because it does not affect how the range is filtered.
- When evaluating data, Microsoft Excel does not distinguish between uppercase and lowercase characters.

[Show All](#)

# Filter a range

You can apply filters to only one range on a worksheet at a time.

1. Click a cell in the range you want to filter.
2. On the **Data** menu, point to **Filter**, and then click **AutoFilter**.

## [Filter for the smallest or largest number](#)

1. Click the arrow  in the column that contains the numbers, and click **(Top 10...)**.
2. In the box on the left, click **Top**, or **Bottom**.
3. In the box in the middle, enter a number.
4. In the box on the right, click **Items**.

## [Filter a range for rows that contain specific text](#)

1. Click the arrow  in the column that contains the numbers, and click **(Custom)**.
2. In the box on the left, click **equals**, or **does not equal**, **contains**, or **does not contain**.
3. In the box on the right, enter the text you want.
4. If you need to find text values that share some characters but not others, use a wildcard character.

## [How?](#)

The following wildcard characters can be used as comparison [criteria](#) for filters, and when searching and replacing content.

Use	To find
? (question mark)	Any single character For example, sm?th finds "smith" and "smyth"
* (asterisk)	Any number of characters For example, *east finds "Northeast" and

"Southeast"

~ (tilde) followed by ?, \*, or ~      A question mark, asterisk, or tilde  
For example, fy91~? finds "fy91?"

5. To add another criteria, click **And** or **Or**, and repeat the previous step.

#### [Filter for blank or nonblank cells](#)

Click the arrow ▼ in the column that contains the numbers, then click **(Blanks)** or **(NonBlanks)**.

**Note** The **Blanks** and **NonBlanks** options are available only if the column you want to filter contains a blank cell.

#### [Filter for numbers greater than or less than another number](#)

1. Click the arrow ▼ in the column that contains the numbers, and click **(Custom)**.
2. In the box on the left, click **is greater than**, **is less than**, **is greater than or equal to**, or **is less than or equal to**.
3. In the box on the right, enter a number.
4. To add another criteria, click **And** or **Or**, and repeat the previous step.

#### [Filter for a number equal to or not equal to another number](#)

1. Click the arrow ▼ in the column that contains the numbers, and click **(Custom)**.
2. In the box on the left, click **equals**, or **does not equal**.
3. In the box on the right, enter a number.
4. To add another criteria, click **And** or **Or**, and repeat the previous step.

#### [Filter for the beginning or end of a text string](#)

1. Click the arrow ▼ in the column that contains the numbers, and click **(Custom)**.
2. In the box on the left, click **begins with**, or **does not begin with**, or **ends with**, or **does not end with**.
3. In the box on the right, enter the text you want.
4. If you need to find text values that share some characters but not

others, use a wildcard character.

[How?](#)

The following wildcard characters can be used as comparison [criteria](#) for filters, and when searching and replacing content.

Use	To find
? (question mark)	Any single character For example, sm?th finds "smith" and "smyth"
* (asterisk)	Any number of characters For example, *east finds "Northeast" and "Southeast"
~ (tilde) followed by ?, *, or ~	A question mark, asterisk, or tilde For example, fy91~? finds "fy91?"

5. To add another criteria, click **And** or **Or**, and repeat the previous step.

[Filter for the top or bottom numbers by percent](#)

1. Click the arrow  in the column that contains the numbers, and click **(Top 10...)**.
2. In the box on the left, click **Top** or **Bottom**.
3. In the box in the middle, enter a number.
4. In the box on the right, click **Percent**.

## Notes

- When you apply a filter to a column, the only filters available for other columns are the values visible in the currently filtered range.
- Only the first 1000 unique entries in a list appear when you click the arrow .

[Show All](#)

# Filter by using advanced criteria

1. Insert at least three blank rows above the range that can be used as a [criteria](#) range. The criteria range must have column labels. Make sure there is at least one blank row between the criteria values and the range.

[What this might look like](#)

## Type Salesperson Sales

Type	Salesperson	Sales
Beverages	Suyama	5122
Meat	Davolio	450
Produce	Buchanan	6328
Produce	Davolio	6544

2. In the rows below the column labels, type the criteria you want to match.

[Criteria examples](#)

[Multiple conditions in a single column](#)

If you have two or more conditions for a single column, type the criteria directly below each other in separate rows. For example, the following criteria range displays the rows that contain either "Davolio," "Buchanan," or "Suyama" in the Salesperson column.

## Salesperson

Davolio

Buchanan

Suyama

[One condition in two or more columns](#)

To find data that meets one condition in two or more columns, enter all the

criteria in the same row of the criteria range. For example, the following criteria range displays all rows that contain "Produce" in the Type column, "Davolio" in the Salesperson column, and sales values greater than \$1,000.

Type	Salesperson	Sales
Produce	Davolio	>1000

[One condition in one column or another](#)

To find data that meets either a condition in one column or a condition in another column, enter the criteria in different rows of the criteria range. For example, the following criteria range displays all rows that contain either "Produce" in the Type column, "Davolio" in the Salesperson column, or sales values greater than \$1,000.

Type	Salesperson	Sales
Produce		
	Davolio	
		>1000

[One of two sets of conditions for two columns](#)

To find rows that meet one of two sets of conditions, where each set includes conditions for more than one column, type the criteria in separate rows. For example, the following criteria range displays the rows that contain both "Davolio" in the Salesperson column and sales values greater than \$3,000, and also displays the rows for salesperson Buchanan with sales values greater than \$1,500.

Salesperson	Sales
Davolio	>3000
Buchanan	>1500

[More than two sets of conditions for one column](#)

To find rows that meet greater than two sets of conditions, include multiple columns with the same column heading. For example, the following criteria

range displays sales that are between 5,000 and 8,000 in addition to sales that are less than 500.

### **Sales Sales**

>5000 <8000

<500

### [Conditions created as the result of a formula](#)

You can use a calculated value that is the result of a [formula](#) as your criterion. When you use a formula to create a criterion, do not use a column label for a criteria label; either keep the criteria label blank or use a label that is not a column label in the range. For example, the following criteria range displays rows that have a value in column C greater than the average of cells C7:C10.

=C7>AVERAGE(\$C\$7:\$C\$10)

### **Notes**

- The formula you use for a condition must use a [relative reference](#) to refer to the column label (for example, Sales) or the corresponding field in the first record. All other references in the formula must be [absolute references](#), and the formula must evaluate to TRUE or FALSE. In the formula example, "C7" refers to the field (column C) for the first record (row 7) of the range.
- You can use a column label in the formula instead of a relative cell reference or a range name. When Microsoft Excel displays an error value such as #NAME? or #VALUE! in the cell that contains the criterion, you can ignore this error because it does not affect how the range is filtered.
- When evaluating data, Microsoft Excel does not distinguish between uppercase and lowercase characters.

All items that begin with that text are filtered. For example, if you type the text **Dav** as a criterion, Microsoft Excel finds "Davolio," "David," and "Davis." To match only the specified text, type the following formula, where *text* is the text you want to find. ="*text*"

To find text values that share some characters but not others, use a wildcard character.

## [Wildcard characters](#)

The following wildcard characters can be used as comparison [criteria](#) for filters, and when searching and replacing content.

Use	To find
? (question mark)	Any single character For example, sm?th finds "smith" and "smyth"
* (asterisk)	Any number of characters For example, *east finds "Northeast" and "Southeast"
~ (tilde) followed by ?, *, or ~	A question mark, asterisk, or tilde For example, fy91~? finds "fy91?"

3. Click a cell in the range.
4. On the **Data** menu, point to **Filter**, and then click **Advanced Filter**.
5. To filter the range by hiding rows that don't match your criteria, click **Filter the list, in-place**.

To filter the range by copying rows that match your criteria to another area of the worksheet, click **Copy to another location**, click in the **Copy to** box, and then click the upper-left corner of the area where you want to paste the rows.

6. In the **Criteria range** box, enter the reference for the criteria range, including the criteria labels.

To move the **Advanced Filter** dialog box out of the way temporarily while you select the criteria range, click **Collapse Dialog** .

7. To change how the data is filtered, change the values in the criteria range and filter the data again.

## [Tips](#)

- You can name a range **Criteria**, and the reference for the range will appear

automatically in the **Criteria range** box. You can also define the name **Database** for the range of data to be filtered and define the name **Extract** for the area where you want to paste the rows, and these ranges will appear automatically in the **List range** and **Copy to** boxes, respectively.

- When you copy filtered rows to another location, you can specify which columns to include in the copy. Before filtering, copy the column labels for the columns you want to the first row of the area where you plan to paste the filtered rows. When you filter, enter a reference to the copied column labels in the **Copy to** box. The copied rows will then include only the columns for which you copied the labels.

# Filter for unique records

1. Select the column or click a cell in the range or list you want to filter.
2. On the **Data** menu, point to **Filter**, and then click **Advanced Filter**.
3. Do one of the following.
  - To filter the range or list in place, similar to using **AutoFilter**, click **Filter the list, in-place**.
  - To copy the results of the filter to another location, click **Copy to another location**. Then, in the **Copy To** box, enter a cell reference.

To select a cell, click **Collapse Dialog**  to temporarily hide the dialog box. Select the cell on the worksheet, and then press **Expand Dialog** .

4. Select the **Unique records only** check box.

[Show All](#)

# Find a record by using a data form

- To move through records one at a time, use the scroll bar arrows in the dialog box. To move through 10 records at a time, click the scroll bar between the arrows.
- To move to the next record in the list, click **Find Next**. To move to the previous record in the list, click **Find Prev**.
- To set search conditions, or [comparison criteria](#), click **Criteria**, then enter the criteria into the data form. To find records that match the criteria, click **Find Next** or **Find Prev**. To return to the data form without searching for records based on the criteria you specified, click **Form**.

## [Wildcard characters you can use as criteria](#)

The following wildcard characters can be used as comparison [criteria](#) for filters, and when searching and replacing content.

Use	To find
? (question mark)	Any single character For example, sm?th finds "smith" and "smyth"
* (asterisk)	Any number of characters For example, *east finds "Northeast" and "Southeast"
~ (tilde) followed by ?, *, or ~	A question mark, asterisk, or tilde For example, fy91~? finds "fy91?"

[Show All](#)

# Guidelines for entering data on a worksheet

Microsoft Excel has a number of features that make it easy to manage and analyze data. To take advantage of these features, enter data in your worksheet according to the following guidelines.

## [Data organization](#)

**Put similar items in one column** Design the data so that all rows have similar items in the same column.

**Keep the range separate** Leave at least one blank column and one blank row between the related data range and other data on the worksheet. Excel can then more easily detect and select the range when you sort, filter, or insert automatic subtotals.

**Position critical data above or below the range** Avoid placing critical data to the left or right of the range; the data might be hidden when you filter the range.

**Show rows and columns** Make sure any hidden rows or columns are displayed before making changes to the range. When rows and columns in a range are not showing, data can be deleted inadvertently.

## [Data format](#)

**Use formatted column labels** Create column labels in the first row of the range of data. Excel uses the labels to create reports and to find and organize data. Use a font, alignment, format, pattern, border, or capitalization style for column labels that is different from the format you assign to the data in the range. Format the cells as text before you type the column labels.

**Use cell borders** When you want to separate labels from data, use cell borders — not blank rows or dashed lines— to insert lines below the labels.

**Avoid blank rows and columns** Avoid putting blank rows and columns in the

range so that Excel can more easily detect and select the related data range.

**Don't type leading or trailing spaces** Extra spaces at the beginning or end of a cell affect sorting and searching. Instead of typing spaces, indent the text within the cell.

**Extend data formats and formulas** When you add new rows of data to the end of a data range, Excel extends consistent formatting and formulas. Three of the five preceding cells must use the same format for a format to be extended. All of the preceding formulas must be consistent for a formula to be extended.

### [List feature](#)

You can designate a contiguous range of cells on your worksheet as a [list](#). When you create a list, data defined by the list can be manipulated independently of data outside of the list. After you create a list, you can use list features to quickly sort, filter, total, or publish the data contained within the list.

You can also use the list feature to compartmentalize sets of related data by organizing that data using multiple lists on a single worksheet.

# Remove filters

- To remove a filter applied to one column in a range or a list, click the arrow  next to the column, and then click **All**.
- To remove filters applied to all columns in a range or list, point to **Filter** on the **Data** menu, and then click **Show All**.
- To remove the filter arrows from a range or list, point to **Filter** on the **Data** menu, and then click **AutoFilter**.

[Show All](#)

# Wildcard characters

The following wildcard characters can be used as comparison [criteria](#) for filters, and when searching and replacing content.

<b>Use</b>	<b>To find</b>
? (question mark)	Any single character For example, sm?th finds "smith" and "smyth"
* (asterisk)	Any number of characters For example, *east finds "Northeast" and "Southeast"
~ (tilde) followed by ?, *, or ~	A question mark, asterisk, or tilde For example, fy91~? finds "fy91?"

# Default sort orders

In an ascending sort, Microsoft Excel uses the following order. (In a descending sort, this sort order is reversed except for blank cells, which are always placed last.)

**Numbers** Numbers are sorted from the smallest negative number to the largest positive number.

**Alphanumeric sort** When you sort alphanumeric text, Excel sorts left to right, character by character. For example, if a cell contains the text "A100," Excel places the cell after a cell that contains the entry "A1" and before a cell that contains the entry "A11."

Text and text that includes numbers are sorted in the following order:

0 1 2 3 4 5 6 7 8 9 (space) ! " # \$ % & ( ) \* , . / : ; ? @ [ \ ] ^ \_ ` { | } ~ + < = > A  
B C D E F G H I J K L M N O P Q R S T U V W X Y Z

Apostrophes (') and hyphens (-) are ignored, with one exception: If two text strings are the same except for a hyphen, the text with the hyphen is sorted last.

**Logical values** In logical values, FALSE is placed before TRUE.

**Error values** All error values are equal.

**Blanks** Blanks are always placed last.

[Show All](#)

# Sort a range

[Sort rows in ascending order \(A to Z, or 0 to 9\) or descending order \(Z to A, or 9 to 0\)](#)

1. Click a cell in the column you would like to sort by.
2. Click **Sort Ascending**  or **Sort Descending** .

**Note** In a PivotTable report, Microsoft Excel uses the selected field to sort.

[Sort rows by 2 or 3 columns](#)

For best results, the range you sort should have column labels.

1. Click a cell in the range you want to sort.
2. On the **Data** menu, click **Sort**.
3. In the **Sort by** and **Then by** boxes, click the columns you want to sort.
4. Select any other sort options you want, and then click **OK**.

[Sort by 4 columns](#)

1. Click a cell in the range you want to sort.
2. On the **Data** menu, click **Sort**.
3. In the first **Sort by** box click the column of least importance.
4. Click **OK**.
5. On the **Data** menu, click **Sort**.
6. In the **Sort by** and **Then by** boxes, click the other 3 columns you want to sort, starting with the most important.
7. Select any other sort options you want, and then click **OK**.

[Sort rows by months or weekdays](#)

1. Select a cell or range you want to sort.
2. On the **Data** menu, click **Sort**.
3. In the **Sort by** box, click the column you want to sort.
4. Click **Options**.

5. Under **First key sort order**, click the custom sort order you want, and then click **OK**.
6. Select any other sort options you want, and then click **OK**.

[Use your own data as the sort order](#)

1. In a range of cells, enter the values you want to sort by, in the order you want them, from top to bottom. For example:

**Data**

High

Medium

Low

2. Select the range.
3. On the **Tools** menu, click **Options**, and then click the **Custom Lists** tab.
4. Click **Import**, and then click **OK**.
5. Select a cell in the range you want to sort.
6. On the **Data** menu, click **Sort**.
7. In the **Sort by** box, click the column you want to sort.
8. Click **Options**.
9. Under **First key sort order**, click the custom list you created. For example, click **High, Medium, Low**.
10. Click **OK**.
11. Select any other sort options you want, and then click **OK**.

**Note** You can't use a custom sort order in a **Then by** box. The custom sort order applies only to the column specified in the **Sort by** box. To sort multiple columns by using a custom sort order, sort by each column separately. For example, to sort by columns A and B, in that order, first sort by column B, and

then specify the custom sort order by using the **Sort Options** dialog box. Next, sort the range by column A.

[Sort columns by rows](#)

Most of the time, you sort rows. This procedure sorts the order of columns.

1. Click a cell in the range you want to sort.
2. On the **Data** menu, click **Sort**.
3. Click **Options**.
4. Under **Orientation**, click **Sort left to right**, and then click **OK**.
5. In the **Sort by** and **Then by** boxes, click the rows you want to sort.

**Note** When you sort rows that are part of a worksheet outline, Microsoft Excel sorts the highest-level groups (level 1) so that the detail rows or columns stay together, even if the detail rows or columns are hidden.

[Show All](#)

# When a range contains some numbers stored as text

## How the range will sort if you treat numbers stored as text as text

Numbers stored as numbers are sorted first, and then numbers stored as text. For example, after sorting in ascending order, the range would appear that you have two sets of numbers. Also numbers stored as text sort left to right, character by character. For example 11 appears before 5 because 1 is before 5 in the first character.

<b>Data</b>	<b>Data type</b>
1	Number
10	Number
11	Number stored as text
5	Number stored as text

## How the range will sort if you treat numbers stored as text as numbers

Both numbers stored as text and numbers are sorted together. For example, after sorting in ascending order the range would appear to have one set of numbers.

<b>Data</b>	<b>Data type</b>
1	Number
5	Number stored as text
10	Number
11	Number stored as text

[Convert numbers stored as text to numbers](#)

[One cell at a time](#)

1. On the **Tools** menu, click **Options**, and then click the **Error Checking** tab.
2. Make sure the **Enable background error checking** and **Number stored as**

**text** boxes are checked.

3. Select any cell with a green error indicator in the upper left corner .
4. Next to the cell, click the button that appears , and then click **Convert to Number**.

 [A whole range at once](#)

1. In an empty cell, enter the number 1.
2. Select the cell, and on the **Edit** menu, click **Copy**.
3. Select the range of numbers stored as text you want to convert.
4. On the **Edit** menu, click **Paste Special**.
5. Under **Operation**, click **Multiply**.
6. Click **OK**.
7. Delete the content of the cell entered in the first step.

**Note** Some accounting programs display negative values with the negative sign (–) to the right of the value. To convert the text strings to values, you must return all of the characters of the text string except the rightmost character (the negation sign), and then multiply the result by –1. For example, if the value in cell A2 is "156–" the following formula converts the text to the value –156.

<b>Data</b>	<b>Formula</b>
156–	=LEFT(A2,LEN(A2)-1)*-1

[Show All](#)

# Troubleshoot sorting

**Check the default sort order rules** Microsoft Excel sorts data according to specific sort order rules.

 [Default sort order](#)

In an ascending sort, Microsoft Excel uses the following order. (In a descending sort, this sort order is reversed except for blank cells, which are always placed last.)

**Numbers** Numbers are sorted from the smallest negative number to the largest positive number.

**Alphanumeric sort** When you sort alphanumeric text, Excel sorts left to right, character by character. For example, if a cell contains the text "A100," Excel places the cell after a cell that contains the entry "A1" and before a cell that contains the entry "A11."

Text and text that includes numbers are sorted in the following order:

0 1 2 3 4 5 6 7 8 9 (space) ! " # \$ % & ( ) \* , . / : ; ? @ [ \ ] ^ \_ ` { | } ~ + < = > A  
B C D E F G H I J K L M N O P Q R S T U V W X Y Z

Apostrophes (') and hyphens (-) are ignored, with one exception: If two text strings are the same except for a hyphen, the text with the hyphen is sorted last.

**Logical values** In logical values, FALSE is placed before TRUE.

**Error values** All error values are equal.

**Blanks** Blanks are always placed last.

**Check that numbers are in a numeric format** If Excel incorrectly sorts a cell that contains a value, the cell might be formatted as text and not as a number. For example, negative numbers from some accounting systems become text when the accounting data is imported into Excel. You can convert numbers stored as

text to numbers.

[How?](#)

[One cell at a time](#)

1. On the **Tools** menu, click **Options**, and then click the **Error Checking** tab.
2. Make sure the **Enable background error checking** and **Number stored as text** boxes are checked.
3. Select any cell with a green error indicator in the upper left corner .
4. Next to the cell, click the button that appears , and then click **Convert to Number**.

[A whole range at once](#)

1. In an empty cell, enter the number 1.
2. Select the cell, and on the **Edit** menu, click **Copy**.
3. Select the range of numbers stored as text you want to convert.
4. On the **Edit** menu, click **Paste Special**.
5. Under **Operation**, click **Multiply**.
6. Click **OK**.
7. Delete the content of the cell entered in the first step.

**Note** Some accounting programs display negative values with the negative sign (–) to the right of the value. To convert the text strings to values, you must return all of the characters of the text string except the rightmost character (the negation sign), and then multiply the result by –1. For example, if the value in cell A2 is "156–" the following formula converts the text to the value –156.

<b>Data</b>	<b>Formula</b>
-------------	----------------

156- =LEFT(A2,LEN(A2)-1)\*-1

**Check that mixed data is formatted as text** If the column you want to sort contains both numbers and numbers that include text characters (such as 100, 100a, 200, 200a), you need to format them all as text. If you do not, the numbers will be sorted first, then the numbers that include text will be sorted. To format a number as text, click **Cells** on the **Format** menu, click the **Number** tab, and then click **Text** in the **Category** list, click **OK**, and then retype the value in the cell. To type a number as text when you are entering new data, format the cell as text before you begin typing.

**Check that dates and times are formatted correctly** Excel treats dates and times as numbers. When you type a date or time that Excel recognizes, the cell's format changes from the General number format to a built-in date or time format. For Excel to sort correctly, all dates and times in a column must use a date or time format. If Excel cannot recognize a value as a date, time, or number, the value is formatted as text. To apply the correct formatting, click the cell, click **Cells** on the **Format** menu, and then click the **Number** tab. If the cell is formatted as text, click either **Date** or **Time**, select the appropriate type, click **OK**, and then retype the value in the cell in the format you selected.

**Unhide rows and columns before you sort** Hidden rows are not moved when you sort rows, and hidden columns are not moved when you sort columns. However, when you sort rows, the data in hidden columns is sorted, and when you sort columns, the data in hidden rows is sorted. Before you sort the range, unhide the hidden rows and columns.

**Remove any leading spaces** In some cases, data imported from another application might have leading spaces inserted before data. Remove the leading spaces before sorting the data.

**Check the locale setting** Sort orders vary by locale setting. Make sure that you have the proper locale setting in **Regional Settings** or **Regional Options** in **Control Panel**. For information about changing the locale setting, see your Windows documentation.

**Enter column labels in only one row** If you need multiple line labels, wrap the text within the cell.

**Check settings for graphic objects** The objects' settings may have been changed so that the objects do not move with cells. To set objects so that they can be sorted with cells, click **Select Objects**  on the **Drawing toolbar**, and then drag around the objects you want to change. Click **AutoShape**, **Picture**, **TextBox**, **WordArt**, **Control**, or **Object** on the **Format** menu, and then click **Move but don't size with cells** on the **Properties** tab.

[Show All](#)

# Sort

Use the **Sort** dialog box to sort a range of selected cells.

[Sort by](#)

If you're sorting rows, select the first column to sort by. If you're sorting columns, select the first row to sort by.

[Then by](#)

Use this box if you're sorting by more than one column or row. After the range is sorted by the column or row in the **Sort By** box, the range is sorted by additional columns or rows in sequence.

[Ascending or Descending](#)

Click **Ascending** to sort the lowest number, the beginning of the alphabet, or the earliest date first in the sorted range. Click **Descending** to sort the highest number, the end of the alphabet, or the latest date first in the sorted range. Blank cells are always sorted last.

[My list has](#)

Click **Header row** to exclude the first row from the sort if your list has column labels in the uppermost row. Click **No header row** to include the first row in the sort if the list doesn't have column labels in the uppermost row.

[Options](#)

Lets you specify a custom sort order, such as Low, Medium, High or Jan, Feb, Mar, and so forth, for the column selected in the **Sort by** box. You can also specify a case-sensitive sort and sort either from top to bottom or from left to right. Click to open the **Sort Options** dialog box.

[First key sort order](#)

Select the custom sort order you want.

[Case sensitive](#)

Click **Case sensitive** to sort on capitalization. This option is not available when you sort items in a PivotTable report.

[Orientation](#)

Click **Sort top to bottom** to sort rows by the values in one or more columns. In PivotTable reports, you can sort by only one column. Click **Sort left to right** to sort columns by the values in one or more rows. In PivotTable reports, you can sort by only one row.

[Show All](#)

# About lists

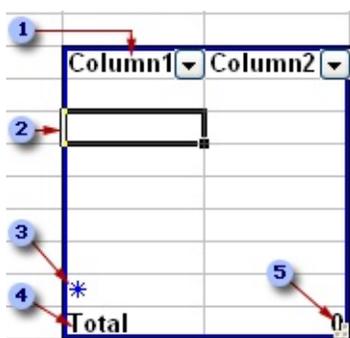
A Microsoft Excel list provides features designed to make it easier to manage and analyze groups of related data in an Excel worksheet. When you designate a range as a list, you can manage and analyze the data in the list independently of data outside the list. For example, using only the data contained within the list, you can filter columns, add a row for totals, and even create a PivotTable report, using only the data contained within the list.

You can have multiple lists on your worksheet, which allows you a great deal of flexibility for separating your data into distinct, manageable sets according to your needs.

**Note** You cannot create a list in a shared workbook. You must remove the workbook from shared use first if you want to create a list.

Excel lists make it easy to share data with other users through integration with Microsoft Windows SharePoint Services. As long as you have the Web address and authoring rights on a SharePoint site, you can share your list so other people can view, edit, and update the list. If you choose to link the list in Excel to a list on a SharePoint site, you can synchronize changes with the SharePoint site so that other users can see updated data.

When you create a list in Excel, the features of the list and the visual elements designed to enhance these features make it easy to identify and modify the contents of the list.



- 1 Every column in the list has AutoFilter enabled by default in the header row.

AutoFilter allows you to filter or sort your data quickly.

- 2 The dark blue border around the list clearly distinguishes the range of cells that makes up your list.
- 3 The row that contains an asterisk is called the insert row. Typing information in this row will automatically add data to the list and expand the border of the list.
- 4 A [total row](#) can be added to your list. When you click a cell within the total row, a drop-down list of aggregate functions becomes available.
- 5 You can modify the size of your list by dragging the resize handle found on the bottom corner of the list border.

## The benefits of lists

- **Sort and filter lists** You can sort lists in ascending or descending order or create custom sort orders. You can also filter lists to show only the data that meets the criteria you specify.
- **Ensure data integrity** For lists that are not linked to SharePoint lists, you can use the built-in data validation features in Excel. For example, you may choose to allow only numbers or dates in a column of a list. For lists that are linked to SharePoint lists, the list validation features of Windows SharePoint Services are automatically applied to the list. For example, when you publish and link the list to a server that is running Windows SharePoint Services, or when you edit an existing SharePoint list in Excel, data type rules are applied to each column in the list to ensure that only one type of data is allowed in each column.
- **Format list objects** You can format cells in a list the same way that you format cells in a worksheet.
- **Compatible with lists in Windows SharePoint Services** When you publish a list to a SharePoint site, you are creating a custom SharePoint list. If you choose to link the list when you publish it, or when you export an existing SharePoint list, you can edit that list offline and synchronize the changes to the SharePoint list at a later time.

# Publish a list

## To publish a list to a server that is running Microsoft Windows SharePoint Services

**Note** The list you want to publish must be active on the worksheet.

1. On the **Data** menu, point to **List**, and then click **Publish List**.
2. In the **Address** box, type the URL of the server.

If you want to link the list to the list that will be created in the SharePoint site, select the **Link to the new SharePoint list** check box.

3. In the **Name** box, type the name of the list.
4. In the **Description** box, type comments that describe the list. This is optional.
5. Click **Next**.
6. Inspect the data types displayed for each of the columns in your list range. If the data types are as expected, click **Finish**. If a column is associated with an incorrect data type, click **Cancel** and confirm that the key cell can be converted to the correct type. After making changes, publish the list to see if the changes you made in the data has affected the data type for the column.

**Note** When you successfully publish a linked list, an ID column is automatically added as the first column of your list. The ID column is used to ensure that all records are unique. This column is read-only and cannot be removed from the list unless you unlink the list from the SharePoint site.

## To view a published list on Microsoft Windows SharePoint Services

1. Select a list on the worksheet that has been published.
2. On the **List** toolbar, click **List**, then click **View List on Server**.

**Note** You must have a working network or internet connection to the Microsoft Windows SharePoint Services site. Additionally, you must have permissions to view the list on the server.

# Convert a list to a range

You can remove list functionality for a list in the worksheet by converting the list to a standard Excel range.

- On the **List** submenu of the **List** toolbar, click **Convert to Range**.

**Note** If the list is linked to a SharePoint list, then the link will be removed and all pending changes will not be reflected in the SharePoint list.

# About list features

When you specify a range of cells as a list in Microsoft Excel, the list user interface integrates and makes readily available much of the standard functionality that you might want to use on the data within that list.

## **AutoFilter drop-downs**

One of the common things that you do with data in Excel is to filter the data based on different field values. To make this functionality available to you when using lists, AutoFilter drop-downs are automatically added in the header row of a list when the list is created.

The AutoFilter drop-down contains new functionality: **Sort Ascending**, **Sort Descending**, and other sort options are located at the top of the drop-down list.

This functionality sorts the entire list on the field where it is chosen, in the specified order. The remaining drop-down selections are unchanged from the functionality in earlier versions of Excel.

## **Insert row**

Another action that is common when you work with a list is to add a new rows. To that end, an insert row is displayed whenever the list is active. This interface element consists of a blank row, displayed directly below the last row of data, with a blue asterisk (\*) inside the left-most cell.

When the list is inactive, the asterisk is removed and the list border shifts up to the bottom of the last row of data.

## Total row

To display a total row, click the **Toggle Total Row**  on the **List** toolbar. This total row is displayed below the insert row when the list is active, and shifts up to the row just below the last row of data when the list is not active. When turned on, the word "**Total**" is displayed in the left-most cell, and an appropriate Subtotal formula in the right-most cell.

The total row provides you the opportunity to display some manner of total for all columns in your list. When you click in any a cell in the total row, an arrow appears to the right of the cell. You can then click this drop-down list arrow to display a number of aggregate functions. When you choose one, a subtotal function is then inserted into that cell.

**Note** You cannot manually edit the cells of the total row to add different functionality. You can select only an aggregate from the drop-down for use in the subtotal function that is inserted into the cell by Excel.

[Show All](#)

# About publishing lists

When you create a list in Microsoft Excel, you have the option to publish the list so that others can view and even edit the list data. You can share the information contained in a list by publishing it to a server that is running Microsoft Windows SharePoint Services. Additionally, when you publish a list to a SharePoint site, you have the option of linking the list to the server. This linking allows you to keep list data synchronized between Excel and Windows SharePoint Services.

If you choose to publish the list, you must have permissions to create a list on the server that is running Windows SharePoint Services.

## [Formulas in lists](#)

SharePoint lists use calculated values instead of the formulas used in Excel. If you link a list that has formulas in it to a SharePoint list, existing formulas in Excel will be converted to calculated values during publishing and synchronization. Likewise, you will see a formula for cells in a list column in Excel if a user has created a calculated column in the linked SharePoint list. The column will be read-only in Excel.

## [Data types supported by Windows SharePoint Services](#)

When you publish a list to a SharePoint site, the data type for each column will be designated in the SharePoint list as one of the following data types:

- Text (single line)
- Text (multiple lines)
- Currency
- Date
- Number
- Hyperlink

When you publish a list, the data type determined for each column will be displayed in Step 2 of the Publish List to SharePoint Site wizard. For each data cell in a column, Excel tries to determine the appropriate data type. If all the

cells in a column have the same data type, Excel will make that the data type for the column, as long as the data type is supported by Windows SharePoint Services. If a column has cells with different data types or different number formats, Excel applies a data type that is appropriate for every cell within the column. For example, if you have a column that contains numbers and text, the data type in the SharePoint list will be text.

If you want to determine for yourself what the resulting data type will be, you can cancel the wizard and make sure the data type is the same for all the cells in the column. You can then run the wizard again and, as long as the data type is supported by the SharePoint list, the wizard will apply that data type to the column in the SharePoint list.

#### [Data type validation with linked lists](#)

For lists that are linked to a SharePoint site, Excel will recognize the data type assigned to each column and validate the data against that type. In order to promote the integrity of SharePoint list data, Excel enforces data type conformity when data is entered into cells in a linked list.

For example, if you attempt to enter text in a column that contains only numbers (excluding the header row), you are prevented from entering that data and notified of the reason. Excel also provides an error-checking [smart tag](#) to indicate the data type mismatch when invalid data is detected by error checking. In addition to the standard error-handling provided by most error-related smart tags, the Data Validation smart tag provides the **Display Type Information** command. Clicking this command displays a dialog box that contains information about the data type associated with the column in the list you are editing.

If you attempt to synchronize a linked list when a cell in the local list contains invalid data, Excel will display a message that tells you the data type for the column. Data validation errors must be resolved before you can synchronize the list.

# Unlink a list

When you unlink a list in Excel, it removes the link with the SharePoint list. The list will remain intact on the worksheet, but you will no longer be able to synchronize changes with the SharePoint list. The SharePoint list will remain on the SharePoint site.

If you had made changes to the list and have not synchronized, the SharePoint list will not be updated with changed data. You cannot undo unlinking the list.

- On the **List** toolbar, click **List**, and then click **Unlink List**.

[Show All](#)

# About importing data

By importing data, you don't have to retype the data you want to analyze in Microsoft Excel. You can also update your Excel reports and summaries automatically from the original source database whenever the database is updated with new information.

# Importing data

## [Importing data from databases and files](#)

You can import data to Excel from most data sources by pointing to **Import External Data** on the **Data** menu, clicking **Import Data**, and then choosing the data you want to import in the **Select Data Source** dialog box.

The Data Connection Wizard, available when you click **New Source** in the **Select Data Source** dialog box, makes it possible to import data from external data connections not available from the **Select Data Source** dialog box. These sources may include OLE DB data sources (including OLAP cubes and exchange servers) and any data sources a system administrator supplies. You cannot filter or join data in the Data Connection Wizard.

The default connection method when you import data using the Data Connection Wizard is through OLE DB providers. The resulting .odc (office data connection) files can be opened for viewing in Internet Explorer and edited in Excel, Notepad, and other Microsoft Office applications if the file doesn't point to an OLAP data source.

The Data Connection Wizard also provides access to a data source called a *data retrieval service*. A data retrieval service is a Web service installed on Windows SharePoint Services for connecting to and retrieving data. To use a data retrieval service, a client application, such as Excel, sends a query request over [HTTP](#) to the data retrieval service on Windows SharePoint Services. The data retrieval service sends that request to the data source, and then passes the data that is returned to it back to the client application as XML. Importing data from a data retrieval service in Excel automatically creates a databound XML list in your worksheet. After adding a databound XML list to your worksheet, you can use the commands on the **XML** submenu of the **Data** menu or the **XML and List** tool bar to refresh data, edit the query, or set the properties of the XML map associated with the XML list.

A default installation of Windows SharePoint Services provides a data retrieval service for connecting to data in SharePoint lists. A SharePoint site administrator can install the Microsoft Office Web Parts and Components to add additional

data retrieval services for Microsoft SQL Server and Microsoft Business Solutions. The installation program for Microsoft Office Web Parts and Components is available on the [Downloads on Microsoft Office Online](#).

**Note** To bring [external data](#) into Microsoft Excel, you must have access to the data. If the external data source you want to access is not on your local computer, you might need to contact the administrator of the database for a password, user permission, or other connection information.

## [Importing data with Microsoft Query](#)

In most cases, you can import data by using the **Import Data** command as described in the section above. Use Query or another program only if you need to perform specialized query tasks such as the following:

- Filter rows or columns of data before they are brought into Excel.
- Create a [parameter query](#).
- Sort data before it is brought into Excel.
- Join multiple tables.

Microsoft Query provides a simple front end, easily accessible from within Excel, to perform these specialized query tasks.

You can use Query to set up ODBC data sources to retrieve data. In Query, you can use the Query Wizard to create a simple [query](#), or you can use advanced criteria in Query to create a more complex query. You can access Query from Excel, or you can create a query from within the PivotTable and PivotChart Wizard.

You can also use [Dynamic Data Exchange \(DDE\)](#) with Query. For more information about DDE, see Query Help.

To import data using Query, you must first:

- **Install Query** Query, including the Query Wizard, is an optional feature for Excel. Under most circumstances, you are prompted to install Query when you point to **Import External Data** on the **Data** menu and click **New Database Query**.
- **Install ODBC drivers** An [ODBC driver](#) is required to retrieve data in

relational databases, text files, or Excel using Query. When you install Query, you automatically install a set of ODBC drivers. If you use a driver other than one installed with Query, you must install the driver separately.

- **Install data source drivers** A [data source driver](#) is required to retrieve OLAP source data. Query supports connecting to databases that are created by using SQL Server OLAP Services; when you installed Query, you automatically installed support for this type of OLAP database. To connect to other OLAP databases, you must install a data source driver and client software.

For more information, see Query Help.

### [Importing data from the Web](#)

You can import data originating from a Web page by pointing to **Import External Data** on the **Data** menu and clicking **New Web Query**. You must have access to the [World Wide Web](#) through your company's intranet or through a modem on your computer or network, or you can make a query against local HTML or XML sources.

### [Importing data with Visual Basic for Applications \(VBA\)](#)

You can use a [Visual Basic for Applications macro](#) to gain access to an external data source.

Depending on the data source, you will use either [ActiveX Data Objects](#) or [Data Access Objects](#) to retrieve data using VBA.

If you want to use a macro that you created in Excel version 5.0 or earlier, click **Add-Ins** on the **Tools** menu, and then make sure the **ODBC Add-In** check box is selected.

For information about creating Visual Basic for Applications macros, see [Visual Basic Help](#).

**Note** While you are recording a macro that includes a query, Excel can't run the query in the background, even if you chose to run it that way. To change the recorded macro so that it runs in the background, edit the macro in the Visual

Basic Editor and change the refresh method for the QueryTable object from "BackgroundQuery := False" to "BackgroundQuery := True".

# Refreshing data and naming ranges

## [Refreshing data](#)

Excel provides many options for refreshing imported data, including refreshing the data whenever you open the workbook and automatically refreshing data at timed intervals. You can continue to work in Excel while data is being refreshed, and you can also check the status of the refresh while it's being refreshed.

If your external [data source](#) requires a [password](#) to gain access to the data, you can require that the password is entered each time the [external data range](#) is refreshed.

When an external data range expands and additional records are returned, Excel can fill formulas in adjacent columns or within the data range so that they remain next to the appropriate data.

You can also choose how to add new data to your worksheet.

## [Naming external data ranges](#)

Excel automatically names an external data range as follows:

- External data ranges from [Office Data Connection](#) (ODC) files are named with the .odc file extension.
- External data ranges from databases are named with the name of the query; by default `Query_from_source` is the name of the data source you used to create the query.
- External data ranges from text files are named with the text file name.
- External data ranges from [Web queries](#) are named with the name of the Web page from which the data was retrieved.

If your worksheet has more than one external data range from the same source, the ranges are numbered. For example, MyText, MyText\_1, MyText\_2, and so on.

You can also change the name of an external data range in the **Data Range Properties** dialog box.

[Show All](#)

# Import a text file

1. Click the cell where you want to put the data from the text file.

To ensure that the [external data](#) does not replace existing data, make sure that the worksheet has no data below or to the right of the cell you click.

2. On the **Data** menu, point to **Import External Data**, and then click **Import Data**.
3. In the **Files of type** box, click **Text Files**.
4. In the **Look in** list, locate and double-click the text file you want to import as an [external data range](#).
5. To specify how you want to divide the text into columns, follow the instructions in the Text Import Wizard, and then click **Finish**.
6. In the **Import Data** dialog box, click **Properties** to set formatting and layout options for the imported data.
7. In the **Import Data** dialog box, do one of the following:
  - To return the data to the location you selected, click **Existing worksheet**, and then click **OK**.
  - To return the data to a new worksheet, click **New worksheet**, and then click **OK**. Microsoft Excel adds a new worksheet to your workbook and automatically puts the external data range in the upper-left corner of the new worksheet.

[Show All](#)

# Import or connect to data

You can use these procedures to import data from most data sources, including OLAP databases.

For information about filtering or joining data before you import it into Microsoft Excel, see Microsoft Query Help.

1. On the **Data** menu, point to **Import External Data**, and then click **Import Data**.
2. Do one of the following:

[Open an existing data source](#)

- In the **Select Data Source** dialog box, select a data source from **My Data Sources**, and then click **Open**.

[Create a new data source connection](#)

1. In the **Select Data Source** dialog box, click **New Source**.
2. In the Data Connection Wizard, choose a data source to connect to, and then click **Next**.

## Notes

- If you cannot find the data source you want, contact your system administrator.
- If you choose **Other/Advanced** under **What kind of data source do you want to connect to?**, you are given a list of OLE DB providers. For more information about connecting to a provider, see your OLE DB provider documentation.
- If you choose **Microsoft Business Solutions** or **Data retrieval services** under **What kind of data source do you want to connect to?**, a databound XML list that can be refreshed from the data source will be created in your worksheet. To use these data sources, you must have access to a server that is running

Windows SharePoint Services. A default installation of Windows SharePoint Services provides a data retrieval service for connecting to data in SharePoint lists. A SharePoint site administrator can install the Microsoft Office Web Parts and Components to add additional data retrieval services for Microsoft SQL Server and Microsoft Business Solutions. The installation program for Microsoft Office Web Parts and Components is available from the [Downloads on Microsoft Office Online](#).

3. Provide the information requested by the Data Connection Wizard dialog boxes.
3. If you want, you can do the following in the **Import Data** dialog box:
  - Click **Properties** to choose query definition, refresh, and formatting and layout options, and then click **OK**.
  - Click **Edit Query** to edit the Connection, Command Type, and Command Text of your OLE DB query.
  - For a query created with Microsoft Query or for a Web query, click **Parameters** to specify how a parameter value is obtained for the external data range.
4. Do one of the following:
  - To return the external data to the selected worksheet, click **Existing worksheet**. On your worksheet, click the cell where you want to place the upper-left corner of the external data range, and then click **OK**.
  - To return the external data to a new worksheet, click **New worksheet**, and then click **OK**. Excel adds a new worksheet to your workbook and automatically puts the external data range in the upper-left corner of the new worksheet.

[Show All](#)

# Troubleshoot importing data

## Creating data sources

[The data source I want isn't listed in the Select Data Source dialog box.](#)

If you can't find your [data source](#), click **New Source** in the **Select Data Source** dialog box, and then click **Other/Advanced** under **What kind of data source do you want to connect to** in the Data Connection Wizard. If you are still unable to find your data source, check with your system administrator or the vendor that provides the database you want to access.

[I can't create a new data source in Microsoft Query.](#)

**Check the server address and logon information** Before you set up a data source, make sure you know the address where the database is located on your network and have the necessary permissions to connect to the database and log on. See the administrator of your database for a logon name, [password](#), or any other permissions required, and to make sure the access you've been granted is working properly.

**Check your driver** First, make sure you have the right [ODBC driver](#) or [data source driver](#) for your [data source](#). ODBC drivers and data source drivers allow you to connect to new databases as they become available. However, you must make sure correct driver is installed for the type of database you're using.

**Make sure the driver works with Excel** In addition to the drivers provided with Microsoft Office, you can use ODBC and data source drivers provided by third-party manufacturers. Before you try to use a third-party driver, make sure the manufacturer has tested the driver with Microsoft Excel. For some databases, the driver supplied with the database software may be the best choice. Contact the administrator of your database to find out what's available and what works best at your site.

**Make sure the driver is properly installed**

1. To display the list of available drivers, point to **Import External Data** on the **Data** menu, and then click **New Database Query**.
2. Double-click **New Data Source** on the **Databases** or **OLAP Cubes** tab.
3. Type a name in step 1 of the **Create New Data Source** dialog box, and then click the list in step 2. If you don't see the driver you need, you should check to make sure the ODBC driver or data source driver is installed properly.

**Make sure you supplied all of the configuration information** After you've installed the driver and selected it in step 2 of the **Create New Data Source** dialog box, make sure you provide all of the necessary information in step 3 of the dialog box. For information about a Microsoft driver, click **Connect**, and then click **Help** in the setup dialog box for the driver. For third-party drivers, see the Help system or the documentation for the driver.

If you are setting up a data source with an ODBC driver or data source driver provided by Microsoft, click the name of your driver for information about the settings you should make in step 3 of the **Create New Data Source** dialog box.

[My data source has an asterisk next to it.](#)

The [data source](#) is from a version of Microsoft Query earlier than Query 97.

Data sources created in versions of Query earlier than Query 97 have a different format from data sources in later versions of the product. These data sources and [queries](#) can still be used with later versions of the product, but queries that are created by using these data sources cannot be shared with other users. Versions earlier than Query 97 store data source information as part of your Microsoft Windows operating system, and that information is available only on your system.

### **Identify data sources created with earlier versions of Query**

1. On the **Data** menu, point to **Import External Data**, and then click **New Database Query**.
2. Click **Options** in the **Choose Data Source** dialog box, and then select the **Include registry DSNs in list of available databases** check box.

All data sources that were created by using a version earlier than Query 97

appear in the **Choose Data Source** dialog box with asterisks next to their names.

**Delete old data sources** After you identify data sources created with earlier versions of Query, on the **Databases** tab in the **Choose Data Source** dialog box, click the data source you want to remove, and then click **Delete**.

**Create shared data sources** If you want to share queries or [report templates](#) that use data from the external databases that are specified in your non-shareable data sources, create new data sources for these databases. Use the new data sources to create the queries, query files, and report templates.

## Importing data

 [A message indicates that the path to my database is not valid.](#)

**Check for a mapped network drive** If your database is on a shared network directory, when you set up the [data source](#) and selected the database file, the path to the database may have been recorded in the data source with the mapped drive letter in use by your system at that time. For example, if your database is named Inventory.mdb, and you had drive G mapped to the shared network directory where this database is stored, your data source might record this location as G:\public\Inventory.mdb. When you try to use this data source, or you or other users try to run queries created with this data source, the [ODBC driver](#) displays a message that the path is not valid if drive G is not mapped to the same shared network directory.

**Use an alternative to drive mapping** If you are using the Microsoft Access driver or the Microsoft Excel driver, you can correct this problem by creating a new data source. When you specify the location of the database file, don't select the mapped drive for the shared network directory. Instead, type the [UNC address](#) of the shared network directory, and then locate the database file. For example, if your database file is stored on a server named Shared, you could type \\Shared\public and then select the file Inventory.mdb.

**Map the same network drive letter before using the data source** For other ODBC drivers, before you use a data source or run a query created with that data source, make sure the same drive is mapped to the shared network directory where the database is located as was mapped when the data source was created.

 [Sorting and formatting are incorrect after I refresh an external data range.](#)

**Formatting changes in Query won't affect Excel** Formatting that you apply in Query affects the view of the [result set](#) only in Query. When you return the result set to Microsoft Excel, formatting changes you made while in Query — such as hiding [fields](#) or changing the width of a column, the height of rows, or the font, style, or size of text— are not displayed in Excel.

**Preserve Excel formatting when you refresh** Each time you [refresh](#) an [external data range](#) Excel replaces the existing data with new data and also removes any Excel outlining and subtotals. You can preserve formatting, but not row sorting or outlining, for an external data range by clicking **Data Range Properties**  on the **External Data toolbar** and making sure that the **Preserve cell formatting** check box is selected under **Data formatting and layout**.

**To preserve sorting, copy the data** Each time you refresh an external data range, Excel automatically removes any sorting you applied. If you want to sort or format data from an external data range and keep all sorting and formatting, copy the data, and then use the **Paste Special** command and select the **Values** option to paste the data onto another sheet in the workbook. Then format the data the way you want. The sorting and formatting will be preserved; however, you won't be able to refresh the data because the underlying [query](#) associated with the external data range was not copied.

**Record a macro to restore sorting and formatting** If you want to be able to refresh an external data range and keep your sorting and formatting, try recording a macro for formatting the data in your external data range and then running the macro after you refresh the data. On the **Tools** menu, point to **Macro**, and then click **Record New Macro**. Specify the options you want, and click **OK**. Format the external data range the way you want, and then click the **Stop Macro** button on the **Stop Recording** toolbar. Run the macro after you refresh the data.

 [How?](#)

1. Set the security level to **Medium** or **Low**.

 [How?](#)

1. On the **Tools** menu, click **Options**.
  2. Click the **Security** tab.
  3. Under **Macro Security**, click **Macro Security**.
  4. Click the **Security Level** tab, and then select the security level you want to use.
2. Open the workbook that contains the [macro](#).
  3. On the **Tools** menu, point to **Macro**, and then click **Macros**.
  4. In the **Macro name** box, enter the name of the macro you want to run.
  5. Do one of the following:

#### **Run a macro in a Microsoft Excel workbook**

- Click **Run**.

If you want to interrupt, press ESC.

#### **Run a macro from a Microsoft Visual Basic module**

1. Click **Edit**.
2. Click **Run Sub/UserForm** .

 [Tip](#)

If you want to run a different macro while you are in the [Visual Basic Editor](#), click **Macros** on the **Tools** menu. In the **Macro name** box, enter the name of the macro you want to run, and then click **Run**.

 [A range of blank cells is selected when I return data to Microsoft Excel.](#)

**Check your ODBC driver** You may not be using a compatible [ODBC driver](#). If you're using an ODBC driver from an earlier version of Microsoft Excel or Query, you must install the most recent version of the driver to import data.

**Check your system's free memory** Your computer might not have enough memory available to import the data. To check available memory in Windows 2000, switch to the Windows desktop. Right-click the **My Computer** icon, click **Properties**, and then click the **Advanced** tab. Click **Performance Options**, and then click **Change** to see the percentage of available memory. To free some memory, try closing unnecessary documents and applications.

**Check whether Excel is ignoring other programs** The **Ignore other applications** check box may be selected in Excel. This option may prevent other programs, including Microsoft Query, from establishing a [dynamic data exchange \(DDE\)](#) connection to Excel. On the **Tools** menu, click **Options**, and then click the **General** tab. Under **Settings**, make sure that the **Ignore other applications** check box is cleared. Then run the query again.

[I run out of disk space when I try to import data.](#)

**Determine how much space is needed** When you create a [query](#), the query is temporarily placed on your hard disk. As a general rule, you should have a minimum of 3 to 5 MB of available disk space to create the temporary query file. If your query is large, you will need more free disk space. If enough disk space is not available, the query will take longer to retrieve data or the query may quit running.

**Check for available disk space** To check available hard disk space in Windows 2000, switch to the Windows desktop, double-click the **My Computer** icon, and then click the disk you want to check. On the **File** menu, click **Properties**. To free some space on your hard disk, try emptying the Recycle Bin, backing up unneeded files and then removing them from your hard disk, or removing Windows components that you don't use. For more information about freeing hard disk space, see Microsoft Windows Help.

**Strategies you can try when disk space is limited** If you have only a limited amount of space available on your hard disk, try the following:

- **Simplify your query** Make sure you include only those [tables](#) and [fields](#) that are needed for your query. If your query contains unnecessary tables or fields, delete them from the query to reduce the size of the temporary query file.
- **Use criteria to reduce the size of the result set** Use criteria to retrieve

only specific records rather than retrieving all the records from a database. For more information, see Microsoft Query Help.

- **Set a limit on the number of records returned by the query** Limit the number of records the query returns. In Query, click **Options** on the **Edit** menu, select the **Limit number of records returned to** check box under **User settings**, and enter the maximum number of records to return in the **Records** box.

[A macro I use to import data doesn't work.](#)

**Make sure Query is installed** If you're using a Microsoft [Visual Basic](#) macro, make sure [ActiveX Data Objects](#) for Visual Basic are installed when you install Query.

**Check your data source and driver** Make sure that you have the correct [ODBC driver](#) or [data source driver](#) for the [data source](#) that is used by the macro.

**Install and load the Microsoft ODBC Function add-in program** On the **Tools** menu, click **Add-Ins**, and then select the **ODBC Add-in** check box. If **ODBC Add-in** does not appear in the box, the add-in was made unavailable when you installed Microsoft Excel or Microsoft Office, and you need to install the ODBC add-in program.

[The columns are in the wrong order after I change my query.](#)

**You can preserve either Excel or Query column order** To keep the columns where you moved them in Microsoft Excel after you [refresh](#) or change a [query](#), click a cell in the [external data range](#), and then click **Data Range Properties**  on the **External Data toolbar**. Under **Data formatting and layout**, select the **Preserve column sort/filter/layout** check box. To change the column order in Query and have the changes reflected in the external data range, clear the check box.

**Effects of changing column names in Query** If you select the **Preserve column sort/filter/layout** check box and then change a column name in Query, when you return the data to Excel, the renamed column becomes the rightmost column in the external data range. You can prevent this from happening by clearing the check box before you change the query, or you can move the column to the position you want in Excel.

[Show All](#)

# About installing OLAP providers

To connect to third-party database products that provide [OLAP](#) data and services, you must install additional [data source drivers](#) and client software.

For information about installing and using a third-party [OLAP provider](#), see your system administrator or contact the vendor for your OLAP product. After you install the provider, you can set up [data sources](#) in Microsoft Query to access the provider's databases. For more information about setting up data sources in Microsoft Query, see Microsoft Query Help.

To use the Microsoft Office features for working with OLAP data, the third-party product must be Microsoft Office-compatible. If you want to work with [offline cube files](#), check if the third-party product supports this by creating a Microsoft Excel [PivotTable report](#) that displays [source data](#) from the third-party database. In the PivotTable report, the **Offline OLAP** command on the **PivotTable** menu (**PivotTable toolbar**) is unavailable if the provider does not support offline cube files.

[Show All](#)

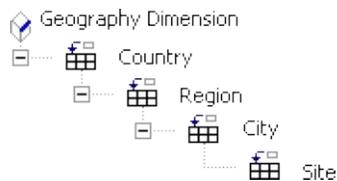
# About OLAP source data in PivotTable and PivotChart reports

On-Line Analytical Processing (OLAP) is a way to organize large business databases. OLAP databases are organized to fit the way you retrieve and analyze data so that it's easier to create the reports you need.

OLAP databases are designed to speed up the retrieval of data. Because the OLAP server, rather than Microsoft Excel, computes the summarized values, less data needs to be sent to Excel when you create or change a report. This approach lets you work with much larger amounts of source data than you could if the data were organized in a traditional database, where Excel must retrieve all the individual records and then calculate the summarized values.

 [OLAP basics](#)

**Levels of detail** OLAP databases organize data by level of detail, using the same categories you use to analyze the data. For example, a sales database might have fields for the country, region, city, and site of each sale. This information could be organized from least to greatest level of detail, like this:



Levels in a geography dimension

This organization makes it easy for a PivotTable or PivotChart report to display high-level summaries, such as sales totals across an entire country or region, and also display the details for sites where sales are particularly strong or weak.

**Dimensions and cubes** A set of levels that encompass one aspect of the data, such as geographic locations, is called a dimension. Similarly, information about when sales were made could be organized in a time dimension with levels for year, quarter, month, and day. OLAP databases are called cubes because they

combine several dimensions, such as time, geography, and product lines, with summarized data, such as sales or inventory figures.

## [OLAP features in Microsoft Excel](#)

**Retrieving OLAP data** You can connect to OLAP [data sources](#) just as you do to other external data sources. You can work with databases created with Microsoft SQL Server OLAP Services, the Microsoft OLAP server product. Excel can also work with third-party OLAP products that are compatible with OLE-DB for OLAP.

You can display OLAP data only as a PivotTable or PivotChart report, not as an [external data range](#). You can save OLAP PivotTable and PivotChart reports in [report templates](#), and you can create Office Data Connection (.odc) files to connect to OLAP databases and query files (.oqy) for OLAP [queries](#). When you open an .odc or .oqy file, Excel displays a blank PivotTable report, ready for you to lay out.

**Creating cube files for offline use** You can use the Excel Offline Cube Wizard to create files with a subset of the data from an OLAP server database. Offline cube files let you work with OLAP data when you are not connected to your network. You can create cube files only if you use an [OLAP provider](#), such as Microsoft SQL Server OLAP Services, that supports this feature.

**Creating cubes from relational databases** Another wizard, the OLAP Cube Wizard, allow you to organize data queried from relational databases, such as Microsoft SQL Server, into OLAP cubes. This wizard is available from Microsoft Query, which you access from Excel. A cube lets you work with larger amounts of data in a PivotTable or PivotChart report than you could otherwise, and speeds retrieval of the data.

## [Software components you need for OLAP access](#)

**An OLAP provider** To set up OLAP [data sources](#) for Microsoft Excel, you need one of the following [OLAP providers](#):

- **Microsoft OLAP provider** Excel includes the [data source driver](#) and client software you need to access databases created with the Microsoft OLAP product, Microsoft SQL Server OLAP Services. The driver provided

with Excel 2002 and later supports both versions 7.0 and 8.0 of this product. If you have the version 7.0 driver that was provided with Excel 2000, you can use this driver to access version 7.0 databases, but for version 8.0 databases you must use the version 8.0 driver.

- **Third-party OLAP providers** For other OLAP products, you need to install additional drivers and client software. To use the Excel features for working with OLAP data, the third-party product must conform to the OLE-DB for OLAP standard and be Microsoft Office compatible. For information about installing and using a third-party OLAP provider, consult your system administrator or the vendor for your OLAP product.

**Server databases and cube files** The Excel OLAP client software supports connections to two types of OLAP databases. If a database on an OLAP server is available on your network, you can retrieve source data from it directly. If you have an [offline cube file](#) containing OLAP data or a [cube definition](#) file, you can connect to that file and retrieve source data from it.

**Data sources** A data source gives you access to all data in the OLAP database or offline cube file. After you have created an OLAP data source, you can base reports on it, and return the OLAP data to Excel in the form of a PivotTable or PivotChart report. You can create a data source while you are using the PivotTable and PivotChart Wizard to create a new report, or you can create a data source in Microsoft Query and use it to create reports in Excel.

**Microsoft Query** Microsoft Query is an optional Microsoft Office component that you can install and access from Excel. You can use Query to retrieve data from an external database such as Microsoft SQL or Microsoft Access. You do not need to use Query to retrieve data from an OLAP PivotTable that is connected to a [cube](#) file.

#### [Feature differences for reports with OLAP source data](#)

If you work with PivotTable and PivotChart reports from both OLAP [source data](#) and other types of source data, you will notice some feature differences.

**Data retrieval** An OLAP server returns new data to Microsoft Excel every time you change the layout of the report. With other types of external source data, you query for all the source data at once, or you can set options to query only when you display different [page field items](#). You also have several other

options for [refreshing](#) the report.

In reports based on OLAP source data, the [page field](#) settings are unavailable, background query is unavailable, and the optimize memory setting is not available.

**Field types** For OLAP source data, [dimension](#) fields have  icons in the field list and can be used only as [row](#) (series), [column](#) (category), or page fields. Fields with  icons can be used only as data fields. For other types of source data, all fields have  icons and can be used in any part of a report.

**Renamed fields and items** For OLAP source data, renamed fields and [items](#) that you hide revert to their original names when you redisplay them. For other types of source data, fields and items retain their new names in these situations.

**Access to detail data** For OLAP source data, the server determines what levels of detail are available and calculates summary values, so the detail records that make up summary values usually aren't available, and you can't show items with no data. The server may, however, provide [property fields](#) that you can display. Other types of source data don't have property fields, but you can display the underlying detail for data field values and for items, and you can show items with no data.

OLAP page fields may not have an **All** item, and the **Show Pages** command is unavailable.

**Initial sort order** For OLAP source data, items first appear in the order in which the OLAP server returns them. You can then sort or manually rearrange the items. For other types of source data, the items in a new report first appear sorted in ascending order by item name.

**Calculations** OLAP servers provide summarized values directly for a report, so you cannot change the [summary functions](#) for data fields. For other types of source data, you can change the summary function for a data field and use multiple summary functions for the same data field.

Both types of source data support [custom calculations](#).

You cannot create [calculated fields](#) or [calculated items](#) in reports with OLAP source data.

**Subtotals** In reports with OLAP source data, you cannot change the summary function for subtotals, and you cannot display subtotals for inner row or column fields. With other types of source data, you can change subtotal summary functions and show or hide subtotals for all row and column fields.

For OLAP source data, you can include or exclude hidden items when you calculate subtotals and grand totals. For other types of source data, you can include hidden page field items in subtotals, but hidden items in other fields are excluded by default.

[Show All](#)

# About offline cube files

An offline cube file is a file with .cub extension that stores a portion of the [source data](#) from an [OLAP](#) server database. This allows you to continue to make changes to [PivotTable](#) and [PivotChart reports](#) when the server is unavailable or you're disconnected from the network.

An offline cube file can speed up changes to your reports, especially if your network connection to the OLAP server is slow. However, if your OLAP database is large and you want the cube file to provide access to a large subset of the data, you'll need to provide ample disk space, and saving the file may be time consuming.

Two wizards are provided for creating offline cube files. To copy part of the data in an OLAP server database to a cube file, you use the Offline Cube Wizard, which you run from your report in Microsoft Excel. To create an OLAP cube from the records retrieved by a [query](#), you use the OLAP Cube Wizard, which you run in Microsoft Query.



## [Creating an offline file from OLAP server data](#)

When you have a PivotTable or PivotChart report that's based on source data from an OLAP server, you can use the Offline Cube Wizard to copy the source data to a separate .cub file on your local disk. To create these files, you must have an [OLAP provider](#), such as Microsoft SQL Server OLAP Services, that supports this capability. The Offline Cube Wizard is available from Excel.

To create the file, you use the Offline Cube Wizard to select a subset of the data in the OLAP database and save that subset in a separate file. To do this, you first create a PivotTable or PivotChart report based on the server database, and then create the offline cube file from the report. You can then switch the report between the server database and the offline file whenever you want to; for example, when you use a portable computer to take work home or on a trip, and later on reconnect the computer to your network.

Your report doesn't have to include every field that you include in the file. You can select from all of the [dimensions](#) and data fields available in the OLAP

database. To keep the size of your file to a minimum, you can include only the data that you want to be able to display in the report. You can omit entire dimensions, and for most types of dimensions you can also omit lower-level detail and top-level [items](#) that you don't need to display. If you include items, any [property fields](#) available in the database for the items are also saved in your offline file.

If your OLAP provider doesn't support offline cube files, the **Offline OLAP** command on the **PivotTable** menu will be unavailable. Contact the vendor for your OLAP provider for more information.

### [Creating a cube from the records in a query](#)

For some types of source data, you can create an OLAP cube from records returned by a query, providing the benefits of OLAP organization and retrieval for other types of external data. When you create an OLAP cube from a query, you turn the flat set of records into a structured hierarchy that allows reports to focus on the desired level of detail. You also predefine the summary values for the reports, which speeds up report calculation.

With a cube, you can work with more data in your reports than you could otherwise return to Excel without running out of system resources, and you can create and update reports faster than if you based them on the individual records from the database.

The data from your OLAP cube can be returned to Excel only as a PivotTable report, unlike the records in your query, which can also be returned to Excel as an [external data range](#).

To create an OLAP cube, you first create a query in Microsoft Query that includes all of the fields you want to use in the cube, and save the query in a .dqy file in case you need to make changes in the future. You then run the OLAP Cube Wizard in Query to create the cube.

The wizard lets you create two types of cubes. One type is a [cube definition](#) that the wizard saves in an .oqy file. When you open a report that's based on this type of .oqy file, the cube is built temporarily in memory. The second type is a separate offline cube file that allows you to continue working with the data when you are disconnected from the network. For help deciding which type of cube to

create, and full information about using the wizard, click the **Help** button in the OLAP Cube Wizard.

When your original database is updated, you can refresh both types of cubes to incorporate any new or changed data that meets the criteria of the original query. However, you cannot add more fields from the original database or the query to the cube. If you need more fields, you can open and modify your original .dqy query file in Microsoft Query and then run the OLAP Cube Wizard again to create a new cube.

[Show All](#)

# Create an offline cube file from an OLAP server database

If your server database is not an [OLAP](#) database, and you accessed the data by creating a [query](#) in Microsoft Query, use Query to create the cube file. For full instructions, see Help in Microsoft Query.

1. Click the [PivotTable report](#) for which you want to create an [offline cube file](#).

For a [PivotChart report](#), click the [associated PivotTable report](#).

2. On the **PivotTable** toolbar, click **PivotTable**, and then click **Offline OLAP**.
3. Click **Create offline data file**, or if an offline cube file already exists for the report, click **Edit offline data file**.
4. In step 1 of the Offline Cube Wizard, click **Next**.
5. In step 2 of the wizard, select each [dimension](#) from your server cube that has data you want to include in the offline cube file. Click the  box next to each such dimension, and select the [levels](#) you want to include.
  - You cannot skip intermediate levels within a dimension.
  - To reduce the size of the cube file, omit lower levels that you don't need to view in the report.
  - Be sure to include any dimensions where you've grouped items, so that Microsoft Excel can maintain these groupings when you switch between the server database and the offline file.
  - Dimensions that do not have a  box don't allow you to exclude levels. You can only include or exclude all of this type of dimension.
6. In step 3 of the wizard, click the  box next to **Measures**, and select the fields you want to use as [data fields](#) in the report. You must select at least one measure. For each dimension listed below **Measures**, click the  box beside the dimension, and then select the top-level [items](#) to include in the offline cube file.
  - To limit the size of the cube file so that you don't run out of disk space and to reduce the amount of time to save the file, select only the items you need to view in the report. Any [property fields](#) available for the items you select are automatically included in the cube.

- If items you want to include are missing, you may not have included the dimension containing them in the previous step. Click **Back** and select the missing dimension in step 2 of the wizard, then return to step 3.
7. In step 4 of the wizard, specify a name and location for the .cub file, and then click **Finish**.

If you want to cancel saving the file, click **Stop** in the **Create Cube File – Progress** dialog box.

8. When Excel finishes creating the offline cube file, click **OK** in the **Offline OLAP Settings** dialog box.

[Show All](#)

# Create an OLAP query file to connect to an OLAP database

You can also use Office database connection (.odc) files to connect to OLAP databases.

1. Create a new [data source](#) that uses the name you want for the OLAP query (.oqy) file as the name of the data source.



1. Under the **Data** menu, point to **Import External Data**, and then click **New Database Query**.
  2. In the **Choose Data Source** dialog box, on the **OLAP Cubes** tab, click **New Data Source**, and then click **OK**.
  3. Choose a name for the data source, select an [OLAP provider](#), and click **Connect**.
  4. Complete the Multi-Dimensional Connection wizard.
2. In the **Choose Data Source** dialog box, click **Options** on the **OLAP Cubes** tab to view the name of the folder where the .oqy file was created. The default location is your user profile folder under Application Data\Microsoft\Queries.

## Notes

- When you use the **Open** command on the Microsoft Excel **File** menu to open an .oqy file, Excel displays a worksheet with a blank [PivotTable report](#) for the OLAP data. You can use this report to display the data you want to see, and then save it in an Excel workbook file.
- You can also use the OLAP Cube Wizard in Microsoft Query to create an .oqy file that connects to a cube file or defines a [cube](#) that is created from queried data. For more information, see Microsoft Query Help.

# Delete an offline cube file

**Warning** If you delete the offline cube file for a report, you can no longer use the report offline or create a new offline cube file for the report.

1. Close all workbooks containing reports that use the offline cube file, or make sure all such reports have been deleted.
2. In Microsoft Windows, locate and delete the .cub file.

[Show All](#)

# Include different data in an offline cube file

If you don't know whether your [offline cube file](#) was created in Microsoft Excel or Microsoft Query, consult the person who created the file.

## [Revise a cube file created in Excel](#)

Saving a revised offline cube file can be time consuming, and you cannot do other work in Excel while the file is being saved. Start the process at a time when you do not need immediate access to other files, and make sure you have adequate disk space to resave the file.

1. Make sure you are connected to your network and can access the original [OLAP](#) server database that supplied the data for the offline cube file.
2. Click a [PivotTable report](#) that's based on the offline cube file.

For a [PivotChart report](#), click the [associated PivotTable report](#).

3. On the **PivotTable** toolbar, click **PivotTable**, and then click **Offline OLAP**.
4. Click **Offline OLAP**, and then click **Edit offline data file**.
5. Follow the steps in the Offline Cube Wizard to select different data for the file. In the last step, specify the same name and location as the existing file that you are changing.

**Note** To cancel saving the file, click **Stop** in the **Create Cube File – Progress** dialog box.

## [Revise a cube file created in Query](#)

In Query, open the .oqy file created by the OLAP Cube Wizard, and then use the wizard to change the .cub file. You can delete and reorganize fields, but you cannot add more fields to this type of cube. For full instructions, see Help in Microsoft Query.

[Show All](#)

# Reconnect to an OLAP server

1. Click the [PivotTable report](#).

For a [PivotChart report](#), click the [associated PivotTable report](#).

2. On the **PivotTable toolbar**, click **PivotTable**, and then click **Offline OLAP**.
3. Click **On-line OLAP**, and then click **OK**.
4. If prompted to locate the data source, click **Browse to find source**, and locate the OLAP server on your network.

**Note** If the report was created from a [data source](#) that connects directly to the [offline cube file](#), you cannot reconnect the file to the server. For information about connecting to the OLAP database server from which the .cub file was originally created, contact the person who created the offline cube file.

[Show All](#)

# Refresh an offline cube file

Refreshing a cube file, which recreates it with the most recent data from the server cube, can be time consuming and require a lot of temporary disk space. Start the process at a time when you do not need immediate access to other files, and make sure you have adequate disk space to resave the file.

1. Make sure you are connected to your network and can access the original server database that supplied the data in the [offline cube file](#). If you aren't sure what original database was used to supply the data for the cube, consult the person who created the [PivotTable](#) or [PivotChart report](#) or the cube.
2. Click a report that's based on the offline cube file that you want to refresh.
3. On the **PivotTable** toolbar, click **Refresh Data** .

To cancel a refresh in progress, press ESC.

**Note** When you work with OLAP data offline, do not put the .cub file in the Windows briefcase. Excel does not use the briefcase to synchronize the offline cube file with the server database.

[Show All](#)

# Work with OLAP data offline

1. Open a [PivotTable](#) or [PivotChart report](#) based on the [OLAP](#) data that you want to access offline.
2. Is this the first time you're going offline? If so, create an [offline cube file](#) on your local hard disk.

[How?](#)

If your server database is not an [OLAP](#) database, and you accessed the data by creating a [query](#) in Microsoft Query, use Query to create the cube file. For full instructions, see Help in Microsoft Query.

1. Click the [PivotTable report](#) for which you want to create an [offline cube file](#).

For a [PivotChart report](#), click the [associated PivotTable report](#).

2. On the **PivotTable** toolbar, click **PivotTable**, and then click **Offline OLAP**.
3. Click **Create offline data file**, or if an offline cube file already exists for the report, click **Edit offline data file**.
4. In step 1 of the Offline Cube Wizard, click **Next**.
5. In step 2 of the wizard, select each [dimension](#) from your server cube that has data you want to include in the offline cube file. Click the  box next to each such dimension, and select the [levels](#) you want to include.
  - You cannot skip intermediate levels within a dimension.
  - To reduce the size of the cube file, omit lower levels that you don't need to view in the report.
  - Be sure to include any dimensions where you've grouped items, so that Microsoft Excel can maintain these groupings when you switch between the server database and the offline file.
  - Dimensions that do not have a  box don't allow you to exclude levels. You can only include or exclude all of this type of dimension.

6. In step 3 of the wizard, click the  box next to **Measures**, and select the fields you want to use as [data fields](#) in the report. You must select at least one measure. For each dimension listed below **Measures**, click the  box beside the dimension, and then select the top-level [items](#) to include in the offline cube file.
  - To limit the size of the cube file so that you don't run out of disk space and to reduce the amount of time to save the file, select only the items you need to view in the report. Any [item properties](#) available for the items you select are automatically included in the cube.
  - If items you want to include are missing, you may not have included the dimension containing them in the previous step. Click **Back** and select the missing dimension in step 2 of the wizard, then return to step 3.
7. In step 4 of the wizard, specify a name and location for the .cub file, and then click **Finish**.

**Note** To cancel saving the file, click **Stop** in the **Create Cube File – Progress** dialog box.

When Microsoft Excel finishes saving the file, proceed to the last step of this procedure.

3. Have you taken this report offline before, so that you already have an offline cube file on your hard disk? If so, reconnect to it.

[How?](#)

1. Click the PivotTable report, or for a PivotChart report, click the [associated PivotTable report](#).
  2. Click **PivotTable** on the **PivotTable toolbar**, and then click **Offline OLAP**.
  3. Click **On-line OLAP**, and then click **OK**.
4. Does the server have new data since you created the offline cube file? If so, click **Refresh Data** , and wait for the file to be recreated and saved with the new data.
  5. Disconnect from your network.

**Note** Do not put the .cub file in the Windows briefcase. Excel does not use the briefcase to synchronize the offline cube file with the server database.

[Show All](#)

# Troubleshoot OLAP cubes

## Creating OLAP cubes

### [Date or time fields have incorrect levels](#)

**Check the date or time field in the source database** If you don't see the [levels](#) you expect in the date or time [dimensions](#) in source data from the OLAP Cube Wizard in Microsoft Query, check the date or time field from the underlying relational database that supplied the data for the cube. The database may store dates and times as text instead of a date or time format that the wizard can recognize. If you suspect this is the case, consult the database administrator for the relational database to verify and correct the date or time format for the field.

**Check the top level of the dimension** When you add date and time fields as lower levels of a dimension, the OLAP Cube Wizard does not automatically break the data out into year/quarter/month/week and hour/minute/second levels. The wizard does this only when you add the date or time field as the top level of a new dimension. If the date or time field is not the top level, modify the cube by opening the .oqy file in Microsoft Query, or contact the person who created the cube to make these changes.

### [The summary function I want is missing](#)

In the OLAP Cube Wizard, the only summary functions available for data fields are Sum, Count, Min, and Max.

**Create the report directly from the database records** If you can simplify and reduce your [query](#) to where your system can handle the amount of data it returns, try returning the data directly to Microsoft Excel from Microsoft Query without creating a cube. When you create a PivotTable or PivotChart report directly from records in a database, you have access to the full set of PivotTable summary functions (Sum, Count, Average, Max, Min, Product, Count Nums, StdDev, StdDevp, Var, and Varp).

**Consider setting up an OLAP server for the database** The Microsoft OLAP server product, Microsoft SQL Server OLAP Services, lets you set up a wider range of summary fields than the OLAP client software included in Microsoft Office.

[I can't change my OLAP cube](#)

**Make sure the original database is available** To edit an OLAP cube, you must have access to the original server database that supplied the cube data. Check to make sure the database hasn't been renamed or moved. Make sure the server is available and you can connect to it.

**Check for changes to the original database** If you used the OLAP Cube Wizard to create the cube from a relational database, tables in the database might have been renamed or deleted so that the cube can no longer locate the original data. Connect to the database in Microsoft Query, and check for any changes to the organization, or schema, of the database. If the database has changed, you'll need to create a new cube.

[A 'Data has been lost' message appears](#)

A field you included in the cube is no longer available in the source database.

**Check for changes to the original database** If the cube is an [offline cube file](#) that was created from an OLAP server database, reconnect a report to the server database and check the fields available in the **PivotTable Field List** window. If the field is no longer available from the server, you can use the **Offline OLAP** command on the **PivotTable** menu to create a new offline cube file.

If you created the cube in Microsoft Query, use Query to open the .dqy [query](#) file that you used to create the cube, or if you did not keep a .dqy file, create a new query connecting to the original relational database. Check what fields are available. For full instructions, see Help in Microsoft Query. If fields have been removed from the database, you can create a new cube.

[Saving the cube file is taking a long time](#)

If you included a large subset of the OLAP data in the cube file, the file may be time consuming to create.

- To cancel saving the file, click **Stop** in the **Create Cube File – Progress** dialog box.
- To reduce the size of the file, eliminate data that you don't need to view in your report. In step 2 of the Offline Cube Wizard, select only the dimensions and levels within each dimension that you need to see. In step 3, select only the measures that you're using as [data fields](#) in the report, and in each dimension eliminate any [items](#) you don't need.

### [I run out of disk space while saving a cube](#)

OLAP databases are designed to manage very large amounts of detailed data, and as a result, the server database might occupy a much larger amount of disk storage than your local hard disk provides. If you specify a large subset of this data for your offline cube file, you might run out of space.

**Free up disk space or find another disk** Try deleting files you don't need from your disk before saving the cube file. Or try saving the file on a network drive.

**Include less data in the offline cube file** Consider how you can minimize the amount of data in the file and still have what you need for your PivotTable or PivotChart report. Try the following:

- **Eliminate dimensions** In step 2 of the Offline Cube Wizard, select only the dimensions that you actually have displayed as fields in your PivotTable or PivotChart report.
- **Eliminate levels of detail** Click the  box next to each selected dimension in step 2 of the wizard, and clear the check boxes for levels lower than those displayed in your report.
- **Eliminate data fields** In step 3 of the wizard, click the  box next to **Measures**, and select only the [data fields](#) you're using in the report.
- **Eliminate items of data** Click the  box next to each dimension in step 3, and clear the check boxes for items you don't need to see in the report.

**Stay connected to the server** If you've eliminated all possible data and still cannot save an offline cube file, you'll need to continue using the connection to the server OLAP database to interact with your report.

## Using OLAP cubes

[Data is missing from my report after I create a cube file](#)

When you selected the contents for the offline cube file, you might have left out some of the data for the fields used in the report. As a result, when you change the report to display different data, data you expected to see isn't available from the offline cube file.

Use the **Offline OLAP** command on the **PivotTable** menu to reconnect the report to the server database, and make sure the report displays the data you want to see. Then edit the offline cube file, making sure you include all dimensions, data fields, and levels of detail used in the report.

[My report is using fields from the query instead of my cube](#)

If the **PivotTable Field List** window is showing you the fields from the relational database that you queried to create the cube, you returned the data from your query to Microsoft Excel instead of opening the .oqy file created by the OLAP Cube Wizard. This file stores the cube definition, and if you saved a .cub offline cube file, provides access to that file. If you did not specify a new location for the .oqy file, the file was saved in either my documents\my data sources or winnt\profiles\*your user name*\my data sources, depending on your version of the Windows operating system.

To base a report on your new cube, click **Open** on the Excel **File** menu, click **Query Files** in the **Files of type** list, and then locate and double-click the .oqy file. If you want a PivotChart report, click the PivotTable report that's created when you open the .oqy file, and then click **Chart Wizard**  on the **PivotTable** toolbar.

[Data I know is in the database is missing from my cube](#)

Cubes created from OLAP server databases or relational databases don't necessarily include all of the data in the original database. Only the data that you select in the Offline Cube Wizard or OLAP Cube Wizard is included in the cube.

**Wait for data retrieval to complete** When you change your PivotTable or PivotChart report to display different data, new data is retrieved from the cube. When you [refresh](#) the report, new data is retrieved from the original database and the cube is completely reconstructed. This process might take a while.

**Check with the person who created the cube** If you got the cube from someone else, and the **PivotTable Field List** window is missing fields that you need or levels of detail that you wanted are unavailable, ask the creator of the cube to change it so that it includes additional data.

**Change the contents of an offline cube file** If you created the offline cube file in Microsoft Excel from an OLAP server database, use the **Offline OLAP** command on the **PivotTable** menu to change the file. Make sure you include all dimensions, data fields, and levels of detail used in the report.

**Check the contents of a cube that was created in Query** You cannot add data to cubes created with the OLAP Cube Wizard in Microsoft Query, but you can change how the cube is organized and delete data from the cube. If the cube is missing fields from the original relational database, you can create a new cube in Query to include those fields. In Query, open the .dqy file that you used to query the data for the OLAP cube, or create a new query if you did not keep a .dqy file. Add to the query any additional fields that you want in the cube, and then use the **Create OLAP Cube** command on the Query **File** menu create a new cube. For full instructions, see Help in Microsoft Query.



[New data doesn't appear in my report when I refresh](#)

The [offline cube file](#), or the cube created in Microsoft Query, might not be able to connect with the original server database to retrieve new data.

**Make sure the original database is available** Check that the original server database that supplied the data for the cube hasn't been renamed or moved. Make sure the server is available and you can connect to it.

**Make sure new data is available** Check with the database administrator to determine whether the database has been updated in the areas included in your report.

**Make sure the database organization hasn't changed** If an OLAP server

cube has been rebuilt, or a relational database supplying data to a cube has been reorganized, you might need to reorganize your report or create a new offline cube file or OLAP Cube Wizard cube to access the changed data. Contact the database administrator to find out about changes to the database.

 [Microsoft Excel can't find my offline cube file](#)

The .cub might have been renamed or moved.

**Make sure you have the file** If someone else gave you the .oqy file you're opening, make sure you also have access to the .cub file.

**Browse for the file** If you're trying to connect to the offline cube file from the **Offline OLAP Settings** dialog box, click **Browse**, and locate the .cub file.

**Reconnect to the original database** If you cannot locate the file, you might be able to reconnect the report to the original OLAP server database. Click the report, click **Offline OLAP** on the **PivotTable** menu, and then click **On-line OLAP**. You can then create a new offline cube file.

**Note** For further help with problems with OLAP Cube Wizard cubes, see Help in Microsoft Query.

[Show All](#)

# Change the query for an external data range

1. Click a cell in the [external data range](#) you want to change.
2. Click **Edit Query**  on the **External Data** [toolbar](#).

**Note** For more information about constructing and editing queries in Microsoft Query, see Microsoft Query Help.

[Show All](#)

# Copy an external data range and its underlying query

1. Click the arrow next to the **Name** box on the [formula bar](#), and select the name of the [external data range](#) that you want to copy.

If you want to include column labels or formulas that are not part of the external data range, select the cells that contain the column labels or formulas that you want to copy. Click the arrow next to the **Name** box on the formula bar, and click the name of the external data range you want to copy.

2. Click **Copy** .
3. Switch to the workbook where you want to paste the external data range.
4. Click the upper-left cell of the [paste area](#).

To ensure that the [external data](#) does not replace existing data, make sure that the worksheet has no data below or to the right of the cell you click.

5. Click **Paste** .

**Note** If you copy only part of an external data range, the underlying [query](#) is not copied and the copied data can't be [refreshed](#).

[Show All](#)

# Customize a parameter query

Parameter queries must be created in Microsoft Query. For more information about creating parameter queries, see Microsoft Query Help.

## [Change the custom prompt for a parameter query](#)

1. In Microsoft Excel, click a cell anywhere in the [external data range](#) created with a [parameter query](#).
2. On the **External Data toolbar**, click **Query Parameters** .
3. In the list on the left side of the **Parameters** dialog box, click the parameter that you want to change.
4. In the **Prompt for value using the following string** box, type the text that you want to use for the prompt, and then click **OK**. The custom prompt can contain up to 100 characters.
5. To use the new custom prompt and [refresh](#) the data, click **Refresh Data**  on the **External Data** toolbar.

**Note** This procedure changes the custom prompt only for the current session of the workbook. If you want to permanently save your changes to the custom prompt, save the workbook or change the prompt for the [query](#) in Microsoft Query. For more information about changing a query, see Microsoft Query Help.

## [Use data from a cell as a parameter value](#)

1. On your worksheet, type the values you want to use as [criteria](#) in the [query](#).
2. Click a cell anywhere in the [external data range](#) created with a [parameter query](#).
3. On the **External Data toolbar**, click **Query Parameters** .
4. In the list on the left side of the **Parameters** dialog box, click the parameter you want to change.
5. Click **Get the value from the following cell**.
6. On the worksheet, click the cell that contains the value you want to use.

If you want to [refresh](#) the data whenever you change the value in the cell, select the **Refresh automatically when cell value changes** check box.

7. Click **OK**.
8. To refresh the data, click **Refresh Data**  on the **External Data** toolbar.

#### [Use a constant parameter value for a query](#)

1. In Excel, click a cell in the [external data range](#) created with a [parameter query](#).
2. On the **External Data toolbar**, click **Query Parameters** .
3. In the list on the left side of the **Parameters** dialog box, click the parameter you want to change.
4. Click **Use the following value**.
5. Type the value you want to use for the parameter, and then click **OK**.
6. To [refresh](#) the data, click **Refresh Data**  on the **External Data** toolbar.

[Show All](#)

# Run a query in the background or while you wait

Running a query in the background allows you to use Microsoft Excel while the query runs.

1. Click a cell in the [external data range](#), and then click **Data Range Properties**  on the **External Data toolbar**.
2. Select the **Enable background refresh** check box to run the query in the background or clear it to run the query while you wait.

## Notes

- **Stop a query** To stop a query from running when **Enable background refresh** is turned off, press ESC.
- **Stop a background refresh** To stop a query that is running in the background, double-click the **Background Refresh**  icon on the [status bar](#) to display the **External Data Refresh Status** dialog box, and then click **Stop Refresh**.
- **Recording a macro** While you are recording a [macro](#) that includes a query, Excel will not run the query in the background. To change the recorded macro so that it runs in the background, edit the macro in the [Visual Basic Editor](#) and change the refresh method for the QueryTable object from "BackgroundQuery := False" to "BackgroundQuery := True". For information about editing macros, see [Visual Basic Help](#).

[Show All](#)

# About installing an ODBC driver

The [ODBC drivers](#) provided by Microsoft are installed when you install Microsoft Excel.

If the external database you want to access is not supported by these ODBC drivers, you must obtain and install a Microsoft Office-compatible ODBC driver from a third-party vendor, such as the manufacturer of the database program. Contact the database vendor for installation instructions.

**Note** [OLAP](#) databases do not require ODBC drivers. When you install Excel, drivers and support are installed to access databases that were created by using Microsoft SQL Server OLAP Services. To connect to third-party OLAP databases, you must install a [data source driver](#) and client software.

[Show All](#)

# About sharing data connections

Query files are text files that contain [data source](#) information, including the name of the server where the data is located and the connection information you provide when you create a data source. Query files make it possible for you to share queries with other users.

Opening either an Office database connection ( .odc) file or database query (.dqy) file runs the query and displays a worksheet containing the retrieved data. Opening a .odc or [OLAP](#) query (.oqy) query file connects you to the OLAP database or cube and displays a worksheet with a blank PivotTable report for the OLAP data. After you open a query file, you can save an Excel workbook file that contains the retrieved [external data](#). However, you can't use the **Save** command on the Excel **File** menu to save in the .dqy or .oqy query file formats.



## [Creating query files](#)

**Creating .odc query files** You can create .odc files by connecting to external data through the **Select Data Source** dialog box or by using the Data Connection Wizard to connect to new data sources. If you need only one table and you don't need to filter data, .odc files are the recommended method for connecting to and sharing data in relational databases, text files, or Excel lists.

**Creating .dqy query files** You can use Microsoft Query to save .dqy files that contain queries for data in relational databases, text files, or Excel lists. When you open these files in Query, you can view the data in the query and select different data for the query to retrieve. You can save a .dqy file for any query that you create either by using the Query Wizard or directly in Query.

**Creating .oqy query files** You can save .oqy files to connect to data in an OLAP database, either on a server or in an [offline cube file](#) (.cub). When you use Query to create a data source for an OLAP database or cube, an .oqy file is created automatically. Because OLAP databases aren't organized in records or tables, you can't create queries or .dqy files to access these databases.

You can also use the OLAP Cube Wizard in Query to save an .oqy file that connects to a cube file or defines a [cube](#) that is created from queried data. This

type of .oqy file can include both information that defines what is in the cube and connection information for the relational database. When you open this type of .oqy file in Query, the OLAP Cube Wizard runs so that you can change the cube definition.

## [Using other query file formats](#)

**Using .rqy query files** Excel can open query files in .rqy format to support OLE DB data source drivers that will use this format. For more information, see the documentation for your driver.

**Using .qry query files** Query can open and save query files in .qry format for use with earlier versions of Query that cannot open .dqy files. If you have a query file in .qry format that you want to use in Excel, open the file in Query, and then save it as a .dqy file. For information about saving .dqy files, see Microsoft Query Help.

**Using .iqy Web query files** Excel can open .iqy Web query files to retrieve data from the Web. You don't need to install Query to create and open .iqy files in Excel.

## [Sharing data](#)

**Sharing query files** You can share query files with other people to give them the same access you have to an external database. Other users don't have to set up a data source to open the query file, but they do have to install the [ODBC driver](#) or [data source driver](#) required to access the external data.

If you don't save your password when you create the data source for the query file, anyone who opens the file in Excel must enter the password before they can access the database.

**Reusing and sharing queries** Excel can open .odc and .dqy files directly, which allows you or others to create additional external data ranges from the same query. In Query Wizard and Query, you can save a .dqy query file that you can modify, reuse, and share.

If you want to share a summary or report that is based on external data, you can give other users a workbook that contains an external data range, or you can

create a report template. A [report template](#) lets you save the summary or report without saving the external data so that the file is smaller. The external data is retrieved when a user opens the report template.

## [Formatting and changing queries](#)

**Changing the format and layout** You can change the format and layout of the external data range.

**Changing a report template** After you create a report template, you can make changes to the template as needed.

[Show All](#)

# Data sources you can access

Microsoft Office provides drivers that you can use to retrieve data from the following [data sources](#):

- Microsoft SQL Server [OLAP](#) Services ([OLAP provider](#))
- Microsoft Access
- dBASE
- Microsoft FoxPro
- Microsoft Excel
- Oracle
- Paradox
- SQL Server
- Text file databases
- Third-party providers

You can use [ODBC drivers](#) or [data source drivers](#) from other manufacturers to get information from data sources that are not listed here, including other types of OLAP databases. For information about other drivers, see the [xlreadme.htm](#) file. For information about installing an ODBC driver or data source driver that is not listed here or in the [xlreadme.htm](#) file, check the documentation for the database, or contact your database vendor.

The Data Connection Wizard also provides access to a data source called a *data retrieval service*. A data retrieval service is a Web service installed on Windows SharePoint Services for connecting to and retrieving data. A data retrieval service can provide access to the following data sources:

- list and document libraries on Windows SharePoint Services
- Microsoft SQL Server
- Microsoft Business Solutions

[Show All](#)

# Change how an imported text file looks

1. Click a cell in your imported text file.
2. Click **Edit Text Import**  on the **External Data** [toolbar](#).
3. Click **Import** in the **Import Text File** dialog box.
4. Make changes to the imported text file in the Text Import Wizard, and then click **Finish**.

[Show All](#)

# Change the name of an external data range

1. Click a cell in the [external data range](#) you want to rename.
2. Click **Data Range Properties**  on the **External Data** [toolbar](#).
3. In the **Name** box, type a name for the external data range.

[Show All](#)

# Copy formulas when an external data range expands

1. Enter a formula in a cell adjacent to the first row of data in the [external data range](#).

**Note** The first row of data might be the first or second row in the external data range, depending on whether the first row contains headers.

2. Select the cell and double-click the [fill handle](#) to copy the formula to all rows in the external data range.
3. Click a cell in the external data range, and then click **Data Range Properties**  on the **External Data toolbar**.
4. In the **External Data Range Properties** dialog box, select the **Fill down formulas in columns adjacent to data** check box.

**Note** If the external data range expands when you [refresh](#), Microsoft Excel copies only those formulas that are immediately adjacent to or within the external data range.

[Show All](#)

# Create a report template for importing data

You need to have a PivotTable report or a worksheet with an [external data range](#) to proceed.

1. Format the workbook the way you want it.
2. On the **File** menu, click **Save** .
3. In the **File name** box, type the name for the report.
4. In the **Save as type** list, click **Template**.
5. In the **Save in** list, locate and click the folder you want to store the template in.
6. Click **Save**.
7. Do one of the following:
  - To delete the external data range from the worksheet and automatically update the data when the report template is opened, click **Yes**.
  - To display the current data in the external data range whenever someone opens a copy of the report template, click **No**.



You can change a report template at any time by opening the report template in Excel and making the changes you want.

[Show All](#)

# Customize field names in an external data range

This procedure applies only to data retrieved from a database, not to data retrieved from a text file (\*.txt) or a Web query (\*.iqy).

1. Insert a blank row above the [external data range](#).

[How?](#)

1. Do one of the following:

**Insert new blank cells** Select a [range](#) of cells where you want to insert the new blank cells. Select the same number of cells as you want to insert.

**Insert a single row** Click a cell in the row immediately below where you want the new row. For example, to insert a new row above row 5, click a cell in row 5.

**Insert multiple rows** Select rows immediately below where you want the new rows. Select the same number of rows as you want to insert.

**Insert a single column** Click a cell in the column immediately to the right of where you want to insert the new column. For example, to insert a new column to the left of column B, click a cell in column B.

**Insert multiple columns** Select columns immediately to the right of where you want to insert the new columns. Select the same number of columns as you want to insert.

2. On the **Insert** menu, click **Cells**, **Rows**, or **Columns**.
3. If you are inserting blank cells, click **Shift cells right** or **Shift cells down** to define where you want existing cells to move.

[Tip](#)

If there is formatting, you can use **Insert Options**  to choose how to set the formatting of the inserted cells, rows, or columns.

2. Type the labels you want in the cells in the blank row.
3. Click a cell in the external data range, and then click **Data Range Properties**  on the **External Data** [toolbar](#).
4. In the **External Data Range Properties** dialog box, under **Data formatting and layout**, clear the **Include field names** check box, and then click **OK**.
5. To remove existing field names and refresh the external data range, click a cell in the external data range, and then click **Refresh Data** .

**Note** When you retrieve data from a database, changes to column names in Microsoft Query are retained in the external data range. For information about changing column names in the query, see Microsoft Query Help.

[Show All](#)

# Delete an external data range

1. Click the worksheet that contains the [external data range](#) you want to delete.
2. On the [formula bar](#), click the arrow next to the **Name** box, and then click the name of the external data range you want to delete.
3. To delete the external data range or the entire worksheet including the external data range but not the underlying query, click **Delete** or **Delete Sheet** on the **Edit** menu.

If you press DELETE on the keyboard instead of clicking **Delete** on the **Edit** menu, Microsoft Excel clears the external data range and prompts you to choose whether to delete the underlying query.



You can create a [report template](#) that removes the external data range but retains the underlying query on a worksheet when you close it.

[Show All](#)

# Find an external data range

1. Select the worksheet in which you want to search for an [external data range](#).
2. On the [formula bar](#), click the arrow next to the **Name** box, and then click the name of the external data range you want.

[Show All](#)

# Freeze data in an external data range

Freezing an [external data range](#) retains the data but not its underlying [query](#), so a frozen external data range cannot be refreshed.

1. Click a cell in the external data range that you want to freeze, and then click **Data Range Properties**  on the **External Data** [toolbar](#).
2. Under **Query definition**, clear the **Save query definition** check box.

**Note** When you save your workbook, the underlying query is deleted from the workbook. However, the saved database query files (\*.dqy or \*.odc files) are not deleted. If you saved the query when you created it in the Query Wizard or in Microsoft Query, the query file is saved on your computer and you can use it again to retrieve external data. For more information, see Microsoft Query Help.

[Show All](#)

# Refresh imported data

## Refreshing data

### [Automatically refresh data when a workbook is opened](#)

You can refresh an [external data range](#) automatically when you open the workbook, and optionally save the workbook without saving the external data, so that the workbook file size is reduced.

1. Click a cell in the external data range you want to [refresh](#), and then click **Data Range Properties**  on the **External Data toolbar**.
2. Select the **Refresh data on file open** check box.
3. If you want to save the workbook with the query definition but without the external data, select the **Remove external data from worksheet before saving** check box.

### [Refresh multiple external data ranges](#)

1. If your worksheet contains more than one [external data range](#) that you want to [refresh](#), on the **View** menu, point to **Toolbars**, and click **External Data**.
2. On the **External Data toolbar**, click **Refresh All**  to refresh all of the external data ranges in the workbook.

If you have more than one workbook open, you must click **Refresh All** in each workbook to refresh external data.

### [Refresh data in an imported text file](#)

1. Select the worksheet with your imported text file.
2. Click **Refresh Data**  on the **External Data toolbar**.
3. In the **Import Text File** dialog box, select your text file, and then click **Import**.

### [Tip](#)

If you want to import only part of the data in a text file as a refreshable data range, you can create a query to retrieve the data. For more information, see Microsoft Query Help.

#### [Automatically refresh data at intervals](#)

1. Click a cell in the [external data range](#), and then click **Data Range Properties**  on the **External Data toolbar**.
2. Select the **Refresh every** box, and then enter the number of minutes between [refreshes](#).

#### [Control the order of refreshes](#)

1. Click a cell in the [external data range](#) you want to [refresh](#) first, and then click **Refresh Data** on the **External Data toolbar**.
2. Repeat for each external data range until they are all refreshed in the order you want.

## Setting refresh options

### [Require a password to refresh an external data range](#)

If your [data source](#) requires a [password](#) to connect to it, you can require that the password is entered before the [external data range](#) can be [refreshed](#). This procedure does not apply to data retrieved from a text file (\*.txt) or a Web query (\*.iqy).

1. Click a cell in the external data range, and then click **Data Range Properties**  on the **External Data toolbar**.
2. Under **Query definition**, clear the **Save password** check box.

### Notes

- Stored passwords are not encrypted.
- Microsoft Excel prompts for the password only the first time that the external data range is refreshed in each Excel session. The next time you start Excel, you will be prompted for the password again if you open the workbook that contains the query, and then click **Refresh Data** .

### [Preserve cell formatting when you refresh an external data range](#)

1. Click a cell in the [external data range](#), and then click **Data Range Properties**  on the **External Data toolbar**.
2. Do one or both of the following
  - If you want to preserve cell formatting that you apply, select the **Preserve cell formatting** check box under **Data formatting and layout**.
  - If you want to preserve column widths that you set, clear the **Adjust column width** check box under **Data formatting and layout**.
3. Click **OK**.
4. To [refresh](#) the external data range, click **Refresh Data**  on the **External Data toolbar**.

## [Run a query in the background or while you wait](#)

Running a query in the background allows you to use Microsoft Excel while the query runs.

1. Click a cell in the [external data range](#), and then click **Data Range Properties**  on the **External Data toolbar**.
2. Select the **Enable background refresh** check box to run the query in the background or clear it to run the query while you wait.

### Notes

- **Stop a query** To stop a query from running when **Enable background refresh** is turned off, press ESC.
- **Stop a background refresh** To stop a query that is running in the background, double-click the **Background Refresh**  icon on the [status bar](#) to display the **External Data Refresh Status** dialog box, and then click **Stop Refresh**.
- **Recording a macro** While you are recording a [macro](#) that includes a query, Excel will not run the query in the background. To change the recorded macro so that it runs in the background, edit the macro in the [Visual Basic Editor](#) and change the refresh method for the QueryTable object from "BackgroundQuery := False" to "BackgroundQuery := True". For information about editing macros, see [Visual Basic Help](#).

**Note** You can check the status of a refresh by clicking **Background Refresh**  in the status bar. To cancel the query, click **Cancel Refresh** on the **External Data toolbar**.

[Show All](#)

# Specify how new data is added to an external data range

1. Click a cell in the [external data range](#), and then click **Data Range Properties**  on the **External Data toolbar**.
2. In the **External Data Range Properties** dialog box, under **If the number of rows in the data range changes upon refresh**, choose an option to insert new cells or entire rows, or to replace existing data when you [refresh](#).

[Show All](#)

# About formatting worksheets and data

Use these formatting features to effectively display your data.

**Format text and individual characters** To make text stand out, you can format all of the text in a cell or selected characters. Select the characters you want to format, and then click a button on the **Formatting toolbar**.



**Rotate text and borders** The data in a column is often very narrow while the label for the column is much wider. Instead of creating unnecessarily wide columns or abbreviated labels, you can rotate text and apply borders that are rotated to the same degree as the text.

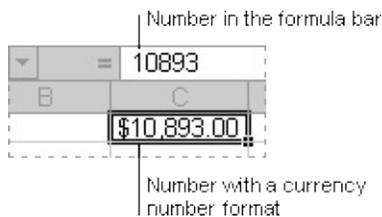
	September	October	November	December		
	12%	9%	6%	11%		
	5%	8%	4%	7%		
	10%	9%	7%	9%		
	8%	12%	8%	5%		
	5%	8%	4%	7%		

**Add borders, colors, and patterns** To distinguish between different types of information in a worksheet, you can apply borders to cells, shade cells with a background color, or shade cells with a color pattern.

	A	B
	<b>Eastern 1998</b>	
2		Qtr 1
3	<b>Golf</b>	\$ 5,000
4	<b>Safari</b>	\$ 9,000
5	<b>Tennis</b>	\$ 1,500
6	<b>Total Sales</b>	\$ 15,500

[Number formats](#)

You can use number formats to change the appearance of numbers, including dates and times, without changing the number behind the appearance. The number format does not affect the actual cell value that Microsoft Excel uses to perform calculations. The actual value is displayed in the [formula bar](#).



## The General number format

The General format is the default number format. For the most part, numbers formatted with the General format are displayed just the way you entered them. However, if the cell is not wide enough to show the entire number, the General format rounds numbers with decimals and uses scientific notation for large numbers.

## Built-in number formats

Excel contains many built-in number formats you can choose from. To list them, click **Cells** on the **Format** menu, and then click the **Number** tab. The **Special** category includes formats for postal codes and phone numbers. Options for each category appear to the right of the **Category** list. The formats appear in categories on the left, including Accounting, Date, Time, Fraction, Scientific, and Text.

### [Formatting cells and lists](#)

**Apply an autoformat to a range or list** To format an entire [list](#) or other range that has distinct elements—for example, column and row labels, summary totals, and detail data—you can apply an autoformat. The design uses distinctive formats for the various elements in the range or list.

**Create and apply a style** To apply several formats in one step and ensure that cells have consistent formatting, you can apply a [style](#) to the cells. Microsoft Excel has styles you can use to format numbers as currency, as percentages, or with commas that separate thousands. You can create your own styles to apply a

font and font size, number formats, cell borders, and shading and to protect cells from changes. If your data is in an outline, you can apply styles according to outline level.

**Copy formats from one cell or range to another** If you've already formatted some cells on a worksheet the way you want, you can use the **Format Painter** button to copy the formatting to other cells.

**Automatically extend formats** When this option is on, the formatting is automatically extended when you enter rows at the end of a range that you've already formatted. You can turn automatic formatting on or off.



### [Formatting cells based on specific conditions](#)

You can monitor formula results or other cell values by applying [conditional formats](#). For example, you can apply green text color to the cell if sales exceed forecast and red shading if sales fall short.

	A	B	C	D	E	F
1	Division	Q1	Q2	Q3	Q4	Total
2	North	67	42	51	35	195
3	South	66	39	57	88	250

**When conditions change** If the value of the cell changes and no longer meets the specified condition, Microsoft Excel clears the formatting from the cell, but leaves the condition applied so that the formatting will be automatically reapplied when the condition is met.

**Shared workbooks** In a shared workbook, conditional formats that are applied before a workbook is shared continue to work; however, you cannot modify the conditional formats or apply new ones while the workbook is shared.

**PivotTable reports** If you try to apply conditional formats to cells in a PivotTable report, you will get unpredictable results.



### [Formulas as formatting criteria](#)

You can compare the values of the selected cells to a [constant](#) or to the results of a formula. To evaluate data in cells outside the selected range or to examine multiple sets of criteria, you can use a logical formula to specify the formatting criteria.

- **Use the value in a cell as the condition** If you select the **Cell Value Is** option and compare the values of the selected cells to the result of a formula, you must start the formula with an equal sign (=).
- **Use a formula as the condition** If you select the **Formula Is** option, the formula you specify must return a logical value of TRUE (1) or FALSE (0). You must start the formula with an equal sign (=). The formula can evaluate data only on the active worksheet. To evaluate data on another sheet or in another workbook, you can define a [name](#) on the active worksheet for the data on another sheet or workbook, or enter a reference to the data in a cell of the active worksheet. Then refer to that cell or name in the formula. For example, to evaluate data in cell A5 on Sheet1 of the workbook Fiscal Year.xls, enter the following reference, including the equal sign (=), in a cell of the active sheet: =[Fiscal Year.xls]SHEET1!\$A\$5

The formula can also evaluate criteria that is not based on worksheet data. For example, the formula =WEEKDAY("12/5/99")=1 returns a value of TRUE if the date 12/5/99 is a Sunday. Unless a formula specifically refers to the selected cells you are formatting, the cell values do not affect whether the condition is true or false. If a formula does refer to the selected cells, you must enter the cell references in the formula.

- **Use cell references as the condition** You can enter [cell references](#) in a formula by selecting cells directly on a worksheet. Selecting cells on the sheet inserts [absolute cell references](#). If you want Microsoft Excel to adjust the references for each cell in the selected range, use [relative cell references](#).
- **Use dates** Dates and times are evaluated as serial numbers. For example, if you compare the cell value with the date January 7, 2001, the date is represented by the serial number 36898.

### [Example 1: Use data in a cell](#)

In the following example, conditional formats applied to the range B2:E3 analyze quarterly contributions to the yearly total. Quarterly results that contribute 30 percent or more to the total are displayed in bold and green. Quarterly results that contribute 20 percent or less are displayed in bold and red.

	A	B	C	D	E	F
1	Division	Q1	Q2	Q3	Q4	Total
2	North	<b>67</b>	42	51	<b>35</b>	<b>195</b>
3	South	66	<b>39</b>	57	<b>88</b>	<b>250</b>

The following table summarizes the conditional formats applied to the range B2:E3. Microsoft Excel adjusts the relative portion (the row number) of the cell reference \$F2 in the formula so that each cell in the range B2:E3 is compared with the corresponding total in column F.

	<b>Cell Value Is</b>	<b>Formula</b>	<b>Formats</b>
Condition 1	Greater than or equal to	=F2*0.3	Bold, green font
Condition 2	Less than or equal to	=F2*0.2	Bold, red font

[Example 2: Use a formula and external cell references](#)

	<b>Formula Is</b>	<b>Formats</b>
Condition 1	=AND(AVERAGE(\$A\$1:\$A\$5)>3000, MIN(\$A\$1:\$A\$5)>=1800)	Green cell shading

[Example 3: Use a formula and a cell reference](#)

	<b>Formula Is</b>	<b>Formats</b>
Condition 1	=MOD(A4,2)=0	Blue font

This formula must evaluate each cell in the range. When you enter such a formula in the **Conditional Formatting** dialog box, however, enter only the cell reference for the [active cell](#) in the selected range. Microsoft Excel adjusts the references to the other cells relative to the active cell.

**Verify a conditional format before applying it** An easy way to ensure that formula references are correct is to apply the conditional formatting first to one cell in the range. Then select the entire range, click **Conditional Formatting** on the **Format** menu, and then click **OK**. The conditional formatting you applied to the first cell is applied to the entire range, with the formula correctly adjusted for each cell.

[Show All](#)

# Apply or remove cell borders

1. On the **Formatting toolbar**, click the arrow next to **Borders** , and then click **Draw Borders**  on the palette.
2. Do one of the following:

## [Apply cell borders](#)

1. On the **Borders toolbar**, click the arrow next to **Draw Border**  or **Draw Border Grid** , and then click **Draw Border**  on the palette.
2. Do one of the following:

**Draw a border line on cells** Click the line you want as a border with the border drawing tool  or click on the line and drag on the lines you want as borders.

**Draw an outside border around a row** Click in the center of a cell with the border drawing tool  and drag on the row.

**Draw an outside border around a column** Click in the center of a cell with the border drawing tool  and drag on the column.

## [Apply border gridlines](#)

1. On the **Borders toolbar**, click the arrow next to **Draw Border**  or **Draw Border Grid** , and then click **Draw Border Grid**  on the palette.
2. Do one of the following:

**Draw a border line on cells** Click the line you want as a border with the border grid drawing tool  or click on the line and drag on the lines you want as borders.

**Draw borders around every cell in a row** Click in the center of a

cell with the border grid drawing tool  and drag on the row.

**Draw borders around every cell in a column** Click in the center of a cell with the border grid drawing tool  and drag on the column.

## Notes

- To apply a different border line style, click the arrow next to **Line Style** , and then click a line style on the palette.
- To apply a different border line color, click **Line Color** , and then click a color on the palette.
- The borders are applied to the edges of the cells, which are rotated to the same degree as the rotated text.
- Holding the CTRL key temporarily toggles between **Draw Border** mode and **Draw Border Grid** mode and also toggles the **Erase Border** mode between erase borders and erase border grids.

 [Remove borders](#)

1. On the **Borders toolbar**, click **Erase Border**  on the palette.
2. Do one of the following:

**Delete a single border** Click the border you want to delete with the eraser tool .

**Delete more than one border** Drag the eraser tool  over the borders you want to delete.

**Note** Holding the CTRL key temporarily toggles the **Erase Border** mode between erase borders and erase border grids.

[Show All](#)

# Apply or remove cell shading

1. Select the cells you want to apply shading to or remove shading from.
2. Do one of the following:

[Shade cells with solid colors](#)

To apply the most recently selected color, click **Fill Color**  on the **Formatting toolbar**.

To apply a different color, click the arrow next to **Fill Color** , and then click a color on the palette.

[Shade cells with patterns](#)

1. On the **Format** menu, click **Cells**, and then click the **Patterns** tab.
2. To include a background color with the pattern, click a color in the **Cell shading** box.
3. Click the arrow next to the **Pattern** box, and then click the pattern style and color you want.

If you do not select a pattern color, the pattern is black.

[Remove shading](#)

On the **Formatting toolbar**, click the arrow next to **Fill Color** , and then click **No Fill**.

[Show All](#)

# Apply a border around a page

1. Select the range of cells on the page that you want to add a border to or delete a border from.
2. Do one of the following:

 [Apply cell borders](#)

To apply the most recently selected border style, click **Borders**  on the **Formatting toolbar**.

To apply a different border style, click the arrow next to **Borders** , and then click a border on the palette.

## Notes

- **More border settings** To apply additional border styles, click **Cells** on the **Format** menu, and then click the **Border** tab. Click the line style you want, and then click a button to indicate the border placement.
- **Border styles** To change the line style of an existing border, select the cells that the border appears on. Click **Cells** on the **Format** menu, then click the **Border** tab. Click a new style in the **Style** list, and then click the border you want to change in the diagram under **Border**.

 [Remove cell borders](#)

On the **Formatting toolbar**, click the arrow next to **Borders** , and then click  on the palette.

[Show All](#)

# Add or remove a sheet background pattern

1. Click the sheet that you want to add a background pattern to or delete a background pattern from. Make sure only one sheet is selected.
2. Do one of the following:



## [Add a sheet background pattern](#)

1. On the **Format** menu, point to **Sheet**, and then click **Background**.
2. Select the graphics file to use for the background pattern.

The selected graphic is repeated to fill the sheet. You can apply solid color shading to cells that contain data.



## [Remove a sheet background pattern](#)

On the **Format** menu, point to **Sheet**, and then click **Delete Background**.

**Note** Background patterns do not print and are not retained in individual worksheets or items that you save as Web pages. However, if you publish an entire workbook as a Web page, the background is retained.

[Show All](#)

# Add, change, or remove conditional formats

1. Select the cells for which you want to add, change, or remove [conditional formatting](#).
2. On the **Format** menu, click **Conditional Formatting**.
3. Do one of the following:

## [Add a conditional format](#)

1. Do one of the following:

To use values in the selected cells as the formatting criteria, click **Cell Value Is**, select the comparison phrase, and then type a [constant](#) value or a formula. If you enter a formula, start it with an equal sign (=).

To use a formula as the formatting criteria (to evaluate data or a condition other than the values in selected cells), click **Formula Is** and then enter the formula that evaluates to a logical value of TRUE or FALSE.

2. Click **Format**.
3. Select the formatting you want to apply when the cell value meets the condition or the formula returns the value TRUE.
4. To add another condition, click **Add**, and then repeat steps 1 through 3.

You can specify up to three conditions. If none of the specified conditions are true, the cells keep their existing formats.

**Note Using multiple conditions** If more than one specified condition is true, Microsoft Excel applies only the formats of the first true condition, even if more than one condition is true.

## [Copy formats to other cells](#)

1. Select the cells that have the conditional formats you want to copy.

2. On the **Formatting toolbar**, click **Format Painter** , and then select the cells you want to format.

### [Change or remove a conditional format](#)

Do one or more of the following:

- To change formats, click **Format** for the condition you want to change.
- To reselect formats on the current tab of the **Format Cells** dialog box, click **Clear** and select new formats.
- To remove one or more conditions, click **Delete**, and then select the check box for the conditions you want to delete.

### [Tip](#)

To remove all conditional formats as well as all other cell formats for selected cells, point to **Clear** on the **Edit** menu, and then click **Formats**.

[Show All](#)

# Find cells that have conditional formats

1. To find all cells that have [conditional formatting](#), click any cell.

To find cells that have conditional formatting settings identical to the settings of a specific cell, click the specific cell.

2. On the **Edit** menu, click **Go To**.
3. Click **Special**.
4. Click **Conditional formats**.
5. Do one of the following:

To find cells with any conditional formatting, click **All** below **Data validation**.

To find cells with identical conditional formats, click **Same** below **Data validation**.

[Show All](#)

# Change column width and row height

## Change the width:

[Of a single column](#)

Drag the boundary on the right side of the column heading until the column is the width you want.

Drag to resize |

	A	B	↔C
1			
2			
3			

The displayed column width is the average number of digits 0 through 9 of the [standard font](#) that fit in a cell.

[Of multiple columns](#)

Select the columns you want to change, and then drag a boundary to the right of a selected column heading.

To do the same for all columns on the worksheet, click the **Select All**

Select All button

	A
1	

button, and then drag the boundary of any column heading.

[To fit the contents](#)

Double-click the boundary to the right of the column heading.

To do the same for all columns on the worksheet, click the **Select All**

Select All button

	A
1	

button, and then double-click a boundary to the right of one of the column headings.

[To a specific width](#)

Select the column, point to **Column** on the **Format** menu, click **Width**, and then enter a number.

[To match another column](#)

1. Select a cell in the column, click **Copy**  on the **Standard toolbar**, and then select the target column.
2. On the **Edit** menu, click **Paste Special**, and then click **Column widths**.

## Change the default width

1. Right-click a sheet tab, and then click **Select All Sheets** on the [shortcut menu](#).
2. On the **Format** menu, point to **Column**, and then click **Standard Width**.
3. Type a new measurement.

The number that appears in the **Standard column width** box is the average number of digits 0-9 of the [standard font](#) that fit in a cell.

[Tip](#)

To define the default column width for all new workbooks and worksheets, create a workbook template and a worksheet template.

## Change the height

[Of a single row](#)

Drag the boundary below the row heading until the row is the height you want.

	A	B	C
1			
2			
3			

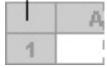
Drag to resize

[Of multiple rows](#)

Select the rows you want to change, and drag a boundary below a selected row heading.

To change the row height for all rows on the worksheet, click the **Select All**

Select All button



button, and then drag the boundary below any row heading.



[To fit the contents](#)

Double-click the boundary below the row heading.



[To a specific height](#)

Select the column, point to **Row** on the **Format** menu, click **Height**, and then enter a number.

[Show All](#)

# Define the default column width

1. Right-click a sheet tab, and then click **Select All Sheets** on the [shortcut menu](#)
2. On the **Format** menu, point to **Column**, and then click **Standard Width**.
3. Type a new measurement.

The number that appears in the **Standard column width** box is the average number of digits 0-9 of the [standard font](#) that fit in a cell.



To define the default column width for all new workbooks and worksheets, create a workbook template and a worksheet template.

[Show All](#)

# Display multiple lines of text within a cell

1. Select the cells you want to format.
2. On the **Format** menu, click **Cells**, and then click the **Alignment** tab.
3. Under **Text control**, select the **Wrap text** check box.



To start a new line of text at a specific point, click where you want to break the line, and then press ALT+ENTER.

[Show All](#)

# Position data in a cell

1. Select the cells you want to reposition. To center or align data that spans several columns or rows, such as column and row labels, first merge a selected [range](#) of cells and then select the [merged cell](#) for repositioning.
2. Do one of the following:

 [Center, left-align, or right-align data](#)

On the **Formatting toolbar**, click the appropriate button.

- Click **Align Left** , to align text to the left.
- Click **Center** , to center text.
- Click **Align Right** , to align text to the right.

 [Tip](#)

To restore the default alignment, select the cells, click **Cells** on the **Format** menu, and then click the **Alignment** tab. In the **Horizontal** box, click **General**.

 [Increase or decrease indented text from the left edge of a cell](#)

On the **Formatting toolbar**, click **Increase Indent**  or **Decrease Indent** .

 [Indent text in a cell](#)

1. On the **Format** menu, click **Cells**, and then click the **Alignment** tab.
2. Do one of the following:
  - To indent text from the left, right, or both sides of the cell, in the **Horizontal** box, click **Left (Indent)**, **Right (Indent)**, or **Distributed (Indent)**. Then, in the **Indent** box, click the amount of indent you want.
  - To indent text from the top, bottom, or both top and bottom of the

cell, in the **Vertical** box, click **Top (Indent)**, **Bottom (Indent)**, or **Distributed**. Then, in the **Indent** box, click the amount of indent you want.

- To horizontally justify text that is distributed in a cell (indented from both sides), in the **Horizontal** box, click **Justify**.
- To horizontally justify text that is not distributed in a cell, in the **Horizontal** box, click **Distributed (Indent)**, and then click **Justify distributed**.
- To vertically justify text in a cell, in the **Vertical** box, click **Justify**.

#### [Align data at the top, center, or bottom of a cell](#)

1. On the **Format** menu, click **Cells**, and then click the **Alignment** tab.
2. In the **Vertical** box, click the option you want.

#### [Rotate text in a cell](#)

1. On the **Format** menu, click **Cells**, and then click the **Alignment** tab.
2. In the **Orientation** box, click a degree point, or drag the indicator to the angle you want.

To display text vertically from top to bottom, click the vertical **Text** box under **Orientation**.

[Show All](#)

# Add or remove a currency symbol

## Add or remove a currency symbol

1. Select the cells you want to format.
2. On the **Format** menu, click **Cells**, and then click the **Number** tab.
3. In the **Category** list, click **Currency**.
4. In the **Symbol** list, do one of the following:
  - To add a currency symbol, select the one you want.
  - To remove a currency symbol, click **None**.

## Add the default currency symbol

1. Select the cells you want to format.
2. Click **Currency Style**  on the **Formatting toolbar**.

[Show All](#)

# Change the number of decimal places displayed

## On a worksheet

1. Select the cells you want to format.
2. To display more or fewer digits after the decimal point, click **Increase Decimal**  or **Decrease Decimal**  on the **Formatting toolbar**.

## In a built-in number format

1. On the **Format** menu, click **Cells**, and then click the **Number** tab.
2. In the **Category** list, click **Currency**, **Accounting**, **Percentage**, or **Scientific**.
3. In the **Decimal places** box, enter the number of decimal places you want to display.
4. If you want to change the currency symbol, click the symbol you want to use in the **Symbol** list.

[Show All](#)

# Convert numbers stored as text to numbers

## [One cell at a time](#)

1. On the **Tools** menu, click **Options**, and then click the **Error Checking** tab.
2. Make sure the **Enable background error checking** and **Number stored as text** boxes are checked.
3. Select any cell with a green error indicator in the upper left corner .
4. Next to the cell, click the button that appears , and then click **Convert to Number**.

## [A whole range at once](#)

1. In an empty cell, enter the number 1.
2. Select the cell, and on the **Edit** menu, click **Copy**.
3. Select the range of numbers stored as text you want to convert.
4. On the **Edit** menu, click **Paste Special**.
5. Under **Operation**, click **Multiply**.
6. Click **OK**.
7. Delete the content of the cell entered in the first step.

**Note** Some accounting programs display negative values with the negative sign (–) to the right of the value. To convert the text strings to values, you must return all of the characters of the text string except the rightmost character (the negation sign), and then multiply the result by –1. For example, if the value in cell A2 is "156–" the following formula converts the text to the value –156.

<b>Data</b>	<b>Formula</b>
156–	=LEFT(A2,LEN(A2)-1)*-1

[Show All](#)

# Create or delete a custom number format

## [Create a custom number format](#)

1. Select the cells you want to format.
2. On the **Format** menu, click **Cells**, and then click the **Number** tab.
3. In the **Category** list, click a category that is similar to the one you want, and then set its built-in formats to be similar to the ones you want. (You will not alter the built-in format; you'll be creating a copy to customize.)
4. In the **Category** list, click **Custom**.
5. In the **Type** box, edit the number format codes to create the format you want.

You can specify up to four sections of format codes. The format codes, separated by semicolons, define the formats for positive numbers, negative numbers, zero values, and text, in that order. If you specify only two sections, the first is used for positive numbers and zeros, and the second is used for negative numbers. If you specify only one section, it is used for all numbers. If you skip a section, include the ending semicolon for that section.

<u>          </u>	Format for positive numbers	<u>          </u>	Format for zeros
<u>#,###.00_)</u>		<u>;</u>	
<u>[Red] (#,###.00)</u>		<u>;0.00;</u>	
<u>“sales “@</u>		<u>”</u>	
	Format for negative numbers		Format for text

Use format codes that describe how you want to display a number; date or time; currency, percentage, or scientific notation; and text or spacing.

## [Format codes](#)

## [Text and spacing](#)

**Displaying both text and numbers** To display both text and numbers in a cell, enclose the text characters in double quotation marks (" ") or precede a single character with a backslash (\). Include the characters in the

appropriate section of the format codes. For example, type the format **"\$0.00" Surplus";\$-0.00" Shortage"** to display a positive amount as "\$125.74 Surplus" and a negative amount as "\$-125.74 Shortage." The following characters are displayed without the use of quotation marks: \$ - + / ( ) : ! ^ & ' (left single quotation mark) ' (right single quotation mark) ~ { } = < > and the space character.

**Including a section for text entry** If included, a text section is always the last section in the number format. Include an at sign (@) in the section where you want to display any text entered in the cell. If the @ character is omitted from the text section, text you enter will not be displayed. If you want to always display specific text characters with the entered text, enclose the additional text in double quotation marks (" ")— for example, **"gross receipts for "@**

If the format does not include a text section, text you enter is not affected by the format.

**Adding space** To create a space the width of a character in a number format, include an underscore (\_) followed by the character. For example, when you follow an underscore with a closing parenthesis ()), positive numbers line up correctly with negative numbers that are enclosed in parentheses.

**Repeating characters** To repeat the next character in the format to fill the column width, include an asterisk (\*) in the number format. For example, type **0\*-** to include enough dashes after a number to fill the cell.

 [Decimal places, spaces, colors, and conditions](#)

**Decimal places and significant digits** To format fractions or numbers with decimal points, include the following digit placeholders in a section. If a number has more digits to the right of the decimal point than there are placeholders in the format, the number rounds to as many decimal places as there are placeholders. If there are more digits to the left of the decimal point than there are placeholders, the extra digits are displayed. If the format contains only number signs (#) to the left of the decimal point, numbers less than one begin with a decimal point.

- # displays only significant digits and does not display insignificant zeros.
- 0 (zero) displays insignificant zeros if a number has fewer digits than there are zeros in the format.
- ? adds spaces for insignificant zeros on either side of the decimal point so that decimal points align when formatted with a fixed-width font, such as Courier New. You can also use ? for fractions that have varying numbers of digits.

To display	Use this code
1234.59 as 1234.6	#####.#
8.9 as 8.900	#.000
.631 as 0.6	0.#
12 as 12.0 and 1234.568 as 1234.57	#.0#
44.398, 102.65, and 2.8 with aligned decimals	???.???
5.25 as 5 1/4 and 5.3 as 5 3/10, with aligned division symbols	# ???/???

**Thousands separator** To display a comma as a thousands separator or to scale a number by a multiple of one thousand, include a comma in the number format.

To display	Use this code
12000 as 12,000	#,###
12000 as 12	#,
12200000 as 12.2 0.0,,	

**Color** To set the color for a section of the format, type the name of one of the following eight colors in square brackets in the section. The color code must be the first item in the section.

[Black] [Blue]  
 [Cyan] [Green]  
 [Magenta] [Red]  
 [White] [Yellow]

**Conditions** To set number formats that will be applied only if a number meets a condition you specify, enclose the condition in square brackets. The

condition consists of a [comparison operator](#) and a value. For example, the following format displays numbers less than or equal to 100 in a red font and numbers greater than 100 in a blue font.

```
[Red][<=100];[Blue][>100]
```

To apply [conditional formats](#) to cells— for example, color shading that depends on the value of a cell— use the **Conditional Formatting** command on the **Format** menu.

 [Currency, percentages, and scientific notation](#)

**Currency symbols** To enter one of the following currency symbols in a number format, turn on NUM LOCK and use the numeric keypad to enter the ANSI code for the symbol.

**To enter Hold down ALT and type this code**

¢	<b>0162</b>
£	<b>0163</b>
¥	<b>0165</b>
€	<b>0128</b>

**Note** Custom formats are saved with the workbook. To have Microsoft Excel always use a specific currency symbol, change the currency symbol selected in **Regional Settings** in Control Panel before you start Excel.

**Percentage** To display numbers as a percentage of 100, include the percent sign (%) in the number format. For example, a number such as .08 appears as 8%; 2.8 appears as 280%.

**Scientific notation** To display numbers in scientific format, use "E-," "E+," "e-," or "e+" exponent codes in a section. If a format contains a zero (0) or number sign(#) to the right of an exponent code, Excel displays the number in scientific format and inserts an "E" or "e". The number of zeros or number signs to the right of a code determines the number of digits in the exponent. "E-" or "e-" places a minus sign by negative exponents. "E+" or "e+" places a minus sign by negative exponents and a plus sign by positive exponents.

## [Dates and times](#)

**Days, months, and years** If you use "m" immediately after the "h" or "hh" code or immediately before the "ss" code, Microsoft Excel displays minutes instead of the month.

To display	Use this code
Months as 1–12	m
Months as 01–12	mm
Months as Jan–Dec	mmm
Months as January–December	mmmm
Months as the first letter of the month	mmmmm
Days as 1–31	d
Days as 01–31	dd
Days as Sun–Sat	ddd
Days as Sunday–Saturday	dddd
Years as 00–99	yy
Years as 1900–9999	yyyy

### **Hours, minutes, and seconds**

To display	Use this code
Hours as 0–23	H
Hours as 00–23	hh
Minutes as 0–59	m
Minutes as 00–59	mm
Seconds as 0–59	s
Seconds as 00–59	ss
Hours as 4 AM	h AM/PM
Time as 4:36 PM	h:mm AM/PM
Time as 4:36:03 P	h:mm:ss A/P
Elapsed time in hours; for example, 25.02	[h]:mm
Elapsed time in minutes; for example, 63:46	[mm]:ss
Elapsed time in seconds	[ss]
Fractions of a second	h:mm:ss.00

**AM and PM** If the format contains an AM or PM, the hour is based on the 12-hour clock, where "AM" or "A" indicates times from midnight until noon and "PM" or "P" indicates times from noon until midnight. Otherwise, the hour is based on the 24-hour clock. The "m" or "mm" code must appear immediately after the "h" or "hh" code or immediately before the "ss" code; otherwise, Microsoft Excel displays the month instead of minutes.

**Note** You can also use the & (ampersand) text [operator](#) to join, or concatenate, two values.

#### [Delete a custom number format](#)

1. On the **Format** menu, click **Cells**, and then click the **Number** tab.
2. In the **Category** list, click **Custom**.
3. At the bottom of the **Type** box, click the custom format you want to delete.
4. Click **Delete**.

Microsoft Excel applies the default General format to any cells in the workbook that were formatted with the deleted custom format.

# Display minus signs on negative numbers

1. Select the cells you want to change.
2. On the **Format** menu, click **Cells**, and then click the **Number** tab.
3. Do one of the following:

For simple numbers, click **Number** in the **Category** list.

For currency, click **Currency** in the **Category** list.

4. In the **Negative numbers** box, select the display style for negative numbers.

# Display numbers as dates or times

1. Select the cells you want to format.
2. On the **Format** menu, click **Cells**, and then click the **Number** tab.
3. In the **Category** list, click **Date** or **Time**, and then click the format you want to use.

**Note** If you don't find what you're looking for, you can create a custom number format by using format codes for dates and times.

[Show All](#)

# Display numbers as fractions or percentages

1. Select the cells you want to format.
2. On the **Format** menu, click **Cells**, and then click the **Number** tab.
3. Do one of the following:
  - To display numbers as fractions, click **Fraction** in the **Category** list, and then click the type of fraction you want to use.
  - To display numbers as percentages, click **Percentage** in the **Category** list. In the **Decimal places** box, enter the number of decimal places you want to display.
  - To quickly display numbers as percentages of 100, click **Percent Style**  on the **Formatting toolbar**.

**Note** Numbers above 1 are automatically entered as percentages; and numbers below 1 are converted to percentages by multiplying by 100. For example, entering 10 results in 10%, and entering .1 results in 10%. To have all numbers converted by multiplying by 100, on the **Tools** menu, click **Options**, click the **Edit** tab, and then clear the **Enable automatic percent entry** check box.

# Display numbers as postal codes, Social Security numbers, or phone numbers

1. Select the cells you want to format.
2. On the **Format** menu, click **Cells**, and then click the **Number** tab.
3. In the **Category** list, click **Special**, and then select the format you want to use.

## Notes

- If a range of cells contains both five-digit and nine-digit ZIP Codes, you can apply a custom format that displays both types of ZIP Codes correctly. In the **Category** list, click **Custom**, and then type the following in the **Type** box:

**[<=99999]00000;00000-0000**

- If you don't find what you're looking for, you can create a custom number format.

# Display numbers with scientific notation

1. Select the cells you want to format.
2. On the **Format** menu, click **Cells**, and then click the **Number** tab.
3. In the **Category** list, click **Scientific**. In the **Decimal places** box, enter the number of decimal places you want to display.

[Show All](#)

# Display or hide all values in a cell

1. Select the cells that contain hidden values or values you want to hide.
2. On the **Format** menu, click **Cells**, and then click the **Number** tab.
3. Do one of the following:

[Display hidden values in a cell](#)

In the **Category** list, click **General** to apply the default number format.

To redisplay a date, a time, or values that have a specific number format, select the appropriate date, time, or number format on the **Number** tab.

[Hide all values in a cell](#)

1. In the **Category** list, click **Custom**.
2. In the **Type** box, select the existing codes and press BACKSPACE.
3. In the **Type** box, type **;;;** (three semicolons).

[Show All](#)

# Display or hide the thousands separator in a number

## Add or remove a thousands separator

1. Select the cells you want to format.
2. On the **Format** menu, click **Cells**, and then click the **Number** tab.
3. In the **Category** list, click **Number**.
4. Select or clear the **Use 1000 separator (,)** check box.

## Add the default thousands separator

1. Select the cells you want to format.
2. Click **Comma Style**  on the **Formatting toolbar**.

# Format numbers as text

## Format cells as text

1. Select the cells you want to format.
2. On the **Format** menu, click **Cells**, and then click the **Number** tab.
3. In the **Category** list, click **Text**, and then click **OK**.
4. Enter the numbers in the formatted cells.

## Format existing numbers as text

If you've already entered the numbers, you can change the numbers to text data.

1. Select the cells that contain the numbers you want to format as text.
2. On the **Format** menu, click **Cells**, and then click the **Number** tab.
3. In the **Category** list, click **Text**, and then click **OK**.

[Show All](#)

# Number format codes

## [Text and spacing](#)

**Displaying both text and numbers** To display both text and numbers in a cell, enclose the text characters in double quotation marks (" ") or precede a single character with a backslash (\). Include the characters in the appropriate section of the format codes. For example, type the format **\$0.00 " Surplus";\$-0.00 " Shortage"** to display a positive amount as "\$125.74 Surplus" and a negative amount as "\$-125.74 Shortage." The following characters are displayed without the use of quotation marks: \$ - + / ( ) : ! ^ & ' (left single quotation mark) ' (right single quotation mark) ~ { } = < > and the space character.

**Including a section for text entry** If included, a text section is always the last section in the number format. Include an at sign (@) in the section where you want to display any text entered in the cell. If the @ character is omitted from the text section, text you enter will not be displayed. If you want to always display specific text characters with the entered text, enclose the additional text in double quotation marks (" ")— for example, "**gross receipts for** "@

If the format does not include a text section, text you enter is not affected by the format.

**Adding space** To create a space the width of a character in a number format, include an underscore (\_) followed by the character. For example, when you follow an underscore with a closing parenthesis ()), positive numbers line up correctly with negative numbers that are enclosed in parentheses.

**Repeating characters** To repeat the next character in the format to fill the column width, include an asterisk (\*) in the number format. For example, type **0\*-** to include enough dashes after a number to fill the cell.

## [Decimal places, spaces, colors, and conditions](#)

**Decimal places and significant digits** To format fractions or numbers with decimal points, include the following digit placeholders in a section. If a number

has more digits to the right of the decimal point than there are placeholders in the format, the number rounds to as many decimal places as there are placeholders. If there are more digits to the left of the decimal point than there are placeholders, the extra digits are displayed. If the format contains only number signs (#) to the left of the decimal point, numbers less than one begin with a decimal point.

- # displays only significant digits and does not display insignificant zeros.
- 0 (zero) displays insignificant zeros if a number has fewer digits than there are zeros in the format.
- ? adds spaces for insignificant zeros on either side of the decimal point so that decimal points align when formatted with a fixed-width font, such as Courier New. You can also use ? for fractions that have varying numbers of digits.

	<b>To display</b>	<b>Use this code</b>
1234.59 as 1234.6		####.#
8.9 as 8.900		#.000
.631 as 0.6		0.#
12 as 12.0 and 1234.568 as 1234.57		#.0#
44.398, 102.65, and 2.8 with aligned decimals		???.???
5.25 as 5 1/4 and 5.3 as 5 3/10, with aligned division symbols	#	???.???

**Thousands separator** To display a comma as a thousands separator or to scale a number by a multiple of one thousand, include a comma in the number format.

<b>To display</b>	<b>Use this code</b>
12000 as 12,000	#,###
12000 as 12	#,
12200000 as 12.2 0.0,,	

**Color** To set the color for a section of the format, type the name of one of the following eight colors in square brackets in the section. The color code must be the first item in the section.

[Black] [Blue]  
 [Cyan] [Green]  
 [Magenta] [Red]

[White] [Yellow]

**Conditions** To set number formats that will be applied only if a number meets a condition you specify, enclose the condition in square brackets. The condition consists of a [comparison operator](#) and a value. For example, the following format displays numbers less than or equal to 100 in a red font and numbers greater than 100 in a blue font.

[Red][<=100];[Blue][>100]

To apply [conditional formats](#) to cells— for example, color shading that depends on the value of a cell— use the **Conditional Formatting** command on the **Format** menu.

 [Currency, percentages, and scientific notation](#)

**Currency symbols** To enter one of the following currency symbols in a number format, turn on NUM LOCK and use the numeric keypad to enter the ANSI code for the symbol.

**To enter Hold down ALT and type this code**

¢	<b>0162</b>
£	<b>0163</b>
¥	<b>0165</b>
€	<b>0128</b>

**Note** Custom formats are saved with the workbook. To have Microsoft Excel always use a specific currency symbol, change the currency symbol selected in **Regional Settings** in Control Panel before you start Excel.

**Percentage** To display numbers as a percentage of 100, include the percent sign (%) in the number format. For example, a number such as .08 appears as 8%; 2.8 appears as 280%.

**Scientific notation** To display numbers in scientific format, use "E-," "E+," "e-," or "e+" exponent codes in a section. If a format contains a zero (0) or number sign(# ) to the right of an exponent code, Excel displays the number in scientific format and inserts an "E" or "e". The number of zeros or number signs to the

right of a code determines the number of digits in the exponent. "E-" or "e-" places a minus sign by negative exponents. "E+" or "e+" places a minus sign by negative exponents and a plus sign by positive exponents.

## [Dates and times](#)

**Days, months, and years** If you use "m" immediately after the "h" or "hh" code or immediately before the "ss" code, Microsoft Excel displays minutes instead of the month.

To display	Use this code
Months as 1–12	m
Months as 01–12	mm
Months as Jan–Dec	mmm
Months as January–December	mmmm
Months as the first letter of the month	mmmmm
Days as 1–31	d
Days as 01–31	dd
Days as Sun–Sat	ddd
Days as Sunday–Saturday	dddd
Years as 00–99	yy
Years as 1900–9999	yyyy

## **Hours, minutes, and seconds**

To display	Use this code
Hours as 0–23	H
Hours as 00–23	hh
Minutes as 0–59	m
Minutes as 00–59	mm
Seconds as 0–59	s
Seconds as 00–59	ss
Hours as 4 AM	h AM/PM
Time as 4:36 PM	h:mm AM/PM
Time as 4:36:03 P	h:mm:ss A/P
Elapsed time in hours; for example, 25.02	[h]:mm

Elapsed time in minutes; for example, 63:46 [mm]:ss

Elapsed time in seconds [ss]

Fractions of a second h:mm:ss.00

**AM and PM** If the format contains an AM or PM, the hour is based on the 12-hour clock, where "AM" or "A" indicates times from midnight until noon and "PM" or "P" indicates times from noon until midnight. Otherwise, the hour is based on the 24-hour clock. The "m" or "mm" code must appear immediately after the "h" or "hh" code or immediately before the "ss" code; otherwise, Microsoft Excel displays the month instead of minutes.

# Reset a number format

1. Select the cells you want to reformat to the default number format.
2. On the **Format** menu, click **Cells**, and then click the **Number** tab.
3. In the **Category** list, click **General**.

[Show All](#)

# Stop rounding numbers

In Microsoft Excel, the appearance of a number is separate from the number stored in the cell. In most circumstances, although it appears a number is rounding, only the display of the number is rounded. Calculations that use the number use the number behind the display.

## The number of decimal places shown is too small.

You can increase the number of decimal places shown.

[How?](#)

### On a worksheet

1. Select the cells you want to format.
2. To display more or fewer digits after the decimal point, click **Increase Decimal**  or **Decrease Decimal**  on the **Formatting toolbar**.

### In a built-in number format

1. On the **Format** menu, click **Cells**, and then click the **Number** tab.
2. In the **Category** list, click **Currency**, **Accounting**, **Percentage**, or **Scientific**.
3. In the **Decimal places** box, enter the number of decimal places you want to display.

## The column is not wide enough to display the number.

If the column is not wide enough, the display of the number is rounded. Increase the column width.

[How?](#)

### Change the width:

[Of a single column](#)

Drag the boundary on the right side of the column heading until the column is the width you want.

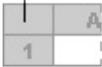
Drag to resize |

	A	B	↔C
1			
2			
3			

The displayed column width is the average number of digits 0 through 9 of the [standard font](#) that fit in a cell.

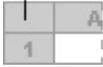
[Of multiple columns](#)

Select the columns you want to change, and then drag a boundary to the right of a selected column heading. To do the same for all columns on the worksheet,

click the **Select All**  button, and then drag the boundary of any column heading.

[To fit the contents](#)

Double-click the boundary to the right of the column heading. To do the same

for all columns on the worksheet, click the **Select All**  button, and then double-click a boundary to the right of one of the column headings.

[To a specific width](#)

Select the column, point to **Column** on the **Format** menu, click **Width**, and then enter a number.

[To match another column](#)

1. Select a cell in the column, click **Copy**  on the **Standard toolbar**, and then select the target column.
2. On the **Edit** menu, click **Paste Special**, and then click **Column widths**.

## Change the default width

[Define the default column width](#)

1. To define the default column width for all worksheets in a workbook, select all worksheets.

[How?](#)

When you enter or change data, the changes affect all selected sheets. These changes may replace data on the active sheet and other selected sheets.

### To select

### Do this

Click the sheet tab.



A single sheet

If you don't see the tab you want, click the tab scrolling buttons to display the tab, and then click the tab.



Two or more adjacent sheets

Click the tab for the first sheet, and then hold down **SHIFT** and click the tab for the last sheet.

Two or more

Click the tab for the first sheet, and then hold down

nonadjacent sheets CTRL and click the tabs for the other sheets.

All sheets in a workbook Right-click a sheet tab, and then click **Select All Sheets** on the [shortcut menu](#).

**Note** If sheet tabs have been color-coded, the sheet tab name will be underlined in a user-specified color when selected. If the sheet tab is displayed with a background color, the sheet has not been selected.

 [Cancel a selection of multiple sheets](#)

To cancel a selection of multiple sheets in a workbook, click any unselected sheet.

If no unselected sheet is visible, right-click the tab of a selected sheet. Then click **Ungroup Sheets** on the shortcut menu.

2. On the **Format** menu, point to **Column**, and then click **Standard Width**.
3. Type a new measurement.

The number that appears in the **Standard column width** box is the average number of digits 0-9 of the [standard font](#) that fit in a cell.

 [Tip](#)

To define the default column width for all new workbooks and worksheets, create a workbook template and a worksheet template.

## Change the height

 [Of a single row](#)

Drag the boundary below the row heading until the row is the height you want.

	A	B	C
1			
2			
3			

Drag to resize

## [Of multiple rows](#)

Select the rows you want to change, and drag a boundary below a selected row heading. To change the row height for all rows on the worksheet, click the **Select**

 **All** button, and then drag the boundary below any row heading.

## [To fit the contents](#)

Double-click the boundary below the row heading.

## [To a specific height](#)

Select the column, point to **Row** on the **Format** menu, click **Height**, and then enter a number.

[Show All](#)

# Apply a style

A style is a collection of formats, like bold text or background shading.

1. Select the cells you want to format.
2. On the **Format** menu, click **Style**.
3. To apply a basic style, click the [style](#) you want in the **Style name** box.

To apply common number styles, click **Comma Style** , **Currency Style** , or **Percent Style**  on the **Formatting** [toolbar](#).

[Show All](#)

# Copy styles from another workbook

1. Open the workbook that contains the [styles](#) you want to copy.
2. Open the workbook you want to copy the styles to, and then click **Style** on the **Format** menu.
3. Click **Merge**.
4. In the **Merge styles** box, double-click the workbook that contains the styles you want to copy.

**Note** If the two workbooks contain styles with the same names, you must confirm that you want to merge these styles. To replace the styles in the active workbook with the copied styles, click **Yes**. To keep the styles in the active workbook, click **No**. This warning occurs only once, regardless of the number of conflicting style names.

[Show All](#)

# Create or delete a style

Do one of the following:

## [Create a new style](#)

1. Select a cell that has the combination of formats you want to include in the new [style](#). (You can specify the formats when you name the style.)
2. On the **Format** menu, click **Style**.
3. In the **Style name** box, type a name for the new style.
4. To define and apply the style to the selected cells, click **OK**.

To define the style without applying it, click **Add**, and then click **Close**.

## [Specify formats for a style](#)

1. On the **Format** menu, click **Style**.
2. In the **Style name** box, type a name for a new [style](#).

To change formats for an existing style, click the style you want to change.

3. Click **Modify**.
4. On any of the tabs in the dialog box, select the formats you want, and then click **OK**.
5. Clear the check box for any type of formats that you don't want the style to include.
6. To define and apply the style to the selected cells, click **OK**.

To define the style without applying it, click **Add**, and then click **Close**.

## [Remove a style from selected cells](#)

1. Select the cells that are formatted with the [style](#) you want to remove.
2. On the **Format** menu, click **Style**.
3. In the **Style name** box, click **Normal**.

## [Delete a style from the style list](#)

1. On the **Format** menu, click **Style**.
2. In the **Style name** box, click the [style](#) you want to delete.
3. Click **Delete**.

**Note** You cannot delete the Normal style. If you delete the Currency, Comma, or Percent style, you won't be able to use the **Comma Style** , **Currency Style** , or **Percent Style**  button on the **Formatting [toolbar](#)**.

[Show All](#)

# Save styles to use in new workbooks

1. Open a new blank workbook.
2. Open the workbook that contains the [styles](#) you want to save.
3. Copy the styles from your workbook to the blank workbook.

[How?](#)

1. Open the workbook that contains the [styles](#) you want to copy.
2. Open the workbook you want to copy the styles to, and then click **Style** on the **Format** menu.
3. Click **Merge**.
4. In the **Merge styles** box, double-click the workbook that contains the styles you want to copy.

**Note** If the two workbooks contain styles with the same names, you must confirm that you want to merge these styles. To replace the styles in the active workbook with the copied styles, click **Yes**. To keep the styles in the active workbook, click **No**. This warning occurs only once, regardless of the number of conflicting style names.

4. In the blank workbook, click **Save As** on the **File** menu.
5. In the **File name** box, type **book**.
6. In the **Save as type** list, click **Template (\*.xlt)**.
7. In the **Save in** list, click the Templates folder.
8. Click **Save**.

**Note** The styles you save will be available in all new workbooks that you subsequently create by clicking **New** .

[Show All](#)

# Apply or remove automatic formatting on a range of cells

1. Select the [range](#) you want to format or remove the [autoformat](#) from.
2. On the **Format** menu, click **AutoFormat**.
3. Do one of the following:

**Apply an autoformat** Click the format you want.

**Remove an autoformat** At the bottom of the list, click the format above **None**.

**Note** If you want to use only selected parts of a format when autoformatting or removing an autoformat, click **Options**, and then clear the check boxes for the formats you don't want to apply. When you remove an autoformat for the font, the font specified in the General tab of the Excel Options dialog box will be used.

[Show All](#)

# Change formatting of text

1. Select cells or text you want to format.

[How?](#)

## To select

## Do this

If editing in a cell is turned on, select the cell, double-click in it, and then select the text in the cell.

Text in a cell

If editing in a cell is turned off, select the cell, and then select the text in the formula bar.



A single cell

Click the cell, or press the arrow keys to move to the cell.

A [range](#) of cells

Click the first cell of the range, and then drag to the last cell.

A large range of cells

Click the first cell in the range, and then hold down SHIFT and click the last cell in the range. You can scroll to make the last cell visible.

Click the **Select All** button.

All cells on a worksheet

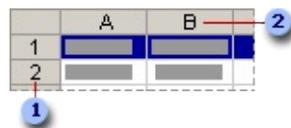


Nonadjacent cells or cell ranges

Select the first cell or range of cells, and then hold down CTRL and select the other cells or ranges.

Click the row or column heading.

An entire row or column



Drag across the row or column headings. Or select the first

Adjacent rows or columns      row or column; then hold down SHIFT and select the last row or column.

Nonadjacent rows or columns      Select the first row or column, and then hold down CTRL and select the other rows or columns.

More or fewer cells than the active selection      Hold down SHIFT and click the last cell you want to include in the new selection. The rectangular range between the [active cell](#) and the cell you click becomes the new selection.

Cancel a selection of cells      Click any cell on the worksheet.

2. Do one of the following:

[Change the font or font size](#)

In the **Font** box  on the **Formatting toolbar**, click the font you want.

In the **Font Size** box , click the font size you want.

[Change the text color](#)

To apply the most recently selected color, click **Font Color**  on the **Formatting toolbar**.

To apply a different color, click the arrow next to **Font Color** , and then click a color on the palette.

[Make selected text or numbers bold, italic, or underlined](#)

On the **Formatting toolbar**, click a button for the format you want.

**To make text      Click**

Bold      **Bold** 

Italic      **Italic** 

Underlined    **Underline**

[Shrink the font size to show all data in a cell](#)

If a small amount of data isn't visible in a cell, you can reduce the font size of the data so that you don't have to resize the column.

1. Select the cells you want to format.
2. On the **Format** menu, click **Cells**, and then click the **Alignment** tab.
3. Select the **Shrink to fit** check box.

[Show multiple lines of text in a cell](#)

1. Select the cells you want to format.
2. On the **Format** menu, click **Cells**, and then click the **Alignment** tab.
3. Select the **Wrap text** check box.

**Note** You can also press ALT+Enter to insert a hard break in your text.

[Change the default font and font size used in new workbooks](#)

1. On the **Tools** menu, click **Options**, and then click the **General** tab.
2. In the **Standard font** box, click a font.
3. In the **Size** box, enter a font size.

**Note** You must restart Microsoft Excel to begin using the new default font and font size. The new default font and font size are used only in the new workbooks you create after you restart Microsoft Excel; existing workbooks are not affected.

[Show All](#)

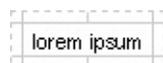
# Copy formats from one cell or range to another

1. Select a cell or range that has the formatting you want to copy.
2. Do one of the following:
  - To copy the formatting to a cell or range, click **Format Painter**  on the **Standard toolbar**.
  - To copy the formatting in the selected cell or range to several locations, double-click the **Format Painter** button. When you finish copying the formatting, click the button again.
  - To copy column widths, select the heading of the column that is the width you want to copy, click the **Format Painter** button, and then click the heading of the column you want to copy the width to.

[Show All](#)

# Merge or split cells or data

 [Spread the content of one cell over many cells](#)



Text spread and centered over multiple cells

**Warning** Microsoft Excel places only the upper-leftmost data in the selected [range](#) into the resulting [merged cell](#). If there is data in other cells, the data is deleted.

1. Copy the data you want into the upper-leftmost cell within the range.
2. Select the cells you want to merge.
3. To merge cells in a row or column and center the cell contents, click **Merge and Center**  on the **Formatting toolbar**.

 [Tip](#)

You can change the text alignment in the merged cell by clicking **Align Left** , **Center** , or **Align Right**  on the **Formatting toolbar**. To make other changes to the text alignment, including the vertical alignment, use the options on the **Alignment** tab (**Cells** command, **Format** menu).

 [Split merged cells](#)

1. Select the [merged cell](#).

When cells have been combined, **Merge and Center**  on the **Formatting toolbar** is [selected](#).

2. Click **Merge and Center**  on the **Formatting toolbar**.

 [Divide text across cells](#)

1. Select the range of cells that contains the text values. The range can be any

number of rows tall, but no more than one column wide.

**Note** There must be one or more blank columns to the right of the selected column or the data to the right of the selected column will be overwritten.

2. On the **Data** menu, click **Text to Columns**.
3. Follow the instructions in the Convert Text to Columns Wizard to specify how you want to divide the text into columns.

[Combine text from multiple cells into one cell, using a formula](#)

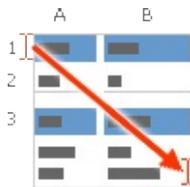
Use the ampersand (&) operator or the CONCATENATE function to do this task.

# Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>First Name</b>	<b>Last Name</b>
	Nancy	Davolio
	Andrew	Fuller
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=A2&" "&B2	Combines the names above, separated by a space (Nancy Davolio)
<b>3</b>	=B3&", "&A3	Combines the names above, separated by a comma (Fuller, Andrew)
	=CONCATENATE(A2," ",B2)	Combines the names above, separated by a space (Nancy Davolio)

**Note** The formula inserts a space between the first and last names by using a

space enclosed within quotation marks. Use quotation marks to include any literal text— text that does not change— in the result.

## **Function details**

[CONCATENATE](#)

# Turn on or off extended formats and formulas

When you turn on extended formats and formulas, Microsoft Excel automatically formats new data that you type at the end of a list to match the preceding rows and automatically copies formulas that repeat in every row. To be extended, formats and formulas must appear in at least three of the five list rows preceding the new row.

1. On the **Tools** menu, click **Options**, and then click the **Edit** tab.
2. Do one of the following:

To automatically format new items to match the rest of the list, select the **Extend list formats and formulas** check box.

To turn off automatic formatting, clear the check box.

[Show All](#)

# Change data validation settings

1. If the workbook is [shared](#), stop sharing it.

[How?](#)

1. Have all other users save and close the [shared workbook](#). If other users are editing, they will lose any unsaved work.
2. Unsharing the workbook deletes the [change history](#). If you want to keep a copy of this information, print out the [History worksheet](#) or copy it to another workbook.

[How?](#)

1. On the **Tools** menu, point to **Track Changes**, and then click **Highlight Changes**.
2. In the **When** box, click **All**.
3. Clear the **Who** and **Where** check boxes.
4. Select the **List changes on a new sheet** check box, and then click **OK**.
5. Do one or more of the following:
  - To print the History worksheet, click **Print** .
  - To copy the history to another workbook, select the cells you want to copy, click **Copy** , switch to another workbook, click where you want the copy to go, and click **Paste** .

**Note** You may also want to save or print the current version of the workbook, because this history might not apply to later versions. For example, cell locations, including row numbers, in the copied history may no longer be current.

3. On the **Tools** menu, click **Share Workbook**, and then click the **Editing** tab.
4. Make sure that you are the only person listed in the **Who has this workbook open now** box.
5. Clear the **Allow changes by more than one user at the same time**

check box.

If this check box is not available, you must unprotect the workbook before clearing the check box.

[How?](#)

1. Click **OK**, point to **Protection** on the **Tools** menu, and then click **Unprotect Shared Workbook**.
  2. Enter the [password](#) if prompted, and then click **OK**.
  3. On the **Tools** menu, click **Share Workbook**, and then click the **Editing** tab.
  6. When prompted about the effects on other users, click **Yes**.
2. If the worksheet is protected, unprotect it.

[How?](#)

[Remove user permissions for a range](#)

1. Switch to the protected worksheet.
2. On the **Tools** menu, point to **Protection**, and then click **Unprotect Sheet**.
3. If prompted, enter the protection [password](#) for the worksheet.
4. On the **Tools** menu, point to **Protection**, and then click **Allow Users to Edit Ranges**.
5. In the **Ranges unlocked by a password when cell is protected** list, click the range for which you want to remove permissions.
6. Click **Delete**.

[Remove protection from a worksheet](#)

1. Switch to the protected worksheet.
2. On the **Tools** menu, point to **Protection**, and then click **Unprotect**

## Sheet.

3. If prompted, enter the protection [password](#) for the worksheet.

### [Remove protection from a workbook](#)

1. Open the protected workbook.
2. On the **Tools** menu, point to **Protection**, and then click **Unprotect Workbook**.
3. If prompted, enter the protection [password](#) for the workbook.

### [Remove protection from a shared workbook](#)

Removing protection when a [password](#) is in use also unshares the workbook, disconnecting other users from the workbook and erasing the [change history](#). If no password is in effect, the workbook remains [shared](#) after you unprotect it.

1. Open the protected workbook
2. On the **Tools** menu, point to **Protection**, and then click **Unprotect Shared Workbook**.
3. If prompted, enter the password for the workbook.
4. If prompted about the effects on other users of removing protection, click **Yes**.

### [Remove the password for viewing or editing a workbook file](#)

1. Open the workbook.
2. On the **File** menu, click **Save As**.
3. On the **Tools** menu, click **General Options**.
4. In the **Password to open** or **Password to modify** box, or both boxes, double-click the asterisks and then press the DELETE key.

5. Click **OK**, and then click **Save**.
6. Click **Yes** to replace the existing workbook.
3. Click a cell that has data validation settings you want to change.
4. On the **Data** menu, click **Validation**.
5. On each tab, select and change the options you want.

If you want the same changes for other cells on the worksheet, select the **Apply these changes to all other cells with the same settings** check box on the **Settings** tab.

**Note** You cannot change the data validation for cells in a [list](#) that is linked to a SharePoint site.

[Show All](#)

# Copy data validation settings

1. Click the cell with the settings you want to copy, and click **Copy** .
2. Select the cells for which you want to duplicate the settings.
3. On the **Edit** menu, click **Paste Special**.
4. Click **Validation**.

**Note** You cannot copy or paste data validation within cells of a [list](#) that is linked to a SharePoint site.



In the **Paste Special** dialog box, the **All** and **All except borders** options also paste the data validation settings.

[Show All](#)

# Designate valid cell entries

1. Select the cell to validate.
2. On the **Data** menu, click **Validation**, and then click the **Settings** tab.
3. Specify the type of validation you want:

## [Allow values from a list](#)

1. In the **Allow** box, click **List**.
2. Click the **Source** box and then do one of the following:
  - To define the list locally, type the list values separated by commas.
  - To use a range of cells with a defined name, type the equal sign (=) followed by the name of the range.
  - To use cell references, select the cells on the worksheet and then press ENTER.

**Note** Cell references have to be to cells on the same worksheet. If you have to refer to a different worksheet or a different workbook, use a defined name and make sure the workbook is already open.

3. Make sure the **In-cell dropdown** check box is selected.

## [Allow numbers within limits](#)

1. In the **Allow** box, click **Whole Number** or **Decimal**.
2. In the **Data** box, click the type of restriction you want. For example, to set upper and lower limits, click **between**.
3. Enter the minimum, maximum, or specific value to allow.

## [Allow dates or times within a timeframe](#)

1. In the **Allow** box, click **Date** or **Time**.

2. In the **Data** box, click the type of restriction you want. For example, to allow dates after a certain day, click **greater than**.
3. Enter the start, end, or specific date or time to allow.

[Allow text of a specified length](#)

1. In the **Allow** box, click **Text Length**.
2. In the **Data** box, click the type of restriction you want. For example, to allow up to a certain number of characters, click **less than or equal to**.
3. Enter the minimum, maximum, or specific length for the text.

[Calculate what's allowed based on the content of another cell](#)

1. In the **Allow** box, click the type of data you want.
2. In the **Data** box, click the type of restriction you want.
3. In the box or boxes below the **Data** box, click the cell that you want to use to specify what's allowed. For example, to allow entries for an account only if the result won't go over the budget, click **Decimal** for **Allow**, click **less than or equal to** for **Data**, and in the **Maximum** box, click the cell that contains the budget amount.

[Use a formula to calculate what's allowed](#)

1. In the **Allow** box, click **Custom**.
  2. In the **Formula** box, enter a formula that calculates a logical value (TRUE for valid entries or FALSE for invalid). For example, to allow the value in the cell for the picnic account only if nothing is budgeted for the discretionary account (cell D6) and the total budget (D20) is also less than the \$40,000 allocated, you could enter **=AND(D6=0,D20<40000)** for the custom formula.
4. Specify whether the cell can be left blank:
- If you want to allow blank (null) values, select the **Ignore blank** check

box.

- If you want to prevent entry of blank (null) values, clear the **Ignore blank** check box.

**Note** If your allowed values are based on a cell range with a defined name, and there is a blank cell anywhere in the range, setting the **Ignore blank** check box allows any values to be entered in the validated cell. This is also true for any cells referenced by validation formulas: if any referenced cell is blank, setting the **Ignore blank** check box allows any values to be entered in the validated cell.

5. To display an optional input message when the cell is clicked, click the **Input Message** tab, make sure the **Show input message when cell is selected** check box is selected, and fill in the title and text for the message.
6. Specify how you want Microsoft Excel to respond when invalid data is entered:

[How?](#)

1. Click the **Error Alert** tab, and make sure the **Show error alert after invalid data is entered** check box is selected.
2. Select one of the following options for the **Style** box:

To display an information message that does not prevent entry of invalid data, click **Information**.

To display a warning message that does not prevent entry of invalid data, click **Warning**.

To prevent entry of invalid data, click **Stop**.

3. Fill in the title and text for the message (up to 225 characters).

**Note** If you don't enter a title or text, the title defaults to "Microsoft Excel" and the message to: "The value you entered is not valid. A user has restricted values that can be entered into this cell."

**Note** Applying data validation to a cell does not format the cell.

[Show All](#)

# Display or hide circles around invalid data

## Circle invalid cells

All cells that don't meet their [data validation](#) criteria are circled, including values that were typed, copied, or filled in the cells, calculated by formulas, or entered by [macros](#).

1. Point to **Formula Auditing** on the **Tools** menu, and then click **Show Auditing Toolbar**.
2. Click **Circle Invalid Data** .

## Hide validation circles

- To remove the circle from a single cell, enter valid data in the cell.
- To hide all circles, point to **Formula Auditing** on the **Tools** menu, make sure the **Show Auditing Toolbar** command is checked, and then click **Clear Validation Circles** .

# Find cells that have data validation

## Find all cells with data validation

1. On the **Edit** menu, click **Go To**.
2. Click **Special**.
3. Click **Data validation**.
4. Click **All**.

## Find cells that match certain data validation settings

1. Click a cell that has the data validation settings for which you want to find matches.
2. On the **Edit** menu, click **Go To**.
3. Click **Special**.
4. Click **Data validation**.
5. Click **Same**.

[Show All](#)

# Remove data validation

1. Select the cells where you no longer want to validate data.

To remove data validation from all similar cells or from all cells that have validation on a worksheet, find the cells.



## Find all cells with data validation

1. On the **Edit** menu, click **Go To**.
2. Click **Special**.
3. Click **Data validation**.
4. Click **All**.

## Find cells that match certain data validation settings

1. Click a cell that has the data validation settings for which you want to find matches.
  2. On the **Edit** menu, click **Go To**.
  3. Click **Special**.
  4. Click **Data validation**.
  5. Click **Same**.
2. On the **Data** menu, click **Validation**, and then do one of the following:

If prompted to erase current settings and continue, click **OK**, and then click **Cancel**.

If the **Data Validation** dialog box appears, click the **Settings** tab, and then click **Clear All**.

**Note** You cannot remove the data validation for cells in a [list](#) that is linked to a SharePoint site.

[Show All](#)

# Enter data in a cell from a list you specify



You can create a dropdown list that gets its choices from cells elsewhere on the worksheet.

1. Type the entries for the dropdown list in a single column or row. Do not include blank cells in the list.

If you type the list on a different worksheet from the data entry cell, define a [name](#) for the list.

[How?](#)

1. Select the cell, range of cells, or [nonadjacent selections](#) that you want to name.
2. Click the **Name** box at the left end of the [formula bar](#)



1 Name box

3. Type the name for the cells.
4. Press ENTER.

**Note** You cannot name a cell while you are changing the contents of the cell.

If you type the list in a different workbook, define a name with an external reference to the list.

## [How?](#)

1. Open the workbook that contains the list of dropdown entries.
  2. Open the workbook where you want to validate cells, point to **Name** on the **Insert** menu, and then click **Define**.
  3. In the **Names in workbook** box, type the name.
  4. In the **Refers to** box, delete the contents, and keep the insertion pointer in the box.
  5. On the **Window** menu, click the name of the workbook that contains the list of dropdown entries, and then click the worksheet that contains the list.
  6. Select the cells containing the list.
  7. In the **Define Name** dialog box, click **Add**, and then click **Close**.
2. Select the cell where you want the dropdown list.
  3. On the **Data** menu, click **Validation**, and then click the **Settings** tab.
  4. In the **Allow** box, click **List**.
  5. If the list is in the same worksheet, enter a reference to your list in the **Source** box.

If the list is elsewhere, enter the name you defined for your list in the **Source** box.

Make sure the reference or name is preceded with an equal sign (=).

6. Make sure the **In-cell dropdown** check box is selected.
7. Specify whether the cell can be left blank: Select or clear the **Ignore blank** check box.
8. To display optional input instructions when the cell is clicked, click the **Input Message** tab, make sure the **Show input message when cell is selected** check box is selected, and then fill in the title and text for the message.
9. Specify how you want Microsoft Excel to respond when invalid data is entered.

## [How?](#)

1. Click the **Error Alert** tab, and make sure the **Show error alert after invalid data is entered** check box is selected.

2. Select one of the following options for the **Style** box:

To display an information message that does not prevent entry of invalid data, click **Information**.

To display a warning message that does not prevent entry of invalid data, click **Warning**.

To prevent entry of invalid data, click **Stop**.

3. Fill in the title and text for the message (up to 225 characters).

**Note** If you don't enter a title or text, the title defaults to " Microsoft Excel" and the message to: "The value you entered is not valid. A user has restricted values that can be entered into this cell."

**Note** Applying data validation to a cell does not format the cell.



If the entry list is short, you can type the entries directly in the **Source** box, separated by the Microsoft Windows list separator character (commas by default). For example, you could type **Low, Average, High** in the **Source** box instead of entering the three words on a worksheet.

[Show All](#)

# Troubleshoot lists

[Formulas are missing from my list.](#)

If you add a new column that contains a formula to the list, and the list is linked to a SharePoint site, the formula will be converted to a calculated value.

You can retain formulas by publishing the list without linking it to Microsoft Windows SharePoint Services.

[The formula is read-only and cannot be updated in a list that is linked to a SharePoint site.](#)

You will see a formula in a list in Microsoft Excel only if the SharePoint list had been exported to Excel and contains a column that has been specified as a calculated column in a SharePoint list. This column is read-only and cannot be modified.

[I can't create a list in a shared workbook.](#)

You cannot create lists in workbooks that are shared. Additionally, the **Share Workbook** command is disabled if your workbook contains any lists. You must first disable workbook sharing if you want to use lists in your worksheet.

[I can't create a list in a protected worksheet.](#)

You cannot create lists in a workbook or a worksheet that is protected. You must first unprotect the worksheet or workbook before creating lists.

[I can't create a list when worksheets are grouped.](#)

If you have multiple worksheets selected, you cannot create a list because the worksheets have been grouped. To create a list, you must have only one worksheet selected.

[I cannot see the list border.](#)

If you cannot see the list border when the list is not active (that is, when a cell outside the list is selected), list borders have been hidden for inactive lists. On the **Data** menu, point to **List**, and then click **Hide Border of Inactive Lists**.

[When I type in a row directly under a list, the list does not automatically expand.](#)

If you have the total row displayed in the list, the list will not expand automatically when you type in the row below the list.

[I made changes to a list linked to a SharePoint list and I can't update my changes because the list has been modified on the SharePoint site.](#)

If the SharePoint list has setting changes to a column that been modified in Microsoft Excel, you will lose your changes if you choose to **Refresh** your list in the dialog box that is displayed when you try to synchronize. If you want to keep the changes you made in Excel, you must click **Cancel** in this dialog box.

[I can't publish a list because I have too many columns in the list.](#)

There are limitations to the number of columns for each data type when publishing a list.

<b>Data type</b>	<b>Number of columns</b>
Short text	64
Multi-line text	32
Number	32
Currency	32
Date/Time	16
Hyperlink	64

[When I copy and paste data in a list, and then type new data in the cell where I've pasted, I get a data validation error, even though my data conforms to the type restrictions of the column.](#)

When you copy a cell by dragging or by clicking **Cut**  or **Copy** , and **Paste** , Microsoft Excel copies the entire cell, including formulas and their resulting values, comments, and cell formats.

For example, if you copy a number from a cell in a column that has been specified as a column of text and paste it into a cell in a column that requires a number, you will get a data validation error. If you then try to type a number into that cell to resolve the error, you will again get a data validation error. This validation error occurs because the format for the cell changed to text when you copied data to the cell from another cell that has text format. In text format cells, numbers are treated as text.

To resolve this error, change the format of the cell back to a format that is suitable for the data type. For example, to correct the problem described above, do the following:

1. Select the cell you want to modify and click **Cells** on the **Format** menu.
2. On the **Number** tab of the **Format Cells** dialog box, select the **General** format.
3. Click **OK** to apply the format.



[I get an unexpected error when I try to publish a list.](#)

When you publish a list, unexpected errors may occur for a number of reasons.

- You may not be able to access the Microsoft Windows SharePoint Web site. The URL specified for the SharePoint site may be incorrect or an administrator may have configured the SharePoint site to deny access.
- The name of the list may be too long. Give the list a shorter name before trying to publish it again.
- You may have cancelled the publish operation while data was being transferred to the SharePoint site.
- There may be a version conflict between Microsoft Excel and the SharePoint site.
- There may have been a schema conflict between the list in Excel and the list on the SharePoint site.

[Show All](#)

# About subtotals



	A	B
1	<b>Sport</b>	<b>Sales</b>
2	Golf	\$5,000
3	Golf	\$2,000
4	Golf	\$1,500
5	<b>Golf Total</b>	<b>\$8,500</b>
6	Safari	\$9,000
7	Safari	\$4,000
8	<b>Safari Total</b>	<b>\$13,000</b>
11	<b>Tennis Total</b>	<b>\$2,000</b>
12	<b>Grand Total</b>	<b>\$23,500</b>

Microsoft Excel can automatically calculate subtotal and grand total values in a [list](#). When you insert automatic subtotals, Excel outlines the list so that you can display and hide the detail rows for each subtotal.

To insert subtotals, you first sort your list so that the rows you want to subtotal are grouped together. You can then calculate subtotals for any column that contains numbers.

If your data isn't organized as a list, or you only need a single total, you can use **AutoSum**  instead of automatic subtotals.

[How subtotals are calculated](#)

**Subtotals** Excel calculates subtotal values with a [summary function](#), such as **Sum** or **Average**. You can display subtotals in a list with more than one type of calculation at a time.

**Grand totals** Grand total values are derived from [detail data](#), not from the values in the subtotal rows. For example, if you use the **Average** summary function, the grand total row displays an average of all detail rows in the list, not an average of the values in the subtotal rows.

**Automatic recalculation** Excel recalculates subtotal and grand total values automatically as you edit the detail data.

[Nesting subtotals](#)

You can insert subtotals for smaller groups within existing subtotal groups. In

the example below, subtotals for each sport are in a list that already has subtotals for each region.

	A	B	C
1	<b>Region</b>	<b>Sport</b>	<b>Sales</b>
2	East	Golf	\$5,000
3	East	Golf	\$2,000
4		<b>Golf Total</b>	\$7,000
5	East	Tennis	\$1,500
6	East	Tennis	\$500
7		<b>Tennis Total</b>	\$2,000
8	<b>East Total</b>		\$9,000
9	West	Golf	\$3,500
10	West	Golf	\$2,500
11		<b>Golf Total</b>	\$6,000
12		<b>Tennis Total</b>	\$9,200
13	<b>West Total</b>		\$13,000

- 1 Outer subtotals
- 2 Nested subtotals

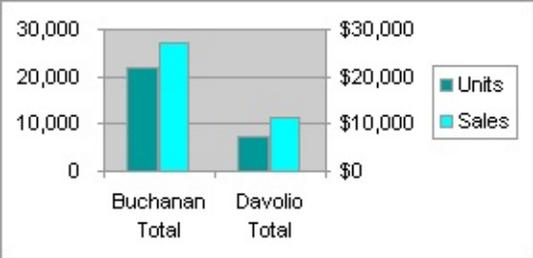
Before inserting nested subtotals, be sure to sort the list by all the columns for which you want subtotal values, so that the rows you want subtotaled are grouped together.

[Summary reports and charts](#)

**Create summary reports** When you add subtotals to a list, the list is outlined so that you can see its structure. You can create a summary report by clicking the outline symbols **1 2 3**, **+**, and **-** to hide the details and show only the totals.

1 2 3		A	B	C	D
	1	<b>Salesperson</b>	<b>Type</b>	<b>Units</b>	<b>Sales</b>
<b>+</b>	7	<b>Buchanan Total</b>		21,816	27,244
<b>+</b>	11	<b>Davolio Total</b>		7,336	11,461
<b>-</b>	12	<b>Grand Total</b>		29,152	38,705

**Chart the summary data** You can create a chart that uses only the visible data in a list that contains subtotals. If you show or hide details in the outlined list, the chart is also updated to show or hide the data.



[Show All](#)

# Insert subtotals

 [Insert individual subtotals](#)



	A	B	C
1	<b>Region</b>	<b>Sport</b>	<b>Sales</b>
2	East	Golf	\$5,000
3	East	Golf	\$2,000
4	East	Golf	\$1,500
5		<b>Golf Total</b>	\$8,500
6	East	Safari	\$9,000
7	East	Safari	\$4,000
8		<b>Safari Total</b>	\$13,000

1 Column to subtotal

2 Subtotals

1. Make sure the data you want to subtotal is in the following format: each column has a label in the first row and contains similar facts, and there are no blank rows or columns within the range.
2. Click a cell in the column to subtotal. In the example above, you'd click a cell in the Sport column, column B.
3. Click **Sort Ascending**  or **Sort Descending** .
4. On the **Data** menu, click **Subtotals**.
5. In the **At each change in** box, click the column to subtotal. In the example above, you'd click the Sport column.
6. In the **Use function** box, click the [summary function](#) you want to use to calculate the subtotals.
7. In the **Add subtotal to** box, select the check box for each column that contains values you want to subtotal. In the example above, you'd select the Sales column.
8. If you want an automatic page break after each subtotal, select the **Page break between groups** check box.
9. If you want the subtotals to appear above the subtotaled rows instead of below, clear the **Summary below data** check box.
10. Click **OK**.

**Note** You can use the **Subtotals** command again to add more subtotals with different summary functions. To avoid overwriting the existing subtotals, clear

the **Replace current subtotals** check box.

[Tip](#)

To display a summary of just the subtotals and grand totals, click the outline symbols **1 2 3** next to the row numbers. Use the **+** and **-** symbols to display or hide the detail rows for individual subtotals.

[Insert nested subtotals](#)

	A	B	C
1	<b>Region</b>	<b>Sport</b>	<b>Sales</b>
2	East	Golf	\$5,000
3	East	Golf	\$2,000
4		<b>Golf Total</b>	\$7,000
5	East	Tennis	\$1,500
6	East	Tennis	\$500
7		<b>Tennis Total</b>	\$2,000
8	<b>East Total</b>		\$9,000
9	West	Golf	\$3,500
10	West	Golf	\$2,500
11		<b>Golf Total</b>	\$6,000
12		<b>Tennis Total</b>	\$9,200
13	<b>West Total</b>		\$13,000

1 Outer subtotals

2 Nested subtotals

1. Make sure the data you want to subtotal is in the following format: each column has a label in the first row and contains similar facts, and there are no blank rows or columns within the range.
2. Sort the range by multiple columns, sorting first by the outer subtotal column, then by the next inner column for the nested subtotals, and so on. In the example above, you'd sort the range first by the Region column, and then by the Sport column.

[How?](#)

For best results, the range you sort should have column labels.

1. Click a cell in the range you want to sort.
2. On the **Data** menu, click **Sort**.
3. In the **Sort by** and **Then by** boxes, click the columns you want to sort.
4. Select any other sort options you want, and then click **OK**.

3. Insert the outer subtotals.

[How?](#)

1. On the **Data** menu, click **Subtotals**.
  2. In the **At each change in** box, click the column for the outer subtotals. In the example above, you'd click Region.
  3. In the **Use function** box, click the [summary function](#) you want to use to calculate the subtotals.
  4. In the **Add subtotal to** box, select the check box for each column that contains values you want to subtotal. In the example above, that column would be Sales.
  5. If you want an automatic page break after each subtotal, select the **Page break between groups** check box.
  6. If you want the subtotals to appear above the subtotaled rows instead of below, clear the **Summary below data** check box.
4. Insert the nested subtotals.

[How?](#)

1. On the **Data** menu, click **Subtotals**.
  2. In the **At each change in** box, click the nested subtotal column. In the example above, that column would be Sport.
  3. Select the [summary function](#) and other options.
  4. Clear the **Replace current subtotals** check box.
5. Repeat the previous step for more nested subtotals, working from the outermost subtotals in.

[Insert a total row in a list](#)

1. Make sure that the [list](#) is active by selecting a cell in the list.
2. Click **Toggle Total Row**  on the **List** toolbar.

[Show All](#)

# Remove subtotals

When you remove subtotals, Microsoft Excel also removes the [outline](#) and any page breaks that you inserted into the list along with the subtotals.

1. Click a cell in the list that contains subtotals.
2. On the **Data** menu, click **Subtotals**.
3. Click **Remove All**.

[Show All](#)

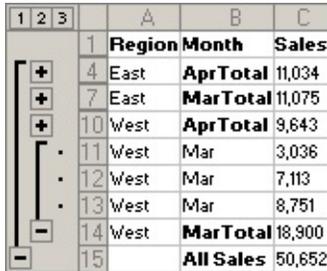
# Summary functions for data analysis

Summary functions are used in automatic subtotals, data consolidations, and [PivotTable](#) and [PivotChart reports](#). In PivotTable and PivotChart reports, the following summary functions are available for all types of [source data](#) except [OLAP](#).

<b>Function</b>	<b>Summarizes</b>
Sum	The sum of the values. This is the default function for numeric data.
Count	The number of data values. The Count summary function works the same as the COUNTA worksheet function. Count is the default function for data other than numbers.
Average	The average of the values.
Max	The largest value.
Min	The smallest value.
Product	The product of the values.
Count Nums	The number of data values that are numbers. The Count Nums summary function works the same as the COUNT worksheet function.
StDev	An estimate of the standard deviation of a population, where the sample is a subset of the entire population.
StDevp	The standard deviation of a population, where the population is all of the data to be summarized.
Var	An estimate of the variance of a population, where the sample is a subset of the entire population.
Varp	The variance of a population, where the population is all of the data to be summarized.

[Show All](#)

# About outlining a worksheet



	A	B	C
1	<b>Region</b>	<b>Month</b>	<b>Sales</b>
4	East	<b>Apr Total</b>	11,034
7	East	<b>Mar Total</b>	11,075
10	West	<b>Apr Total</b>	9,643
11	West	Mar	3,036
12	West	Mar	7,113
13	West	Mar	8,751
14	West	<b>Mar Total</b>	18,900
15		<b>All Sales</b>	50,652

Microsoft Excel can create an outline for your data to let you show and hide levels of detail with a single mouse click. You can click the outline symbols  to quickly display only the rows or columns that provide summaries or headings for sections of your worksheet, or you can use the symbols to see details under an individual summary or heading.

## [Preparing data to be outlined](#)

Data to be outlined should be in range, where each column has a label in the first row and contains similar facts, and there are no blank rows or columns within the range.

Before outlining, you may need to sort the data so that rows to be grouped are together. In the illustration above, the range was sorted by region and then by month, so that the detail rows for March and April within the East region are together, and the rows for each month within the West region are together.

Provide summary rows, either above or below each group of detail rows. For best results summary rows should contain formulas that reference cells in each of the detail rows. In the illustration, there's a total row below the detail for each month and region. For example, the sales in rows 11 through 13 are totaled in row 14. You can also outline data where the summary rows contain descriptive text or other data.

If you're outlining columns instead of rows, make sure your range has labels in the first column, and that you have summary columns either to the left or right of your detail columns.

## [Displaying and hiding outlined data](#)

An outline can have up to eight levels of detail, with each inner level providing details for the preceding outer level. In the illustration, the All Sales row, which contains the total of all the rows, is level 1. The rows containing the total for each month are level 2, and the detail rows for the sales are level 3. To display only the rows for a particular level, you can click the number for the level you want to see. In the illustration, the detail rows for the East region and for April in the West region are hidden, but you can click the  symbols to display these rows.

## [Automatic versus manual outlining](#)

**Outlining automatically** If you have summarized the data with formulas that contain [functions](#), such as SUM, Excel can automatically outline the data, as in the illustration. The summary data must be adjacent to the detail data.

If you insert automatic subtotals in a range organized in rows, Excel automatically outlines the worksheet at the same time, so that you can show or hide as much detail as you need.

**Outlining manually** If the data is not organized so that Excel can outline it automatically, you can create an outline manually. For example, you'll need to manually outline data if the rows or columns of summary data contain values or descriptive text instead of formulas.

## [Customizing an outline with styles](#)

You can apply automatic [styles](#) to an outline, either when you create it or afterward. For outlined rows, Excel uses styles such as RowLevel\_1 and RowLevel\_2. For outlined columns, Excel uses styles such as ColLevel\_1 and ColLevel\_2. The styles use bold, italic, and other text formats to differentiate the summary rows in your data. By changing the way each of these styles is defined, you can apply different text and cell formats to customize the appearance of your outline. You can also use [autoformats](#) to format outlined data.

[Show All](#)

# Create an outline

	A	B	C
1	Region	Month	Sales
4	East	AprTotal	11,034
7	East	MarTotal	11,075
10	West	AprTotal	9,643
11	West	Mar	3,036
12	West	Mar	7,113
13	West	Mar	8,751
14	West	MarTotal	18,900
15	All Sales		50,652

This outline lets you show and hide the detail rows for monthly sales.

1. If your summary rows are above the detail rows, or your summary columns are to the left of the detail columns, change the direction setting.

[How?](#)

1. On the **Data** menu, point to **Group and Outline**, and then click **Settings**.
  2. Clear the **Summary rows below detail** check box, the **Summary columns to right of detail** check box, or both check boxes.
2. If you want to set outline [styles](#) that will be applied automatically when the outline is created, set the **Automatic styles** option.

[How?](#)

1. On the **Data** menu, point to **Group and Outline**, and then click **Settings**.
2. Select the **Automatic styles** check box.

**Note** If you don't want to apply automatic styles before you begin, you can apply them after you create the outline.

3. Decide whether to outline the worksheet automatically or manually.
  - You can outline any worksheet manually.

- You can outline worksheets automatically if they have summary formulas that reference cells in the [detail data](#). All columns containing summary formulas must be either to the right or to the left of the detail data, or rows containing summary formulas must be either below or above the detail data.

If you aren't sure whether your worksheet meets these requirements, try outlining automatically, and if the results aren't as you expect, undo the operation and outline manually instead.

4. Do one of the following:

[Outline the data automatically](#)

1. Select the range of cells you want to outline.

To outline the entire worksheet, click any cell on the worksheet.

2. On the **Data** menu, point to **Group and Outline**, and then click **Auto Outline**.

[Outline the data manually](#)

1. Select the rows or columns that contain detail data.

Detail rows or columns are usually adjacent to the row or column that contains the summary formula or a heading. For example, if row 6 contains totals for rows 3 through 5, select rows 3 through 5. If row 8 contains a heading that describes rows 9 through 12, select rows 9 through 12.

2. On the **Data** menu, point to **Group and Outline**, and then click **Group**.

The [outline symbols](#) appear beside the group on the screen.

3. Continue selecting and grouping detail rows or columns until you have created all of the levels you want in the outline.

5. If you didn't select automatic styles, you can apply styles now.

[How?](#)

1. Select the cells that you want to apply outline styles to.
2. On the **Data** menu, point to **Group and Outline**, and then click **Settings**.
3. Select the **Automatic styles** check box.
4. Click **Apply Styles**.

[Show All](#)

# Show or hide outlined data

1. If you don't see the outline symbols **1 2 3**, **+**, and **-**, click **Options** on the **Tools** menu, click the **View** tab, and then select the **Outline symbols** check box.
2. Do one or more of the following:

[Show or hide the details for a group](#)

- To display the detail data within a group, click the **+** for the group.
- To hide the detail for a group, click the **-** for the group.

[Expand or collapse the entire outline to a particular level](#)

- In the **1 2 3** outline symbols, click the number of the level you want. Detail at lower levels is then hidden.

For example, if an outline has four levels, you can hide the fourth level while displaying the rest of the levels by clicking **3**.

[Show or hide all of the outlined detail](#)

- To show all detail, click the lowest level in the **1 2 3** outline symbols. For example, if there are three levels, click **3**.
- To hide all detail, click **1**.

# Remove an outline

No data is deleted when you remove an outline.

1. Click the worksheet.
2. On the **Data** menu, point to **Group and Outline**, and then click **Clear Outline**.
3. If rows or columns are still hidden, drag across the visible row or column headings on both sides of the hidden rows and columns, point to **Row** or **Column** on the **Format** menu, and then click **Unhide**.

## Notes

- You can also ungroup sections of the outline without removing the entire outline. Hold down SHIFT while you click the  or  for the group, then point to **Group and Outline** on the **Data** menu and click **Ungroup**.
- To hide the outline without removing it, display all of the data by clicking the highest number in the  outline symbols, click **Options** on the **Tools** menu, click the **View** tab, and then clear the **Outline symbols** check box.

[Show All](#)

# Troubleshoot outlining a worksheet

## [Detail data is copied along with summary rows](#)

1. Use the outline symbols , , and  to hide the [detail data](#) that you don't want copied.
2. Select the range of summary rows.
3. On the **Edit** menu, click **Go To**.
4. Click **Special**.
5. Click **Visible Cells only**.
6. Click **OK**, and then copy the data.

## [The data is grouped wrong](#)

**Select only the detail data for grouping** When you manually group rows and columns, select only the detail rows or columns that make up the group. Do not include the related summary row or column in the selection. For example, if row 6 contains totals for the data in rows 3 through 5, select only rows 3 through 5 to define the group.

**Display all data before grouping** When you group multiple outline levels, it's best to have all data displayed. If you're grouping manually, make sure to select all of the subordinate summary rows or columns, as well as their related detail data. For example, rows 6 and 10 contain subtotals for rows 3 through 5 and rows 7 through 9, respectively. Row 11 contains grand totals. To group the detail data for row 11, select rows 3 through 10.

**Change the direction of the outline** If Microsoft Excel displays  or  next to the wrong row or column of the outline, first display any hidden data, and then select the outlined range. On the **Data** menu, point to **Group and Outline**, click **Settings**, and then verify that the options under **Direction** are correct. If summary rows or columns are located above or to the left of the related detail rows and columns, clear the **Summary rows below detail** or **Summary columns to right of detail** check box.

## [The outline symbols are missing](#)

1. On the **Tools** menu, click **Options**.
2. Click the **View** tab.
3. Select the **Outline symbols** check box.
4. If the symbols still aren't visible or readable, use the **Zoom** box on the **Standard** toolbar to change the magnification to 100%.

 [Data is still hidden after ungrouping or removing the outline](#)

If you ungroup or remove an outline while the [detail data](#) is hidden, the detail rows or columns may remain hidden. To display the data, drag across the visible row numbers or column letters adjacent to the hidden rows and columns. On the **Format** menu, point to **Row** or **Column**, and then click **Unhide**.

[Show All](#)

# About consolidating data

To consolidate data, you combine the values from several ranges of data. For example, if you have a worksheet of expense figures for each of your regional offices, you might use a consolidation to roll these figures into a corporate expense worksheet.

Excel provides several ways to consolidate data. The most flexible method is to create formulas that refer to cells in each range of data that you're combining. Formulas that refer to cells on multiple worksheets are called 3-D formulas.

## [Using 3-D formulas](#)

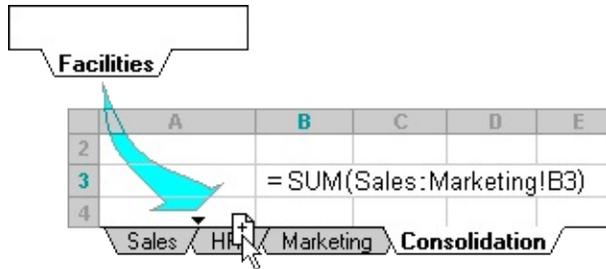
When you use [3-D references](#) in formulas, there are no restrictions on the layout of the separate ranges of data. You can change the consolidation any way you need to. The consolidation updates automatically when the data in the source ranges changes.

**Use formulas to combine data** In the following example, the formula in cell A2 adds three numbers that are located in different positions on three different worksheets.

	A	B	C	D	E
1					
2	=SUM(Sales!B4, HR!F5, Marketing!B9)				
3					

Sales HR Marketing Consolidation

**Add data to a consolidation with 3-D references** When all of your source worksheets have the same layout, you can use a range of sheet names in 3-D formulas. To add another worksheet to the consolidation, just move the sheet into the range your formula refers to.



## [Consolidating by position](#)

Consolidate by position when the data in all source areas is arranged in identical order and location; for example, if you have data from a series of worksheets that were created from the same template, you can consolidate the data by position.

You can set up the consolidation to update automatically when the source data changes, but you won't be able to change which cells and ranges are included in the consolidation. Or you can update the consolidation manually, allowing you to change the included cells and ranges.

## [Consolidating by category](#)

Consolidate by category when you want to summarize a set of worksheets that have the same row and column labels but organize the data differently. This method combines data that has matching labels from each worksheet.

You can set up the consolidation to update automatically when the source data changes, but you won't be able to change which cells and ranges are included in the consolidation. Alternatively, you can update the consolidation manually, allowing you to change the included cells and ranges.

## [Other ways to combine data](#)

You can create a [PivotTable report](#) from multiple consolidation ranges. This method is similar to consolidating by category but offers more flexibility to reorganize the categories.

[Show All](#)

# Consolidate data

1. Examine your data and decide whether to consolidate it with [3-D references](#) in formulas, by position, or by category.

**Formulas** You can use 3-D references in formulas for any type or arrangement of data. This is the recommended method.

**Position** If you're planning to combine data that's in the same cell in each of several ranges, you can consolidate by position.

**Category** If you have several ranges with different layouts, and you're planning to combine data from rows or columns that have matching labels, you can consolidate by category.

2. Do one of the following:

[Consolidate the data with 3-D references or formulas](#)

1. On the consolidation worksheet, copy or enter the labels you want for the consolidated data.
2. Click a cell that you want to contain consolidated data.
3. Type a formula that includes references to the source cells on each worksheet that contains data you want to consolidate.

For example, to combine the data in cell B3 from worksheets Sheet 2 through Sheet 7 inclusive, you could type **=SUM(Sheet2:Sheet7!B3)**. If the data to consolidate is in different cells on different worksheets, enter a formula such as this: **=SUM(Sheet3!B4, Sheet4!A7, Sheet5!C5)**. To enter a reference such as Sheet3!B4 in a formula without typing, type the formula up to the point where you need the reference, click the worksheet tab, and then click the cell.

[Consolidate by position or category](#)

1. Set up the data to be consolidated.

## How?

- Make sure each range of data is in [list](#) format: each column has a label in the first row and contains similar facts, and there are no blank rows or columns within the list.
- Put each range on a separate worksheet. Don't put any of the ranges on the worksheet where you plan to put the consolidation.
- If you're consolidating by position, make sure each range has the same layout.

If you're consolidating by category, make sure the labels for columns or rows that you want to combine have identical spelling and capitalization.

- Name each range: select the entire range, point to **Name** on the **Insert** menu, click **Define**, and type a name for the range.
2. Click the upper-left cell of the area where you want the consolidated data to appear.
  3. On the **Data** menu, click **Consolidate**.
  4. In the **Function** box, click the [summary function](#) you want Microsoft Excel to use to consolidate the data.
  5. Click the **Reference** box, click the sheet tab of the first range to consolidate, type the name you gave the range, and then click **Add**. Repeat this step for each range.
  6. If you want to update the consolidation table automatically whenever data in any of the source ranges changes, and you're sure you won't want to include different or additional ranges in the consolidation later on, select the **Create links to source data** check box.
  7. If you're consolidating by position, leave the boxes under **Use labels in** blank. Microsoft Excel does not copy the row or column labels in the source ranges to the consolidation. If you want labels for the consolidated data, copy them from one of the source ranges or enter them manually.

If you're consolidating by category, select the check boxes under **Use labels in** that indicate where the labels are located in the source ranges: either the top row, the left column, or both. Any labels that don't match up with labels in the other source areas result in separate rows or columns in the consolidation.

**Note** Other ways to consolidate data include creating a [PivotTable report](#) from multiple consolidation ranges.

[Show All](#)

# Change a data consolidation

- If you used [3-D references](#) or other formulas to consolidate the data, you can change the consolidation by editing the formulas.
- If you used the **Consolidate** command on the **Data** menu, you can change the consolidation by using the following steps:

1. Click the upper-left cell in the consolidated data.
2. On the **Data** menu, click **Consolidate**.

You can change the consolidation only if you did not previously select the **Create links to source data** check box. If the check box is selected, click **Close**, and re-create the consolidation.

3. Do one or more of the following:

[Add another source range to the consolidation](#)

The new source range must have either data in the same positions or column labels that match those in the other ranges in the consolidation.

1. Click the **Reference** box.
2. Click the sheet tab of the first range to consolidate.
3. Type the name you gave the range, or select the range.
4. Click **Add**.

[Adjust the size or shape of a source range](#)

1. Under **All references**, click the source range you want to change.
2. In the **References** box, edit the selected reference.
3. Click **Add**.

[Delete a source range from the consolidation](#)

1. Under **All references**, click the source range you want to delete.
2. Click **Delete**.

[Make the consolidation update automatically](#)

**Note** Once you make this change, you can't add, change, or delete any of the source ranges.

Select the **Create links to source data** check box.

4. To update the consolidation with the changes, click **OK**.

[Show All](#)

# Troubleshoot data consolidation

These suggestions apply only to consolidations that were created by using the **Consolidate** command on the **Data** menu. They do not apply to consolidations created by using 3-D references in formulas.

## [All consolidations](#)

**Check your source range references** Make sure you entered the references to all source ranges correctly.

**Check the summary function** Make sure you selected the appropriate [summary function](#) in the **Consolidate** dialog box.

**Check the consolidation** To avoid problems with the shape of the destination area, select the upper-left cell of the area before you create the consolidation. Make sure you leave enough cells to the right and below this cell for the consolidated data. The **Consolidate** command fills in the area as needed.

## [Consolidation by position](#)

Make sure each source area contains the same range of similar data in the same order.

## [Consolidation by category](#)

**Include row or column labels** In the **Consolidate** dialog box, under **Use labels in**, make sure you selected the **Top row** or **Left column** check box, or both. And make sure you included corresponding labels in the source ranges.

**Check for identical category labels** Make sure you entered category labels with identical spelling and capitalization in all source areas. For example, labels Annual Avg. and Annual Average are different and will not consolidate.

**Check for unique categories** Make sure any categories that you don't want to consolidate have unique labels that appear in only one source range.

[Show All](#)

# About Goal Seek

Goal Seek is part of a suite of commands sometimes called [what-if analysis](#) tools. When you know the desired result of a single [formula](#) but not the input value the formula needs to determine the result, you can use the Goal Seek feature available by clicking **Goal Seek** on the **Tools** menu. When [goal seeking](#), Microsoft Excel varies the value in one specific cell until a formula that's dependent on that cell returns the result you want.

The value in cell B4 is the result of the formula =PMT(B3/12,B2,B1).

	A	B
1	Loan Amount	\$ 100,000
2	Term in Months	180
3	Interest Rate	7.02%
4	Payment	(\$900.00)

Goal seek to determine the interest rate in cell B3 based on the payment in cell B4.

For example, use Goal Seek to change the interest rate in cell B3 incrementally until the payment value in B4 equals \$900.00.

[Show All](#)

# Adjust the value of a cell to get a specific result for another cell

1. On the **Tools** menu, click **Goal Seek**.
2. In the **Set cell** box, enter the reference for the cell that contains the [formula](#) you want to resolve.
3. In the **To value** box, type the result you want.
4. In the **By changing cell** box, enter the reference for the cell that contains the value you want to adjust. This cell must be referenced by the formula in the cell you specified in the **Set cell** box.
5. Click **OK**.

[Show All](#)

# About data tables

Data tables are part of a suite of commands sometimes called [what-if analysis](#) tools. A data table is a range of cells that shows how changing certain values in your [formulas](#) affects the results of the formulas. Data tables provide a shortcut for calculating multiple versions in one operation and a way to view and compare the results of all of the different variations together on your worksheet.

**One-variable data tables** For example, use a one-variable data table if you want to see how different interest rates affect a monthly mortgage payment. In the following example, cell D2 contains the payment formula, =PMT(B3/12,B4,-B5), which refers to the input cell B3.

	A	B	C	D
1	<b>Mortgage Loan Analysis</b>			<b>Payments</b>
2	Down Payment	None		\$ 672.68
3	Interest Rate	9.50%	9.00%	\$ 643.70
4	Term (months)	360	9.25%	\$ 658.14
5	Loan Amount	\$80,000	9.50%	\$ 672.68

Input cell

List of values that Excel substitutes in the input cell, B3.

**Two-variable data tables** A two-variable data table can show how different interest rates and loan terms will affect the mortgage payment. In the following example, cell C2 contains the payment formula, =PMT(B3/12,B4,-B5), which uses two input cells, B3 and B4.

	A	B	C	D	E
1	<b>Mortgage Loan Analysis</b>				
2	Down Payment	None	\$ 672.68	180	360
3	Interest Rate	9.50%	9.00%	\$811.41	\$643.70
4	Term (months)	360	9.25%	\$823.35	\$658.14
5	Loan Amount	\$80,000	9.50%	\$835.38	\$672.68

Column input cell

List of values that Excel substitutes in the row input cell, B4.

Row input cell

List of values that Excel substitutes in the column input cell, B3.

**Data table calculations** Data tables recalculate whenever a worksheet is recalculated, even if they have not changed. To speed up calculation of a worksheet that contains a data table, you can change the **Calculation** options to automatically recalculate the worksheet but not data tables.

[Show All](#)

# Add a formula to a one-variable data table

[Formulas](#) used in a one-variable [data table](#) must refer to the same [input cell](#).

1. Do one of the following:
  - If the data table is column-oriented, type the new formula in a blank cell to the right of an existing formula in the top row of the table.
  - If the data table is row-oriented, type the new formula in a blank cell below an existing formula in the first column of the table.
2. Select the data table, including the column or row that contains the new formula.
3. On the **Data** menu, click **Table**.
4. Do one of the following:
  - If the data table is column-oriented, type the [cell reference](#) for the input cell in the **Column input cell** box.
  - If the data table is row-oriented, type the cell reference for the input cell in the **Row input cell** box.

[Show All](#)

# Clear a data table

## [Clear the entire table](#)

1. Select the entire [data table](#), including all [formulas](#), input values, resulting values, formats, and comments.
2. On the **Edit** menu, point to **Clear**, and then click **All**.

## [Clear resulting values from a data table](#)

**Note** Because resulting values are in an [array](#), you must clear all values. Unless you want to clear the entire [data table](#), make sure that you do not select the [formulas](#) and input values.

1. Select all resulting values in the data table.
2. On the **Edit** menu, point to **Clear**, and then click **Contents**.

[Show All](#)

# Convert resulting data table values to constant values

1. Select all resulting values in the [data table](#).
2. Click **Copy**  on the **Standard toolbar**, and select the upper-left cell of the [paste area](#).
3. Click the arrow next to **Paste** , click **Values**.

**Note** Because the resulting values are in an [array](#), you must convert all of the values to constant values.

[Show All](#)

# Create a one-variable data table

You must design one-variable [data tables](#) so that input values are listed either down a column (column-oriented) or across a row (row-oriented). [Formulas](#) used in a one-variable data table must refer to an [input cell](#).

1. Type the list of values you want to substitute in the input cell either down one column or across one row.
2. Do one of the following:
  - If the data table is column-oriented, type the formula in the row above the first value and one cell to the right of the column of values. Type any additional formulas to the right of the first formula.
  - If the data table is row-oriented, type the formula in the column to the left of the first value and one cell below the row of values. Type any additional formulas below the first formula.
3. Select the range of cells that contains the formulas and values you want to substitute.
4. On the **Data** menu, click **Table**.
5. Do one of the following:
  - If the data table is column-oriented, type the [cell reference](#) for the input cell in the **Column input cell** box.
  - If the data table is row-oriented, type the cell reference for the input cell in the **Row input cell** box.



You can add additional formulas to a one-variable data table.

[Show All](#)

# Create a two-variable data table

Two-variable [data tables](#) use only one [formula](#) with two lists of input values. The formula must refer to two different [input cells](#).

1. In a cell on the worksheet, enter the formula that refers to the two input cells.

In the example below, where the formula's starting values are entered in cells B3, B4, and B5, you would type the formula `=PMT(B3/12,B4,-B5)` into cell C2.

2. Type one list of input values in the same column, below the formula.

In the example below, you would type the different interest rates into cells C3, C4, and C5.

3. Type the second list in the same row, to the right of the formula.

In the example below, you would type the loan terms (in months) into cells D2 and E2.

4. Select the range of cells that contains the formula and both the row and column of values.

In the example below, you would select the range C2:E5.

5. On the **Data** menu, click **Table**.

6. In the **Row input cell** box, enter the reference to the input cell for the input values in the row.

In the example below, you would type cell B4 in the **Row input cell** box.

7. In the **Column input cell** box, enter the reference to the input cell for the input values in the column.

In the example below, you would type B3 in the **Column input cell** box.

8. Click **OK**.

### Example

A two-variable data table can show how different interest rates and loan terms will affect the mortgage payment. In the following example, cell C2 contains the payment formula,  $=PMT(B3/12,B4,-B5)$ , which uses two input cells, B3 and B4.

	A	B	C	D	E
1	<b>Mortgage Loan Analysis</b>				
2	Down Payment	None	\$ 672.68	180	360
3	Interest Rate	9.50%	9.00%	\$811.41	\$643.70
4	Term (months)	360	9.25%	\$823.35	\$658.14
5	Loan Amount	\$80,000	9.50%	\$835.38	\$672.68

Column input cell: B3

Row input cell: B4

List of values that Excel substitutes in the row input cell, B4: 9.00%, 9.25%, 9.50%

List of values that Excel substitutes in the column input cell, B3: 180, 360

[Show All](#)

# Speed up calculation of a worksheet that contains a data table

1. On the **Tools** menu, click **Options**, and then click the **Calculation** tab.
2. Click **Automatic except tables**.

**Note** When you select this calculation option, data tables are skipped when the rest of the workbook is recalculated. To manually recalculate your data tables, select the [formula](#) and press F9.

[Show All](#)

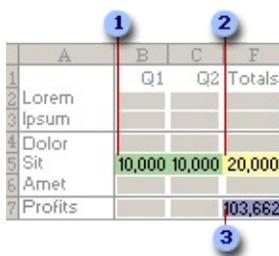
# About Solver

Solver is part of a suite of commands sometimes called [what-if analysis](#) tools. With Solver, you can find an optimal value for a [formula](#) in one cell— called the target cell— on a worksheet. Solver works with a group of cells that are related, either directly or indirectly, to the formula in the target cell. Solver adjusts the values in the changing cells you specify— called the adjustable cells— to produce the result you specify from the target cell formula. You can apply [constraints](#) to restrict the values Solver can use in the model, and the constraints can refer to other cells that affect the target cell formula.

Use Solver to determine the maximum or minimum value of one cell by changing other cells— for example, you can change the amount of your projected advertising budget and see the affect on your projected profit amount.

## [Example of a Solver evaluation](#)

In the following example, the level of advertising in each quarter affects the number of units sold, indirectly determining the amount of sales revenue, the associated expenses, and the profit. Solver can change the quarterly budgets for advertising (cells B5:C5), up to a total budget constraint of \$20,000 (cell F5), until the value for total profit reaches the maximum possible amount. The values in the adjustable cells are used to calculate the profit for each quarter, so they are related to the formula in target cell F7, =SUM(Q1 Profit:Q2 Profit).



	A	B	C	F
1		Q1	Q2	Totals
2	Lorem			
3	Ipsum			
4	Dolor			
5	Sit	10,000	10,000	20,000
6	Amet			
7	Profits			103,662

- 1 Adjustable cells
- 2 Constrained cell
- 3 Target cell

After Solver runs, the new values are as follows:

5	Sit	7,273	12,346	19,619
6	Amet			
7	Profits			105,447

[Solver sample worksheets](#)

Microsoft Excel includes a workbook, Solvsamp.xls in the Office\Samples folder, that demonstrates the types of problems you can solve.

You can use the sample worksheets in Solvsamp.xls to help you set up your problems. To use any of the six worksheets— Product Mix, Shipping Routes, Staff Scheduling, Maximizing Income, Portfolio of Securities, and Engineering Design— open the workbook, switch to the worksheet you want to use, and then click **Solver** on the **Tools** menu. The target cell, adjustable cells, and constraints for the worksheet are already specified.

[Algorithm and methods used by Solver](#)

The Microsoft Excel Solver tool uses the Generalized Reduced Gradient (GRG2) nonlinear optimization code developed by Leon Lasdon, University of Texas at Austin, and Allan Waren, Cleveland State University.

Linear and integer problems use the simplex method with bounds on the variables, and the branch-and-bound method, implemented by John Watson and Dan Fylstra, Frontline Systems, Inc. For more information on the internal solution process used by Solver, contact:

Frontline Systems, Inc.  
P.O. Box 4288  
Incline Village, NV 89450-4288  
(775) 831-0300  
Web site: <http://www.frontsys.com>  
Electronic mail: [info@frontsys.com](mailto:info@frontsys.com)

Portions of the Microsoft Excel Solver program code are copyright 1990, 1991, 1992, and 1995 by Frontline Systems, Inc. Portions are copyright 1989 by Optimal Methods, Inc.

[Show All](#)

# Add, change, or delete a constraint in Solver

1. On the **Tools** menu, click **Solver**.

If the **Solver** command is not available on the **Tools** menu, you need to load the Solver [add-in](#) program.

[How?](#)

1. On the **Tools** menu, click **Add-Ins**.
  2. If the [add-in](#) you want to use is not listed in the **Add-Ins available** box, click **Browse**, and then locate the add-in.
  3. In the **Add-Ins available** box, select the check box next to the add-in you want to load, and then click **OK**.
  4. If necessary, follow the instructions in the setup program.
2. Add or make changes to constraints.

[How?](#)

[Add a constraint](#)

1. In the **Solver Parameters** dialog box, under **Subject to the Constraints**, click **Add**.
2. In the **Cell Reference** box, enter the [cell reference](#) or [name](#) of the cell range for which you want to constrain the value.
3. Click the relationship (  $\leq$ ,  $=$ ,  $\geq$ , **Int**, or **Bin** ) that you want between the referenced cell and the [constraint](#). If you click **Int**, "integer" appears in the **Constraint** box. If you click **Bin**, "binary" appears in the **Constraint** box.
4. In the **Constraint** box, type a number, a cell reference or name, or a

[formula](#).

5. Do one of the following:
  - To accept the constraint and add another, click **Add**.
  - To accept the constraint and return to the **Solver Parameters** dialog box, click **OK**.

### Notes

- You can apply the **Int** and **Bin** relationships only in constraints on adjustable cells.
- When the **Assume Linear Model** check box on the **Solver Options** dialog box is selected, there is no limit on the number of constraints. For nonlinear problems, each adjustable cell can have up to 100 constraints, in addition to bounds and integer restrictions on the variables.



[Change or delete a constraint](#)

1. In the **Solver Parameters** dialog box, under **Subject to the Constraints**, click the [constraint](#) that you want to change or delete.
2. Click **Change** and then make your changes, or click **Delete**.

[Show All](#)

# Change how Solver finds solutions

1. On the **Tools** menu, click **Solver**.

If the **Solver** command is not available on the **Tools** menu, you need to install the Solver [add-in](#).

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
  2. If the [add-in](#) you want to use is not listed in the **Add-Ins available** box, click **Browse**, and then locate the add-in.
  3. In the **Add-Ins available** box, select the check box next to the add-in you want to load, and then click **OK**.
  4. If necessary, follow the instructions in the setup program.
2. In the **Solver Parameters** dialog box, click **Options**.
  3. In the **Solver Options** dialog box, set one or more of the following options:

## [Solution time and iterations](#)

1. In the **Max Time** box, type the number of seconds that you want to allow for the solution time.
2. In the **Iterations** box, enter the maximum number of iterations that you want to allow.

**Note** If the solution process reaches the maximum time or number of iterations before Solver finds a solution, Solver displays the **Show Trial Solution** dialog box.

## [Degree of precision](#)

- In the **Precision** box, type the degree of precision that you want—the smaller the number, the higher the precision.

[Integer tolerance](#)

- In the **Tolerance** box, type the percentage of error you want to allow in the solution.

[Degree of convergence](#)

- In the **Convergence** box, type the amount of relative change you want to allow in the last five iterations before Solver stops with a solution — the smaller the number, the less relative change that is allowed.

**Note** You can use the **Help** button on the dialog box to get more information about other options.

4. Click **OK**.
5. In the **Solver Parameters** dialog box, click **Solve** or **Close**.

[Show All](#)

# Create a Solver report

1. Define and solve a problem.

[How?](#)

1. On the **Tools** menu, click **Solver**.
2. If the **Solver** command is not available on the **Tools** menu, you need to install the Solver [add-in](#) program.

[How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. If the [add-in](#) you want to use is not listed in the **Add-Ins available** box, click **Browse**, and then locate the add-in.
3. In the **Add-Ins available** box, select the check box next to the add-in you want to load, and then click **OK**.
4. If necessary, follow the instructions in the setup program.
3. In the **Set Target Cell** box, enter a [cell reference](#) or [name](#) for the target cell. The target cell must contain a [formula](#).
4. Do one of the following:
  - To have the value of the target cell be as large as possible, click **Max**.
  - To have the value of the target cell be as small as possible, click **Min**.
  - To have the target cell be a certain value, click **Value of**, and then type the value in the box.
5. In the **By Changing Cells** box, enter a name or reference for each adjustable cell, separating nonadjacent references with commas. The adjustable cells must be related directly or indirectly to the target cell. You can specify up to 200 adjustable cells.

6. If you want to have Solver automatically propose the adjustable cells based on the target cell, click **Guess**.
7. In the **Subject to the Constraints** box, enter any [constraints](#) you want to apply.

[How?](#)

[Add a constraint](#)

1. In the **Solver Parameters** dialog box, under **Subject to the Constraints**, click **Add**.
2. In the **Cell Reference** box, enter the [cell reference](#) or [name](#) of the cell range for which you want to constrain the value.
3. Click the relationship (  $\leq$ ,  $=$ ,  $\geq$ , **Int**, or **Bin** ) that you want between the referenced cell and the [constraint](#). If you click **Int**, "integer" appears in the **Constraint** box. If you click **Bin**, "binary" appears in the **Constraint** box.
4. In the **Constraint** box, type a number, a cell reference or name, or a [formula](#).
5. Do one of the following:
  - To accept the constraint and add another, click **Add**.
  - To accept the constraint and return to the **Solver Parameters** dialog box, click **OK**.

## Notes

- You can apply the **Int** and **Bin** relationships only in constraints on adjustable cells.
- When the **Assume Linear Model** check box on the **Solver Options** dialog box is selected, there is no limit on the number of constraints. For nonlinear problems, each adjustable cell can have up to 100 constraints, in addition to bounds and integer

restrictions on the variables.

[Change or delete a constraint](#)

1. In the **Solver Parameters** dialog box, under **Subject to the Constraints**, click the [constraint](#) that you want to change or delete.
  2. Click **Change** and then make your changes, or click **Delete**.
8. Click **Solve** and do one of the following:
- To keep the solution values on the worksheet, click **Keep Solver Solution** in the **Solver Results** dialog box.
  - To restore the original data, click **Restore Original Values**.

[Tip](#)

You can interrupt the solution process by pressing ESC. Microsoft Excel recalculates the worksheet with the last values found for the adjustable cells.

2. If Solver finds a solution, you can click a report type in the **Reports** box, and then click **OK**.

The report is created on a new worksheet in your workbook.

[Show All](#)

# Define and solve a problem by using Solver

1. On the **Tools** menu, click **Solver**.
2. If the **Solver** command is not available on the **Tools** menu, you need to install the Solver [add-in](#) program.

[How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. If the [add-in](#) you want to use is not listed in the **Add-Ins available** box, click **Browse**, and then locate the add-in.
3. In the **Add-Ins available** box, select the check box next to the add-in you want to load, and then click **OK**.
4. If necessary, follow the instructions in the setup program.
3. In the **Set Target Cell** box, enter a [cell reference](#) or [name](#) for the target cell. The target cell must contain a [formula](#).
4. Do one of the following:
  - To have the value of the target cell be as large as possible, click **Max**.
  - To have the value of the target cell be as small as possible, click **Min**.
  - To have the target cell be a certain value, click **Value of**, and then type the value in the box.
5. In the **By Changing Cells** box, enter a name or reference for each adjustable cell, separating nonadjacent references with commas. The adjustable cells must be related directly or indirectly to the target cell. You can specify up to 200 adjustable cells.
6. If you want to have Solver automatically propose the adjustable cells based on the target cell, click **Guess**.

7. In the **Subject to the Constraints** box, enter any [constraints](#) you want to apply.

[How?](#)

[Add a constraint](#)

1. In the **Solver Parameters** dialog box, under **Subject to the Constraints**, click **Add**.
2. In the **Cell Reference** box, enter the [cell reference](#) or [name](#) of the cell range for which you want to constrain the value.
3. Click the relationship (  $\leq$ ,  $=$ ,  $\geq$ , **Int**, or **Bin** ) that you want between the referenced cell and the [constraint](#). If you click **Int**, "integer" appears in the **Constraint** box. If you click **Bin**, "binary" appears in the **Constraint** box.
4. In the **Constraint** box, type a number, a cell reference or name, or a [formula](#).
5. Do one of the following:
  - To accept the constraint and add another, click **Add**.
  - To accept the constraint and return to the **Solver Parameters** dialog box, click **OK**.

## Notes

- You can apply the **Int** and **Bin** relationships only in constraints on adjustable cells.
- When the **Assume Linear Model** check box on the **Solver Options** dialog box is selected, there is no limit on the number of constraints. For nonlinear problems, each adjustable cell can have up to 100 constraints, in addition to bounds and integer restrictions on the variables.

## [Change or delete a constraint](#)

1. In the **Solver Parameters** dialog box, under **Subject to the Constraints**, click the [constraint](#) that you want to change or delete.
  2. Click **Change** and then make your changes, or click **Delete**.
8. Click **Solve** and do one of the following:
- To keep the solution values on the worksheet, click **Keep Solver Solution** in the **Solver Results** dialog box.
  - To restore the original data, click **Restore Original Values**.

## [Tip](#)

You can interrupt the solution process by pressing ESC. Microsoft Excel recalculates the worksheet with the last values found for the adjustable cells.

# Load a Solver problem model

Before loading a problem, you must have previously saved a model.

1. On the **Tools** menu, click **Solver**.
2. In the **Solver Parameters** dialog box, click **Options**.
3. In the **Solver Options** dialog box, click **Load Model**.
4. Enter the reference for the entire range of cells that contains the problem model.

# Reapply the default Solver settings

1. On the **Tools** menu, click **Solver**.
2. To return the settings to their original values, click **Reset All**.

[Show All](#)

# Save a Solver problem model

1. Define and solve a problem.

[How?](#)

1. On the **Tools** menu, click **Solver**.

If the **Solver** command is not available on the **Tools** menu, you need to install the Solver [add-in](#) program.

[How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. If the [add-in](#) you want to use is not listed in the **Add-Ins available** box, click **Browse**, and then locate the add-in.
3. In the **Add-Ins available** box, select the check box next to the add-in you want to load, and then click **OK**.
4. If necessary, follow the instructions in the setup program.
2. In the **Set Target Cell** box, enter a [cell reference](#) or [name](#) for the target cell. The target cell must contain a [formula](#).
3. Do one of the following:
  - To have the value of the target cell be as large as possible, click **Max**.
  - To have the value of the target cell be as small as possible, click **Min**.
  - To have the target cell be a certain value, click **Value of**, and then type the value in the box.
4. In the **By Changing Cells** box, enter a name or reference for each adjustable cell, separating nonadjacent references with commas. The adjustable cells must be related directly or indirectly to the target cell. You can specify up to 200 adjustable cells.

If you want to have Solver automatically propose the adjustable cells based on the target cell, click **Guess**.

5. In the **Subject to the Constraints** box, enter any [constraints](#) you want to apply.

[How?](#)

[Add a constraint](#)

1. In the **Solver Parameters** dialog box, under **Subject to the Constraints**, click **Add**.
2. In the **Cell Reference** box, enter the [cell reference](#) or [name](#) of the cell range for which you want to constrain the value.
3. Click the relationship (  $\leq$ ,  $=$ ,  $\geq$ , **Int**, or **Bin** ) that you want between the referenced cell and the [constraint](#). If you click **Int**, "integer" appears in the **Constraint** box. If you click **Bin**, "binary" appears in the **Constraint** box.
4. In the **Constraint** box, type a number, a cell reference or name, or a [formula](#).
5. Do one of the following:
  - To accept the constraint and add another, click **Add**.
  - To accept the constraint and return to the **Solver Parameters** dialog box, click **OK**.

## Notes

- You can apply the **Int** and **Bin** relationships only in constraints on adjustable cells.
- When the **Assume Linear Model** check box on the **Solver Options** dialog box is selected, there is no limit on the number of constraints. For nonlinear problems, each adjustable cell can have up to 100 constraints, in addition to bounds and integer restrictions on the variables.

[Change or delete a constraint](#)

1. In the **Solver Parameters** dialog box, under **Subject to the Constraints**, click the [constraint](#) that you want to change or delete.
2. Click **Change** and then make your changes, or click **Delete**.
6. Click **Solve** and do one of the following:
  - To keep the solution values on the worksheet, click **Keep Solver Solution** in the **Solver Results** dialog box.
  - To restore the original data, click **Restore Original Values**.



You can interrupt the solution process by pressing ESC. Microsoft Excel recalculates the worksheet with the last values found for the adjustable cells.

2. On the **Tools** menu, click **Solver**.
3. Click **Options**.
4. Click **Save Model**.
5. Enter the reference for the first cell of a vertical range of empty cells in which you want to place the problem model.



You can save the last selections in the **Solver Parameters** dialog box with a worksheet by clicking **Save** on the **File** menu. You can also define more than one problem for a worksheet by using **Save Model** to save problems individually.

[Show All](#)

# Save adjustable cell values in Solver as a scenario

1. Define a problem.

[How?](#)

1. On the **Tools** menu, click **Solver**.

If the **Solver** command is not available on the **Tools** menu, you need to install the Solver [add-in](#) program.

[How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. If the [add-in](#) you want to use is not listed in the **Add-Ins available** box, click **Browse**, and then locate the add-in.
3. In the **Add-Ins available** box, select the check box next to the add-in you want to load, and then click **OK**.
4. If necessary, follow the instructions in the setup program.
2. In the **Set Target Cell** box, enter a [cell reference](#) or [name](#) for the target cell. The target cell must contain a [formula](#).
3. Do one of the following:
  - To have the value of the target cell be as large as possible, click **Max**.
  - To have the value of the target cell be as small as possible, click **Min**.
  - To have the target cell be a certain value, click **Value of**, and then type the value in the box.
4. In the **By Changing Cells** box, enter a name or reference for each adjustable cell, separating nonadjacent references with commas. The

adjustable cells must be related directly or indirectly to the target cell. You can specify up to 200 adjustable cells.

If you want to have Solver automatically propose the adjustable cells based on the target cell, click **Guess**.

5. In the **Subject to the Constraints** box, enter any [constraints](#) you want to apply.

[How?](#)

[Add a constraint](#)

1. In the **Solver Parameters** dialog box, under **Subject to the Constraints**, click **Add**.
2. In the **Cell Reference** box, enter the [cell reference](#) or [name](#) of the cell range for which you want to constrain the value.
3. Click the relationship (  $\leq$ ,  $=$ ,  $\geq$ , **Int**, or **Bin** ) that you want between the referenced cell and the [constraint](#). If you click **Int**, "integer" appears in the **Constraint** box. If you click **Bin**, "binary" appears in the **Constraint** box.
4. In the **Constraint** box, type a number, a cell reference or name, or a [formula](#).
5. Do one of the following:
  - To accept the constraint and add another, click **Add**.
  - To accept the constraint and return to the **Solver Parameters** dialog box, click **OK**.

## Notes

- You can apply the **Int** and **Bin** relationships only in constraints on adjustable cells.
- When the **Assume Linear Model** check box on the **Solver Options** dialog box is selected, there is no limit on the number of constraints. For nonlinear problems, each adjustable cell can have up to 100 constraints, in addition to bounds and integer restrictions on the variables.

## [Change or delete a constraint](#)

1. In the **Solver Parameters** dialog box, under **Subject to the Constraints**, click the [constraint](#) that you want to change or delete.
2. Click **Change** and then make your changes, or click **Delete**.
6. Click **Solve** and do one of the following:
  - To keep the solution values on the worksheet, click **Keep Solver Solution** in the **Solver Results** dialog box.
  - To restore the original data, click **Restore Original Values**.

## [Tip](#)

You can interrupt the solution process by pressing ESC. Microsoft Excel recalculates the worksheet with the last values found for the adjustable cells.

2. In the **Solver Results** dialog box, click **Save Scenario**.
3. In the **Scenario Name** box, type a name for the [scenario](#).

## [Tips](#)

- To display different sets of adjustable cell values that you've saved, display each scenario.
- To create a scenario without saving the **Solver** solution or without displaying the results on the worksheet, save the scenario in the **Solver Results** dialog box, and then click **Restore Original Values**.

[Show All](#)

# Step through Solver trial solutions

1. Define a problem.

[How?](#)

1. On the **Tools** menu, click **Solver**.
2. If the **Solver** command is not available on the **Tools** menu, you need to install the Solver [add-in](#) program.

[How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. If the [add-in](#) you want to use is not listed in the **Add-Ins available** box, click **Browse**, and then locate the add-in.
3. In the **Add-Ins available** box, select the check box next to the add-in you want to load, and then click **OK**.
4. If necessary, follow the instructions in the setup program.
3. In the **Set Target Cell** box, enter a [cell reference](#) or [name](#) for the target cell. The target cell must contain a [formula](#).
4. Do one of the following:
  - To have the value of the target cell be as large as possible, click **Max**.
  - To have the value of the target cell be as small as possible, click **Min**.
  - To have the target cell be a certain value, click **Value of**, and then type the value in the box.
5. In the **By Changing Cells** box, enter a name or reference for each adjustable cell, separating nonadjacent references with commas. The adjustable cells must be related directly or indirectly to the target cell. You can specify up to 200 adjustable cells.

6. If you want to have Solver automatically propose the adjustable cells based on the target cell, click **Guess**.
7. In the **Subject to the Constraints** box, enter any [constraints](#) you want to apply.

[How?](#)

[Add a constraint](#)

1. In the **Solver Parameters** dialog box, under **Subject to the Constraints**, click **Add**.
2. In the **Cell Reference** box, enter the [cell reference](#) or [name](#) of the cell range for which you want to constrain the value.
3. Click the relationship (  $\leq$ ,  $=$ ,  $\geq$ , **Int**, or **Bin** ) that you want between the referenced cell and the [constraint](#). If you click **Int**, "integer" appears in the **Constraint** box. If you click **Bin**, "binary" appears in the **Constraint** box.
4. In the **Constraint** box, type a number, a cell reference or name, or a [formula](#).
5. Do one of the following:
  - To accept the constraint and add another, click **Add**.
  - To accept the constraint and return to the **Solver Parameters** dialog box, click **OK**.

## Notes

- You can apply the **Int** and **Bin** relationships only in constraints on adjustable cells.
- When the **Assume Linear Model** check box on the **Solver Options** dialog box is selected, there is no limit on the number of constraints. For nonlinear problems, each adjustable cell can have up to 100 constraints, in addition to bounds and integer

restrictions on the variables.

[Change or delete a constraint](#)

1. In the **Solver Parameters** dialog box, under **Subject to the Constraints**, click the [constraint](#) that you want to change or delete.
2. Click **Change** and then make your changes, or click **Delete**.
8. Click **Solve** and do one of the following:
  - To keep the solution values on the worksheet, click **Keep Solver Solution** in the **Solver Results** dialog box.
  - To restore the original data, click **Restore Original Values**.

[Tip](#)

You can interrupt the solution process by pressing ESC. Microsoft Excel recalculates the worksheet with the last values found for the adjustable cells.

2. In the **Solver Parameters** dialog box, click **Options**.
3. In the **Solver Options** dialog box, select the **Show Iteration Results** check box to see the values of each trial solution, and then click **OK**.
4. In the **Solver Parameters** dialog box, click **Solve**.
5. In the **Show Trial Solution** dialog box, do one of the following:
  - To stop the solution process and display the **Solver Results** dialog box, click **Stop**.
  - To continue the solution process and display the next trial solution, click **Continue**.

[Show All](#)

# Troubleshoot Solver

[Solver stops before a solution is found.](#)

Solver might stop before reaching a solution for any of the following reasons:

- You interrupted the solution process.
- You selected **Show Iteration Results** in the **Solver Options** dialog box before you clicked **Solve**.
- You clicked **Stop** while stepping through iterations or when the maximum time or number of iterations was reached.
- You selected the **Assume Linear Model** check box in the **Solver Options** dialog box, but the problem is nonlinear.
- The value in the **Set Target Cell** you specified in the **Solver Parameters** dialog box is increasing or decreasing without limit.
- You need to allow Solver more time to find a solution. Adjust the **Max Time** or **Iterations** setting in the **Solver Options** dialog box.
- For problems with integer constraints, you need to decrease the **Tolerance** setting in the **Solver Options** dialog box so that Solver can find a better integer solution.
- For nonlinear problems, you need to decrease the **Convergence** setting in the **Solver Options** dialog box so that Solver can keep searching for a solution when the target cell value is changing slowly.
- You need to select the **Use Automatic Scaling** check box in the **Solver Options** dialog box because some input values are several orders of magnitude apart, or input and output values differ by several orders of magnitude.

When Solver stops, a completion message appears in the **Solver Results** dialog box. Click **Keep Solver Solution** or **Restore Original Values**, make the changes you want, and then try again.

[The adjustable cells and constraint or target cells differ in magnitude.](#)

When the typical values of the adjustable cells and the constraint cells or target cells differ from each other by more than a few orders of magnitude, select the

Use **Automatic Scaling** check box in the **Solver Options** dialog box. For nonlinear problems, before you click **Solve** in the **Solver Parameters** dialog box, make sure that the initial values of the adjustable cells are the same order of magnitude as you expect for the final values.

[I didn't get the solution I expected.](#)

For nonlinear problems, it can be helpful to try different starting values for the adjustable cells, especially if Solver has found a solution that is significantly different from what you expected. You can also reduce the solution time by setting the adjustable cells to values that you suspect are close to optimal.

For linear models (that is, when the **Assume Linear Model** check box on the **Solver Options** dialog box is selected), the initial values of the adjustable cells don't affect the final values or the solution time.

[The solution found by Solver was different from the previous result.](#)

Solver displays the following message, "Solver has converged to the current solution. All constraints are satisfied." The relative change in the target cell is less than the **Convergence** setting in the **Solver Options** dialog box for the last five trial solutions. If you provide a smaller value for the **Convergence** setting, Solver could try for a better solution but would take more solution time.

[Solver cannot reach an optimal solution.](#)

The following lists completion messages displayed by the Solver.

[Solver cannot improve the current solution. All constraints are satisfied.](#)

Only an approximate solution has been found, but the iterative process cannot find a better set of values than those displayed. Either further accuracy is not achievable, or the precision setting is too low. Try changing the precision setting in the **Solver Options** dialog box to a larger number, and then run the problem again.

[Stop chosen when the maximum time limit was reached.](#)

The maximum amount of time has elapsed without finding a satisfactory solution. To save the values found so far and also save future recalculation time, click **Keep Solver Solution** or **Save Scenario**.

[Stop chosen when the maximum iteration limit was reached.](#)

The maximum number of iterations has been reached without finding a satisfactory solution. Increasing the number of iterations might help, but you should examine the final values for insights into the problem. To save the values found so far and also save future recalculation time, click **Keep Solver Solution** or **Save Scenario**.

[The Set Target Cell values do not converge.](#)

The value for the target cell is increasing (or decreasing) without bound, even though all constraints are satisfied. You might have omitted one or more constraints in setting up the problem. Check the current worksheet values to see how the solution is diverging, check the constraints, and then run the problem again.

[Solver could not find a feasible solution.](#)

Solver could not find a trial solution that satisfies all constraints within the precision setting. It is likely that the constraints are inconsistent. Examine the worksheet for a possible mistake in the constraint formulas or in the choice of constraints.

[Solver stopped at user's request.](#)

You clicked **Stop** in the **Show Trial Solution** dialog box, either after interrupting the solution process or when stepping through trial solutions.

[The conditions for Assume Linear Model are not satisfied.](#)

You selected the **Assume linear model** check box, but the final calculations in Solver yield values that do not agree with the linear model. The solution is not valid for the actual worksheet formulas. To check whether the problem is nonlinear, select the **Use automatic scaling** check box, and run the problem

again. If you see this message again, clear the **Assume linear model** check box, and then run the problem again.

[Solver encountered an error value in a target or constraint cell.](#)

One or more formulas yielded an error value on the latest calculation. Find the target or constraint cell that contains the error, and change its formula to yield an appropriate numeric value.

You typed an invalid name or formula in the **Add Constraint** or **Change Constraint** dialog box, or you typed "integer" or "binary" in the **Constraint** box. To constrain a value to an integer, click **Int** in the list of comparison operators. To set a binary constraint, click **Bin**.

[There is not enough memory available to solve the problem.](#)

Microsoft Excel couldn't allocate the memory needed by Solver. Close some files or programs and try again.

[Another Microsoft Excel instance is using SOLVER.DLL.](#)

More than one Microsoft Excel session is running, and one session is already using Solver.dll. Solver.dll can be used in only one session at a time.

[Show All](#)

# About scenarios

Scenarios are part of a suite of commands sometimes called [what-if analysis](#) tools. A scenario is a set of values that Microsoft Excel saves and can substitute automatically in your worksheet. You can use scenarios to forecast the outcome of a worksheet model. You can create and save different groups of values on a worksheet and then switch to any of these new scenarios to view different results.

**Creating scenarios** For example, if you want to create a budget but are uncertain of your revenue, you can define different values for the revenue and then switch between the scenarios to perform what-if analyses.

	A	B
1	Gross Revenue	\$50,000
2	Cost of Goods Sold	\$13,200
3	Gross Profit	\$36,800

In the example above, you could name the scenario Worst Case, set the value in cell B1 to \$50,000, and set the value in cell B2 to \$13,200.

	A	B
1	Gross Revenue	\$150,000
2	Cost of Goods Sold	\$26,000
3	Gross Profit	\$124,000

You could name the second scenario Best Case and change the values in B1 to \$150,000 and B2 to \$26,000.

**Scenario summary reports** To compare several scenarios, you can create a report that summarizes them on the same page. The report can list the scenarios side by side or summarize them in a [PivotTable report](#).

[Show All](#)

# Create a scenario

1. On the **Tools** menu, click **Scenarios**.
2. Click **Add**.
3. In the **Scenario name** box, type a name for the [scenario](#).
4. In the **Changing cells** box, enter the references for the cells that you want to change.

**Note** To preserve the original values for the changing cells, create a scenario that uses the original cell values before you create scenarios that change the values.

5. Under **Protection**, select the options you want.
6. Click **OK**.
7. In the **Scenario Values** dialog box, type the values you want for the changing cells.
8. To create the scenario, click **OK**.
9. If you want to create additional scenarios, click **Add** again, and then repeat the procedure. When you finish creating scenarios, click **OK**, and then click **Close** in the **Scenario Manager** dialog box.

[Show All](#)

# Create a scenario summary report

1. On the **Tools** menu, click **Scenarios**.
2. Click **Summary**.
3. Click **Scenario summary** or **Scenario PivotTable**.
4. In the **Result cells** box, enter the references for the cells that refer to cells whose values are changed by the [scenarios](#). Separate multiple references with commas.

**Note** You don't need result cells to generate a scenario summary report, but you do need them for a scenario [PivotTable report](#).

[Show All](#)

# Delete a scenario

1. On the **Tools** menu, click **Scenarios**.
2. Click the name of the [scenario](#) you want to delete, and then click **Delete**.

[Show All](#)

# Display a scenario

When you display a [scenario](#), you change the values of the cells saved as part of that scenario.

1. On the **Tools** menu, click **Scenarios**.
2. Click the name of the scenario you want to display.
3. Click **Show**.

[Show All](#)

# Edit a scenario

If you keep the original name of a [scenario](#) after you make changes to it, the new values for changing cells replace the values in the original scenario.

1. On the **Tools** menu, click **Scenarios**.
2. Click the name of the scenario you want to edit, and then click **Edit**.
3. Make the changes you want.
4. In the **Scenario Values** dialog box, type the values you want for the changing cells.
5. Do one of the following:
  - To save the changes, click **OK**.
  - To return to the **Scenario Manager** dialog box without changing the current scenario, click **Cancel**.

[Show All](#)

# Merge scenarios from another worksheet

It is easier to merge [scenarios](#) when all [what-if](#) models on the worksheets are identical. All changing cells on the source worksheet must refer to the corresponding changing cells on the active worksheet. Microsoft Excel copies all scenarios on the source sheet to the active worksheet.

1. Open all of the workbooks that contain the scenarios you want to merge.
2. Switch to the worksheet where you want to merge the scenarios.
3. On the **Tools** menu, click **Scenarios**.
4. Click **Merge**.
5. In the **Book** box, click a workbook name.
6. In the **Sheet** box, click the name of a worksheet that contains the scenarios you want to merge, and then click **OK**.
7. Repeat this process if you want to merge scenarios from more worksheets.

[Show All](#)

# Prevent changes to a scenario

1. On the **Tools** menu, click **Scenarios**.
2. In the **Scenarios** box, click the name of the [scenario](#).
3. Click **Edit**.
4. Do one of the following:
  - To prevent others from making changes to your scenarios, select the **Prevent changes** check box.
  - To remove a scenario from the list in the **Scenario Manager** dialog box, select the **Hide** check box.
5. Click **OK**.
6. In the **Scenario Values** dialog box, click **OK**, and then click **Close**.
7. On the **Tools** menu, point to **Protection**, and then click **Protect Sheet**.
8. Select the **Protect worksheet and contents of locked cells** check box, and make sure the **Edit scenarios** check box is clear.

**Note** You can add scenarios when a worksheet is protected, but you cannot edit or delete existing scenarios while a worksheet is protected unless you clear the **Prevent changes** check box in the **Edit Scenario** dialog box. You can still edit the values in changing cells on the worksheet unless the cells are locked.

[Show All](#)

# About forms



Microsoft Excel works with several types of forms. You can use forms provided with Excel to enter data in ranges, [lists](#), or other databases. You can design forms to print out or use online, including forms you open in Excel and forms you put on Web pages. To capture and organize the data on your online forms, you can use an Excel workbook or another program or database.

**Built-in forms for Excel data** For ranges or lists on Excel worksheets, you can display a data form that lets you enter new data, find rows based on cell contents, update the data, and delete rows from the range or list.

**Ready-made forms for common business tasks** Excel provides Spreadsheet Solutions: ready-made templates to help you create expense statements, invoices, and purchase orders. These templates also allow you to store the information entered into the forms in a database.

**Designing your own form in Excel** You can create Excel forms to print out or use online. Online forms can include [controls](#), such as option buttons and dropdown lists. You can protect an online form so that only certain cells are available for data entry, and you can validate the data to make sure users enter only the types of data the form calls for. You can make online forms available from within Excel, on Web pages, or from Microsoft [Visual Basic for Applications \(VBA\)](#) programs.

[Show All](#)

# About controls: when to use ActiveX or Forms toolbar controls



Payment

Check is enclosed

Bill me later

Send information about

Europe  North America

Far East  Africa

South America  Russia

Controls are graphic objects that you place on a form to display or enter data, perform an action, or make the form easier to read. These objects include text boxes, list boxes, option buttons, command buttons, and others. Controls offer users options to select or buttons to click that run [macros](#) or [Web scripts](#).

Microsoft Excel has two types of controls. [ActiveX controls](#) are appropriate for most situations, and work with both Microsoft [Visual Basic for Applications](#) (VBA) macros and Web scripts. **Forms** toolbar controls are compatible with earlier versions of Excel, beginning with Excel version 5.0, and can be used on XLM macro sheets.

[About ActiveX controls](#)

**When to use** Use an ActiveX control for most online forms, especially when you need to control different events that occur when the control is used. For example, you can add a list box control to a worksheet, and then write a macro to perform different actions depending on which choice a user selects from the list.

**What the controls can do** ActiveX controls are similar to controls in programming languages such as Microsoft Visual Basic, and are the same controls you can add to custom forms in the Visual Basic Editor. When you add an ActiveX control to a worksheet, you write macro code that refers to the ID number of the control, as opposed to assigning a macro to run when the control is clicked. When a user of the form uses the control, your code then runs to process any events that occur.

**What the controls can't do** You cannot use ActiveX controls on chart sheets or XLM macro sheets. For these situations, use the **Forms** toolbar controls. If you want to attach a macro to run directly from a control, use a **Forms** toolbar control.

**ActiveX controls in custom solutions** ActiveX controls have properties you can customize. For example, you can specify the appearance of the pointer when a user points to the control. You can write macros that respond to events associated with ActiveX controls. You can use ActiveX controls both on Excel forms and on forms and dialog boxes in VBA programs.

**ActiveX controls on Web pages** For Excel forms and data that you plan to put on Web pages, you can include ActiveX controls and write Web scripts (rather than macro code) to run when the controls are used in a Web browser. You can write the scripts in [VBScript](#) or [JavaScript](#) from within Excel by using the Microsoft Script Editor.

**Where to find the controls** The **Control Toolbox** is a toolbar that provides ActiveX controls. Some of these controls look the same as the **Forms** toolbar controls, and others, such as toggle buttons and image controls, are not available on the **Forms** toolbar. The **Control Toolbox** also contains custom ActiveX controls installed by other programs, such as the active movie control installed by Microsoft Internet Explorer.

 [About Forms toolbar controls](#)

**When to use** Use a control from the **Forms** toolbar when you want to record all of the macros for a form but do not want to write or modify any macro code in VBA. You can also use **Forms** toolbar controls on chart sheets.

**What the controls can do** These controls are designed for use on worksheet forms that other users fill in from Microsoft Excel. You can attach an existing macro to a control or write or record a new macro. When a user of the form clicks the control, the control then runs the macro.

**What the controls can't do** **Forms** toolbar controls can't be used to control events, in the way that ActiveX controls can. In addition, **Forms** toolbar controls can't be used to run Web scripts on Web pages.

**Where to find the controls** Forms toolbar controls are located on the **Forms** toolbar.

[Show All](#)

# About data entry forms

Microsoft Excel provides the following types of forms to help you enter data in a worksheet range.

## [Data forms](#)

Excel can generate a built-in [data form](#) for your range. The data form displays all of your column labels in a single dialog box, with a blank space beside each label for you to fill in data for the column. You can enter new data, find rows based on cell contents, update existing data, and delete rows from the range.

Use a data form when a simple form listing the columns is sufficient and you don't need more sophisticated or custom features. A data form can make data entry easier than typing across the columns when you have a wide range with more columns than will fit on the screen at one time.

## [Worksheet forms](#)

If you need a sophisticated or specialized data entry form, you can create a worksheet or [template](#) to use as a form and then customize the worksheet form to meet your needs. For example, you might create an expense report form for people to fill out online or in printed form.

Use this method when you want complete flexibility to customize your form. Worksheet forms are particularly useful when you want individual printable copies of your forms. You can develop a data entry application using the [Microsoft Visual Basic Editor](#) to keep the data from the forms in an Excel range.

[Show All](#)

# Add a Forms toolbar control

1. If you want the control to run an existing macro, open the workbook that contains the macro.
2. Click the worksheet where you want to add the control.
3. Display the **Forms** toolbar: point to **Toolbars** on the **View** menu, and then click **Forms**.
4. Click the the control you want to add.
5. Click on the worksheet at the location where you want to place the control.
6. Drag the control to the size you want.
7. Do one of the following:

## [Assign an existing macro](#)

- If you're adding a button, select the macro you want the button to run in the **Macro name** box.
- If you're adding a control other than a button, right-click the control, and then click **Assign Macro** on the shortcut menu. Select the macro you want.

## [Record or write a new macro](#)

- If the macro does not exist, click **Record** in the **Assign Macro** dialog box to record a new macro, or click **New** to open a Microsoft [Visual Basic for Applications \(VBA\)](#) module in which you can write the macro.

8. Right-click the control, click **Edit Text**, and then add the text for the control. When you're finished, right-click the control and then click **Exit Edit Text**.
9. Set control properties.

## [How?](#)

Right-click the [control](#), click **Format Control**, and then click the **Control** tab. Labels and buttons don't have properties.

 **Label** Text that provides information about a control or the worksheet or form.

 **Edit box** Unavailable in Microsoft Excel workbooks. This control is provided to allow you to work with Excel version 5.0 dialog sheets.

 **Group box** Groups related controls, such as option buttons or check boxes.

 [Group box properties](#)

**3D shading** Displays the group box with a 3-dimensional shaded effect.

 **Button** Runs a macro when clicked.

 **Check box** Turns an option on or off. You can check more than one check box at a time on a sheet or in a group.

 [Check box properties](#)

**Value** Determines the state of the check box, that is, whether it is selected (**Checked**), cleared (**Unchecked**), or neither (**Mixed**).

**Cell link** A cell that returns the state of the check box. If the check box is selected, the cell in the **Cell link** box contains TRUE. If the check box is cleared, the cell contains FALSE. If the check box state is mixed, the cell contains #N/A. If the linked cell is empty, Excel interprets the check box state as FALSE.

**3D shading** Displays the check box with a 3-dimensional shaded effect.

 **Option button** Selects one of a group of options contained in a group box. Use option buttons to allow only one of several possibilities.

 [Option button properties](#)

**Value** Determines the initial state of the option button, that is, whether it is selected (**Checked**) or cleared (**Unchecked**).

**Cell Link** Returns the number of the selected option button in the group of options (the first option button is number 1). Use the same **Cell Link** cell for all options in a group. You can then use the returned number in a formula or a macro to respond to the selected option.

For example, if you create a personnel form with an option button labeled **Full-time** and another option button labeled **Part-time**, you could link the two option buttons to cell C1. The following formula displays "Full-time" if the first option button is selected or "Part-time" if the second option button is selected:

```
=IF(C1=1, "Full-time", "Part-time")
```

**3D shading** Displays the option button with a 3-dimensional shaded effect.

 **List box** Displays a list of items.

 [List box properties](#)

**Input range** Reference to the range containing the values to display in the list box.

**Cell link** Returns the number of the item that's selected in the list box (the first item in the list is 1). You can use this number in a formula or macro to return the actual item from the input range.

For example, if a list box is linked to cell C1 and the input range for the list is D10:D15, the following formula returns the value from range D10:D15 based on the selection in the list:

```
=INDEX(D10:D15, C1)
```

**Selection type** Specifies how items can be selected in the list. If you set the selection type to **Multi** or **Extend**, the cell specified in the **Cell link** box is ignored.

**3D shading** Displays the list box with a 3-dimensional shaded effect.

 **Combo box** A drop-down list box. The item that is selected in the list box appears in the text box.

 [Combo box properties](#)

**Input range** Reference to the range containing the values to display in the drop-down list.

**Cell link** Returns the number of the item that's selected in the combo box (the first item in the list is 1). You can use this number in a formula or macro to return the actual item from the input range.

For example, if a combo box is linked to cell C1 and the input range for the list is D10:D15, the following formula returns the value from range D10:D15 based on the selection in the list:

```
=INDEX(D10:D15, C1)
```

**Drop-down lines** Specifies the number of lines to display in the drop-down list.

**3D shading** Displays the combo box with a 3-dimensional shaded effect.

 **Combination list-edit** Unavailable in Excel workbooks. This control is provided to allow you to work with Excel version 5.0 dialog sheets.

 **Combination drop-down edit** Unavailable in Excel workbooks. This control is provided to allow you to work with Excel version 5.0 dialog sheets.

 **Scroll bar** Scrolls through a range of values when you click the scroll arrows or when you drag a scroll box. You can move through a page of values by clicking between the scroll box and a scroll arrow.

 [Scroll bar properties](#)

**Current value** The relative position of the scroll box within the scroll bar.

**Minimum value** The position of the scroll box closest to the top of a vertical scroll bar or the left end of a horizontal scroll bar.

**Maximum value** The position of the scroll box farthest from the top of a vertical scroll bar or the right end of a horizontal scroll bar.

**Incremental change** The amount the scroll box moves when the arrow at either end of the scroll bar is clicked.

**Page change** The amount the scroll box moves when you click between the scroll box and one of the scroll arrows.

**Cell link** Returns the current position of the scroll box. This number can be used in a formula or macro to respond to the position of the scroll box.

**3D shading** Displays the scroll bar with a 3-dimensional shaded effect.

 **Spinner** Increases or decreases a value. To increase the value, click the up arrow; to decrease the value, click the down arrow.

 [Spinner properties](#)

**Current value** The relative position of the spinner within the range of allowed values.

**Minimum value** The lowest value allowed for the spinner.

**Maximum value** The highest value allowed for the spinner.

**Incremental change** The amount the spinner increases or decreases when the arrows are clicked.

**Cell link** Returns the current position of the spinner. This number can be used in a formula or macro to return the actual value you want selected by the spinner.

**3D shading** Displays the spinner with a 3-dimensional shaded effect.

 [Tip](#)

A control on a worksheet can run a macro only when the worksheet is active. If you want a button that's available from any workbook or worksheet, you can assign a macro to run from a toolbar button.

[Show All](#)

# Add an ActiveX control

1. Open the worksheet where you want to add an [ActiveX control](#).
2. Display the **Control Toolbox**: point to **Toolbars** on the **View** menu, and then click **Control Toolbox**.
3. Click the control you want to add.
4. Click on the worksheet at the location where you want to place the control.
5. Drag the control to the size you want.
6. If you're adding a check box, text box, command button, option button, list box, combo box, toggle button, or label, enter the text you want to appear on the control.

## [How?](#)

1. Right-click the control.
  2. Point to the name of the object on the shortcut menu (for example, **CheckBox Object**).
  3. Click **Edit**.
  4. Edit and type the text.
  5. When you're finished, press ESC.
7. Set the properties you want for the control: right-click the control, and then click **Properties** on the shortcut menu.

For information about the properties, press F1 in the **Properties** dialog box to display the Microsoft Visual Basic Help for Microsoft Forms.

8. Do one of the following:

## [Add Visual Basic macro code for a control to be used in Excel](#)

1. Right-click the control, and then click **View Code** on the shortcut menu.
2. In the Visual Basic Editor, write your macro code.

For information about writing macro code, see Visual Basic Help.

3. To quit, click **Close and Return to Microsoft Excel** on the **File** menu.

[Add a Web script for a control to be used on a Web page](#)

1. Click the worksheet anywhere within the data that will go on the Web page.
2. On the **Tools** menu, point to **Macro**, and then click **Microsoft Script Editor**.
3. In the Script Editor, write your script, using the control ID to handle events for the control.

For information about developing Web scripts, click the option you want on the **Help** menu in the Script Editor window.

4. To return to Excel from the Script Editor, click **Exit** on the **File** menu.
9. To quit design mode and enable the ActiveX control, click **Exit Design Mode** .

[Show All](#)

# Change a control

Microsoft Excel has two different types of [controls](#) that you modify in different ways: [ActiveX controls](#), and controls from the **Forms** toolbar.

1. Determine which type of control you have: right-click the control you want to change.

If no shortcut menu appears, or the shortcut menu contains the command **Properties**, the control is an ActiveX control.

If the shortcut menu contains the command **Assign Macro**, the control is a **Forms** toolbar control.

2. Based on the type of control you are working with, do one of the following:

## [Modify an ActiveX control](#)

1. Display the **Control Toolbox**: point to **Toolbars** on the **View** menu, and then click **Control Toolbox**.
2. Click **Design Mode** .
3. Right-click the control, and then click **Properties** on the shortcut menu.

For more information about the properties, press F1 in the **Properties** dialog box to display the Microsoft Visual Basic Help for Microsoft Forms.

4. When you finish modifying the control, click **Exit Design Mode** .

## [Modify a Forms toolbar control](#)

1. Click **Format Control** on the shortcut menu, and then click the **Control** tab.
2. Set control properties.

 [How?](#)

Right-click the [control](#), click **Format Control**, and then click the **Control** tab.

The following lists the Forms toolbar controls and their properties. Labels and buttons don't have properties.

 **Label** Text that provides information about a control or the worksheet or form.

 **Edit box** Unavailable in Microsoft Excel workbooks. This control is provided to allow you to work with Excel version 5.0 dialog sheets.

 **Group box** Groups related controls, such as option buttons or check boxes.

 [Group box properties](#)

**3D shading** Displays the group box with a 3-dimensional shaded effect.

 **Button** Runs a macro when clicked.

 **Check box** Turns an option on or off. You can check more than one check box at a time on a sheet or in a group.

 [Check box properties](#)

**Value** Determines the state of the check box, that is, whether it is selected (**Checked**), cleared (**Unchecked**), or neither (**Mixed**).

**Cell link** A cell that returns the state of the check box. If the check box is selected, the cell in the **Cell link** box contains TRUE. If the check box is cleared, the cell contains FALSE. If the check box state is mixed, the cell contains #N/A. If the linked cell is empty, Excel interprets the check box state as FALSE.

**3D shading** Displays the check box with a 3-dimensional shaded effect.

 **Option button** Selects one of a group of options contained in a group box. Use option buttons to allow only one of several possibilities.

 [Option button properties](#)

**Value** Determines the initial state of the option button, that is, whether it is selected (**Checked**) or cleared (**Unchecked**).

**Cell Link** Returns the number of the selected option button in the group of options (the first option button is number 1). Use the same **Cell Link** cell for all options in a group. You can then use the returned number in a formula or a macro to respond to the selected option.

For example, if you create a personnel form with an option button labeled **Full-time** and another option button labeled **Part-time**, you could link the two option buttons to cell C1. The following formula displays "Full-time" if the first option button is selected or "Part-time" if the second option button is selected:

```
=IF(C1=1, "Full-time", "Part-time")
```

**3D shading** Displays the option button with a 3-dimensional shaded effect.

 **List box** Displays a list of items.

 [List box properties](#)

**Input range** Reference to the range containing the values to display in the list box.

**Cell link** Returns the number of the item that's selected in the list box (the first item in the list is 1). You can use this number in a formula or macro to return the actual item from the input range.

For example, if a list box is linked to cell C1 and the input range for

the list is D10:D15, the following formula returns the value from range D10:D15 based on the selection in the list:

```
=INDEX(D10:D15, C1)
```

**Selection type** Specifies how items can be selected in the list. If you set the selection type to **Multi** or **Extend**, the cell specified in the **Cell link** box is ignored.

**3D shading** Displays the list box with a 3-dimensional shaded effect.

 **Combo box** A drop-down list box. The item that is selected in the list box appears in the text box.

 [Combo box properties](#)

**Input range** Reference to the range containing the values to display in the drop-down list.

**Cell link** Returns the number of the item that's selected in the combo box (the first item in the list is 1). You can use this number in a formula or macro to return the actual item from the input range.

For example, if a combo box is linked to cell C1 and the input range for the list is D10:D15, the following formula returns the value from range D10:D15 based on the selection in the list:

```
=INDEX(D10:D15, C1)
```

**Drop-down lines** Specifies the number of lines to display in the drop-down list.

**3D shading** Displays the combo box with a 3-dimensional shaded effect.

 **Combination list-edit** Unavailable in Excel workbooks. This control is provided to allow you to work with Excel version 5.0 dialog sheets.

 **Combination drop-down edit** Unavailable in Excel workbooks.

This control is provided to allow you to work with Excel version 5.0 dialog sheets.

 **Scroll bar** Scrolls through a range of values when you click the scroll arrows or when you drag a scroll box. You can move through a page of values by clicking between the scroll box and a scroll arrow.

 [Scroll bar properties](#)

**Current value** The relative position of the scroll box within the scroll bar.

**Minimum value** The position of the scroll box closest to the top of a vertical scroll bar or the left end of a horizontal scroll bar.

**Maximum value** The position of the scroll box farthest from the top of a vertical scroll bar or the right end of a horizontal scroll bar.

**Incremental change** The amount the scroll box moves when the arrow at either end of the scroll bar is clicked.

**Page change** The amount the scroll box moves when you click between the scroll box and one of the scroll arrows.

**Cell link** Returns the current position of the scroll box. This number can be used in a formula or macro to respond to the position of the scroll box.

**3D shading** Displays the scroll bar with a 3-dimensional shaded effect.

 **Spinner** Increases or decreases a value. To increase the value, click the up arrow; to decrease the value, click the down arrow.

 [Spinner properties](#)

**Current value** The relative position of the spinner within the range of allowed values.

**Minimum value** The lowest value allowed for the spinner.

**Maximum value** The highest value allowed for the spinner.

**Incremental change** The amount the spinner increases or decreases when the arrows are clicked.

**Cell link** Returns the current position of the spinner. This number can be used in a formula or macro to return the actual value you want selected by the spinner.

**3D shading** Displays the spinner with a 3-dimensional shaded effect.

3. To remove the selection handles when you're finished modifying the control, click a cell on the worksheet.

[Show All](#)

# Create a dialog box

You can create a dialog box in Microsoft Excel either of two ways:

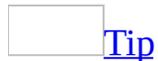
- Create a form on a worksheet and use [controls](#) to make the form look and work like a dialog box. Excel does not have a specialized tool for editing dialog boxes.
- Create the dialog box in Microsoft [Visual Basic for Applications \(VBA\)](#). For more information, see [Visual Basic Help](#).

[Show All](#)

# Create a macro for an ActiveX control

For more information about writing macros, see Microsoft [Visual Basic Help](#).

1. Display the **Control Toolbox**: point to **Toolbars** on the **View** menu, and then click **Control Toolbox**.
2. Click **Design Mode** .
3. Right-click the control, and then click **View Code** on the shortcut menu.
4. In the Visual Basic Editor, write a new macro or change the existing macro.
5. When you finish writing the macro, click **Close and Return to Microsoft Excel** on the **File** menu.
6. When you finish designing the control, click **Exit Design Mode** .



If you're designing a form for use on a Web page rather than in Microsoft Excel or a Visual Basic program, use a [Web script](#) instead of a macro to automate the control.

[Show All](#)

# Create an on-screen, printed, or Web form

1. Click **New** .
2. Delete any sheets you won't use: click each sheet tab, and then click **Delete Sheet** on the **Edit** menu.
3. Add the questions, labels, instructions, and other text you want to appear on the form.
4. Add formulas for any calculations you want on the form.
5. Format the form to look the way you want. The following types of Microsoft Excel formatting are particularly useful for forms:
  - Changing text fonts, colors, alignment, and wrapping
  - Changing cell size, colors, and borders
  - Hiding gridlines
  - Merging cells
  - Adding lines, graphics, and sheet backgrounds
6. Add the features you need to finish the type of form you're creating:

## [Printed form](#)

1. Preview the printed appearance.
2. Set print options.
3. Print the form.

## [Online form for use as a Web page](#)

1. Add controls such as check boxes and option buttons.
2. Create Web scripts to automate the controls.
3. Save the form as a Web page.

## [Online form for use in Excel](#)

1. Add controls such as check boxes and option buttons.
2. Add data validation rules.
3. Add data validation dropdown lists.

4. Protect areas you don't want changed.
5. Save the form as a template.
6. Make the template available over your network by saving it in a shared network folder.

[Online form for use in a Microsoft Visual Basic for Applications program.](#)

1. Add controls such as check boxes and option buttons.
2. Create macros to automate the controls.

[Show All](#)

# Move or resize a control

Microsoft Excel has two different types of [controls](#) that you move and resize in different ways: [ActiveX controls](#), and controls from the **Forms** toolbar.

1. Determine which type of control you have: right-click the control you want to change.

If no shortcut menu appears or the shortcut menu contains the command **Properties**, the control is an ActiveX control.

If the shortcut menu contains the command **Assign Macro**, the control is a **Forms** toolbar control.

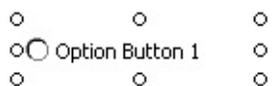
2. Based on the type of control you are working with, do one of the following:

## [Move or resize an ActiveX control](#)

1. Display the **Control Toolbox**: point to **Toolbars** on the **View** menu, and then click **Control Toolbox**.
2. Click **Design Mode** .
3. Do one or more of the following:

**Move the control** Drag it to another location. To align it with cell gridlines, hold down ALT while you drag the control.

**Resize the control** Drag one of the [sizing handles](#):



To retain the proportions of the control, hold down SHIFT while you drag a corner sizing handle.

**Set whether changes to the underlying cells affect the control** To change how the control is resized or moved when the cells underneath it are resized or moved, right-click the control, click **Format Control**,

and then click the **Properties** tab.

4. When you finish modifying the control, click **Exit Design Mode** .

### Move or resize a **Forms** toolbar control

1. Do one or more of the following:

**Move the control** Drag it to another location. To align it with cell gridlines, hold down ALT while you drag the control.

**Resize the control** Drag one of the [sizing handles](#):



To retain the proportions of the control, hold down SHIFT while you drag a corner sizing handle.

**Set whether changes to the underlying cells affect the control** To change how the control is resized or moved when the cells underneath it are resized or moved, right-click the control, click **Format Control**, click the **Properties** tab, and then click the option you want under **Object positioning**.

2. To remove the handles when you're finished modifying the control, click a cell on the worksheet.

[Show All](#)

# Types of controls and their properties

To determine whether a control is an [ActiveX control](#) or a **Forms** toolbar control, right-click the control. If no shortcut menu appears or the shortcut menu contains the command **Properties**, the control is an ActiveX control. If the shortcut menu contains the command **Assign Macro**, the control is a **Forms** toolbar control.

## [ActiveX controls](#)

To set the properties for ActiveX controls, and get more information about these controls and the properties available for each control, see [Visual Basic Help](#).

 **Check box** An option you can turn on or off by selecting or clearing it. You can have more than one check box checked on a sheet at a time.

 **Text box** A box in which you can type text.

 **Command button** A button that initiates an action when it is clicked.

 **Option button** A button used to select one option from a group of options.

 **List box** A box that contains a list of items.

 **Combo box** A text box with a drop-down list box. You can either select a choice from the list or type your own entry in the box.

 **Toggle button** A button that remains pressed in when clicked, and then releases when it is clicked again.

 **Spin button** A button that can be attached to a cell or a text box. To increase a value, click the up arrow; to decrease a value, click the down arrow.

 **Scroll bar** A control that scrolls through a range of values when you click the scroll arrows or when you drag the scroll box. You can move through a page of values by clicking between the scroll box and a scroll arrow.

 **Label** Text added to a worksheet or form to provide information about a control or the worksheet or form.

 **Image** A control that embeds a picture into a form.

 **More Controls** A list of additional ActiveX controls.

 [Forms toolbar controls](#)

To set the properties for an existing [control](#), right-click the control, click **Format Control**, and then click the **Control** tab. Labels and buttons don't have properties.

 **Label** Text that provides information about a control or the worksheet or form.

 **Edit box** Unavailable in Microsoft Excel workbooks. This control is provided to allow you to work with Excel version 5.0 dialog sheets.

 **Group box** Groups related controls, such as option buttons or check boxes.

 [Group box properties](#)

**3D shading** Displays the group box with a 3-dimensional shaded effect.

 **Button** Runs a macro when clicked.

 **Check box** Turns an option on or off. You can check more than one check box at a time on a sheet or in a group.

 [Check box properties](#)

**Value** Determines the state of the check box, that is, whether it is selected (**Checked**), cleared (**Unchecked**), or neither (**Mixed**).

**Cell link** A cell that returns the state of the check box. If the check box is selected, the cell in the **Cell link** box contains TRUE. If the check box is cleared, the cell contains FALSE. If the check box state is mixed, the cell contains #N/A. If the linked cell is empty, Excel interprets the check box state as FALSE.

**3D shading** Displays the check box with a 3-dimensional shaded effect.

 **Option button** Selects one of a group of options contained in a group box. Use option buttons to allow only one of several possibilities.

 [Option button properties](#)

**Value** Determines the initial state of the option button, that is, whether it is selected (**Checked**) or cleared (**Unchecked**).

**Cell Link** Returns the number of the selected option button in the group of options (the first option button is number 1). Use the same **Cell Link** cell for all options in a group. You can then use the returned number in a formula or a macro to respond to the selected option.

For example, if you create a personnel form with an option button labeled **Full-time** and another option button labeled **Part-time**, you could link the two option buttons to cell C1. The following formula displays "Full-time" if the first option button is selected or "Part-time" if the second option button is selected:

```
=IF(C1=1, "Full-time", "Part-time")
```

**3D shading** Displays the option button with a 3-dimensional shaded effect.

 **List box** Displays a list of items.

 [List box properties](#)

**Input range** Reference to the range containing the values to display in the list box.

**Cell link** Returns the number of the item that's selected in the list box (the first item in the list is 1). You can use this number in a formula or macro to return the actual item from the input range.

For example, if a list box is linked to cell C1 and the input range for the list is D10:D15, the following formula returns the value from range D10:D15 based on the selection in the list:

```
=INDEX(D10:D15, C1)
```

**Selection type** Specifies how items can be selected in the list. If you set the selection type to **Multi** or **Extend**, the cell specified in the **Cell link** box is ignored.

**3D shading** Displays the list box with a 3-dimensional shaded effect.

 **Combo box** A drop-down list box. The item that is selected in the list box appears in the text box.

 [Combo box properties](#)

**Input range** Reference to the range containing the values to display in the drop-down list.

**Cell link** Returns the number of the item that's selected in the combo box (the first item in the list is 1). You can use this number in a formula or macro to return the actual item from the input range.

For example, if a combo box is linked to cell C1 and the input range for the list is D10:D15, the following formula returns the value from range D10:D15 based on the selection in the list:

```
=INDEX(D10:D15, C1)
```

**Drop-down lines** Specifies the number of lines to display in the drop-down list.

**3D shading** Displays the combo box with a 3-dimensional shaded effect.

 **Combination list-edit** Unavailable in Microsoft Excel workbooks. This control is provided to allow you to work with Excel version 5.0 dialog sheets.

 **Combination drop-down edit** Unavailable in Microsoft Excel workbooks. This control is provided to allow you to work with Excel version 5.0 dialog sheets.

 **Scroll bar** Scrolls through a range of values when you click the scroll arrows or when you drag a scroll box. You can move through a page of values by clicking between the scroll box and a scroll arrow.

## [Scroll bar properties](#)

**Current value** The relative position of the scroll box within the scroll bar.

**Minimum value** The position of the scroll box closest to the top of a vertical scroll bar or the left end of a horizontal scroll bar.

**Maximum value** The position of the scroll box farthest from the top of a vertical scroll bar or the right end of a horizontal scroll bar.

**Incremental change** The amount the scroll box moves when the arrow at either end of the scroll bar is clicked.

**Page change** The amount the scroll box moves when you click between the scroll box and one of the scroll arrows.

**Cell link** Returns the current position of the scroll box. This number can be used in a formula or macro to respond to the position of the scroll box.

**3D shading** Displays the scroll bar with a 3-dimensional shaded effect.

 **Spinner** Increases or decreases a value. To increase the value, click the up arrow; to decrease the value, click the down arrow.

## [Spinner properties](#)

**Current value** The relative position of the spinner within the range of allowed values.

**Minimum value** The lowest value allowed for the spinner.

**Maximum value** The highest value allowed for the spinner.

**Incremental change** The amount the spinner increases or decreases when the arrows are clicked.

**Cell link** Returns the current position of the spinner. This number can be used in a formula or macro to return the actual value you want selected by the spinner.

**3D shading** Displays the spinner with a 3-dimensional shaded effect.

[Show All](#)

# Fill out an on-screen form

1. On the **File** menu, click **New**, and then click **General Templates**.
2. In the **Templates** dialog box, click the tab that contains the [template](#) for the form, and then double-click the template.

If the template for your form is not displayed on one of the tabs, make sure the template is stored in your **Templates** folder or one of its subfolders, or ask your system administrator how to find and use the form.

3. Enter the requested information, and follow any other instructions in the form.
4. Click **Save** .
5. In the **Save in** box, open the folder where you want to store your copy of the form.

If the form is used by others in your group and you want to save your copy of the form in a shared network location, ask your system administrator where you should save your copy of the form and whether you should follow any file naming conventions.

6. In the **File name** box, type a name for the form, and then click **Save**.

If the form has been designed to copy your entered data to a database, a message is displayed asking whether you want to add your data as a new database record. To add your data, click **Yes**.

[Show All](#)

# Troubleshoot controls

[The command I want is unavailable after I click a control.](#)

You clicked an [ActiveX control](#). To make the command available, click a cell on the worksheet.

[The \*\*More Controls\*\* button doesn't list the ActiveX controls I installed.](#)

When you install new [ActiveX controls](#), the setup program for the controls usually registers each control, making it available to use from Microsoft Excel. If the control doesn't appear in the list, you need to register it manually.

1. In the **Control Toolbox**, click **More Controls** .
2. At the bottom of the list, click **Register Custom Control**.
3. In the **Register Custom Control** dialog box, locate the folder that contains the control file (.ocx extension) or dynamic link library file (.dll extension) for the control you want to register.
4. Select the file for your control, and then click **Open**.

[When I right-click a control, nothing happens.](#)

If you right-click a control to display the shortcut menu and nothing happens, the control is an [ActiveX control](#) and not a control from the **Forms** toolbar. To display the shortcut menu for ActiveX controls— for example, to edit properties or view macro code— you must be in design mode. To switch to design mode, click **Design Mode**  in the **Control Toolbox**.

[When I click a control, I get a 'file not found' message.](#)

**The workbook with the macro may be unavailable** Usually when you click a control that's assigned to a [macro](#) in another workbook, Microsoft Excel opens the workbook and runs the macro. If Excel cannot find the file, the workbook that contains the macro may no longer exist or may have been moved or renamed.

**Assign a different macro** If you can't find the file, you can delete the control or assign a different macro to the control.

1. Open the workbook that contains the macro you want to assign to the control.
2. Click **Design Mode**  in the **Control Toolbox**.
3. Right-click the control, and then click **Assign Macro**.
4. In the **Macro Name** box, click the name of the macro.

[Show All](#)

# About calculation operators

Operators specify the type of calculation that you want to perform on the elements of a formula. Microsoft Excel includes four different types of calculation operators: arithmetic, comparison, text, and reference.

## [Types of operators](#)

**Arithmetic operators** To perform basic mathematical operations such as addition, subtraction, or multiplication; combine numbers; and produce numeric results, use the following arithmetic operators.

### **Arithmetic operator Meaning (Example)**

+ (plus sign)	Addition (3+3)
- (minus sign)	Subtraction (3-1) Negation (-1)
* (asterisk)	Multiplication (3*3)
/ (forward slash)	Division (3/3)
% (percent sign)	Percent (20%)
^ (caret)	Exponentiation (3^2)

**Comparison operators** You can compare two values with the following operators. When two values are compared by using these operators, the result is a logical value either TRUE or FALSE.

<b>Comparison operator</b>	<b>Meaning (Example)</b>
= (equal sign)	Equal to (A1=B1)
> (greater than sign)	Greater than (A1>B1)
< (less than sign)	Less than (A1<B1)
>= (greater than or equal to sign)	Greater than or equal to (A1>=B1)
<= (less than or equal to sign)	Less than or equal to (A1<=B1)
<> (not equal to sign)	Not equal to (A1<>B1)

**Text concatenation operator** Use the ampersand (&) to join, or concatenate,

one or more text strings to produce a single piece of text.

<b>Text operator</b>	<b>Meaning (Example)</b>
&	Connects, or concatenates, two values to produce one continuous (ampersand) text value ("North"&"wind")

**Reference operators** Combine ranges of cells for calculations with the following operators.

<b>Reference operator</b>	<b>Meaning (Example)</b>
: (colon)	Range operator, which produces one reference to all the cells between two references, including the two references (B5:B15)
, (comma)	Union operator, which combines multiple references into one reference (SUM(B5:B15,D5:D15))
(space)	Intersection operator, which produces one reference to cells common to the two references (B7:D7 C6:C8)

### [The order in which Excel performs operations in formulas](#)

Formulas calculate values in a specific order. A formula in Excel always begins with an equal sign (=). The equal sign tells Excel that the succeeding characters constitute a formula. Following the equal sign are the elements to be calculated (the operands), which are separated by calculation operators. Excel calculates the formula from left to right, according to a specific order for each operator in the formula.

### **Operator precedence**

If you combine several operators in a single formula, Excel performs the operations in the order shown in the following table. If a formula contains operators with the same precedence—for example, if a formula contains both a multiplication and division operator—Excel evaluates the operators from left to right.

<b>Operator</b>	<b>Description</b>
: (colon)	

(single space)

, (comma) Reference operators

– Negation (as in –1)

% Percent

^ Exponentiation

\* and / Multiplication and division

+ and – Addition and subtraction

& Connects two strings of text (concatenation)

= < > <= >= <> Comparison

## Use of parentheses

To change the order of evaluation, enclose in parentheses the part of the formula to be calculated first. For example, the following formula produces 11 because Excel calculates multiplication before addition. The formula multiplies 2 by 3 and then adds 5 to the result.

=5+2\*3

In contrast, if you use parentheses to change the syntax, Excel adds 5 and 2 together and then multiplies the result by 3 to produce 21.

=(5+2)\*3

In the example below, the parentheses around the first part of the formula force Excel to calculate B4+25 first and then divide the result by the sum of the values in cells D5, E5, and F5.

=(B4+25)/SUM(D5:F5)

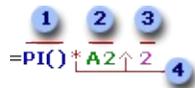
[Show All](#)

# About formulas

Formulas are equations that perform calculations on values in your worksheet. A formula starts with an equal sign (=). For example, the following formula multiplies 2 by 3 and then adds 5 to the result.

=5+2\*3

A formula can also contain any or all of the following: [functions](#), references, [operators](#), and [constants](#).



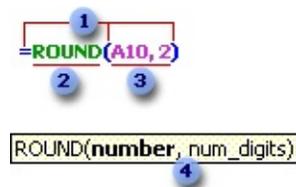
=PI()\*A2^2

Parts of a formula

- 1 **Functions:** The PI() function returns the value of pi: 3.142...
- 2 **References (or names):** A2 returns the value in cell A2.
- 3 **Constants:** Numbers or text values entered directly into a formula, such as 2.
- 4 **Operators:** The ^ (caret) operator raises a number to a power, and the \* (asterisk) operator multiplies.

[About functions in formulas](#)

Functions are predefined formulas that perform calculations by using specific values, called arguments, in a particular order, or structure. Functions can be used to perform simple or complex calculations. For example, the ROUND function rounds off a number in cell A10.



=ROUND(A10,2)

ROUND(number, num\_digits)

## Structure of a function

- 1 **Structure.** The structure of a function begins with an equal sign (=), followed by the function name, an opening parenthesis, the arguments for the function separated by commas, and a closing parenthesis.
- 2 **Function name.** For a list of available functions, click a cell and press SHIFT+F3.
- 3 **Arguments.** Arguments can be numbers, text, logical values such as TRUE or FALSE, [arrays](#), error values such as #N/A, or [cell references](#). The argument you designate must produce a valid value for that argument. Arguments can also be [constants](#), formulas, or other functions.
- 4 **Argument tooltip.** A tooltip with the syntax and arguments appears as you type the function. For example, type =ROUND( and the tooltip appears. Tooltips only appear for built-in functions.

**Entering formulas** When you create a formula that contains a function, the **Insert Function** dialog box helps you enter worksheet functions. As you enter a function into the formula, the **Insert Function** dialog box displays the name of the function, each of its arguments, a description of the function and each argument, the current result of the function, and the current result of the entire formula.

### [Nested functions](#)

In certain cases, you may need to use a function as one of the [arguments](#) of another function. For example, the following formula uses a nested AVERAGE function and compares the result with the value 50.

Nested functions

```
=IF(AVERAGE(F2:F5)>50,SUM(G2:G5),0)
```

**Valid returns** When a nested function is used as an argument, it must return the same type of value that the argument uses. For example, if the argument returns a TRUE or FALSE value, then the nested function must return a TRUE or FALSE. If it doesn't, Microsoft Excel displays a #VALUE! error value.

**Nesting level limits** A formula can contain up to seven levels of nested

functions. When Function B is used as an argument in Function A, Function B is a second-level function. For instance, the AVERAGE function and the SUM function are both second-level functions because they are arguments of the IF function. A function nested within the AVERAGE function would be a third-level function, and so on.

## [About references in formulas](#)

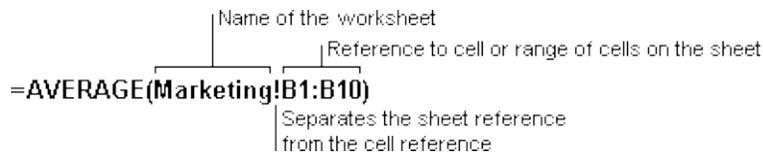
A reference identifies a cell or a range of cells on a worksheet and tells Microsoft Excel where to look for the values or data you want to use in a formula. With references, you can use data contained in different parts of a worksheet in one formula or use the value from one cell in several formulas. You can also refer to cells on other sheets in the same workbook, and to other workbooks. References to cells in other workbooks are called links.

## [The A1 reference style](#)

By default, Excel uses the A1 reference style, which refers to columns with letters (A through IV, for a total of 256 columns) and refers to rows with numbers (1 through 65536). These letters and numbers are called row and column headings. To refer to a cell, enter the column letter followed by the row number. For example, B2 refers to the cell at the intersection of column B and row 2.

<b>To refer to</b>	<b>Use</b>
The cell in column A and row 10	A10
The range of cells in column A and rows 10 through 20	A10:A20
The range of cells in row 15 and columns B through E	B15:E15
All cells in row 5	5:5
All cells in rows 5 through 10	5:10
All cells in column H	H:H
All cells in columns H through J	H:J
The range of cells in columns A through E and rows 10 through 20	A10:E20

**Reference to another worksheet** In the following example, the AVERAGE worksheet function calculates the average value for the range B1:B10 on the worksheet named Marketing in the same workbook.



Link to another worksheet in the same workbook

Note that the name of the worksheet and an exclamation point (!) precede the range reference.

## [The difference between relative and absolute references](#)

**Relative references** A relative cell reference in a formula, such as A1, is based on the relative position of the cell that contains the formula and the cell the reference refers to. If the position of the cell that contains the formula changes, the reference is changed. If you copy the formula across rows or down columns, the reference automatically adjusts. By default, new formulas use relative references. For example, if you copy a relative reference in cell B2 to cell B3, it automatically adjusts from =A1 to =A2.

	A	B
1	█	
2	█	=A1
3		=A2

Copied formula with relative reference

**Absolute references** An absolute cell reference in a formula, such as \$A\$1, always refer to a cell in a specific location. If the position of the cell that contains the formula changes, the absolute reference remains the same. If you copy the formula across rows or down columns, the absolute reference does not adjust. By default, new formulas use relative references, and you need to switch them to absolute references. For example, if you copy a absolute reference in cell B2 to cell B3, it stays the same in both cells =\$A\$1.

	A	B
1	█	
2		=\$A\$1
3		=\$A\$1

Copied formula with absolute reference

**Mixed references** A mixed reference has either an absolute column and relative row, or absolute row and relative column. An absolute column reference takes the form \$A1, \$B1, and so on. An absolute row reference takes the form A\$1, B\$1, and so on. If the position of the cell that contains the formula changes, the relative reference is changed, and the absolute reference does not change. If you copy the formula across rows or down columns, the relative reference automatically adjusts, and the absolute reference does not adjust. For example, if you copy a mixed reference from cell A2 to B3, it adjusts from =A\$1 to =B\$1.

	A	B	C
1	█	█	
2		=A\$1	
3			=B\$1

Copied formula with mixed reference

[The 3-D reference style](#)

If you want to analyze data in the same cell or range of cells on multiple worksheets within the workbook, use a 3-D reference. A 3-D reference includes the cell or range reference, preceded by a range of worksheet names. Excel uses any worksheets stored between the starting and ending names of the reference. For example, =SUM(Sheet2:Sheet13!B5) adds all the values contained in cell B5 on all the worksheets between and including Sheet 2 and Sheet 13.

- You can use 3-D references to refer to cells on other sheets, to define names, and to create formulas by using the following functions: SUM, AVERAGE, AVERAGEA, COUNT, COUNTA, MAX, MAXA, MIN, MINA, PRODUCT, STDEV, STDEVA, STDEVP, STDEVPA, VAR, VARA, VARP, and VARPA.
- 3-D references cannot be used in [array formulas](#).
- 3-D references cannot be used with the intersection [operator](#) (a single space) or in formulas that use [implicit intersection](#).

### **How 3-D references change when you move, copy, insert, or delete worksheets**

The following examples explain what happens when you move, copy, insert, or delete worksheets that are included in a 3-D reference. The examples use the

formula =SUM(Sheet2:Sheet6!A2:A5) to add cells A2 through A5 on worksheets 2 through 6.

**Insert or copy** If you insert or copy sheets between Sheet2 and Sheet6 (the endpoints in this example), Microsoft Excel includes all values in cells A2 through A5 from the added sheets in the calculations.

**Delete** If you delete sheets between Sheet2 and Sheet6, Excel removes their values from the calculation.

**Move** If you move sheets from between Sheet2 and Sheet6 to a location outside the referenced sheet range, Excel removes their values from the calculation.

**Move an endpoint** If you move Sheet2 or Sheet6 to another location in the same workbook, Excel adjusts the calculation to accommodate the new range of sheets between them.

**Delete an endpoint** If you delete Sheet2 or Sheet6, Excel adjusts the calculation to accommodate the range of sheets between them.

## [The R1C1 reference style](#)

You can also use a reference style where both the rows and the columns on the worksheet are numbered. The R1C1 reference style is useful for computing row and column positions in [macros](#). In the R1C1 style, Excel indicates the location of a cell with an "R" followed by a row number and a "C" followed by a column number.

<b>Reference</b>	<b>Meaning</b>
R[-2]C	A <a href="#">relative reference</a> to the cell two rows up and in the same column
R[2]C[2]	A relative reference to the cell two rows down and two columns to the right
R2C2	An <a href="#">absolute reference</a> to the cell in the second row and in the second column
R[-1]	A relative reference to the entire row above the active cell
R	An absolute reference to the current row

When you record a macro, Excel records some commands by using the R1C1 reference style. For example, if you record a command such as clicking the **AutoSum** button to insert a formula that adds a range of cells, Excel records the formula by using R1C1 style, not A1 style, references.

## To turn R1C1 reference style on or off

1. Click **Options** on the **Tools** menu, and then click the **General** tab.
2. Under **Settings**, select or clear the **R1C1 reference style** check box.

[About names in formulas](#)

You can use the labels of columns and rows on a worksheet to refer to the cells within those columns and rows. Or you can create descriptive [names](#) to represent cells, ranges of cells, formulas, or [constant](#) values. Labels can be used in formulas that refer to data on the same worksheet; if you want to represent a range on another worksheet, use a name.

[Using defined names to represent cells, constants, or formulas](#)

A defined name in a formula can make it easier to understand the purpose of the formula. For example, the formula =SUM(FirstQuarterSales) might be easier to identify than =SUM(C20:C30).

Names are available to any sheet. For example, if the name ProjectedSales refers to the range A20:A30 on the first worksheet in a workbook, you can use the name ProjectedSales on any other sheet in the same workbook to refer to range A20:A30 on the first worksheet.

Names can also be used to represent formulas or values that do not change (constants). For example, you can use the name SalesTax to represent the sales tax amount (such as 6.2 percent) applied to sales transactions.

You can also link to a defined name in another workbook, or define a name that refers to cells in another workbook. For example, the formula =SUM(Sales.xls!ProjectedSales) refers to the named range ProjectedSales in the workbook named Sales.

**Note** By default, names use [absolute cell references](#).

## Guidelines for names

**What characters are allowed?** The first character of a name must be a letter or an underscore character. Remaining characters in the name can be letters, numbers, periods, and underscore characters.

**Can names be cell references?** Names cannot be the same as a cell reference, such as Z\$100 or R1C1.

**Can more than one word be used?** Yes, but spaces are not allowed. Underscore characters and periods may be used as word separators— for example, Sales\_Tax or First.Quarter.

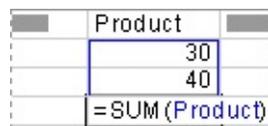
**How many characters can be used?** A name can contain up to 255 characters.

**Note** If a name defined for a range contains more than 253 characters, you cannot select it from the **Name** box.

**Are names case sensitive?** Names can contain uppercase and lowercase letters. Microsoft Excel does not distinguish between uppercase and lowercase characters in names. For example, if you have created the name Sales and then create another name called SALES in the same workbook, the second name will replace the first one.

### [Using existing row and column labels as names](#)

When you create a formula that refers to data in a worksheet, you can use the column and row labels in the worksheet to refer to the data. For example, to calculate the total value for the Product column, use the formula =SUM(Product).



	Product
	30
	40
	=SUM(Product)

Using a label

Or if you need to refer to the Product 3 amount for the East division (that is, the

value 110.00), you can use the formula =Product 3 East. The space in the formula between "Product 3" and "East" is the intersection [operator](#). This operator designates that Microsoft Excel should find and return the value in the cell at the intersection of the row labeled East and the column labeled Product 3.

**Note** By default, Excel does not recognize labels in formulas. To use labels in formulas, click **Options** on the **Tools** menu, and then click the **Calculation** tab. Under **Workbook** options, select the **Accept labels in formulas** check box.

**Stacked labels** When you use labels for the columns and rows on your worksheet, you can use those labels to create formulas that refer to data on the worksheet. If your worksheet contains stacked column labels—in which a label in one cell is followed by one or more labels below it—you can use the stacked labels in formulas to refer to data on the worksheet. For example, if the label West is in cell E5 and the label Projected is in cell E6, the formula =SUM(West Projected) returns the total value for the West Projected column.

**The order for stacked labels** When you refer to information by using stacked labels, you refer to the information in the order in which the labels appear, from top to bottom. If the label West is in cell F5 and the label Actual is in cell F6, you can refer to the actual figures for West by using West Actual in a formula. For example, to calculate the average of the actual figures for West, use the formula =AVERAGE(West Actual).

**Using dates as labels** When you label a range by using the **Label Ranges** dialog box and the range contains a year or date as a label, Excel defines the date as a label by placing single quotation marks around the label when you type the label in a formula. For example, suppose your worksheet contains the labels 2007 and 2008 and you have specified these labels by using the **Label Ranges** dialog box. When you type the formula =SUM(2008), Excel automatically updates the formula to =SUM('2008').

[About calculation operators in formulas](#)

Operators specify the type of calculation that you want to perform on the elements of a formula. Microsoft Excel includes four different types of calculation operators: arithmetic, comparison, text, and reference.

[Types of operators](#)

**Arithmetic operators** To perform basic mathematical operations such as addition, subtraction, or multiplication; combine numbers; and produce numeric results, use the following arithmetic operators.

**Arithmetic operator Meaning (Example)**

+ (plus sign)	Addition (3+3)
- (minus sign)	Subtraction (3-1) Negation (-1)
* (asterisk)	Multiplication (3*3)
/ (forward slash)	Division (3/3)
% (percent sign)	Percent (20%)
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**Comparison operators** You can compare two values with the following operators. When two values are compared by using these operators, the result is a logical value either TRUE or FALSE.

<b>Comparison operator</b>	<b>Meaning (Example)</b>
= (equal sign)	Equal to (A1=B1)
> (greater than sign)	Greater than (A1>B1)
< (less than sign)	Less than (A1<B1)
>= (greater than or equal to sign)	Greater than or equal to (A1>=B1)
<= (less than or equal to sign)	Less than or equal to (A1<=B1)
<> (not equal to sign)	Not equal to (A1<>B1)

**Text concatenation operator** Use the ampersand (&) to join, or concatenate, one or more text strings to produce a single piece of text.

<b>Text operator</b>	<b>Meaning (Example)</b>
&	Connects, or concatenates, two values to produce one continuous (ampersand) text value ("North"&"wind")

**Reference operators** Combine ranges of cells for calculations with the following operators.

<b>Reference operator</b>	<b>Meaning (Example)</b>
: (colon)	Range operator, which produces one reference to all the cells between two references, including the two references (B5:B15)
, (comma)	Union operator, which combines multiple references into one reference (SUM(B5:B15,D5:D15))
(space)	Intersection operator, which produces one reference to cells common to the two references (B7:D7 C6:C8)

### [The order in which Excel performs operations in formulas](#)

Formulas calculate values in a specific order. A formula in Excel always begins with an equal sign (=). The equal sign tells Excel that the succeeding characters constitute a formula. Following the equal sign are the elements to be calculated (the operands), which are separated by calculation operators. Excel calculates the formula from left to right, according to a specific order for each operator in the formula.

### **Operator precedence**

If you combine several operators in a single formula, Excel performs the operations in the order shown in the following table. If a formula contains operators with the same precedence—for example, if a formula contains both a multiplication and division operator—Excel evaluates the operators from left to right.

<b>Operator</b>	<b>Description</b>
: (colon)	
(single space)	Reference operators
, (comma)	
–	Negation (as in –1)
%	Percent
^	Exponentiation
* and /	Multiplication and division
+ and –	Addition and subtraction

& Connects two strings of text (concatenation)  
= < > <= >= <> Comparison

## Use of parentheses

To change the order of evaluation, enclose in parentheses the part of the formula to be calculated first. For example, the following formula produces 11 because Excel calculates multiplication before addition. The formula multiplies 2 by 3 and then adds 5 to the result.

=5+2\*3

In contrast, if you use parentheses to change the syntax, Excel adds 5 and 2 together and then multiplies the result by 3 to produce 21.

=(5+2)\*3

In the example below, the parentheses around the first part of the formula force Excel to calculate B4+25 first and then divide the result by the sum of the values in cells D5, E5, and F5.

=(B4+25)/SUM(D5:F5)



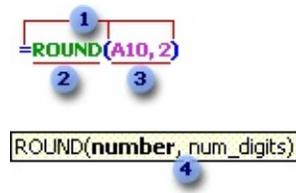
### [About constants in formulas](#)

A constant is a value that is not calculated. For example, the date 10/9/2008, the number 210, and the text "Quarterly Earnings" are all constants. An expression, or a value resulting from an expression, is not a constant. If you use constant values in the formula instead of references to the cells (for example, =30+70+110), the result changes only if you modify the formula yourself.

[Show All](#)

# About functions

Functions are predefined formulas that perform calculations by using specific values, called arguments, in a particular order, or structure. Functions can be used to perform simple or complex calculations. For example, the ROUND function rounds off a number in cell A10.



## Structure of a function

- 1 Structure. The structure of a function begins with an equal sign (=), followed by the function name, an opening parenthesis, the arguments for the function separated by commas, and a closing parenthesis.
- 2 Function name. For a list of available functions, click a cell and press SHIFT+F3.
- 3 Arguments. Arguments can be numbers, text, logical values such as TRUE or FALSE, [arrays](#), error values such as #N/A, or [cell references](#). The argument you designate must produce a valid value for that argument. Arguments can also be [constants](#), formulas, or other functions.
- 4 Argument tooltip. A tooltip with the syntax and arguments appears as you type the function. For example, type =ROUND( and the tooltip appears. Tooltips only appear for built-in functions.

**Entering formulas** When you create a formula that contains a function, the **Insert Function** dialog box helps you enter worksheet functions. As you enter a function into the formula, the **Insert Function** dialog box displays the name of the function, each of its arguments, a description of the function and each argument, the current result of the function, and the current result of the entire formula.

## Nested functions

In certain cases, you may need to use a function as one of the [arguments](#) of another function. For example, the following formula uses a nested AVERAGE function and compares the result with the value 50.

| Nested functions

```
=IF(AVERAGE(F2:F5)>50,SUM(G2:G5),0)
```

**Valid returns** When a nested function is used as an argument, it must return the same type of value that the argument uses. For example, if the argument returns a TRUE or FALSE value, then the nested function must return a TRUE or FALSE. If it doesn't, Microsoft Excel displays a #VALUE! error value.

**Nesting level limits** A formula can contain up to seven levels of nested functions. When Function B is used as an argument in Function A, Function B is a second-level function. For instance, the AVERAGE function and the SUM function are both second-level functions because they are arguments of the IF function. A function nested within the AVERAGE function would be a third-level function, and so on.

[Show All](#)

# About nesting functions within functions

In certain cases, you may need to use a function as one of the [arguments](#) of another function. For example, the following formula uses a nested AVERAGE function and compares the result with the value 50.

| Nested functions

```
=IF(AVERAGE(F2:F5)>50,SUM(G2:G5),0)
```

**Valid returns** When a nested function is used as an argument, it must return the same type of value that the argument uses. For example, if the argument returns a TRUE or FALSE value, then the nested function must return a TRUE or FALSE. If it doesn't, Microsoft Excel displays a #VALUE! error value.

**Nesting level limits** A formula can contain up to seven levels of nested functions. When Function B is used as an argument in Function A, Function B is a second-level function. For instance, the AVERAGE function and the SUM function are both second-level functions because they are arguments of the IF function. A function nested within the AVERAGE function would be a third-level function, and so on.

[Show All](#)

# Create a formula

Formulas are equations that perform calculations on values in your worksheet. A formula starts with an equal sign (=). For example, the following formula multiplies 2 by 3 and then adds 5 to the result.

=5+2\*3

[Create a simple formula: =128+345](#)

The following formulas contain [operators](#) and [constants](#).

<b>Example formula</b>	<b>What it does</b>
------------------------	---------------------

=128+345	Adds 128 and 345
----------	------------------

=5^2	Squares 5
------	-----------

1. Click the cell in which you want to enter the formula.
2. Type = (an equal sign).
3. Enter the formula.
4. Press ENTER.

[Create a formula that contains references or names: =A1+23](#)

The following formulas contain [relative references](#) to and [names](#) of other cells. The cell that contains the formula is known as a dependent cell when its value depends on the values in other cells. For example, cell B2 is a dependent cell if it contains the formula =C2.

<b>Example formula</b>	<b>What it does</b>
------------------------	---------------------

=C2	Uses the value in the cell C2
-----	-------------------------------

=Sheet2!B2	Uses the value in cell B2 on Sheet2
------------	-------------------------------------

=Asset-Liability	Subtracts a cell named Liability from a cell named Asset
------------------	--

1. Click the cell in which you want to enter the formula.
2. In the [formula bar](#) , type = (equal sign).
3. Do one of the following:

- To create a reference, select a cell, a range of cells, a location in another worksheet, or a location in another workbook. You can drag the border of the cell selection to move the selection, or drag the corner of the border to expand the selection.



- To create a reference to a named range, press F3, select the name in the **Paste name** box, and click **OK**.

4. Press ENTER.

[Create a formula that contains a function: =AVERAGE\(A1:B4\)](#)

The following formulas contain [functions](#).

<b>Example formula</b>	<b>What it does</b>
=SUM(A:A)	Adds all numbers in column A
=AVERAGE(A1:B4)	Averages all numbers in the range

1. Click the cell in which you want to enter the formula.
2. To start the formula with the function, click **Insert Function**  on the [formula bar](#) .
3. Select the function you want to use. You can enter a question that describes what you want to do in the **Search for a function** box (for example, "add numbers" returns the SUM function), or browse from the categories in the **Or Select a category** box.
4. Enter the [arguments](#). To enter cell references as an argument, click **Collapse Dialog**  to temporarily hide the dialog box. Select the cells on the worksheet, then press **Expand Dialog** .
5. When you complete the formula, press ENTER.

[Create a formula with nested functions: =IF\(AVERAGE\(F2:F5\)>50, SUM\(G2:G5\),0\)](#)

Nested functions use a function as one of the arguments of another function. The following formula sums a set of numbers (G2:G5) only if the average of another set of numbers (F2:F5) is greater than 50. Otherwise it returns 0.

| Nested functions

=IF(AVERAGE(F2:F5)>50,SUM(G2:G5),0)

1. Click the cell in which you want to enter the formula.
2. To start the formula with the function, click **Insert Function**  on the [formula bar](#) .
3. Select the function you want to use. You can enter a question that describes what you want to do in the **Search for a function** box (for example, "add numbers" returns the SUM function), or browse from the categories in the **Or Select a category** box.
4. Enter the [arguments](#).
  - To enter cell references as an argument, click **Collapse Dialog**  next to the argument you want to temporarily hide the dialog box. Select the cells on the worksheet; then press **Expand Dialog** .
  - To enter another function as an argument, enter the function in the argument box you want. For example, you can add SUM(G2:G5) in the **Value\_if\_true** edit box.
  - To switch the parts of the formula displayed in the **Function Arguments** dialog box, click a function name in the formula bar. For example, if you click IF, the arguments for the IF function appear.

#### [Tips](#)

- You can enter the same formula into a range of cells by selecting the range first, typing the formula, and then pressing CTRL+ENTER.
- If you are familiar with the [arguments](#) of a function, you can use the function tooltip that appears after you type the function name and an opening parenthesis. Click the function name to view the Help topic on the function, or click an argument name to select the corresponding argument in your formula. To hide the function tooltips, on the **Tools** menu, click **Options**, and then clear the **Function tooltips** check box on the **General** tab.

# Delete a formula

1. Click the cell that contains the formula.
2. Press DELETE.

[Show All](#)

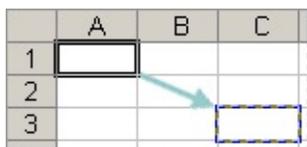
# Move or copy a formula

When you move a formula, the cell references within the formula do not change. When you copy a formula, the cell references may change based on the type of reference used.

1. Select the cell that contains the formula.
2. Verify that the cell references used in the formula will produce the result you want. Switch to the type of reference you need. To move a formula, use an [absolute reference](#).

[How?](#)

1. Select the cell that contains the formula.
2. In the [formula bar](#)  , select the reference you want to change.
3. Press F4 to toggle through the combinations. The "Changes To" column reflects how a reference type updates if a formula containing the reference is copied two cells down and two cells to the right.



	A	B	C
1			
2			
3			

Formula being copied

Reference (Description)	Changes to
\$A\$1 ( <a href="#">absolute</a> column and absolute row)	\$A\$1
A\$1 ( <a href="#">relative</a> column and absolute row)	C\$1
\$A1 (absolute column and relative row)	\$A3
A1 (relative column and relative row)	C3

3. On the **Edit** menu, click **Copy**.
4. Select the cell you want to copy it to.
5. To copy the formula and any formatting, on the **Edit** menu, click **Paste**.
6. To copy the formula only, on the **Edit** menu, click **Paste Special**, and then click **Formulas**.

## Tips

- You can also copy formulas into adjacent cells by using the [fill handle](#) . Select the cell that contains the formula, and then drag the fill handle over the range you want to fill.
- You can also move formulas by dragging the border of the selected cell to the upper-left cell of the paste area. Any existing data is replaced.

[Show All](#)

# Select cells that contain formulas

1. Do one of the following:
  - Select the [range](#) that includes the type of cells you want to select.
  - Click any cell to select all cells of this type on the active worksheet.
2. On the **Edit** menu, click **Go To**.
3. Click **Special**.
4. Click **Formulas**, and then select the check box next to the type of data you want to select.

[Show All](#)

# About cell and range references

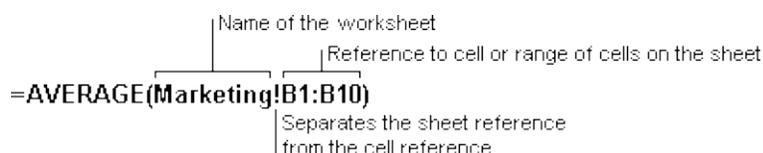
A reference identifies a cell or a range of cells on a worksheet and tells Microsoft Excel where to look for the values or data you want to use in a formula. With references, you can use data contained in different parts of a worksheet in one formula or use the value from one cell in several formulas. You can also refer to cells on other sheets in the same workbook, and to other workbooks. References to cells in other workbooks are called links.

## [The A1 reference style](#)

By default, Excel uses the A1 reference style, which refers to columns with letters (A through IV, for a total of 256 columns) and refers to rows with numbers (1 through 65536). These letters and numbers are called row and column headings. To refer to a cell, enter the column letter followed by the row number. For example, B2 refers to the cell at the intersection of column B and row 2.

To refer to	Use
The cell in column A and row 10	A10
The range of cells in column A and rows 10 through 20	A10:A20
The range of cells in row 15 and columns B through E	B15:E15
All cells in row 5	5:5
All cells in rows 5 through 10	5:10
All cells in column H	H:H
All cells in columns H through J	H:J
The range of cells in columns A through E and rows 10 through 20	A10:E20

**Reference to another worksheet** In the following example, the AVERAGE worksheet function calculates the average value for the range B1:B10 on the worksheet named Marketing in the same workbook.

  
=AVERAGE(Marketing!B1:B10)

Link to another worksheet in the same workbook

Note that the name of the worksheet and an exclamation point (!) precede the range reference.

## [The difference between relative and absolute references](#)

**Relative references** A relative cell reference in a formula, such as A1, is based on the relative position of the cell that contains the formula and the cell the reference refers to. If the position of the cell that contains the formula changes, the reference is changed. If you copy the formula across rows or down columns, the reference automatically adjusts. By default, new formulas use relative references. For example, if you copy a relative reference in cell B2 to cell B3, it automatically adjusts from =A1 to =A2.

	A	B
1	█	
2	█	=A1
3		=A2

Copied formula with relative reference

**Absolute references** An absolute cell reference in a formula, such as \$A\$1, always refer to a cell in a specific location. If the position of the cell that contains the formula changes, the absolute reference remains the same. If you copy the formula across rows or down columns, the absolute reference does not adjust. By default, new formulas use relative references, and you need to switch them to absolute references. For example, if you copy a absolute reference in cell B2 to cell B3, it stays the same in both cells =\$A\$1.

	A	B
1	█	
2		=\$A\$1
3		=\$A\$1

Copied formula with absolute reference

**Mixed references** A mixed reference has either an absolute column and relative row, or absolute row and relative column. An absolute column reference takes the form \$A1, \$B1, and so on. An absolute row reference takes the form A\$1, B\$1, and so on. If the position of the cell that contains the formula

changes, the relative reference is changed, and the absolute reference does not change. If you copy the formula across rows or down columns, the relative reference automatically adjusts, and the absolute reference does not adjust. For example, if you copy a mixed reference from cell A2 to B3, it adjusts from =A\$1 to =B\$1.

	A	B	C
1			
2		=A\$1	
3			=B\$1

Copied formula with mixed reference

[The 3-D reference style](#)

If you want to analyze data in the same cell or range of cells on multiple worksheets within the workbook, use a 3-D reference. A 3-D reference includes the cell or range reference, preceded by a range of worksheet names. Excel uses any worksheets stored between the starting and ending names of the reference. For example, =SUM(Sheet2:Sheet13!B5) adds all the values contained in cell B5 on all the worksheets between and including Sheet 2 and Sheet 13.

- You can use 3-D references to refer to cells on other sheets, to define names, and to create formulas by using the following functions: SUM, AVERAGE, AVERAGEA, COUNT, COUNTA, MAX, MAXA, MIN, MINA, PRODUCT, STDEV, STDEVA, STDEVP, STDEVPA, VAR, VARA, VARP, and VARPA.
- 3-D references cannot be used in [array formulas](#).
- 3-D references cannot be used with the intersection [operator](#) (a single space) or in formulas that use [implicit intersection](#).

### How 3-D references change when you move, copy, insert, or delete worksheets

The following examples explain what happens when you move, copy, insert, or delete worksheets that are included in a 3-D reference. The examples use the formula =SUM(Sheet2:Sheet6!A2:A5) to add cells A2 through A5 on worksheets 2 through 6.

**Insert or copy** If you insert or copy sheets between Sheet2 and Sheet6 (the

endpoints in this example), Microsoft Excel includes all values in cells A2 through A5 from the added sheets in the calculations.

**Delete** If you delete sheets between Sheet2 and Sheet6, Excel removes their values from the calculation.

**Move** If you move sheets from between Sheet2 and Sheet6 to a location outside the referenced sheet range, Excel removes their values from the calculation.

**Move an endpoint** If you move Sheet2 or Sheet6 to another location in the same workbook, Excel adjusts the calculation to accommodate the new range of sheets between them.

**Delete an endpoint** If you delete Sheet2 or Sheet6, Excel adjusts the calculation to accommodate the range of sheets between them.



### [The R1C1 reference style](#)

You can also use a reference style where both the rows and the columns on the worksheet are numbered. The R1C1 reference style is useful for computing row and column positions in [macros](#). In the R1C1 style, Excel indicates the location of a cell with an "R" followed by a row number and a "C" followed by a column number.

<b>Reference</b>	<b>Meaning</b>
R[-2]C	A <a href="#">relative reference</a> to the cell two rows up and in the same column
R[2]C[2]	A relative reference to the cell two rows down and two columns to the right
R2C2	An <a href="#">absolute reference</a> to the cell in the second row and in the second column
R[-1]	A relative reference to the entire row above the active cell
R	An absolute reference to the current row

When you record a macro, Excel records some commands by using the R1C1 reference style. For example, if you record a command such as clicking the **AutoSum** button to insert a formula that adds a range of cells, Excel records the formula by using R1C1 style, not A1 style, references.

## **To turn R1C1 reference style on or off**

1. Click **Options** on the **Tools** menu, and then click the **General** tab.
2. Under **Settings**, select or clear the **R1C1 reference style** check box.

[Show All](#)

# Name cells on more than one worksheet

This is also called a [3-D reference](#).

1. On the **Insert** menu, point to **Name**, and then click **Define**.
2. In the **Names in workbook** box, type the name.
3. If the **Refers to** box contains a reference, select the equal sign (=) and the reference and press BACKSPACE.
4. In the **Refers to** box, type = (equal sign).
5. Click the tab for the first worksheet to be referenced.
6. Hold down SHIFT and click the tab for the last worksheet to be referenced.
7. Select the cell or range of cells to be referenced.

[Show All](#)

# Refer to the same cell or range on multiple sheets

A reference that refers to the same cell or [range](#) on multiple sheets is called a [3-D reference](#).

1. Click the cell where you want to enter the function.
2. Type = (equal sign), enter the name of the function, and then type an opening parenthesis.

[Functions that can be used in a 3-D reference](#)

[SUM](#) - adds numbers

[AVERAGE](#) - calculates average (arithmetic mean) of numbers

[AVERAGEA](#) - calculates average (arithmetic mean) of numbers; includes text and logicals

[COUNT](#) - counts cells that contain numbers

[COUNTA](#) - counts cells that are not empty

[MAX](#) - finds largest value in a set of values

[MAXA](#) - finds largest value in a set of values; includes text and logicals

[MIN](#) - finds smallest value in a set of values

[MINA](#) - finds smallest value in a set of values; includes text and logicals

[PRODUCT](#) - multiplies numbers

[STDEV](#) - calculates standard deviation based on a sample

[STDEVA](#) - calculates standard deviation based on a sample; includes text and logicals

[STDEV](#) - calculates standard deviation of an entire population

[STDEVPA](#) - calculates standard deviation of an entire population; includes text and logicals

[VAR](#) - estimates variance based on a sample

[VARA](#) - estimates variance based on a sample; includes text and logicals

[VARP](#) - calculates variance for an entire population

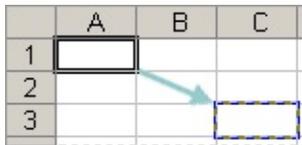
[VARPA](#) - calculates variance for an entire population; includes text and logicals

3. Click the tab for the first worksheet to be referenced.
4. Hold down SHIFT and click the tab for the last worksheet to be referenced.
5. Select the cell or range of cells to be referenced.
6. Complete the formula, and press ENTER.

[Show All](#)

# Switch between relative, absolute, and mixed references

1. Select the cell that contains the formula.
2. In the [formula bar](#)  , select the reference you want to change.
3. Press F4 to toggle through the combinations. The "Changes To" column reflects how a reference type updates if a formula containing the reference is copied two cells down and two cells to the right.



	A	B	C
1	<input type="text"/>		
2			
3			<input type="text"/>

Formula being copied

Reference (Description)	Changes to
\$A\$1 ( <a href="#">absolute</a> column and absolute row)	\$A\$1
A\$1 ( <a href="#">relative</a> column and absolute row)	C\$1
\$A1 (absolute column and relative row)	\$A3
A1 (relative column and relative row)	C3

[Show All](#)

# About array formulas and array constants

An array formula can perform multiple calculations and then return either a single result or multiple results. Array formulas act on two or more sets of values known as array arguments. Each array argument must have the same number of rows and columns. You create array formulas in the same way that you create other formulas, except you press CTRL+SHIFT+ENTER to enter the formula.

Array constants can be used in place of references when you don't want to enter each constant value in a separate cell on the worksheet.

Some of the built-in functions are array formulas, and must be entered as arrays to get the correct results.

## [Using an array formula](#)

**To calculate a single result** This type of array formula can simplify a worksheet model by replacing several different formulas with a single array formula.

For example, the following calculates the total value of an array of stock prices and shares, without using a row of cells to calculate and display the individual values for each stock.

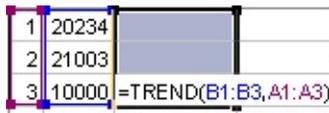
	Lorem	Ipsium
Shares	500	300
Price	10	15
Total Value	=SUM(B2:C2*B3:C3)	

Array formula that produces a single result

When you enter the formula  $=\{SUM(B2:D2*B3:D3)\}$  as an array formula, it multiplies the Shares and Price for each stock, and then adds the results of those calculations together.

**To calculate multiple results** Some worksheet functions return arrays of values, or require an array of values as an argument. To calculate multiple results with an array formula, you must enter the array into a range of cells that has the same number of rows and columns as the array arguments.

For example, given a series of three sales figures (in column B) for a series of three months (in column A), the TREND function determines the straight-line values for the sales figures. To display all of the results of the formula, it is entered into three cells in column C (C1:C3).



1	20234	
2	21003	
3	10000	=TREND(B1:B3,A1:A3)

Array formula that produces multiple results

When you enter the formula =TREND(B1:B3,A1:A3) as an array formula, it produces three separate results (22196, 17079, and 11962), based on the three sales figures and the three months.

### [Using array constants](#)

In an ordinary formula, you can enter a reference to a cell containing a value, or the value itself, also called a [constant](#). Similarly, in an array formula you can enter a reference to an array, or enter the array of values contained within the cells, also called an array constant. Array formulas accept constants in the same way that nonarray formulas do, but you must enter the array constants in a certain format.

Array constants can contain numbers, text, logical values such as TRUE or FALSE, or error values such as #N/A. Different types of values can be in the same array constant— for example, {1,3,4;TRUE,FALSE,TRUE}. Numbers in array constants can be in integer, decimal, or scientific format. Text must be enclosed in double quotation marks— for example, "Tuesday".

Array constants cannot contain cell references, columns or rows of unequal length, formulas, or the special characters \$ (dollar sign), parentheses, or % (percent sign).

## **The format of array constants**

Array constants are enclosed in braces ( { } ).

Separate values in different columns with commas (.). For example, to represent the values 10, 20, 30, and 40, enter {10,20,30,40}. This array constant is known as a 1-by-4 array and is equivalent to a 1-row-by-4-column reference.

Separate values in different rows with semicolons (;). For example, to represent the values 10, 20, 30, and 40 in one row and 50, 60, 70, and 80 in the row immediately below, you would enter a 2-by-4 array constant:  
{10,20,30,40;50,60,70,80}.

[Show All](#)

# Create an array formula

When you enter an [array formula](#), Microsoft Excel automatically inserts the formula between { } (braces).

## [Calculate a single result](#)

You can use an array formula to perform several calculations to generate a single result. This type of array formula can simplify a worksheet model by replacing several different formulas with a single array formula.

1. Click the cell in which you want to enter the array formula.
2. Type the array formula.

For example, the following calculates the total value of an array of stock prices and shares, without using a row of cells to calculate and display the individual values for each stock.

	Lorem	Ipsium
Shares	500	300
Price	10	15
Total Value	=SUM(B2:C2*B3:C3)	

Array formula that produces a single result

When you enter the formula  $=\{SUM(B2:D2*B3:D3)\}$  as an array formula, it multiplies the Shares and Price for each stock, and then adds the results of those calculations together.

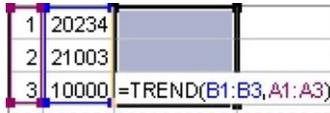
3. Press CTRL+SHIFT+ENTER.

## [Calculate multiple results](#)

Some worksheet functions return arrays of values, or require an array of values as an argument. To calculate multiple results with an array formula, you must enter the array into a range of cells that has the same number of rows and columns as the array arguments have.

1. Select the range of cells in which you want to enter the array formula.
2. Type the array formula.

For example, given a series of three sales figures (column B) for a series of three months (column A), the TREND function determines the straight-line values for the sales figures. To display all of the results of the formula, it is entered into three cells in column C (C1:C3).



1	20234	
2	21003	
3	10000	=TREND(B1:B3,A1:A3)

Array formula that produces multiple results

When you enter the formula =TREND(B1:B3,A1:A3) as an array formula, it produces three separate results (22196, 17079, and 11962), based on the three sales figures and the three months.

3. Press CTRL+SHIFT+ENTER.

[Show All](#)

# Edit an array formula

1. Click the cell that contains the [array formula](#).
2. Click in the [formula bar](#)  . When the formula bar is active, the braces ( { } ) do not appear in the array formula.
3. Edit the array formula.
4. Press CTRL+SHIFT+ENTER.

[Show All](#)

# Select a range of cells that contains an array formula

1. Click a cell in the [array formula](#).
2. On the **Edit** menu, click **Go To**.
3. Click **Special**.
4. Click **Current array**.

[Show All](#)

# About labels and names in formulas

You can use the labels of columns and rows on a worksheet to refer to the cells within those columns and rows. Or you can create descriptive [names](#) to represent cells, ranges of cells, formulas, or [constant](#) values. Labels can be used in formulas that refer to data on the same worksheet; if you want to represent a range on another worksheet, use a name.



## [Using defined names to represent cells, constants, or formulas](#)

A defined name in a formula can make it easier to understand the purpose of the formula. For example, the formula =SUM(FirstQuarterSales) might be easier to identify than =SUM(C20:C30).

Names are available to any sheet. For example, if the name ProjectedSales refers to the range A20:A30 on the first worksheet in a workbook, you can use the name ProjectedSales on any other sheet in the same workbook to refer to range A20:A30 on the first worksheet.

Names can also be used to represent formulas or values that do not change (constants). For example, you can use the name SalesTax to represent the sales tax amount (such as 6.2 percent) applied to sales transactions.

You can also link to a defined name in another workbook, or define a name that refers to cells in another workbook. For example, the formula =SUM(Sales.xls!ProjectedSales) refers to the named range ProjectedSales in the workbook named Sales.

**Note** By default, names use [absolute cell references](#).

## Guidelines for names

**What characters are allowed?** The first character of a name must be a letter or an underscore character. Remaining characters in the name can be letters, numbers, periods, and underscore characters.

**Can names be cell references?** Names cannot be the same as a cell reference,

such as Z\$100 or R1C1.

**Can more than one word be used?** Yes, but spaces are not allowed. Underscore characters and periods may be used as word separators— for example, Sales\_Tax or First.Quarter.

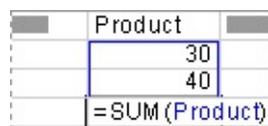
**How many characters can be used?** A name can contain up to 255 characters.

**Note** If a name defined for a range contains more than 253 characters, you cannot select it from the **Name** box.

**Are names case sensitive?** Names can contain uppercase and lowercase letters. Microsoft Excel does not distinguish between uppercase and lowercase characters in names. For example, if you have created the name Sales and then create another name called SALES in the same workbook, the second name will replace the first one.

### [Using existing row and column labels as names](#)

When you create a formula that refers to data in a worksheet, you can use the column and row labels in the worksheet to refer to the data. For example, to calculate the total value for the Product column, use the formula =SUM(Product).



	Product
	30
	40
	=SUM(Product)

Using a label

Or if you need to refer to the Product 3 amount for the East division (that is, the value 110.00), you can use the formula =Product 3 East. The space in the formula between "Product 3" and "East" is the intersection [operator](#). This operator designates that Microsoft Excel should find and return the value in the cell at the intersection of the row labeled East and the column labeled Product 3.

**Note** By default, Excel does not recognize labels in formulas. To use labels in formulas, click **Options** on the **Tools** menu, and then click the **Calculation** tab. Under **Workbook** options, select the **Accept labels in formulas** check box.

**Stacked labels** When you use labels for the columns and rows on your worksheet, you can use those labels to create formulas that refer to data on the worksheet. If your worksheet contains stacked column labels— in which a label in one cell is followed by one or more labels below it— you can use the stacked labels in formulas to refer to data on the worksheet. For example, if the label West is in cell E5 and the label Projected is in cell E6, the formula =SUM(West Projected) returns the total value for the West Projected column.

**The order for stacked labels** When you refer to information by using stacked labels, you refer to the information in the order in which the labels appear, from top to bottom. If the label West is in cell F5 and the label Actual is in cell F6, you can refer to the actual figures for West by using West Actual in a formula. For example, to calculate the average of the actual figures for West, use the formula =AVERAGE(West Actual).

**Using dates as labels** When you label a range by using the **Label Ranges** dialog box and the range contains a year or date as a label, Excel defines the date as a label by placing single quotation marks around the label when you type the label in a formula. For example, suppose your worksheet contains the labels 2007 and 2008 and you have specified these labels by using the **Label Ranges** dialog box. When you type the formula =SUM(2008), Excel automatically updates the formula to =SUM('2008').

# Change cell references in formulas to names

1. Do one of the following:
  - Select the range of cells that contains formulas in which you want to replace references with names.
  - Select a single cell to change the references to names in all formulas on the worksheet.
2. On the **Insert** menu, point to **Name**, and then click **Apply**.
3. In the **Apply names** box, click one or more names.

# Change or delete a defined name

1. On the **Insert** menu, point to **Name**, and then click **Define**.
2. In the **Names in workbook** list, click the name you want to change.
3. Do one of the following:
  - Change the name
    1. Type the new name for the reference, and then click **Add**.
    2. Click the original name, and then click **Delete**.
  - Change the cell, formula, or constant represented by a name

Change it in the **Refers to** box.

- Delete the name

Click **Delete**.

[Show All](#)

# Create a name to represent a formula or a constant

1. On the **Insert** menu, point to **Name**, and then click **Define**.
2. In the **Names in workbook** box, enter the name for the formula.
3. In the **Refers to** box, type = (equal sign), followed by the formula or the [constant](#) value.

[Show All](#)

# Determine what a name refers to

1. On the **Insert** menu, point to **Name**, and then click **Define**.
2. In the **Names in workbook** list, click the name whose reference you want to check.

The **Refers to** box displays the reference, formula, or [constant](#) the name represents.



You can also create a list of the available names in a workbook. Locate an area with two empty columns on the worksheet (the list will contain two columns — one for the name and one for a description of the name). Select a cell that will be the upper-left corner of the list. On the **Insert** menu, point to **Name**, and then click **Paste**. In the **Paste Name** dialog box, click **Paste List**.

# Examples of commonly used formulas

## Common Conditional

[Check if a number is greater than or less than another number](#)

[Create conditional formulas by using the IF function](#)

[Display or hide zero values](#)

[Look up values in a list](#)

## Common Date and Time

[Add dates](#)

[Add times](#)

[Calculate the difference between two dates](#)

[Calculate the difference between two times](#)

[Convert times](#)

[Count days before a date](#)

[Insert Julian dates](#)

[Insert the current date and time in a cell](#)

[Show dates as the day of the week](#)

## Common Financial

[Calculate a running balance](#)

[Create a multiplication table](#)

## **Common Math**

[Add numbers](#)

[Calculate the average of numbers](#)

[Calculate the difference between two numbers as a percentage](#)

[Calculate the median of a group of numbers](#)

[Calculate the smallest or largest number in a range](#)

[Convert measurements](#)

[Count cells that contain numbers](#)

[Count numbers greater than or less than a number](#)

[Divide numbers](#)

[Hide error values and error indicators in a cell](#)

[Increase or decrease a number by a percentage](#)

[Multiply numbers](#)

[Raise a number to a power](#)

[Round a number](#)

[Subtract numbers](#)

## **Common Text**

[Change the case of text](#)

[Check if a cell contains text](#)

[Combine first and last names](#)

[Combine text and numbers](#)

[Combine text with a date or time](#)

[Compare cell contents](#)

[Count nonblank cells](#)

[Remove characters from text](#)

[Remove spaces from the beginning and end of a cell](#)

[Repeat a character in a cell](#)

[Count unique entries in a list](#)

[Show All](#)

# Count unique entries in a range of data

The method for this task depends on the result you want to see.

[Count the occurrence of a value in a range of cells](#)

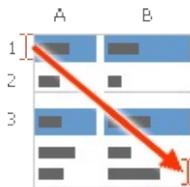
Use the COUNTIF function to do this task.

## Example

The example may be easier to understand if you copy to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	B
	<b>Salesperson</b>	<b>Invoice</b>
Buchanan		15,000

1	Buchanan	9,000
2	Suyama	8,000
3	Suyama	20,000
4	Buchanan	5,000
5	Dodsworth	22,500

6	Formula	Description (Result)
7	=COUNTIF(A2:A7,"Buchanan")	Number of invoices for Buchanan (3)
	=COUNTIF(A2:A7,A4)	Number of invoices for Suyama (2)

# Function details

## [COUNTIF](#)

[Count the occurrence of more than one condition](#)

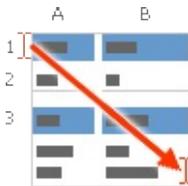
Use the IF and SUM functions to do this task.

### Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Salesperson</b>	<b>Invoice</b>
	Buchanan	15,000
	Buchanan	9,000
	Suyama	8,000
	Suyama	20,000

	Buchanan	5,000
1	Dodsworth	22,500
2	<b>Formula</b>	<b>Description (Result)</b>
3	=SUM(IF((A2:A7="Buchanan")+ (A2:A7="Dodsworth"),1,0))	Number of invoices for Buchanan or Dodsworth (4)
4		Number of invoices with values less than 9000 or greater than 19000 (3)
5	=SUM(IF((B2:B7<9000)*(B2:B7>10),1,0))	Number of invoices for Buchanan with a value less than 9,000. (1)
6		
7	=SUM(IF(A2:A7="Buchanan",IF(B2:B7<9000,1,0)))	

**Note** The formulas in this example must be entered as [array formulas](#). Select each cell that contains a formula, press F2, and then press CTRL+SHIFT+ENTER.

## Function details

### [SUM](#)

### [IF](#)



### [Count the occurrences of unique entries](#)

1. Select the column containing the data.

Lorem	
Ipsum	
Ipsum	
Amet	
Dolor	
Dolor	
Dolor	

2. On the **Data** menu, click **PivotTable and PivotChart Report**.
3. Click **Finish**.
4. Drag the column label from PivotTable Field List to Drop Row Fields Here.
5. Drag the same column label from PivotTable Field List to Drop Data Items Here.

**Note** If your data contains numbers, the PivotTable report totals the entries instead of counting them. To change from the Sum summary function to the Count summary function, on the **PivotTable toolbar**, click **Field Settings** , and then in the **Summarize by** box, click **Count**.



### [Count the number of unique values](#)

For example, if a column contains 1,2,2,2 the result is 2 unique values in the column.

1. On the **Data** menu, point to **Filter**, and then click **Advanced Filter**.
2. In the **Advanced Filter** dialog box, click **Copy to another location**.
3. In the **List range** box, delete any information in the box or click the box, and then click the column for which you want to count the unique entries.
4. If you have a column label, in the **Criteria range** box, delete any information in the box or click the box, and then click the column label for your column of data.

5. In the **Copy to** box, delete any information in the box or click the box, and then click a blank column where you want to copy the unique values.
6. Select the **Unique records only** check box, and click **OK**.
7. Select the blank cell below the last cell in the range.
8. Click the arrow next to **AutoSum**  on the **Standard** toolbar, and then click **Count**.
9. Press **Enter**.

[Show All](#)

# Create conditional formulas by using the IF function

[For a result that is a logical value \(TRUE or FALSE\)](#)

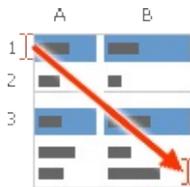
Use the AND, OR, and NOT functions, and [operators](#) to do this task.

## Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	B
	<b>Data</b>	
	15	
<b>1</b>	9	
<b>2</b>	8	
<b>3</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>4</b>	=AND(A2>A3, A2<A4)	Is 15 greater than 9 and less than 8? (FALSE)
	=OR(A2>A3, A2<A4)	Is 15 greater than 9 or less than 8? (TRUE)
	=NOT(A2+A3=24)	Is 15 plus 9 not equal to 24? (FALSE)

## Function details

AND

OR

NOT

For a result is another calculation, or any other value other than TRUE or FALSE.

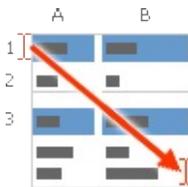
Use the IF, AND, and OR functions to do this task.

# Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.

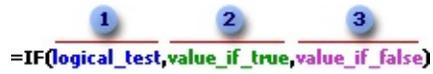


Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	B
	Data	
15		
9		
1 8		
2	Formula	Description (Result)
3	=IF(A2=15, "OK", "Not OK")	If the value in cell A2 equals 15, then return "OK". (OK)
4	=IF(AND(A2>A3, A2<A4), "OK", "Not OK")	If 15 is greater than 9 and less than 8, then return "OK". (Not OK)
	=IF(OR(A2>A3, A2<A4), "OK", "Not OK")	If 15 is greater than 9 or less than 8, then return "OK". (OK)

The IF function uses the following arguments.

The diagram shows the IF function syntax: =IF(logical\_test,value\_if\_true,value\_if\_false). Above the text, three blue circles containing the numbers 1, 2, and 3 are positioned over the arguments. Red horizontal lines connect these circles to their respective arguments in the formula below: circle 1 is over 'logical\_test', circle 2 is over 'value\_if\_true', and circle 3 is over 'value\_if\_false'.  
=IF(logical\_test,value\_if\_true,value\_if\_false)

Formula with the IF function

- 1 logical\_test: the condition you want to check
- 2 value\_if\_true: the value to return if the condition is true
- 3 value\_if\_false: the value to return if the condition is false

## Function details

[AND](#)

[OR](#)

[IF](#)

[Show All](#)

# Add dates

[Add a number of days to a date](#)

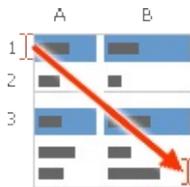
Use the addition (+) operator to do this task.

## Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Date</b>	<b>Days to add</b>
	6/9/2007	3
<b>1</b>	=TODAY()	5
<b>2</b>	12/10/2008	54
<b>3</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>4</b>	=A2+B2	Add 3 days to 6/9/2007 (6/12/2007)
	=A3+B3	Add 5 days to the current day (varies)
	=A4+B4	Add 54 days to 12/10/2008 (2/2/2009)

[Add a number of months to a date](#)

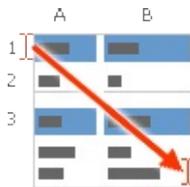
Use the DATE, YEAR, MONTH, and DAY functions to do this task.

# Worksheet example

This example can be copied on to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	B
	Date	Months to add
	6/9/2007	3
	9/2/2007	5
1	12/10/2008	25
2	Formula	Description (Result)
3	=DATE(YEAR(A2),MONTH(A2)+B2,DAY(A2))	Add 3 months to 6/9/2007 (9/9/2007)
4	=DATE(YEAR(A3),MONTH(A3)+B3,DAY(A3))	Add 5 months to 9/2/2007 (2/2/2008)
	=DATE(YEAR(A4),MONTH(A4)+B4,DAY(A4))	Add 25 months to 12/10/2008 (1/10/2011)

## Function details

[DATE](#)

[YEAR](#)

[MONTH](#)

[DAY](#)

[Add a number of years to a date](#)

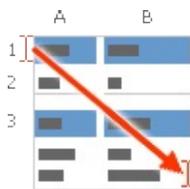
Use the DATE, YEAR, MONTH, and DAY functions to do this task.

# Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	B
	Date	Years to add
	6/9/2007	3
	9/2/2007	5
1	12/10/2008	25
2	Formula	Description (Result)
3	=DATE(YEAR(A2)+B2,MONTH(A2),DAY(A2))	Add 3 years to 6/9/2007 (6/9/2010)
4	=DATE(YEAR(A3)+B3,MONTH(A3),DAY(A3))	Add 5 years to 9/2/2007 (9/2/2012)
	=DATE(YEAR(A4)+B4,MONTH(A4),DAY(A4))	Add 25 years to 12/10/2008 (12/10/2033)

## Function details

[DATE](#)

[YEAR](#)

[MONTH](#)

[DAY](#)

[Add a combination of days, months, and years to a date](#)

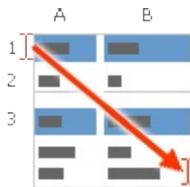
Use the DATE, YEAR, MONTH, and DAY functions to do this task.

# Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	
	<b>Date</b>	
	6/9/2007	
	<b>Formula</b>	<b>Description (Result)</b>
<b>1</b>		Add 3 years, 1 month,
<b>2</b>	=DATE(YEAR(A2)+3,MONTH(A2)+1,DAY(A2)+5)	and 5 days to 6/9/2007 (7/14/2010)
		Add 1 year, 7 months,
	=DATE(YEAR(A2)+1,MONTH(A2)+7,DAY(A2)+5)	and 5 days to 6/9/2007 (1/14/2009)

The formula above has the following arguments.

  
=DATE(YEAR(start\_date)+add\_year, MONTH(start\_date)+add\_month, DAY(start\_date)+add\_day)

Formula to add dates

- 1 start\_date: a date or reference to a cell that contains a date
- 2 add\_year: the number of years to be added
- 3 add\_month: the number of months to be added
- 4 add\_day: the number of days to be added

## **Function details**

DATE

YEAR

MONTH

DAY

[Show All](#)

# Add times

[For times entered in the standard time format \(hours : minutes : seconds\)](#)

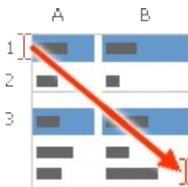
For this method to work, hours can never exceed 24, minutes can ever exceed 60, and seconds can never exceed 60.

# Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

A		
Hours worked		
	1:35	
1	8:30	
2	3:00	
3	4:15	
4	8:00	
5	Formula	Description (Result)
6	=SUM(A2:A5)	Total hours worked when the total is less than a day (17:20)
	=SUM(A2:A6)*24	Total hours worked when the total is greater than a day (25.33333).

## Notes

- To view the second formula as a number, select the cell and click **Cells** on the **Format** menu. Click the **Number** tab, and then click **General** in the **Category** box.
- If the time you are adding contain seconds, format the cell with time format that displays seconds. Select the cell and click **Cells** on the **Format** menu. Click the **Number** tab, and then click **Time** in the **Category** box.

## Function details

### SUM

For times entered as a number in a single time unit

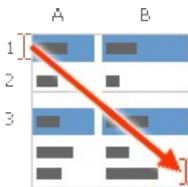
Use the TIME function to manipulate a part of a time— such as the hour or minute— within a formula.

# Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	B	C
	Time	Description	Amount
	10:35:00 AM	Hours	2
	10:35:00 AM	Minutes	10
1	10:35:00 AM	Seconds	30
2	<b>Formula</b>	<b>Description (Result)</b>	
3	=A2+TIME(C2,0,0)	Add 2 hours to the time above (12:35:00 PM)	
4	=A3+TIME(0,C3,0)	Add 10 minutes to the time above (10:45:00 AM)	
	=A4+TIME(0,0,C4)	Add 30 seconds to the time above (10:35:30 AM)	

## Functions details

TIME

[Show All](#)

# Calculate the difference between two dates

[Calculate the number of days between two dates](#)

Use the subtraction (-) operator or the NETWORKDAYS function to do this task.

If this function is not available, install and load the Analysis ToolPak add-in.

[How?](#)

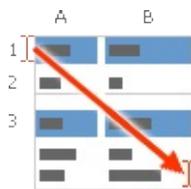
1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	B
	Date	
1	6/8/2007	
2	6/20/2007	
3	Formula	Description
	=A3-A2	Days between the two dates (12)
	=NETWORKDAYS(A2,A3)	Weekdays between the two dates (9)

**Note** To view the dates as numbers, select the cell and click **Cells** on the **Format** menu. Click the **Number** tab, and then click **Number** in the **Category** box.

## Function details

### NETWORKDAYS

Calculate the number of months between two dates

Use the MONTH and YEAR functions to do this task.

# Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	B
	Date	
	6/9/2007	
	9/2/2007	
1	12/10/2008	
2	<b>Formula</b>	<b>Description (Result)</b>
3		
4	=MONTH(A3)-MONTH(A2)	Months occurring between two dates in the same year (3)
	=(YEAR(A4)-YEAR(A3))*12+MONTH(A4)-MONTH(A3)	Months occurring between two dates over a year apart (15)

**Note** To view the dates as numbers, select the cell and click **Cells** on the

**Format** menu. Click the **Number** tab, and then click **Number** in the **Category** box.

## Function details

[MONTH](#)

[YEAR](#)

[Calculate the number of years between two dates](#)

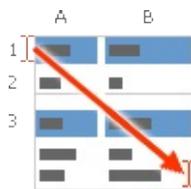
Use the YEAR function to do this task.

# Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	B
1	6/9/2007	
2	6/4/2010	
3	<b>Formula</b>	<b>Description (Result)</b>
	=YEAR(A3)-YEAR(A2)	Years occurring between two dates (3)

## Notes

- To view the dates as numbers, select the cell and click **Cells** on the **Format** menu. Click the **Number** tab, and then click **Number** in the **Category** box.
- You cannot subtract a date that is later than another date, or the error ##### appears in the cell.

## Function details

YEAR

[Show All](#)

# Calculate the difference between two times

[For presenting the result in the standard time format \(hours : minutes : seconds \)](#)

Use the subtraction operator (-) to find the difference between times, and the TEXT function to format the times.

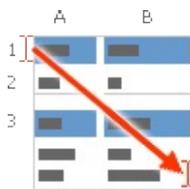
Hours never exceed 24, minutes never exceed 60, and seconds never exceed 60.

## Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Start time</b>	<b>End time</b>
	6/9/2007 10:35 AM	6/9/2007 3:30 PM
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=TEXT(B2-A2,"h")	Hours between two times (4)
	=TEXT(B2-A2,"h:mm")	Hours and minutes between two times (4:55)
	=TEXT(B2-A2,"h:mm:ss")	Hours and seconds between two times (4:55:00)

**Note** You can also apply the time and date number format without using the TEXT function to specify the format. However, if you use both a format applied with the TEXT function and number format, the TEXT function takes precedence.

## Function details

TEXT

For presenting the result in a total based on one time unit (120 minutes)

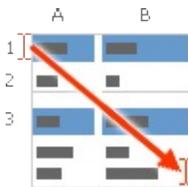
Use the INT function, or HOUR, MINUTE, and SECOND functions to do this task.

# Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Start time</b>	<b>End time</b>
	6/9/2007 10:35 AM	6/10/2007 3:30 PM
	<b>Formula</b>	<b>Description (Result)</b>
	=INT((B2-A2)*24)	Total hours between two times (28)
1	=(B2-A2)*1440	Total minutes between two times (1735)
2	=(B2-A2)*86400	Total seconds between two times (104100)
	=HOUR(B2-A2)	Hours between two times, when the difference does not exceed 24. (4)
	=MINUTE(B2-	Minutes between two times, when the difference does not

A2) exceed 60. (55)

=SECOND(B2- Seconds between two times, when the difference does not

A2) exceed 60. (0)

## Function details

[INT](#)

[HOUR](#)

[MINUTE](#)

[SECOND](#)

[Show All](#)

# Convert times

[Convert between time units](#)

Use the CONVERT function to do this task.

If this function is not available, install and load the Analysis ToolPak add-in.

[How?](#)

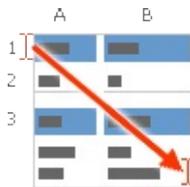
1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

### A Data

6

1	Formula	Description (Result)
2	=CONVERT(A2,"day","hr")	Convert 6 days to hours (144)
	=CONVERT(A2,"hr","mn")	Convert 6 hours to minutes (360)
	=CONVERT(A2,"yr", "day")	Convert 6 years to days (2191.5)

**Note** For conversions using a year, a year is treated as 365.25 days.

## Function details

### CONVERT

Convert hours from standard time format (hours : minutes : seconds) to a decimal number

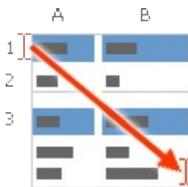
Use INT function to do this task.

# Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Time</b>	
<b>1</b>	10:35 AM	
<b>2</b>	12:15 PM	
<b>3</b>	<b>Formula</b>	<b>Description (Result)</b>
	$= (A2 - \text{INT}(A2)) * 24$	Number of hours since 12:00 AM (10.583333)
	$= (A3 - \text{INT}(A3)) * 24$	Number of hours since 12:00 AM (12.25)

## Function details

INT

Convert hours from decimal number to the standard time format (hours : minutes : seconds)

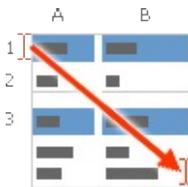
Use the divisor operator (/) and the TEXT function to do this task.

## Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	B
1	10.5833	
2	12.25	
3	<b>Formula</b>	<b>Description (Result)</b>
	=TEXT(A2/24, "h:mm")	Hours since 12:00 AM (10:35)
	=TEXT(A3/24, "h:mm")	Hours since 12:00 AM (12:15)

**Note** You can also apply the time number format without using the TEXT function to specify the format. To view the number as a time, select the cell and click **Cells** on the **Format** menu. Click the **Number** tab, and then click **Time** in the **Category** box. However, if you use both a format applied with the TEXT function and number format, the TEXT function takes precedence.

## Function details

[TEXT](#)

[Show All](#)

# Count days before a date

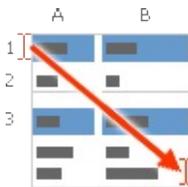
Use the TODAY function to do this task.

# Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	B
	<b>Date</b>	
1	1/1/2008	
2	6/1/2007	
3	<b>Formula</b>	<b>Description (Result)</b>
	=A2-TODAY()	Number of days from current date to end of 2007 (Varies)
	=A2-A3	Number of days from 6/1/2007 until the end of 2007 (214)

## Notes

- In the first formula above, the current date used is taken from the system clock.
- In the last formula above, to view the date as a number, select the cell and

click **Cells** on the **Format** menu. Click the **Number** tab, and then click **Number** in the **Category** box.

## Function details

[TODAY](#)

[Show All](#)

# Insert Julian dates

The phrase "Julian date" is sometimes used to refer to a date format that is a combination of the current year, and the number of days since the beginning of the year. For example, January 1, 2007 is represented as 2007001 and December 31, 2007 is represented as 2003356. Note that this format is not based on the Julian calendar.

There is also a Julian date commonly used in astronomy, which is a serial date system starting on January 1, 4713 B.C.E.

[Enter today as a "Julian date"](#)

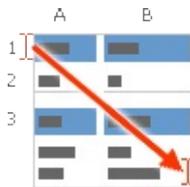
Use the TEXT, TODAY, and DATEVALUE functions to do this task.

# Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	B
	Formula	Description (Result)
1	=TEXT(TODAY() ,"yy")&TEXT((TODAY() -	Current day in
2	DATEVALUE("1/1/"&TEXT(TODAY(),"yy"))+1),"000")	"Julian" format,
3		with a two-digit year (Varies)
	=TEXT(TODAY() ,"yyyy")&TEXT((TODAY() -	Current day in
	DATEVALUE("1/1/"&TEXT(TODAY(),"yy"))+1),"000")	"Julian" format,
		with a four-digit year (Varies)

**Notes**

- The current date used is taken from the computer's system clock.
- In the formulas above, the year begins on January 1 (1/1). To convert the formulas to use a different starting date, edit the portion "1/1/" to the date you want.

## Function details

[DATEVALUE](#)

[TEXT](#)

[TODAY](#)

[Convert a date to a "Julian date"](#)

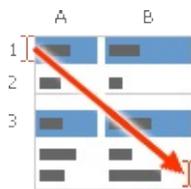
Use the TEXT and DATEVALUE functions to do this task.

## Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	
	<b>Date</b>	
	6/23/2007	
	<b>Formula</b>	<b>Description (Result)</b>
<b>1</b>	=TEXT(A2,"yy")&TEXT((A2-	Date above in "Julian"
<b>2</b>	DATEVALUE("1/1/"&TEXT(A2,"yy))+1),"000")	format, with a two-digit year (07174)
	=TEXT(A2,"yyyy")&TEXT((A2-	Date above in "Julian"
	DATEVALUE("1/1/"&TEXT(A2,"yy))+1),"000")	format, with a four-digit year (2007174)

**Note** In the formula above, the year begins on January 1 (1/1). To convert the formulas to use a different starting date, edit the portion "1/1/" to the date you

want.

## Function details

[DATEVALUE](#)

[TEXT](#)

[Convert a date to a Julian date used in astronomy](#)

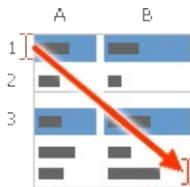
This formula only works for dates after 3/1/1901, and in workbooks using the 1900 date system.

# Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	B
1	6/23/2007	
2	<b>Formula</b>	<b>Description (Result)</b>
	=A2+2415018.50	First date above in Julian date format used in astronomy (2454274.50)

**Note** To view the date as a number, select the cell and click **Cells** on the **Format** menu. Click the **Number** tab, and then click **Number** in the **Category** box.

[Show All](#)

# Insert the current date and time in a cell

[Insert a static date or time](#)

**Current date** Select a cell and press CTRL+;

**Current time** Select a cell and press CTRL+SHIFT+;

**Current date and time** Select a cell and press CTRL+; then SPACE then CTRL+SHIFT+;

[Insert a date or time whose value is updated](#)

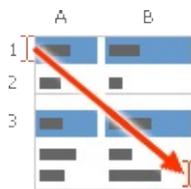
Use the TODAY and NOW functions to do this task.

## Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=TODAY()	Current date (varies)
<b>3</b>	=NOW()	Current date and time (varies)

**Note** The NOW() and TODAY() functions change only when the worksheet is calculated or when a macro that contains the function is run. They are not updated continuously. The date and time used are taken from the computer's system clock.

## Function details

[TODAY](#)

[NOW](#)

[Show All](#)

# Show dates as the day of the week

If you want to sort the cells by date, format the cells to show the day of the week. If you want to sort or filter by the day of the week regardless of the date, convert them to the text for the day of the week.

[Format cells to show dates as the day of the week](#)

1. Select the cells that contain dates you want to show as the day of the week.
2. On the **Format** menu, click **Cells**, and then click the **Number** tab.
3. Under **Category**, click **Custom**, and in the **Type** box, type dddd for full weekdays (Monday, Tuesday, etc.), or ddd for abbreviations (Mon, Tue, Wed, etc.).

[Convert dates to the text for the day of the week](#)

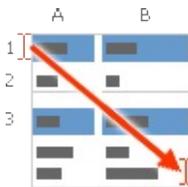
Use the TEXT and WEEKDAY functions to do this task.

# Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	B
	Date	
	19-Feb-2007	
1	3-Jan-2008	
2	Formula	Description (Result)
3	=TEXT(WEEKDAY(A2), "dddd")	Calculates the day of the week for the date and returns the full name of the day (Monday)
	=TEXT(WEEKDAY(A3), "ddd")	Calculates the day of the week for the date and returns the abbreviated name of the day (Thu)

## Function details

[WEEKDAY](#)

[TEXT](#)

[Show All](#)

# Add numbers

[Add numbers](#)

You can add numbers as you type them into a cell. For example, type =5+10 in a cell to display the result 15.

[Add all numbers in a contiguous row or column](#)

Use **AutoSum**  $\Sigma$  to do this task.

1. Click a cell below the column of numbers or to the right of the row of numbers.
2. Click **AutoSum**  $\Sigma$  on the **Standard toolbar**, and then press ENTER.

[Add numbers that are not in a contiguous row or column](#)

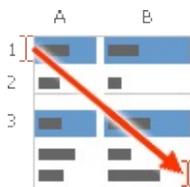
You can use the SUM function to do this task as in the following example.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Salesperson</b>	<b>Invoice</b>
	Buchanan	15,000
<b>1</b>	Buchanan	9,000
<b>2</b>	Suyama	8,000
<b>3</b>	Suyama	20,000
<b>4</b>	Buchanan	5,000
<b>5</b>	Dodsworth	22,500
<b>6</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>7</b>	=SUM(B2:B3, B5)	Adds 2 invoices from Buchanan, and one from Suyama (44,000)
	=SUM(B2,B5,B7)	Adds individual invoices from Buchanan, Suyama, and Dodsworth (57,500)

**Note** The SUM function can include up to 30 cell or range references.

For more information, see the [SUM](#) function.

[Add numbers based on one condition](#)

You can use the SUMIF function to create a total value for one range based on a value in another range, as in the following example.

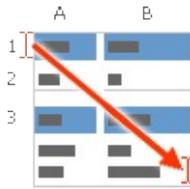
### Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column

headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	B
	Salesperson	Invoice
	Buchanan	15,000
	Buchanan	9,000
1	Suyama	8,000
2	Suyama	20,000
3	Buchanan	5,000
4	Dodsworth	22,500
5	Formula	Description (Result)
6	=SUMIF(A2:A7,"Buchanan",B2:B7)	Sum of invoices for Buchanan (29000)
7	=SUMIF(B2:B7,">=9000",B2:B7)	Sum of large invoices greater than or equal to 9,000 (66500)
	=SUMIF(B2:B7,"<9000",B2:B7)	Sum of small invoices less than 9,000 (13000)

The SUMIF function uses the following arguments

**1** **2** **3**  
 =SUMIF(A2:A7, "Buchanan", B2:B7)

Formula with SUMIF function

- 1 Range to evaluate: check these cells to determine whether a row meets your

criteria.

2 Criteria: the condition that the cells you evaluate must meet for the row to be included in the sum.

3 Range to sum: add the numbers in these cells, provided the row satisfies the condition.

For more information, see the [SUMIF](#) function.

[Add numbers based on multiple conditions](#)

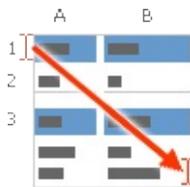
You can use the IF and SUM functions to do this task, as in the following example.

### Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

**A**

**B**

**C**

**D**

	Region	Salesperson	Type	Sales
	South	Buchanan	Beverages	3571
1	West	Davolio	Dairy	3338
2	East	Suyama	Beverages	5122
3	North	Suyama	Dairy	6239
4	South	Dodsworth	Produce	8677
5	South	Davolio	Meat	450
6	South	Davolio	Meat	7673
7	East	Suyama	Produce	664
8	North	Davolio	Produce	1500
9	South	Dodsworth	Meat	6596
	Formula	Description (Result)		
10	=SUM(IF((A2:A11="South")*	Sum of Meat sales in the South region (14719)		
11	(C2:C11="Meat"),D2:D11))			
	=SUM(IF((A2:A11="South")+	Sum of sales where the region is South or East (32753)		
	(A2:A11="East"),D2:D11))			

**Note** The formulas in the example must be entered as [array formulas](#). After copying the example to a blank worksheet, select the formula cell. Press F2, and then press CTRL+SHIFT+ENTER. If the formula is not entered as an array formula, the error #VALUE! is returned.

For more information, see the functions [SUM](#) and [IF](#) functions.

[Add numbers based on criteria stored in a separate range](#)

You can use the DSUM function to do this task, as in the following example.

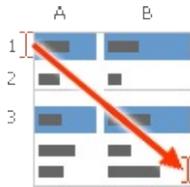
### Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.

2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
	<b>Region</b>	<b>Salesperson</b>	<b>Type</b>	<b>Sales</b>
	South	Buchanan	Beverages	3571
	West	Davolio	Dairy	3338
	East	Suyama	Beverages	5122
<b>1</b>	North	Suyama	Dairy	6239
<b>2</b>	South	Dodsworth	Produce	8677
<b>3</b>	South	Davolio	Meat	450
<b>4</b>	South	Davolio	Meat	7673
<b>5</b>	East	Suyama	Produce	664
<b>6</b>	North	Davolio	Produce	1500
<b>7</b>	South	Dodsworth	Meat	6596
<b>8</b>	<b>Region</b>	<b>Salesperson</b>	<b>Type</b>	<b>Sales</b>
<b>9</b>	South		Meat	
<b>10</b>			Produce	
<b>11</b>	<b>Formula</b>	<b>Description (Result)</b>		
	=DSUM(A1:D11, "Sales", A12:D13)	Sum of Meat sales in the South region (14719)		
	=DSUM(A1:D11, "Sales", A12:D14)	Sum of Meat and Produce sales in the South region (25560)		

The DSUM function uses the following arguments.

  
=DSUM(A1:D11, "Sales", A13:D15)

- 1 Range to evaluate: the list from which you want to sum.
- 2 Field: the label of the column to sum.
- 3 Criteria: is the range of cells that contains the conditions.

For more information, see the [DSUM](#) function.

 [Add numbers based on multiple conditions with the Conditional Sum Wizard](#)

If you want to summarize values in a [list](#) based on specific conditions, you can use the Conditional Sum Wizard. For example, if your list contains sales amounts for different salespeople, the Conditional Sum Wizard [add-in](#) program can help you create a formula that calculates the total sales amount for one salesperson.

1. Click a cell in the list.
2. On the **Tools** menu, point to **Wizard**, and then click **Conditional Sum**.

If the **Conditional Sum** command is not on the **Wizard** submenu on the **Tools** menu, you need to load the Conditional Sum Wizard add-in program.

 [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
  2. If the [add-in](#) you want to use is not listed in the **Add-Ins available** box, click **Browse**, and then locate the add-in.
  3. In the **Add-Ins available** box, select the check box next to the add-in you want to load, and then click **OK**.
  4. If necessary, follow the instructions in the setup program.
3. Follow the instructions in the wizard.

**Note** The formulas created by the Conditional Sum Wizard are [array formulas](#). After you edit these formulas, you must press CTRL+SHIFT+ENTER to lock in the formulas.

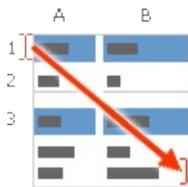
[Show All](#)

# Calculate a running balance

1. Set up a worksheet like the following example, or copy it to a blank worksheet.



1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

## Example

	A	B	C
1	<b>Deposits</b>	<b>Withdrawals</b>	<b>Balance</b>
2	\$1,000	\$625	=SUM(A2,-B2)
3	1000	740	=SUM(C2,A3,-B3)

2. Click anywhere outside cell C3 to see the calculated total.
3. To maintain the running balance, add a row for each new entry.

[How?](#)

1. Type the amounts of your deposits and withdrawals into the empty rows directly below the existing data.

For instance, if you were using the example above, you would type the deposits into A4, A5, and so on, and the withdrawals into B4, B5, and so on.

2. Extend the running balance formula into the new rows by selecting the last cell in the balance column and then double-clicking the [fill handle](#).

For instance, if you were using the example above, you would select cell C3 and then double-click its fill handle to extend the formula into all new rows that contain deposit and withdrawal values.

[Show All](#)

# Calculate the average of numbers

The average is also called the mean.

[Calculate the average of numbers in a contiguous row or column](#)

1. Click a cell below or to the right of the numbers for which you want to find the average.
2. Click the arrow next to **AutoSum**  $\Sigma$  on the **Standard toolbar**, and then click **Average**, and then press ENTER.

[Calculate the average of numbers not in a contiguous row or column](#)

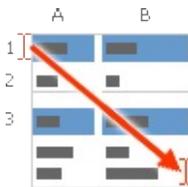
Use the AVERAGE function to do this task.

# Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	
	Data	
	10	
	7	
<b>1</b>	9	
<b>2</b>	27	
<b>3</b>	0	
<b>4</b>	4	
<b>5</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>6</b>	=AVERAGE(A2:A7)	Averages all of numbers in list above (9.5)
<b>7</b>	=AVERAGE(A2:A4,A7)	Averages the top three and the last number in the list (7.5)

=AVERAGE(IF(A2:A7<>0, Averages the numbers in the list except those  
A2:A7, "")) that contain zero, such as cell A6 (11.4)

**Note** The last formula in the example must be entered as an [array formula](#). After copying the example to a blank worksheet, select the cell A11. Press F2, and then press CTRL+SHIFT+ENTER. If the formula is not entered as an array formula, the error #VALUE! is returned.

## Function details

### AVERAGE

[Calculate a weighted average](#)

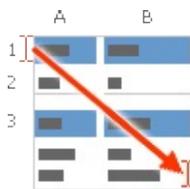
Use the SUMPRODUCT and SUM functions to do this task.

# Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

This example calculates the average price paid for a unit across three purchases, where each purchase is for a different number of units at a different price per unit.

	A	B
	Price per unit	Number of units
	20	500
	25	750
1	35	200
2	<b>Formula</b>	<b>Description (Result)</b>
3		Divides the total cost of all
4	=SUMPRODUCT(A2:A4,B2:B4)/SUM(B2:B4)	three orders by the total number of units ordered

(24.66)

## Function details

[SUM](#)

[SUMPRODUCT](#)

[Calculate the average of numbers, ignoring zero \(0\) values](#)

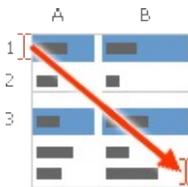
Use the AVERAGE and IF functions to do this task.

## Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	B
1	10	
2	7	
3	9	
4	27	
5	0	
6	4	
7	<b>Formula</b>	<b>Description (Result)</b>
	=AVERAGE(IF(A2:A7<>0, Averages the numbers in the list except those A2:A7, ""))	that contain zero, such as cell A6 (11.4)

**Note** The formula in the example must be entered as an [array formula](#). After

copying the example to a blank worksheet, select the cell A9. Press F2, and then press CTRL+SHIFT+ENTER. If the formula is not entered as an array formula, the error #VALUE! is returned.

## Function details

[AVERAGE](#)

[IF](#)

[Show All](#)

# Calculate the median of a group of numbers

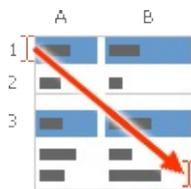
Use the MEDIAN function to do this task. The median is the value at the center of an ordered range of numbers.

## Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	
	<b>Data</b>	
<b>1</b>	10	
<b>2</b>	7	
<b>3</b>	9	
<b>4</b>	27	
<b>5</b>	0	
<b>6</b>	4	
<b>7</b>	<b>Formula</b>	<b>Description (Result)</b>
	=MEDIAN(A2:A7)	Median of numbers in list above (8)

## Function details

[MEDIAN](#)

[Show All](#)

# Calculate the difference between two numbers as a percentage

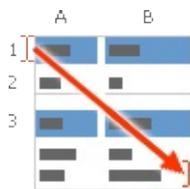
Use the subtraction (-) and division (/) operators, and the ABS function to do this task.

## Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	B
	November	December
1	2342	2500
2	Formula	Description (Result)
	= $(B2-A2)/ABS(A2)$	Percentage change (0.06746 or 6.75%)

**Note** To view the number as a percent, select the cell and click **Cells** on the **Format** menu. Click the **Number** tab, and then click **Percentage** in the **Category** box.

## Function details

[ABS](#)

[Show All](#)

# Calculate the smallest or largest number in a range

[If the cells are in a contiguous row or column](#)

1. Select a cell below or to the right of the numbers for which you want to find the smallest number
2. Click the arrow next to **AutoSum**  $\Sigma$ , and then click **Min** (calculates the smallest), or **Max** (calculates the largest), and then press ENTER.

[If the cells are not in a contiguous row or column](#)

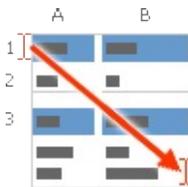
Use the MIN, MAX, SMALL, or LARGE functions to do this task.

# Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	
	Data	
10		
7		
<b>1</b>	9	
<b>2</b>	27	
<b>3</b>	0	
<b>4</b>	4	
<b>5</b>		
	Formula	Description (Result)
<b>6</b>	=MIN(A2:A7)	Smallest number in the range (0)
<b>7</b>	=MAX(A2:A7)	Largest number in the range (27)
	=SMALL(A2:A7, 2)	Second smallest number in the range (4)

=LARGE(A2:A7,3) Third largest number in the range (9)

## Function details

[LARGE](#)

[MAX](#)

[MIN](#)

[SMALL](#)

[Show All](#)

# Check if a number is greater than or less than another number

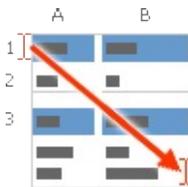
Use the IF function to do this task.

# Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

A	
Data	
15,000	
1 9,000	
2 8,000	
3	Formula
4	Description (Result)
=A2>A3	Is A2 greater than number in A3? (TRUE)
=IF(A3<=A4, "OK", "Not OK")	Is A3 less than or equal to the number in A4? (Not OK)

## Functions details

[IF](#)

[Show All](#)

# Convert measurements

Use the CONVERT function to convert a wide range of measurements, including measures of weight, distance, time, pressure, force, energy, power, magnetism, temperature, and liquid measure.

If this function is not available, install and load the Analysis ToolPak add-in.

[How?](#)

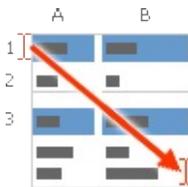
1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

# Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

## A Data

6

	<b>Formula</b>	<b>Description (Result)</b>
	=CONVERT(A2,"C","F")	Convert 6 degrees Celsius to Fahrenheit (42.8)
1	=CONVERT(A2,"tsp","tbs")	Convert 6 teaspoons to tablespoons (2)
2	=CONVERT(A2,"gal","l")	Convert 6 gallons to liters (22.71741274)
	=CONVERT(A2,"mi","km")	Convert 6 miles to kilometers (9.656064)
	=CONVERT(A2,"km","mi")	Convert 6 kilometers to miles (3.728227153)
	=CONVERT(A2,"in","ft")	Convert 6 inches to feet (0.5)
	=CONVERT(A2,"cm","in")	Convert 6 centimeters to inches (2.362204724)

**Note** To see a full list of all the measures that can be converted see the CONVERT function help topic.

## Function details

[CONVERT](#)

[Show All](#)

# Count cells that contain numbers

Use the COUNT function to do this task.

[If the cells are in a contiguous row or column](#)

1. Select a cell below or to the right of the numbers you want to count.
2. Click the arrow next to the **AutoSum**  $\Sigma$  on the **Standard toolbar**, and then click **Count**, and then press ENTER.

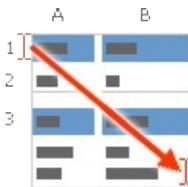
[If the cells are not in a contiguous row or column](#)

# Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

A	
Data	
Sales	
1	12/8/2007
2	19
3	22.44
4	Formula
Description (Result)	
5	=COUNT(A2:A6) Counts number of cells that contain numbers (3) in the list. A date is a number.
6	=COUNT(A2:A3,A6) Counts number of cells that contain numbers (2), of the top two and bottom cells in the list. A date is a number.

## Function details

[COUNT](#)

[Show All](#)

# Count numbers greater than or less than a number

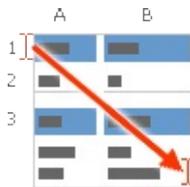
Use the COUNTIF function to do this task.

# Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Salesperson</b>	<b>Invoice</b>
<b>1</b>	Buchanan	15,000
<b>2</b>	Buchanan	9,000
<b>3</b>	Suyama	8,000
<b>4</b>	Suyama	20,000
<b>5</b>	Buchanan	5,000
<b>6</b>	Dodsworth	22,500
<b>7</b>	<b>Formula</b>	<b>Description (Result)</b>
	=COUNTIF(B2:B7,">9000")	Numbers above 9000 (3)
	=COUNTIF(B2:B7,"<=9000")	Numbers less than or equal to 9000 (3)

## Function details

[COUNTIF](#)

[Show All](#)

# Create a multiplication table

A multiplication table is a two-variable [data table](#).

1. Set up a worksheet with the following structure.
- 2.

**A**

**1** 1

**2** 1

**3** =A1\*A2

3. Enter a row of values from B3 to the right. For example, 1 through 10.
4. Enter a column of values from A4 down. For example, 1 through 10.
5. Select all cells in the range except cells A1 and A2.
6. On the **Data** menu, click **Table**.
7. In the **Row input cell** box, enter A1.
8. In the **Column input cell** box, enter A2.
9. Click **OK**.
10. If you like, freeze the data table by converting the result to their values.

[How?](#)

1. Select all resulting values in the [data table](#).
2. Click **Copy**  on the **Standard toolbar**, and select the upper-left cell of the [paste area](#).
3. Click the arrow next to **Paste** , click **Values**.

**Note** Because the resulting values are in an [array](#), you must convert all of the values to constant values.

[Show All](#)

# Divide numbers

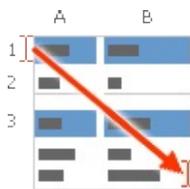
Type =10/5 in a cell to display the result 2.

# Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

**A**

**Data**

**1** 15,000

**2** 12

**3** **Formula**      **Description (Result)**

=A2/A3   Divides 15,000 by 12 (1250)

[Show All](#)

# Hide error values and error indicators in cells

For example, the formula =1/0 returns #DIV/0. Error values include #DIV/0!, #N/A, #NAME?, #NULL!, #NUM!, #REF!, and #VALUE!.



## [Format text in cells that contain errors so they don't show](#)

1. Select the cells that contain the error value.
2. On the **Format** menu, click **Conditional Formatting**.
3. In the box on the left, click **Formula Is**.
4. In the box on the right, type =ISERROR(*reference*), where *reference* is a reference to the cell that contains the error value.
5. Click **Format**, and then click the **Font** tab.
6. Click **Format**.
7. In the **Color** box, select white.



## [Display a dash, #N/A, or NA in place of an error value](#)

Use the IF, ISERROR, and NA functions to do this task.

1. Select the cell that contain the error value.
2. Wrap the following formula around the formula in the cell, where *old\_formula* is the formula that was previously in the cell.

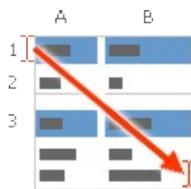
```
=IF(ISERROR(old_formula),"",old_formula)
```

# Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	B
	<b>Data</b>	
10		
0		
1	Formula	Description (Result)
2	=A2/A3	Results in an error (#DIV/0)
3	=IF(ISERROR(A2/A3),"NA",A2/A3)	Returns NA when the value is an error
	=IF(ISERROR(A2/A3),"-",A2/A3)	Returns a dash when the value is an error
	=IF(ISERROR(A2/A3),NA(),A2-A3)	Returns #N/A when the value is an error

## Function details

### [IF](#)

### [ISERROR](#)

#### [Hide error values in a PivotTable report](#)

1. Click the report.
2. On the **PivotTable** toolbar, click **PivotTable**, and then click **Table Options**.
3. Do one or more of the following:

**Change error display** Select the **For error values, show** check box under **Format options**. In the box, type the value you want to display instead of errors. To display errors as blank cells, delete any characters in the box.

**Change empty cell display** Select the **For empty cells, show** check box. In the box, type the value you want to display in empty cells. To display blank cells, delete any characters in the box. To display zeros, clear the check box.

#### [Hide error indicators in cells](#)

If a cell contains a formula that breaks one of the rules, a triangle appears in the top-left corner of the cell. You can prevent these indicators from being displayed.



Cell with a formula problem

1. On the **Tools** menu, click **Options** and then click the **Error Checking** tab.
2. Clear the **Enable background error checking** check box.

[Show All](#)

# **Increase or decrease a number by a percentage**

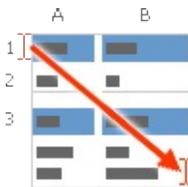
Use the formulas below to do these tasks.

# Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Number</b>	<b>Percent Increase</b>
	23	3%
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=A2*(1+5%)	Increases number in A2 by 5% (24.15)
	=A2*(1+B2)	Increase number in A2 by the percent value in B2: 3% (23.69)
	=A2*(1-B2)	Decrease number in A2 by the percent value in B2: 3% (22.31)

**Note** When you use a number followed by a percent sign (%), the number is interpreted as a hundredth of its value. For example, 5% is interpreted as .05.

[Show All](#)

# Multiply numbers

Type =5\*10 in a cell to display the result 50.

[Multiply a range of numbers by a number](#)

**Important** This procedure replaces the numbers in the range with the result of the multiplication.

1. In an empty cell, enter the number you want to multiply by.
2. Select the cell, and on the **Edit** menu, click **Copy**.
3. Select the range of numbers you want to multiply.
4. On the **Edit** menu, click **Paste Special**.
5. Under **Operation**, click **Multiply**.
6. Click **OK**.
7. Delete the content of the cell entered in the first step.

[Multiply numbers in different cells using a formula](#)

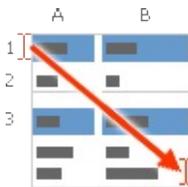
Use the asterisk (\*) operator or the PRODUCT function to do this task.

# Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	B
1	15	30
2	30	75
3	<b>Formula</b>	<b>Description (Result)</b>
4	=A2*A3	Multiplies the numbers in the first two cells (75)
	=PRODUCT(A2:A4)	Multiplies all the numbers in the range (2250)
	=PRODUCT(A2:A4,2)	Multiplies all the numbers in the range, and 2 (4500)

# Function details

[PRODUCT](#)

[Show All](#)

# Raise a number to a power

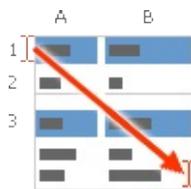
Use the "^" operator or the POWER function to do this task.

## Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=POWER(5,2)	Calculates five squared (25)
<b>3</b>	=5^3	Calculates five cubed (125)

## Function details

[POWER](#)

[Show All](#)

# Round a number

[Change the number of decimal places displayed, without changing the number](#)

## On a worksheet

1. Select the cells you want to format.
2. To display more or fewer digits after the decimal point, click **Increase Decimal**  or **Decrease Decimal**  on the **Formatting toolbar**.

## In a built-in number format

1. On the **Format** menu, click **Cells**, and then click the **Number** tab.
2. In the **Category** list, click **Currency**, **Accounting**, **Percentage**, or **Scientific**.
3. In the **Decimal places** box, enter the number of decimal places you want to display.

[Round a number up](#)

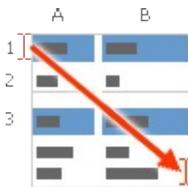
Use the ROUNDUP, EVEN, or ODD functions to do this task.

# Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	B
	<b>Data</b>	
	20.3	
	-5.9	
1	12.5493	
2	<b>Formula</b>	<b>Description (Result)</b>
3	=ROUNDUP(A2,0)	Rounds 20.3 up to the nearest whole number (21)
4	=ROUNDUP(A3,0)	Rounds -5.9 up (-6)
	=ROUNDUP(A4,2)	Rounds 12.5493 up to the nearest hundredth, two decimal places (12.55)
	=EVEN(A2)	Rounds 20.3 up to the nearest even number (22)
	=ODD(A2)	Rounds 20.3 up to the nearest odd number (21)

## Function details

[ROUNDUP](#)

[EVEN](#)

[ODD](#)

[Round a number down](#)

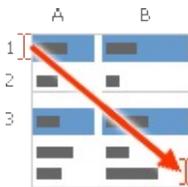
Use the ROUNDDOWN function to do this task.

# Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	B
	<b>Data</b>	
	20.3	
	-5.9	
1	12.5493	
2	<b>Formula</b>	<b>Description (Result)</b>
3	=ROUNDDOWN(A2,0)	Rounds 20.3 down to the nearest whole number (
4	=ROUNDDOWN(A3,0)	Rounds -5.9 down (-5)
	=ROUNDDOWN(A4,2)	Rounds the number down to the nearest hundredth, two decimal places ( 12.54)

## Functions details

### ROUNDDOWN

Round a number to the nearest number

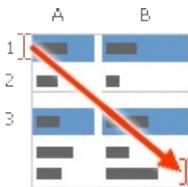
Use the ROUND function to do this task.

# Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	B
	<b>Data</b>	
	20.3	
	5.9	
1	-5.9	
2	<b>Formula</b>	<b>Description (Result)</b>
3	=ROUND(A2,0)	Rounds 20.3 down, because the fractional part is less than .5 (20)
4	=ROUND(A3,0)	Rounds 5.9 up, because the fractional part is greater than .5 (6)
	=ROUND(A4,0)	Rounds -5.9 down, because the fractional part is less than -.5 (-6)

## Function details

ROUND

Round a number to a near fraction

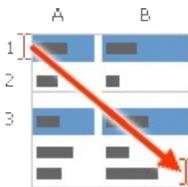
Use the ROUND function to do this task.

# Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

A	
Data	
	1.25
	30.452
1	Formula
2	Description (Result)
2	Rounds the number to the nearest tenth (one decimal
3	=ROUND(A2,1) place). Because the portion to be rounded is 0.05 or greater, the number is rounded up (result: 1.3)
	Rounds the number to the nearest hundredth (two decimal
	=ROUND(A3,2) places). Because the portion to be rounded, 0.002, is less than 0.005, the number is rounded down (result: 30.45)

## Functions details

### ROUND

Round a number to a significant digit above 0

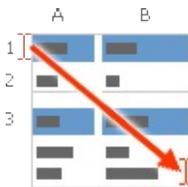
Use the ROUND, ROUNDUP, ROUNDDOWN, LEN, and INT functions to do this task.

# Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	
	Data	
	5492820	
	22230	
1	Formula	Description (Result)
2	=ROUND(A2,3-LEN(INT(A2)))	Rounds the top number to 3 significant digits (5490000)
3	=ROUNDDOWN(A3,3-LEN(INT(A3)))	Rounds the bottom number down to 3 significant digits (22200)
	=ROUNDUP(A2,6-LEN(INT(A2)))	Rounds the top number up to 5 significant digits (5492900)

## Function details

[ROUNDUP](#)

[ROUNDDOWN](#)

[ROUND](#)

[LEN](#)

[INT](#)

[Show All](#)

# Subtract numbers

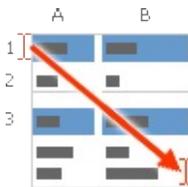
Type =10-5 in a cell to display the result 5.

# Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

A		
Data		
	15,000	
1	9,000	
2	-8,000	
3	Formula	Description (Result)
4	=A2-A3	Subtracts 9,000 from 15,000 (6,000)
	=SUM(A2:A4)	Adds all numbers in the list, including negative numbers (16,000)

**Note** Adding a negative number is the same as subtracting.

## Function details

[SUM](#)

[Show All](#)

# Change the case of text

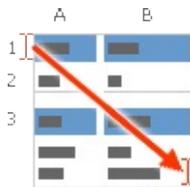
Use the UPPER, LOWER, or PROPER functions to do this task.

## Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

**A**

**Name**

nancy Davolio

<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=UPPER(A2)	Changes text to all UPPERCASE (NANCY DAVOLIO)
	=LOWER(A2)	Changes text to all lowercase (nancy davolio)
	=PROPER(A2)	Changes text to Title Case (Nancy Davolio)

## Function details

[UPPER](#)

[LOWER](#)

[PROPER](#)

[Show All](#)

# Check if a cell contains text

[Check if a cell has any text in it](#)

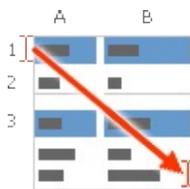
Use the ISTEXT function to do this task.

# Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	
<b>1</b>	Davolio	
<b>2</b>	123	
<b>3</b>	<b>Formula</b>	<b>Description</b>
	=ISTEXT(A2)	Checks to see if cell A2 has text (TRUE)
	=ISTEXT(A3)	Checks to see if cell A3 has text (FALSE)

## Function details

### ISTEXT

Check if cell contents matches specific text, and return a value

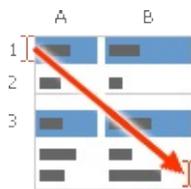
Use the IF function to do this task. The IF function returns results you specify.

# Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	
	<b>Data</b>	
	Davolio	
<b>1</b>	<b>Formula</b>	<b>Description</b>
<b>2</b>	=IF(A2="Davolio","OK", "Not OK")	Checks to see if A2 is Davolio (OK)
	=IF(A2="Buchanan", TRUE, FALSE)	Checks to see if A2 is Buchanan (FALSE)

## Function details

### IF

[Filter a list for rows that contain specific text](#)

1. Click a cell in the list you want to filter.
2. On the **Data** menu, point to **Filter**, and then click **AutoFilter**.
3. Click the arrow ▼ in the column that contains the numbers, and click **(Custom)**.
4. In the box on the left, click **equals**, or **does not equal**, **contains**, or **does not contain**.
5. In the box on the right, enter the text you want.
6. If you need to find text values that share some characters but not others, use a wildcard character.

[How?](#)

The following wildcard characters can be used as comparison [criteria](#) for filters, and when searching and replacing content.

Use	To find
? (question mark)	Any single character For example, sm?th finds "smith" and "smyth"
* (asterisk)	Any number of characters For example, *east finds "Northeast" and "Southeast"
~ (tilde) followed by ?, *, or ~	A question mark, asterisk, or tilde For example, fy91~? finds "fy91?"

[Check if part of a cell matches specific text, and return a value](#)

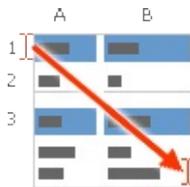
Use the IF, FIND, SEARCH and ISNUMBER functions to do this task.

# Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	B
	<b>Data</b>	
	Davolio	
1	BD123	
2		
3		
	<b>Formula</b>	<b>Description (Result)</b>
	=IF(ISNUMBER(FIND("v",A2)),"OK", "Not OK")	Checks to see if A2 contain the letter v (OK)
	=ISNUMBER(FIND("BD",A3))	Checks to see if A3 contains BD (TRUE)

The formula above uses the following arguments.

=ISNUMBER(FIND(<sup>1</sup>search\_for, <sup>2</sup>to\_search))

Formula to check for text

1 search\_for: is what you want to check for

2 to\_search: the cell that has the text you want to check

**Note** The FIND function is case sensitive. Use the SEARCH function in place of the the FIND function if you want to ignore case.

# Function details

[IF](#)

[ISNUMBER](#)

[FIND](#)

[SEARCH](#)

[Find cells that contain text](#)

1. Select the [range](#) of cells you want to search.

If you want to search the entire worksheet, click any cell.

2. On the **Edit** menu, click **Find**.
3. In the **Find what** box, enter the text or numbers you want to search for or choose a recent search from the **Find what** drop down box.

**Note** You can use wildcard characters in your search criteria.

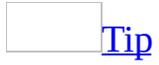
4. If you want to specify a format for your search, click **Format** and make your selections in the **Find Format** dialog box.
5. Click **Options** to further define your search. For example, you can search for all of the cells that contain the same kind of data, such as formulas.

In the **Within** box, you can select **Sheet** or **Workbook** to search a worksheet or an entire workbook.

6. Click **Find All** or **Find Next**.

**Find All** lists every occurrence of the item you are searching for and allows you to make a cell active by selecting a specific occurrence. You can sort the results of a **Find All** search by clicking a header.

**Note** To cancel a search in progress, press ESC.



Tip

To find data in a [list](#), you can use filters to display only the rows that contain the desired data. For example, in a list that includes international sales data, you can display just domestic sales.

[Show All](#)

# Combine first and last names

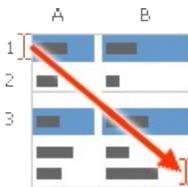
Use the CONCATENATE function or the ampersand (&) operator to do this task.

# Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	B
	First Name	Last Name
	Nancy	Davolio
	Andrew	Fuller
1	Formula	Description (Result)
2	=A2&" "&B2	Combines the names above, separated by a space (Nancy Davolio)
3	=B3&", "&A3	Combines the names above, separated by a comma (Fuller, Andrew)
	=CONCATENATE(A2," ",B2)	Combines the names above, separated by a space (Nancy Davolio)

**Note** To replace the formula with the results, select the cells, click **Copy** ,

click **Paste** , click **Paste Options**  , and then click **Values Only**.

## Function details

[CONCATENATE](#)

[Show All](#)

# Combine text and numbers

 [Display text before or after a number in a cell, using a number format](#)

If a column you want to sort contains both numbers and text (such as Product #15, Product #100, Product #200), it may not sort as expected. You can use a number format to add text without changing the sorting behavior of the number.

1. Select the cells you want to format.
2. On the **Format** menu, click **Cells**, and then click the **Number** tab.
3. In the **Category** list, click a category, and then click a built-in format that resembles the one you want.
4. In the **Category** list, click **Custom**.
5. In the **Type** box, edit the number format codes to create the format you want.

To display both text and numbers in a cell, enclose the text characters in double quotation marks ( " ") or precede the numbers with a backslash (\). Editing a built-in format does not remove the format.

To display	Use this code
12 as Product #12	"Product # " 0
12:00 as 12:00 AM EST	h:mm AM/PM "EST"
-12 as \$-12.00 Shortage and 12 as \$12.00 Surplus	\$0.00 "Surplus";\$-0.00 "Shortage"

 [Combine text and numbers from different cells into the same cell, using a formula](#)

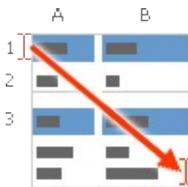
Use the CONCATENATION, TEXT functions and the ampersand (&) operator to do this task.

# Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Salesperson</b>	<b>Sales</b>
	Buchanan	28
	Dodsworth	40%
	<b>Formula</b>	<b>Description (Result)</b>
<b>1</b>	=A2&" sold "&B2&" units."	Combines contents above into a phrase (Buchanan sold 28 units)
<b>2</b>	=A3&" sold "&TEXT(B3,"0%")&" of the total sales."	Combines contents above into a phrase (Dodsworth sold 40% of the total sales)
<b>3</b>	=CONCATENATE(A2," sold ",B2," units.")	Combines contents above into a phrase (Buchanan sold 28 units)

Note the use of the TEXT function in the formula. When you join a number to a string of text by using the concatenation operator, use the TEXT function to format the number. The formula uses the underlying value from the referenced cell (.4 in this example)— not the formatted value you see in the cell (40%). The TEXT function restores the number formatting.

## Functions details

[CONCATENATE](#)

[TEXT](#)

[Show All](#)

# Combine text with a date or time

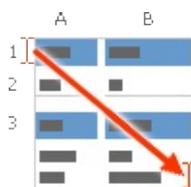
Use the TEXT function and the & (ampersand) operator to do this task.

# Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

A	
Data	
Billing Date	
5-Jun-2007	
1	Formula
2	Description (Result)
= "Statement date:	Combine text in a formula with a date
3 "&TEXT(A3, "d-mmm- yyyy")	(Statement date: 5-Jun-2007)
=A2&" "&TEXT(A3, "mmm-dd-yyyy")	Combine text and date from difference cells into one cell (Billing Date Jun-05-2007)

**Note** To copy the number format code used in a cell into the formula, select the cell, then click **Cells** on the **Format** menu. Click the **Number** tab. In the

**Category** box, click **Custom**, and then copy the contents of the **Type** box.

## Functions details

[TEXT](#)

[Show All](#)

# Compare cell contents

[Compare one cell to another cell](#)

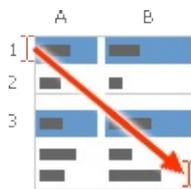
Use the EXACT function to do this task.

## Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	B
	<b>Data</b>	
1	BD122	
2	BD123	
3	BD123	
	<b>Formula</b>	<b>Description (Result)</b>
4	=EXACT(A2,A3)	Compare contents of A2 and A3 (FALSE)
	=EXACT(A3,A4)	Compare contents of A3 and A4 (TRUE)

**Note** EXACT is case-sensitive but ignores formatting differences.

## Function details

[EXACT](#)

[Compare one value to a list of values](#)

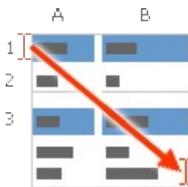
Use the EXACT and OR functions to do this task.

# Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>List</b>	<b>Cell</b>
<b>1</b>	Apple	Grape
<b>2</b>	Orange	
<b>3</b>	Banana	
<b>4</b>	<b>Formula</b>	<b>Description (Result)</b>
	=OR(EXACT(B2, A2:A4))	Compares "Grape" to each value in the list (FALSE)

**Note** The formula in the example must be entered as an [array formula](#). After copying the example to a blank worksheet, select each formula cell individually. Press F2, and then press CTRL+SHIFT+ENTER. If the formula is not entered as an array formula, the error #VALUE! is returned.

The formula above uses the following syntax:

```
=OR(EXACT(TestValue, CompareRange))
```

TestValue refers to a cell containing a user-entered value; CompareRange refers to a list of text values to be compared against.

## **Function details**

OR

EXACT

[Show All](#)

# Count nonblank cells

Use the COUNTA function to do this task.

# Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	
	<b>Data</b>	
1	Sales	
2	19	
3	TRUE	
4	Formula	Description (Result)
5	=COUNTA(A2:A6)	Counts the number of nonblank cells in the list above (3)
6	=COUNTA(A2:A3, A6)	Counts the number of nonblank cells in the top two, and bottom cell in the list (1)

## Function details

[COUNTA](#)

[Show All](#)

# Remove characters from text

[Remove a specified number of characters from the right or left side of text](#)

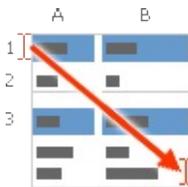
Use the LEN, LEFT, and RIGHT functions to do this task.

# Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	B
	<b>Data</b>	
	Vitamin A	
1	Vitamin B1	
2	<b>Formula</b>	<b>Description (Result)</b>
3	=LEFT(A2, LEN(A2)-2)	Removes last two characters from contents of A2 (Vitamin)
	=RIGHT(A3, LEN(A3)-8)	Removes first 8 characters from A3 (B1)

# Function details

[LEN](#)

[LEFT](#)

[RIGHT](#)



[Remove a text string from a worksheet using the \*\*Replace\*\* command](#)

1. Select the [range](#) of cells you want to search.

If you want to search the entire worksheet, click any cell in the worksheet.

2. On the **Edit** menu, click **Replace**.
3. In the **Find what** box, enter the text or numbers you want to search for or choose a recent search from the **Find what** drop down box.

**Note** You can use wildcard characters in your search criteria.

4. If you want to specify a format for your search, click **Format** and make your selections in the **Find Format** dialog box.
5. Click **Options** to further define your search. For example, you can search for all of the cells that contain the same kind of data, such as formulas.

In the **Within** box, you can select **Sheet** or **Workbook** to search a worksheet or an entire workbook.

6. In the **Replace with** box, enter the replacement characters and specific formats if necessary.

If you want to delete the characters in the **Find what** box, leave the **Replace with** box blank.

7. Click **Find Next**.
8. To replace the highlighted occurrence or all occurrences of the found characters, click **Replace** or **Replace All**.

**Note** To cancel a search in progress, press ESC.

[Show All](#)

# **Remove spaces from the beginning and end of a cell**

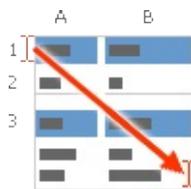
Use the TRIM function to do this task.

## Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

**A**

**Data**

**1** BD122

**2** **Formula**

**Description (Result)**

=TRIM(A2) Removes the spaces from the string " BD122 " (BD112)

## Function details

[TRIM](#)

[Show All](#)

# Repeat a character in a cell

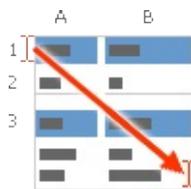
Use the REPT function to do this task.

## Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=REPT(".",6)	Repeat a period (.) 6 times (.....)
<b>3</b>	=REPT("-",4)	Repeat a dash (-) 4 times (----)

## Function details

[REPT](#)

[Show All](#)

# Display or hide zero values

## [Display or hide all zero values on a worksheet](#)

1. On the **Tools** menu, click **Options**, and then click the **View** tab.
2. Do one of the following:
  - To display zero (0) values in cells, select the **Zero values** check box.
  - To display zero values as blank cells, clear the check box.

## [Use a number format to hide zero values in selected cells](#)

**Caution** This topic applies a format to hide zero values in selected cells. If the value in one of these cells changes to a nonzero value, the format of the value will be similar to the General number format.

1. Select the cells that contain the zeros (0's) you want to hide.
2. On the **Format** menu, click **Cells**, and then click the **Number** tab.
3. In the **Category** list, click **Custom**.
4. In the **Type** box, type **0;-0;;@**

## Notes

- The hidden values appear only in the formula bar — or in the cell if you edit within the cell— and are not printed.
- To display hidden values again, select the cells, click the **Cells** command on the **Format** menu, and then click the **Number** tab. In the **Category** list, click **General** to apply the default number format. To redisplay a date or a time, select the appropriate date or time format on the **Number** tab.

## [Use a conditional format to hide zero values returned by a formula](#)

1. Select the cell that contains the zero value.
2. On the **Format** menu, click **Conditional Formatting**.

3. In the box on the left, click **Cell Value Is**.
4. In the second box from the left, click **equal to**.
5. In the box on the right, type 0.
6. Click **Format**, and then click the **Font** tab.
7. In the **Color** box, select white.

[Use a formula to display zeros as a blanks, or dashes](#)

Use the IF function to do this task.



## Function details

### IF

[Hide zero values in a PivotTable report](#)

1. Click the report.
2. On the **PivotTable** toolbar, click **PivotTable**, and then click **Table Options**.
3. Do one or more of the following:

**Change error display** Select the **For error values, show** check box under **Format options**. In the box, type the value you want to display instead of errors. To display errors as blank cells, delete any characters in the box.

**Change empty cell display** Select the **For empty cells, show** check box. In the box, type the value you want to display in empty cells. To display blank cells, delete any characters in the box. To display zeros, clear the check box.

[Show All](#)

# Look up values in a range

 [Create a lookup formula with the Lookup Wizard](#)

The Lookup Wizard creates the lookup formula based on a worksheet data that has row and column labels. The Lookup Wizard helps you find other values in a row when you know the value in one column, and vice versa. The Lookup Wizard uses INDEX and MATCH in the formulas it creates.

1. On the **Tools** menu, click **Add-ins**, select the **Lookup Wizard** box, and then click **OK**.
2. Click a cell in the range.
3. On the **Tools** menu, click **Lookup**.
4. Follow the instructions in the wizard.

 [Look up values by comparing them with the values in the first column](#)

Use the VLOOKUP function to do this task.

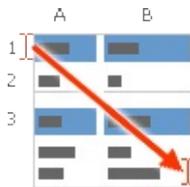
**Important** This method only works if the values in the first row or column have been sorted in ascending order.

# Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

In this example, you know the frequency and want to look up the associated color.

	<b>A</b>	<b>B</b>
	<b>Frequency</b>	<b>Color</b>
<b>1</b>	4.14	red
<b>2</b>	4.19	orange
<b>3</b>	5.17	yellow
<b>4</b>	5.77	green
<b>5</b>	6.39	blue
<b>6</b>	<b>Formula</b>	<b>Description (Result)</b>
	=VLOOKUP(5.77, A1:B6, 2)	Looks up 5.77 in column A, and returns the value from column B that's in the same row (green)

## Function details

### VLOOKUP

Look up values by comparing them with the values in the first row

Use the HLOOKUP function to do this task

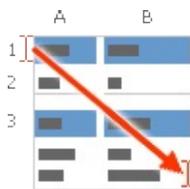
**Important** This method only works if the values in the first row or column have been sorted in ascending order.

# Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>	<b>C</b>
	<b>Status</b>	<b>Axles</b>	<b>Bolts</b>
<b>1</b>	In stock	4	9
<b>2</b>	On order	5	10
<b>3</b>	Back order	6	11
<b>4</b>	<b>Formula</b>	<b>Description (Result)</b>	
	=HLOOKUP("Bolts",	Looks up Bolts in row 1, and returns the value	
	A1:C4, 3)	from row 3 that's in the same column (10)	

## Function details

### HLOOKUP

Look up values in a range that isn't sorted

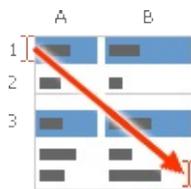
Use the INDEX and MATCH functions to do this task.

## Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.

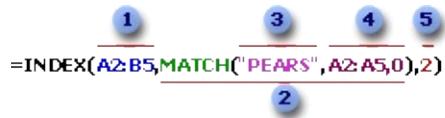


Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Product</b>	<b>Count</b>
	Bananas	38
<b>1</b>	Oranges	25
<b>2</b>	Apples	41
<b>3</b>	Pears	40
<b>4</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>5</b>	<code>=INDEX(A2:B5,MATCH("Pears",A2:A5,0),2)</code>	Looks up Pears in column A and returns the value for Pears in column B (40).

The formula uses the following arguments.

  
=INDEX(A2:B5,MATCH("PEARS",A2:A5,0),2)

Formula to look up a value in an unsorted range (INDEX function)

- 1 A2:B5: The entire range in which you are looking up values
- 2 MATCH("Pears",A2:A5,0): The MATCH function determines the row number
- 3 "Pears": The value to find in the lookup column.
- 4 A2:A5: The column for the MATCH function to search.
- 5 2: The column from which to return the value. The leftmost column is 1.

## Function details

[INDEX](#)

[MATCH](#)

[Look up values in a range of uncertain size that isn't sorted](#)

Use the OFFSET and MATCH functions to do this task.

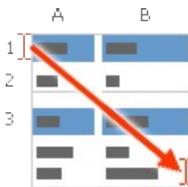
Use this process when your data is in an external data range that you refresh each day. You know the price is in column B, but you don't know how many rows of data the server will return, and first column isn't sorted alphabetically.

# Worksheet example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Product</b>	<b>Count</b>
	Bananas	38
<b>1</b>	Oranges	25
<b>2</b>	Apples	41
<b>3</b>	Pears	40
<b>4</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>5</b>	<code>=OFFSET(A1,MATCH("Pears",A2:A5,0),1)</code>	Looks up Pears in column A and returns the value for Pears in column B ( 40).

The formula uses the following arguments.

  
=OFFSET(A1, MATCH("Pears", A2:A5, 0), 1)

- 1 A1: The upper left cell of the range, also called the starting cell.
- 2 MATCH("Pears", A2:A5, 0): The MATCH function determines the row number below the starting cell to find the look up value.
- 3 "Pears": The value to find in the lookup column.
- 4 A2:A5: The column for the MATCH function to search. Don't include the starting cell in this range.
- 5 1: The number of columns to the right of the starting cell to find the lookup value.

## Function details

[MATCH](#)

[OFFSET](#)

[Show All](#)

# About projecting values

Some of the content in this topic may not be applicable to some languages.

## Filling in values automatically

### [Filling in values for a linear best-fit trend](#)

In a linear series, the step value, or the difference between the first and next value in the series, is added to the starting value and then added to each subsequent value.

#### **Initial selection Extended linear series**

1, 2	3, 4, 5
1, 3	5, 7, 9
100, 95	90, 85

### [Filling in values for an exponential growth trend](#)

In a growth series, the starting value is multiplied by the step value to get the next value in the series. The resulting product and each subsequent product is then multiplied by the step value.

#### **Initial selection Extended growth series**

1, 2	4, 8, 16
1, 3	9, 27, 81
2, 3	4.5, 6.75, 10.125

## Filling in values manually

When you use the **Series** command, you can manually control how a linear or growth trend is created and use the keyboard to fill in values.

- In a linear series, the starting values are applied to the least-squares

- algorithm ( $y=mx+b$ ) to generate the series.
- In a growth series, the starting values are applied to the exponential curve algorithm ( $y=b*m^x$ ) to generate the series.

In either case, the step value is ignored. The series created is equivalent to the values returned by the TREND function or GROWTH function.

## Calculating trends by adding a trendline to a chart

You can create a [trendline](#) in a chart without creating the data for the trendline.

## Projecting values with a worksheet function

### [Using the FORECAST function](#)

The FORECAST function predicts new values based on a least-squares linear regression of a range of known data or known  $x$ -arrays and  $y$ -arrays. For example, given corporate earnings for each of the previous six quarters, the FORECAST function returns earnings expected for the next two quarters.

### [Using the TREND or GROWTH functions](#)

The TREND function and GROWTH function can extrapolate future  $y$ -values that extend a straight line or exponential curve that best describes the existing data. They can also return only the  $y$ -values based on known  $x$ -values for the best-fit line or curve. To plot a line or curve that describes existing data, use the existing  $x$ -values and  $y$ -values returned by the TREND or GROWTH function.

### [Using the LINEST or LOGEST function](#)

You can use the LINEST or LOGEST function to calculate a straight line or exponential curve from existing data. The LINEST function and LOGEST function return various regression statistics, including the slope and intercept of the best-fit line.

## Performing regression analysis with the Analysis ToolPak add-in

When you need to perform more complicated [regression analysis](#)— including

calculating and plotting residuals— you can use the regression analysis tool in the Analysis ToolPak [add-in](#). The Regression analysis tool performs linear regression analysis by using the "least squares" method to fit a line through a set of observations. With it, you can analyze how a single dependent variable is affected by the values of one or more independent variables.

[Show All](#)

# Project values

You can fill in a series of values that fit a simple linear trend or an exponential growth trend by using the [fill handle](#). To extend complex and nonlinear data, you can use the worksheet functions or the [regression analysis](#) tool in the Analysis ToolPak [add-in](#).

## Fill in values automatically

### [Fill in a series for a linear best-fit trend](#)

1. Select at least two cells that contain the starting values for the trend.

If you want to increase the accuracy of the trend series, select additional starting values.

2. Drag the fill handle in the direction you want to fill with increasing or decreasing values.

For example, if the selected starting values in cells C1:E1 are 3, 5, and 8, drag the fill handle to the right to fill with increasing trend values, or drag it to the left to fill with decreasing values.

### [Tip](#)

To manually control how the series is created or to use the keyboard to fill in a series, use the **Series** command.

### [Fill in a series for a growth trend](#)

1. Select at least two cells that contain the starting values for the trend.

If you want to increase the accuracy of the trend series, select additional starting values.

2. Hold down the right mouse button and drag the fill handle in the direction

you want to fill with increasing or decreasing values.

For example, if the selected starting values in cells C1:E1 are 3, 5, and 8, drag the fill handle to the right to fill with increasing trend values, or drag it to the left to fill with decreasing values.

3. Release the mouse button, and then click **Growth Trend** on the [shortcut menu](#).



To manually control how the series is created or to use the keyboard to fill in a series, use the **Series** command.

## Fill in values manually



1. Select the cell where you want to start the series. The cell must contain the first value in the series.

When you use the **Series** command, the resulting series replaces the original selected values. If you want to save the original values, copy them to a different row or column, and then create the series by selecting the copied values.

2. On the **Edit** menu, point to **Fill**, and then click **Series**.
3. Do one of the following:

- To fill the series down the page, click **Columns**.
- To fill the series across the page, click **Rows**.

4. In the **Step value** box, enter the value that you want to increase the series by.

**Series  
type**

**Step value result**

linear      The step value is added to the first starting value and then added to each subsequent value.

The first starting value is multiplied by the step value. The resulting growth product and each subsequent product is then multiplied by the step value.

5. Under **Type**, click **Linear** or **Growth**.
6. In the **Stop value** box, enter the value you want to stop the series at.

**Note** If there is more than one starting value in the series and you want Microsoft Excel to generate the trend, select the **Trend** box.

## Calculate trends by adding a trendline to a chart

You can create a [trendline](#) in a chart without creating the data for the trendline.

[How?](#)

1. Click the [data series](#) to which you want to add a [trendline](#) or [moving average](#).
2. On the **Chart** menu, click **Add Trendline**.
3. On the **Type** tab, click the type of regression trendline or moving average you want.
  - If you select **Polynomial**, enter in the **Order** box the highest power for the independent variable.
  - If you select **Moving Average**, enter in the **Period** box the number of periods to be used to calculate the moving average.

### Notes

- The **Based on series** box lists all the data series in the chart that support trendlines. To add a trendline to another series, click the name in the box, and then select the options you want.
- If you add a moving average to an xy (scatter) chart, the moving average is based on the order of the x values plotted in the chart. To get the result you want, you might need to sort the x values before adding a moving average.

## Project values with a worksheet function

You can use these functions to project values.

<b>Function</b>	<b>Description</b>
<a href="#">FORECAST</a>	Project values
<a href="#">TREND</a>	Project values that fit a straight trend line
<a href="#">GROWTH</a>	Project values that fit an exponential curve
<a href="#">LINEST</a>	Calculate a straight line from existing data
<a href="#">LOGEST</a>	Calculate an exponential curve from existing data

## **Perform regression analysis with the Analysis ToolPak add-in**

When you need to perform more complicated regression analysis—including calculating and plotting residuals—you can use the regression analysis tool in the Analysis ToolPak add-in.

[How?](#)

1. On the **Tools** menu, click **Data Analysis**.

If **Data Analysis** is not available, load the Analysis ToolPak.

[How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.
2. In the **Data Analysis** dialog box, click the name of the analysis tool you want to use, then click **OK**.
3. In the dialog box for the tool you selected, set the analysis options you want.

You can use the **Help** button on the dialog box to get more information about the options.

[Show All](#)

# About linking to another workbook or program

A link is a reference to another workbook, and is sometimes called an external reference. A link can also be made to another program, and this link is sometimes called a remote reference. Because data in another workbook or program may change and outdate the data in your workbook, there are options for controlling the updating of links.

## [Where links can be used effectively](#)

Linking is especially useful when it is not practical to keep large worksheet models together in the same workbook.

- **Merge data from several workbooks** You can link workbooks from several users or departments and then integrate the pertinent data into a summary workbook. That way, when the source workbooks are changed, you won't have to manually change the summary workbook.
- **Create different views of your data** You can enter all of your data into one or more source workbooks, and then create a report workbook that contains links to only the pertinent data.
- **Streamline large, complex models** By breaking down a complicated model into a series of interdependent workbooks, you can work on the model without opening all of its related sheets. Smaller workbooks are easier to change, don't require as much memory, and are faster to open, save, and calculate.

## [What a link to another workbook looks like](#)

Formulas with links to other workbooks are displayed in two ways, depending on whether the source workbook—the one workbook that supplies data to a formula—is open or closed.

When the source is open, the link includes the workbook name in square brackets, followed by the worksheet name, an exclamation point (!), and the

cells that the formula depends on. For example, the following formula adds the cells C10:C25 from the workbook named Budget.xls.

### Link

```
=SUM([Budget.xls]Annual!C10:C25)
```

When the source is not open, the link includes the entire path.

### Link

```
=SUM('C:\Reports\[Budget.xls]Annual!C10:C25)
```

**Note** If the name of the other worksheet or workbook contains nonalphanumeric characters, you must enclose the name (or the path) within single quotation marks.

Formulas that link to a defined [name](#) in another workbook use the workbook name followed by an exclamation point (!), and the name. For example, the following formula adds the cells in the range named Sales from the workbook named Budget.xls.

### Link

```
=SUM(Budget!Sales)
```

[The difference between linking and embedding other programs in Excel](#)

When you copy information between Microsoft Excel or any program that supports [Object Linking and Embedding \(OLE\)](#), such as Microsoft Word, you can copy the information as either a [linked object](#) or an [embedded object](#).



- 1 Embedded object: No connection to the source file.
- 2 Linked object: Linked to the source file.
- 3 Source file: Updates the linked object.

**When to use linked objects** When you want the information in your [destination file](#) to be updated when the data in the [source file](#) changes, use linked objects.

With a linked object, the original information remains stored in the source file. The destination file displays a representation of the linked information but stores only the location of the original data (and the size if the object is an Excel chart object). The source file must remain available on your computer or network to maintain the link to the original data.

The linked information is updated automatically if you change the original data in the source file. For example, if you select a range of cells in an Excel workbook and then paste the cells as a linked object in a Word document, the information is updated in Word if you change the information in your workbook.

**When to use embedded objects** When you don't want to update the copied data when it changes in the source file, use an embedded object. The version of the source is embedded entirely in the workbook.

When someone opens the file on another computer, they can view the embedded object without having access to the original data. Because an embedded object has no links to the source file, the object is not updated if you change the original data. To change an embedded object, double-click the object to open and edit it in the source program. The source program (or another program capable of editing the object) must be installed on your computer. If you copy information as an embedded object, the destination file requires more disk space than if you link the information.

## [Controlling how links are updated](#)

A [linked object](#) is updated automatically by default every time you open the [destination file](#) or any time the [source file](#) changes while the destination file is open. When you open the workbook, a startup prompt appears, asking if you want to update the links. This is the primary way to update links, although you can also manually update them. You can also control the response to the prompt, or whether to display it at all.

If you use a formula to link data from other programs, that data is updated automatically in Microsoft Excel whenever it is changed in the other program.

## [Links that use Dynamic Data Exchange \(DDE\)](#)

**Security** Dynamic data exchange (DDE) is an older technology that is not secure. If possible, use a more secure alternative to DDE, such as object linking and embedding (OLE).

You can also create a link using [Dynamic Data Exchange \(DDE\)](#) if the program you are linking to supports it. To determine whether your program supports DDE or to learn the DDE name and topic information for the program, contact the software vendor of the program. For more information about DDE, see the Microsoft Office 2003 Resource Kit.

## [How to obtain the Office 2003 Resource Kit](#)

The Office 2003 Resource Kit is the definitive guide to installing, configuring, and supporting Microsoft Office in your organization. Designed for system administrators, consultants, and power users, this guide offers complete coverage whether you're running Microsoft Office on Windows or the Macintosh.

You can obtain the Office 2003 Resource Kit wherever computer books are sold, or order direct from Microsoft Press, or online at the Office 2003 Resource Kit Web site.

To locate your nearest source for Microsoft Press products worldwide, visit the Microsoft Press Web site.

[Show All](#)

# Break links

 [Break a link to a source](#)

**Important** When you break a link to a source, all formulas that use the source are converted to their current value. For example, the link =SUM([Budget.xls]Annual!C10:C25) would be converted to =45. Because this action cannot be undone, you may want to save a version of the file before you start.

1. On the **Edit** menu, click **Links**.
2. In the **Source** list, click the link you want to break.

To select multiple linked objects, hold down CTRL and click each linked object.

To select all links, press CTRL+A.

3. Click **Break Link**.
4. If the link used a defined [name](#), the name is not automatically removed. You may want to delete the name as well.

 [How?](#)

1. On the **Insert** menu, point to **Name**, and then click **Define**.
2. In the **Names in workbook** list, click the name you want to change.
3. Do one of the following:

## Change the name

1. Type the new name for the reference, and then click **Add**.
2. Click the original name, and then click **Delete**.

## Change the cell, formula, or constant represented by a name

Change it in the **Refers to** box.

## Delete the name

Click **Delete**.

5. If you use an [external data range](#), a parameter of a query may also use data from another workbook. You may want to check for and remove any of these type of links.

[Control the startup prompt for updating links](#)

[Don't prompt for all workbooks I open, and update the links automatically](#)

This option is for the current user only, and affects every workbook opened. Other users of the workbook are not affected.

1. On the **Tools** menu, click **Options**, and then click the **Edit** tab.
2. Clear the **Ask to update automatic links** check box. If the box is cleared, the links are automatically updated, and no alert is displayed.

[Prompt in the same way for every user of the workbook](#)

**Warning** This option affects all users of the workbook. If you choose to not update links, and not to prompt, users of the workbook will not know the data is out of date.

1. On **Edit** menu, click **Links**.
2. Click **Startup Prompt**.
3. Select the option you want.

**Note** You will still be notified if there are any broken links.

[Replace a single formula with its calculated value](#)

**Caution** When you replace a formula with its value, Microsoft Excel

permanently removes the formula. If you accidentally replace a formula with a value and want to restore the formula, click **Undo**  immediately after you enter or paste the value.

1. Select the cell that contains the formula.

If the formula is an [array formula](#), select the range that contains the array formula.

[How?](#)

1. Click any cell in the [array](#) range.
  2. On the **Edit** menu, click **Go To**.
  3. Click **Special**.
  4. Click **Current array**.
2. Click **Copy** .
  3. Click **Paste**  on the **Standard toolbar**.
  4. Click the arrow next to **Paste Options** , and then click **Values**.

[Show All](#)

# Change the source of a link

[Change the source workbook for all links that use the source](#)

1. Open the workbook that contains the link.
2. On the **Edit** menu, click **Links**.
3. In the **Source** box, click the name of the link whose source you would like to change.
4. Click **Change Source**.
5. In the **Change Source** dialog box, click the [source workbook](#) you want to refer to.

[Change the source of one link without affecting other links that use the source](#)

1. Select the cell with the link.
2. In the [formula bar](#)  , look for a reference to another workbook, such as C:\Reports\[Budget.xls], and change it to the name of the new workbook.

[Show All](#)

# Change the way a linked or embedded object is displayed

You can display a [linked object](#) or [embedded object](#) in a workbook exactly as it appears in the [source program](#) or as an icon. If the workbook will be viewed online, and you don't intend to print the workbook, you can display the object as an icon. This minimizes the amount of display space it occupies. Viewers who want to display the information can double-click the icon.

1. Click the icon for the linked or embedded object you want to display.
2. On the **Edit** menu, point to *object type* **Object** (for example, **Document Object**), and then click **Convert**.
3. To display the content of the object, clear the **Display as icon** check box.

To display an icon of the object, select the **Display as icon** check box. To change the default icon image or label, click **Change Icon**, and click the icon you want from the **Icon** list, or type a label in the **Caption** box.

[Show All](#)

# Check status of and fix links

1. On the **Edit** menu, click **Links**.

The **Links** command is unavailable if your file does not contain linked information.

2. Click **Check Status** to update the status for all links in the list. This may take a while if there are a lot of links, or if the source workbook for the links is on a network location, and the network is slow.
3. Check the status in the **Status** column, select the link, and then take the action needed.

**OK** No action required, the link is working and up to date.

**Unknown** Click **Check Status** to update the status for all links in the list.

**Not applicable** The link uses [Object Linking and Embedding \(OLE\)](#) or [Dynamic Data Exchange \(DDE\)](#). Microsoft Excel cannot check the status of these types of links.

**Error: Source not found** Click **Change Source**, and select another workbook.

**Error: Worksheet not found** Click **Change Source**, and then select another worksheet. The source may have been moved or renamed.

**Warning: Values not updated** Click **Update Values**. The link was not updated when the workbook was opened.

**Warning** Click **Open Source**, and calculate the workbook by pressing F9. The workbook may be set to manual calculation. To set to automatic calculation, on the **Tools** menu, click **Options**, select the **Calculation** tab, and then click **Automatic**.

**Warning** Some [names](#) cannot be resolved until the [source workbook](#) is opened. Click **Open Source**, switch back to the [destination workbook](#), and

click **Check Status**. If this does not resolve the problem, make sure the name is not misspelled or missing. Switch to the source workbook, and then on the **Insert** menu, point to **Name**, and then click **Define**, and look for the name.

**Warning** Click **Open Source**. The link cannot be updated until the source is open.

**Source is open** The source is open. No action required unless worksheet errors are present.

**Values updated from *filename*** No action required, the values have been updated.

**Warning** Excel cannot determine the status of the link. The source may contain no worksheets, or be saved in an unsupported file format. Click **Update Values**.

[Show All](#)

# Control the startup prompt for updating links

[Don't ask whether to update links when I open any workbook, and update links automatically](#)

This option is for the current user only, and affects every workbook opened. Other users of the workbook are not affected. This option also affects links to other programs.

1. On the **Tools** menu, click **Options**, and then click the **Edit** tab.
2. Clear the **Ask to update automatic links** check box. If the box is cleared, the links are automatically updated, and no prompt is displayed.

[Don't ask to update links for this workbook, and let me control whether links are updated](#)

**Warning** This option affects all users of the workbook. If you choose to not update links, and not to prompt, users of the workbook will not know the data is out of date.

1. On **Edit** menu, click **Links**.
2. Click **Startup Prompt**.
3. Select the option you want.

**Note** You will still be notified if there are any broken links.

[Show All](#)

# Control when links are updated

The control of how linked information is updated in Microsoft Excel is dependent on the type of link used.

## Links to other workbooks

The workbook that contains the links is called the [destination workbook](#), and the workbook that is linked to is called the [source workbook](#). When both the source workbook and the destination workbook are open, links are updated automatically. When you open a destination workbook, and the source workbook is not open, you are asked whether to update the links using a startup prompt. You can control whether or not the prompt appears, and whether or not to update all links when the prompt does not appear. You can also update only some of the links, if the workbook contains more than one.

### [Update all links or no links in a workbook](#)

1. Close all workbooks. If one source workbook is left open, and others are closed, the updates will not be uniform.
2. Open the workbook that contains the links.
3. To update the links, click **Update**.

To not update the links, click **Don't Update**.

For help deciding which button to click, click **Help**.

### [Update only some of the links to other workbooks](#)

1. Close all workbooks.
2. Open the workbook that contains the links.
3. When asked whether to update links, click **Don't Update**.
4. On the **Edit** menu, click **Links**.
5. In the **Source** list, click the linked object you want to update.

To select multiple linked objects, hold down CTRL and click each linked object.

To select all linked objects, press CTRL+A.

6. Click **Update Values**.

[Control the startup prompt for updating all links](#)

[Don't ask whether to update links when I open any workbook, and update links automatically](#)

This option is for the current user only, and affects every workbook opened. Other users of the workbook are not affected. This option also affects links to other programs.

1. On the **Tools** menu, click **Options**, and then click the **Edit** tab.
2. Clear the **Ask to update automatic links** check box. If the box is cleared, the links are automatically updated, and no prompt is displayed.

[Don't ask to update links for this workbook, and let me control whether links are updated](#)

**Warning** This option affects all users of the workbook. If you choose to not update links, and not to prompt, users of the workbook will not know the data is out of date.

1. On **Edit** menu, click **Links**.
2. Click **Startup Prompt**.
3. Select the option you want.

**Note** You will still be notified if there are any broken links.

### **Links to other programs**

These options are for links to other programs that use [OLE \(Object Linking and Embedding\)](#) or [DDE \(Dynamic Data Exchange\)](#).

Links to other programs can be set to be updated automatically (when you open the [destination file](#) or any time the [source file](#) changes while the destination file

is open) or manually (you specifically request the update). By default, new links are set to automatic updating. Set a link to update manually when you want to see the previous data before updating to the new data.

#### [Set a link to another program to be updated manually](#)

1. On the **Edit** menu, click **Links**.

The **Links** command is unavailable if your file does not contain linked information.

2. In the **Source** list, click the linked object you want to update. An **A** in the **Update** column means the link is automatic, and a **M** in the **Update** column means the link is set to **Manual** update.
  - To select multiple linked objects, hold down CTRL and click each linked object.
  - To select all linked objects, press CTRL+A.
3. To update a linked object only when you click **Update Values**, click **Manual**.

#### [Set a link to another program to be updated automatically](#)

1. On the **Edit** menu, click **Links**.

The **Links** command is unavailable if your file does not contain linked information.

2. In the **Source** list, click the linked object you want to update. An **A** in the **Update** column means the link is automatic, and a **M** in the **Update** column means the link is set to **Manual** update.
  - To select multiple linked objects, hold down CTRL and click each linked object.
  - To select all linked objects, press CTRL+A.
3. To update a linked object every time you open the file that contains the

object or any time the original information changes while the file is open, click **Automatic**.

4. Click **OK**.
5. On the **Tools** menu, click **Options**, and then click the **Calculation** tab.
6. Make sure the **Update remote references** check box is selected.

[Ignore automatic updates for links to other programs](#)

This setting applies only for the current session of Excel. The next time you open the workbook, the prompt to update links overrides this setting.

1. Switch to the worksheet that contains the links.
2. On the **Tools** menu, click **Options**.
3. On the **Calculation** tab, clear the **Update remote references** check box.

**Note** Clearing the check box overrides the **Automatic** option (for all links) in the **Links** dialog box (**Edit** menu), but does not change the option to **Manual**.

[Update a link to another program now](#)

This procedure updates a linked object at any time regardless of whether automatic or manual updating is turned on.

1. On the **Edit** menu, click **Links**.

The **Links** command is unavailable if your file does not contain linked information.

2. In the **Source** list, click the linked object you want to update.
  - To select multiple linked objects, hold down CTRL and click each linked object.
  - To select all linked objects, press CTRL+A.
3. Click **Update Values**.

[Don't ask whether to update links when I open any workbook, and update](#)

## [links automatically](#)

This option is for the current user only, and affects every workbook opened. Other users of the workbook are not affected. This option also affects links to other workbooks.

1. On the **Tools** menu, click **Options**, and then click the **Edit** tab.
2. Clear the **Ask to update automatic links** check box. If the box is cleared, the links are automatically updated, and no prompt is displayed.

[Show All](#)

# Create a link to another cell, workbook, or program

## [Create a link between cells in the same worksheet or workbook](#)

1. Click the cell that contains the data you want to link to, and then click **Copy**  on the **Standard toolbar**.
2. Click the cell you want to link from, and then click **Paste** .
3. Click **Paste Options**  and then click **Link Cells**.

## [Create a link between cells in different workbooks](#)

1. Open both the workbook that will contain the link (called the [destination](#) workbook), and the workbook that contains the data you want to link to (called the [source](#) workbook).
2. In the destination workbook, click **Save** .
3. Select a cell or cells you want to link from.
4. If you are creating a new formula, type = (an equal sign).

If you are entering the link elsewhere in the formula, type the [operator](#) or function that you want to precede the link.

5. On the **Window** menu, click the name of the source workbook, and then click the worksheet that contains the cells you want to link to.
6. Select the cells you want to link to.
7. Complete the formula. When you finish entering the formula, press ENTER.

## [Link or embed content from another program using Object Linking and Embedding \(OLE\)](#)

OLE (Object Linking and Embedding) is supported by many different programs, and is used to make content created in one program available in another. For example, you can insert a Microsoft Word document into Microsoft Excel. To

see what types of content you can insert, click **Object** on the **Insert** menu. Only programs that are installed on your computer and that support [OLE](#) objects appear in the **Object type** box.

The main differences between linked objects and embedded objects are where the data is stored and how the object is updated after you place it in the [destination file](#).

Embedded objects are stored in the workbook they are inserted in, and are not updated. Linked objects remain as separate files, and need to be updated.



Linked and embedded objects in a document

[Create a link to an existing document](#)

1. Click in the worksheet where you want to place the [linked object](#).
2. On the **Insert** menu, click **Object**.
3. Click the **Create from File** tab.
4. In the **File name** box, type the name of the file, or click **Browse** to select from a list.
5. Select the **Link to file** check box.
6. To display the content, clear the **Display as icon** check box.

If you want to display as an icon, select the **Display as icon** check box.

**Note** You cannot use the **Object** command on the **Insert** menu to insert graphics and certain types of files. To insert a graphic, point to **Picture** on the **Insert** menu, and then click **From File**.

[Embed a document](#)

1. Click in the worksheet where you want to place the [embedded object](#).
2. On the **Insert** menu, click **Object**.
3. If the document does not already exist, click the **Create New** tab. In the **Object type** box, click the type of object you want to create.

If the document already exists, click the **Create from File** tab. In the **File name** box, type the name of the file, or click **Browse** to select from a list.

4. Clear the **Link to file** check box.
5. To display the content, clear the **Display as icon** check box.

To display as an icon, select the **Display as icon** check box.

#### [Insert part of an existing document as a linked or embedded object](#)

1. From a program other than Microsoft Excel, select the information you want to copy as a [linked](#) or [embedded object](#).
2. Click **Copy** .
3. Switch to the worksheet you want to place the information in, and then click where you want the information to appear.
4. On the **Edit** menu, click **Paste Special**.
5. To paste the information as a linked object, click **Paste link**.

To paste the information as an embedded object, click **Paste**. In the **As** box, click the entry with the word "object" in its name. For example, if you copied the information from a Microsoft Word document, click **Microsoft Word Document Object**.

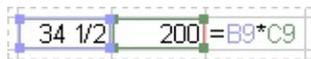
**Note** You can't paste worksheet cells or a chart as a linked or embedded object in a Microsoft Excel workbook. However, you can use the **Copy Picture** command (hold down SHIFT and click the **Edit** menu) to create a link to cells on this or another sheet

## [Create a reference between cells on the same or different worksheets](#)

The following formulas contain [relative references](#) to and [names](#) of other cells. The cell that contains the formula is known as a dependent cell when its value depends on the values in other cells. For example, cell B2 is a dependent cell if it contains the formula =C2.

Example formula	What it does
=C2	Uses the value in the cell C2
=Sheet2!B2	Uses the value in cell B2 on Sheet2
=Asset-Liability	Subtracts a cell named Liability from a cell named Asset

1. Click the cell in which you want to enter the formula.
2. In the [formula bar](#) , type = (equal sign).
3. Do one of the following:
  - To create a reference, select a cell, a range of cells, a location in another worksheet, or a location in another workbook. You can drag the border of the cell selection to move the selection, or drag the corner of the border to expand the selection.



- To create a reference to a named range, press F3, select the name in the **Paste name** box, and click **OK**.
4. Press ENTER.

## [Link to a name in another workbook](#)

You can create descriptive [names](#) to represent a cell or range of cells in another workbook.

## [Link to a defined name in another workbook](#)

1. Open both the workbook that will contain the link (called the [destination](#) workbook), and the workbook that contains the data you want to link to (called the [source](#) workbook).
2. In the destination workbook, click **Save** .

3. Select a cell or cells you want to link from. If you are creating a new formula, type = (an equal sign).

If you are entering the link elsewhere in the formula, type the operator or function that you want to precede the link.

4. On the **Window** menu, click the name of the source workbook, and then click the worksheet that contains the cells you want to link to.
5. Press F3, and select the name you want to link to.

#### [Define a name that refers to cells in another workbook](#)

1. Open both the workbook that will contain the link (called the [destination](#) workbook), and the workbook that contains the data you want to link to (called the [source](#) workbook).
2. In the destination workbook, point to **Name** on the **Insert** menu, and then click **Define**.
3. In the **Names in workbook** box, enter the name for the link.
4. Delete the contents of the **Refers to** box, and keep the cursor in the box.

If the name is a formula, enter the formula, and position the cursor where you want the link. For example, type =SUM(), and position the cursor between the parenthesis.

5. On the **Window** menu, click the name of the source workbook, and then click the worksheet that contains the cells you want to link to.
6. Select the cell or range of cells you want to link to.
7. In the **Define Name** dialog box, click **Add**.

[Show All](#)

# Create a link using Dynamic Data Exchange (DDE)

**Security** Dynamic data exchange (DDE) is an older technology that is not secure. If possible, use a more secure alternative to DDE, such as object linking and embedding (OLE).

The program that contains the data you want to link to must support [Dynamic Data Exchange \(DDE\)](#). To determine whether your program supports DDE or to learn the DDE name and topic information for the program, contact the software vendor of the program. For more information about DDE, see the Microsoft Office 2003 Resource Kit.



[How to obtain the Office 2003 Resource Kit](#)

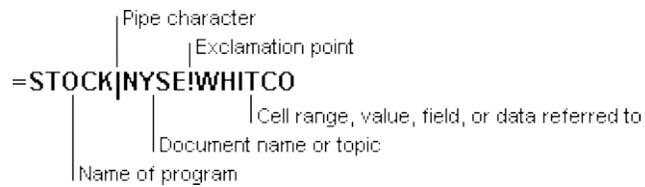
The Office 2003 Resource Kit is the definitive guide to installing, configuring, and supporting Microsoft Office in your organization. Designed for system administrators, consultants, and power users, this guide offers complete coverage whether you're running Microsoft Office on Windows or the Macintosh.

You can obtain the Office 2003 Resource Kit wherever computer books are sold, or order direct from Microsoft Press, or online at the Office 2003 Resource Kit Web site.

To locate your nearest source for Microsoft Press products worldwide, visit the Microsoft Press Web site.

1. Select the cell you want to link from.
2. Enter a formula using the following syntax: application name; document name or topic; and cell range, value, field, or data that's referred to.

The following example shows the parts of a remote reference formula and the required separator characters:



A pipe character (|) separates the program name from the document or topic name. An exclamation point (!) separates the document or topic name from the cell range, value, field, or data referred to.

3. Press ENTER.

**Note** If the name of the application, document, topic, or data item contains spaces or characters such as colons (:) or minus signs (–) that have special uses in a formula, or if a name resembles a cell reference, enclose the name in single quotation marks.

[Show All](#)

# Edit a linked or embedded object

## [Edit a linked object in the source program](#)

1. On the **Edit** menu, click **Links**.
2. In the **Source file** list, click the source for the [linked object](#), and then click **Open Source**.
3. Make the changes you want to the linked object.
4. In the [source program](#), click **Exit** on the **File** menu.

## [Edit an embedded object in the source program](#)

1. Double-click the [embedded object](#) to open it.
2. Make the changes you want to the object.
3. If you are editing the object in place in the open program, click anywhere outside the object to return to the [destination file](#).

If you edit the embedded object in the source program in a separate window, click **Exit** on the **File** menu to return to the destination file.

**Note** Double-clicking certain embedded objects, such as video and sound clips, plays the object instead of opening a program. To edit one of these embedded objects, click the object, point to *object type* **Object** on the **Edit** menu, and then click **Edit**.

## [Edit an embedded object in a program other than the source program](#)

1. Select the [embedded object](#) you want to edit.
2. On the **Edit** menu, point to *object name* **Object** (for example, **Document Object**), and then click **Convert**.
3. To convert the embedded object to the type you specify in the list, click **Convert to**.

To open the embedded object as the type you specify in the list without changing the embedded object type, click **Activate**.

**Note** To select an object by using the keyboard, do the following:

1. Press CTRL+G to display the **Go To** dialog box.
2. Click **Special**, then select **Objects**, and click **OK**.
3. Press tab until the object you want is selected.
4. Press SHIFT+F10.
5. Point to **Object** or **Chart Object**, then click **Edit**.

[Show All](#)

# Find links in a workbook

There is no automatic way to find links used in a workbook. However, because links use brackets [ ] to enclose the [source workbook](#) name when it is closed, you can search for it. For example =SUM([Budget.xls]Annual!C10:C25).

1. Close all workbooks except the one you want to find the links in.
2. On the **Edit** menu, click **Find**.
3. Click **Options**.
4. In the **Find what** box, enter [.
5. In the **Within** box, click **Workbook**.
6. In the **Look In** box, click **Formulas**.
7. Click **Find All**.
8. In the box at the bottom, look in the **Formula** column for formulas that contain [.
9. To select the cell with a link, select the row in the box at the bottom.
10. Links are also commonly used in names, text boxes, or chart titles.

## [Find links used in names](#)

1. On the **Insert** menu, point to **Name**, and then click **Define**.
2. Select each entry in the **Names in workbook** list, and look in the **Refers to** box for links. Links contain a reference to another workbook, such as [Budget.xls].

## [Find links used in text boxes or chart titles](#)

1. Click the text box or chart title you want to check.
2. In the **formula bar**  , look for a reference to another workbook, such as [Budget.xls].

## [Find links used in other objects](#)

1. On the **Edit** menu, click **Go To**, and then click **Special**.
2. Click **Objects**, and then click **OK**.
3. Press TAB, and then look in the **formula bar**  for a reference

to another workbook, such as [Budget.xls]. The name of the object appears in the **Name** box.

4. Repeat the previous step until each object is checked.

#### [Find links used in chart data series](#)

1. Select the data series you want to check.
2. In the [formula bar](#) , look for a reference to another workbook, such as [Budget.xls].
3. To proceed to the next data series, press TAB.
4. Repeat the previous two steps until each data series is checked.

[Show All](#)

# Open the source of a link

1. Switch to the workbook that contains the [link](#).
2. On the **Edit** menu, click **Links**.
3. In the **Source** box, click the name of the workbook you want to open.
4. Click **Open Source**.

[Show All](#)

# Troubleshoot linking with other programs

[I can't update the automatic links on my Microsoft Excel worksheet.](#)

[When I double-click a linked or embedded object, a "cannot edit" message appears.](#)

This message appears when the [source file](#) or [source program](#) can't be opened.

**Make sure the source program is available** If the source program is not installed on your computer, convert the object to the file format of a program you do have installed.

**Ensure that memory is adequate** Make sure you have enough memory to run the source program. Close other programs to free up memory, if necessary.

**Close all dialog boxes** If the source program is running, make sure it doesn't have any open dialog boxes. Switch to the source program, and close any open dialog boxes.

**Close the source file** If the source file is a linked object, make sure someone else doesn't have the it open.

**Ensure that the source file name has not changed** If the source file you want to edit is a linked object, make sure it has the same name as it did when you created the link and has not been moved. Select the linked object, and then click the **Links** command on the **Edit** menu to see the name of the source file. If the source file has been renamed or moved, use the **Change Source** button in the **Links** dialog box to locate the source file and reconnect the link.

[I can't open an Excel object from another program.](#)

1. In Excel, click **Options** on the **Tools** menu, and then click the **General** tab.
2. Clear the **Ignore other applications** check box.

If this option is selected, Excel ignores requests from programs that link to Excel data by means of [DDE](#) rather than [OLE](#).

[Show All](#)

# About calculation in workbooks

Calculation is the process of computing formulas and then displaying the results as values in the cells that contain the formulas.

 [When Microsoft Excel calculates, and how to control it](#)

**When are existing formulas recalculated?** Excel recalculates those cells that are dependent on other cells that contain changed values. This type of calculation helps to avoid unnecessary calculations. Excel also calculates workbooks each time they are opened.

**Background calculation** As calculation proceeds, you can choose commands or perform actions such as entering numbers or formulas. Excel temporarily interrupts calculation to carry out the other commands or actions and then resumes calculation. The calculation process may take more time if the workbook contains a large number of formulas, or if the worksheets contain data tables or functions that automatically recalculate every time the workbook is recalculated. Also, the calculation process may take more time if the worksheets contain links to other worksheets or workbooks. You can control when calculation occurs by changing the calculation process to manual calculation.

 [Precision of calculation](#)

**15 digit precision** Excel stores and calculates with 15 significant digits of precision.

**Excel calculates stored, not displayed, values** The displayed, and printed, value depends on how you choose to format and display the stored value. For example, a cell that displays a date as "6/22/2008" also contains a serial number that is the stored value for the date in the cell. You can change the display of the date to another format (for example, to "22-Jun-2008"), but changing the display of a value on a worksheet does not change the stored value.

**Change the precision of calculations** When a formula performs calculations, Excel usually uses the values stored in cells referenced by the formula. For

example, if two cells each contain the value 10.005 and the cells are formatted to display values in currency format, the value \$10.01 is displayed in each cell. If you add the two cells together, the result is \$20.01 because Excel adds the stored values 10.005 and 10.005, not the displayed values. You can change the precision of calculations so that Excel uses the displayed value instead of the stored value when it recalculates formulas.

**Change the number of times Excel calculates, or iterates, a formula** Excel cannot automatically calculate a formula that refers to the cell— either directly or indirectly— that contains the formula. This is called a circular reference. If a formula refers back to one of its own cells, you must determine how many times the formula should recalculate.

**Note** You can use Solver when you need to find the optimum value for a particular cell by adjusting the values of several cells or when you want to apply specific limitations to one or more of the values in the calculation.



### [Calculating workbooks that were created in an earlier version of Excel](#)

To be sure that older workbooks are calculated correctly, Excel behaves differently when you first open an old workbook than when you open a workbook created in the current version.

When you open a workbook created in the current version, Excel recalculates only the formulas that depend on cells that have changed.

When you use open a workbook that was created in a earlier version of Excel, all the formulas in the workbook— those that depend on cells that have changed and those that do not— are recalculated. This ensures that the workbook is fully optimized for the current Excel version.

Because complete recalculation can take longer than partial recalculation, opening a workbook that was not previously saved in the current Excel version can take longer than usual. After you save the workbook in the current version, it will open faster.

[Show All](#)

# About dates and date systems

Microsoft Excel stores dates as sequential numbers which are called serial values. By default, January 1, 1900 is serial number 1, and January 1, 2008 is serial number 39448 because it is 39,448 days after January 1, 1900. Excel stores times as decimal fractions because time is considered a portion of a day.

Because dates and times are values, they can be added, subtracted, and included in other calculations. You can view a date as a serial value and a time as a decimal fraction by changing the format of the cell that contains the date or time to General format.

Because the rules that govern the way that any calculation program interprets dates are complex, you should be as specific as possible about dates whenever you enter them. This will produce the highest level of accuracy in your date calculations.



## [The 1900 and 1904 date systems](#)

Excel supports two date systems: the 1900 and 1904 date systems. The default date system for Microsoft Excel for Windows is 1900. The default date system for Microsoft Excel for the Macintosh is 1904. You can change the date system. On the **Tools** menu, click **Options**, click the **Calculation** tab, and then select or clear the **1904 date system** check box.

The date system is changed automatically when you open a document from another platform. For example, if you are working in Excel for Windows and you open a document created in Excel for the Macintosh, the **1904 date system** check box is selected automatically.

The following table shows the first date and the last date for each date system and the serial value associated with each date.

<b>Date system</b>	<b>First date</b>	<b>Last date</b>
1900	January 1, 1900 (serial value 1)	December 31, 9999 (serial value 2958465)

1904            January 2, 1904 December 31, 9999  
(serial value 1) (serial value 2957003)

## [How Excel interprets two-digit years](#)

To ensure that year values are interpreted as you intended, type year values as four digits (2001, rather than 01). By entering four digits for the years, Excel won't interpret the century for you.

### **For Microsoft Windows 2000 or later**

If you are using Microsoft Windows 2000 or later, the **Regional Options** in Windows **Control Panel** controls how Excel interprets two-digit years.

### **For dates entered as text values**

When you enter a date as a text value, Excel interprets the year as follows:

- **00 through 29** Excel interprets the two-digit year values 00 through 29 as the years 2000 through 2029. For example, if you type the date **5/28/19**, Excel assumes the date is May 28, 2019.
- **30 through 99** Excel interprets the two-digit year values 30 through 99 as the years 1930 through 1999. For example, if you type the date **5/28/98**, Excel assumes the date is May 28, 1998.

[Show All](#)

# Change the default date format

By default, as you enter dates in a workbook, the dates are formatted to display two-digit years.



[Change the way two-digit years are interpreted](#)

**Caution** This procedure changes the way two-digit years are interpreted for all the Microsoft Windows programs that you have installed.

1. On the Windows **Start** menu, point to **Settings**, and then click **Control Panel**.
2. Double click the **Regional Settings** or **Regional Options** icon.
3. In the **When a two-digit year is entered, interpret as a year between** box, change the upper limit for the century.

As you change the upper-limit year, the lower-limit year automatically changes.



[Change the default date format to display four-digit years](#)

When you change the default date format to a different format by using this procedure, the display of dates that were previously entered in your workbook will change to the new format as long as the dates haven't been formatted by using the **Cells** command (**Format** menu).

1. On the Microsoft Windows **Start** menu, point to **Settings**, and then click **Control Panel**.
2. Double click the **Regional Settings** or **Regional Options** icon.
3. In the **Short date format** list, click a format that uses four digits for the year ("yyyy").

[Show All](#)

# Change when and how formulas are calculated

By default, Microsoft Excel automatically recalculates formulas when the cells that the formula depends on have changed.

[Calculate a worksheet or workbook now](#)

**Press F9** Calculates formulas that have changed since the last calculation, and formulas dependent on them, in all open workbooks. If a workbook is set for automatic calculation, you do not need to press F9 for calculation.

**Press SHIFT+F9** Calculates formulas that have changed since the last calculation, and formulas dependent on them, in the active worksheet.

**Press CTRL+ALT+F9** Calculates all formulas in all open workbooks, regardless of whether they have changed since last time or not.

**Press CTRL+SHIFT+ALT+F9** Rechecks dependent formulas, and then calculates all formulas in all open workbooks, regardless of whether they have changed since last time or not.

[Change when a worksheet or workbook calculates](#)

1. On the **Tools** menu, click **Options**, and then click the **Calculation** tab.
2. Under **Calculation**, select an option.

Changing this option affects all open workbooks.

3. If you select an option other than **Automatic**, press F9 to calculate all worksheets in all open workbooks.

To calculate only the active worksheet, press SHIFT+F9.

**Note** If a worksheet contains a formula that is linked to a worksheet that has not been calculated and you update that link, Excel displays a message stating that

the source worksheet is not completely calculated. To update the link with the current value stored on the source worksheet, even though the value might not be correct, click **OK**. To cancel updating the link and use the previous value obtained from the source worksheet, click **Cancel**.

#### [Change the precision of calculations in a workbook](#)

**Caution** When you change the precision of the calculations in a workbook by using the displayed (formatted) values, Excel permanently changes any constant values on the worksheets in the workbook. If you later choose to calculate with full precision, the original underlying values cannot be restored.

1. On the **Tools** menu, click **Options**, and then click the **Calculation** tab.
2. Under **Workbook options**, select the **Precision as displayed** check box.

#### [Change the number of times Microsoft Excel iterates a formula](#)

1. On the **Tools** menu, click **Options**, and then click the **Calculation** tab.
2. Select the **Iteration** check box.
3. To set the maximum number of times Microsoft Excel will recalculate, type the number of iterations in the **Maximum iterations** box. The higher the number of iterations, the more time Excel needs to calculate a worksheet.
4. To set the maximum amount of change you will accept between calculation results, type the amount in the **Maximum change** box. The smaller the number, the more accurate the result and the more time Excel needs to calculate a worksheet.

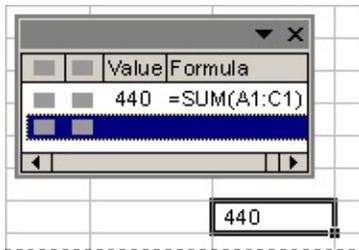
[Show All](#)

# About correcting formulas

Microsoft Excel has several different tools to help you find and correct problems with formulas.

## [Watch Window](#)

Enables you to watch cells and their [formulas](#) on the **Watch Window toolbar**, even when the cells are out of view.



## Watch Window

This toolbar can be moved or [docked](#) like any other toolbar. For example, you can dock it on the bottom of the window. The toolbar keeps track of the following properties of a cell: workbook, sheet, name, cell, value, and formula.

You can only have one watch per cell.

## [Formula error checker](#)

Like a grammar checker, Excel uses certain rules to check for problems in formulas. These rules do not guarantee that your spreadsheet is problem-free, but they can go a long way to finding common mistakes. You can turn these rules on or off individually.

Problems can be reviewed in two ways: one at a time like a spelling checker, or immediately on the worksheet as you work. A triangle appears in the top-left corner of the cell when a problem is found. Both methods present the same options.



Cell with a formula problem

A problem can be resolved using the options that appear, or it can be ignored. If a problem is ignored, it does not appear in further error checks. However, all previously ignored errors can be reset so that they appear again.

## The rules and what they check for

**Evaluates to error value** The formula does not use the expected syntax, [arguments](#), or data types. Error values include #DIV/0!, #N/A, #NAME?, #NULL!, #NUM!, #REF!, and #VALUE!. Each error value has different causes, and is resolved in different ways.

**Note** If you enter an error value directly in a cell, it is not marked as a problem.

**Text date with 2 digit years** The cell contains a text date that can be misinterpreted as the wrong century when used in formulas. For example, the date in the formula =YEAR("1/1/31") could be 1931 or 2031. Use this rule to check for ambiguous text dates.

**Number stored as text** The cell contains numbers stored as text. These usually come from data imported from other sources. Numbers stored as text can cause unexpected sorting behaviors, and it is best to convert them to numbers.



[Inconsistent formula in region](#)

The formula does not match the pattern of other formulas near it. In many cases formulas that are adjacent to other formulas only differ in the references used. For example, the formula =SUM(A10:F10) would be noted because the adjacent formulas change by one row, and it changes by 8 rows.

### Formulas

=SUM(A1:F1)

=SUM(A2:F2)

=SUM(A10:F10)

=SUM(A4:F4)

If the references used in a formula are not consistent with those in the adjacent formulas, then the problem is noted.

#### [Formula omits cells in region](#)

The formula may not include a correct reference. If a formula refers to a range of cells, and you add cells to the bottom or right of that range, the references may no longer be correct. The formula does not always automatically update its reference to include the new cells. This rule compares the reference in a formula against adjacent cells. If the adjacent cells contain more numbers (are not blank cells), then the problem is noted.

For example, the formula =SUM(A2:A4) would be noted with this rule, because A5, A6, and A7 are adjacent, and contain data.

#### **Invoice**

15,000

9,000

8,000

20,000

5,000

22,500

=SUM(A2:A4)

#### [Unlocked cells contain formulas](#)

The formula is not locked for protection. By default, all cells are locked for protection, so the cell has been set to be unprotected. When a formula is protected it cannot be modified without being unprotected. Check to make sure you do not want the cell protected. Protecting cells that contain formulas prevents them from being changed, and can help avoid future errors.

#### [Formulas refer to empty cells](#)

The formula contains a reference to an empty cell. This can cause unintended results, as in the following example.

Suppose you want to take the average of the numbers below. If the third cell down is blank, then the result is 22.75. If the third cell down contains 0, then the result is 18.2.

### Data

24

12

45

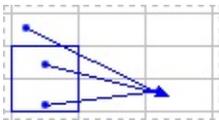
10

### Formula

=AVERAGE(A2:A6)

 [Formula Auditing toolbar](#)

Use the **Formula Auditing toolbar** to graphically display, or trace, the relationships between cells and formulas with blue arrows. You can trace the precedents (the cells that provide data to a specific cell) or you can trace the dependents (the cells that depend on the value in a specific cell).



Worksheet with tracer arrows

 [Evaluate Formula](#)

You can see the different parts of a nested [formula](#) evaluated in the order the formula is calculated by using the **Evaluate Formula** dialog box (**Formula Auditing toolbar**). For example, you can see this in the following formula where the function AVERAGE(F2:F5) is shown as its value 80.

=IF(AVERAGE(F2:F5)>50,SUM(G2:G5),0) as

=IF(80>50,SUM(G2:G5),0)

### Notes

- Some parts of formulas that use the IF and CHOOSE functions are not evaluated, and #N/A is displayed in the **Evaluation** box.
- If a reference is blank, a zero value (0) is displayed in the **Evaluation** box.
- The following functions are recalculated each time the worksheet changes, and can cause the Evaluate Formula to give results different from what appears in the cell. RAND, AREAS, INDEX, OFFSET, CELL, INDIRECT, ROWS, COLUMNS, NOW, TODAY, RANDBETWEEN.

[Show All](#)

# Allow or correct a circular reference

When a [formula](#) refers back to its own cell, either directly or indirectly, it is called a circular reference. Microsoft Excel cannot automatically calculate all open workbooks when one of them contains a circular reference. You can remove a circular reference, or you can have Excel calculate each cell involved in the circular reference once by using the results of the previous [iteration](#). Unless you change the default settings for iteration, Excel stops calculating after 100 iterations or after all values in the circular reference change by less than 0.001 between iterations, whichever comes first.

## [Locate and remove a circular reference](#)

1. If the **Circular Reference toolbar** is not displayed, click **Customize** on the **Tools** menu, click the **Toolbars** tab, and then select the **Circular Reference** check box.
2. On the **Circular Reference** toolbar, click the first cell in the **Navigate Circular Reference** box.
3. Review the formula in the cell. If you cannot determine whether the cell is the cause of the circular reference, click the next cell in the **Navigate Circular Reference** box.

**Note** The status bar displays the word "Circular," followed by a reference to one of the cells contained in the circular reference. If the word "Circular" appears without a cell reference, the active worksheet does not contain the circular reference.

4. Continue to review and correct the circular reference until the status bar no longer displays the word "Circular."

## [Tips](#)

- When the **Circular Reference toolbar** appears, [tracer arrows](#) appear that point out the cells that depend on the formula.
- You can move between cells in a circular reference by double-clicking the

tracer arrows.

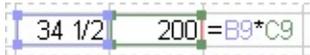
[Make a circular reference work by changing the number of times Microsoft Excel iterates formulas](#)

1. On the **Tools** menu, click **Options**, and then click the **Calculation** tab.
2. Select the **Iteration** check box.
3. To set the maximum number of times Microsoft Excel will recalculate, type the number of iterations in the **Maximum iterations** box. The higher the number of iterations, the more time Excel needs to calculate a worksheet.
4. To set the maximum amount of change you will accept between calculation results, type the amount in the **Maximum change** box. The smaller the number, the more accurate the result and the more time Excel needs to calculate a worksheet.

[Show All](#)

# Change which cells a formula refers to

When you enter or edit a [formula](#), cell references and the borders around the corresponding cells are color-coded.



Color-coded cell references

If there are no squares at each corner of the color-coded border, then the reference is to a [named](#) range.



## [Change references that are not a named range](#)

1. Double-click the cell that contains the formula you want to change.  
Microsoft Excel highlights each cell or range of cells with a different color.
2. Do one of the following:
  - To move a cell or range reference to a different cell or range, drag the color-coded border of the cell or range to the new cell or range.
  - To include more or fewer cells in a reference, drag a corner of the border.
  - In the formula, select the reference, and type a new one.
3. Press ENTER or CTRL+SHIFT+ENTER for an [array formula](#).



## [Change references to a named range](#)

1. Do one of the following:
  - Select the range of cells that contains formulas in which you want to replace references with names.
  - Select a single cell to change the references to names in all formulas on the worksheet.

2. On the **Insert** menu, point to **Name**, and then click **Apply**.
3. In the **Apply names** box, click one or more names.

[Show All](#)

# Display or hide formulas

[Switch between displaying formulas and their values on a worksheet](#)

- Press CTRL + ` (grave accent).

[Prevent a formula from displaying in the formula bar](#)

**Caution** This procedure also prevents the cells that contain the formula from being edited.

1. Select the range of cells whose formulas you want to hide. You can also select [nonadjacent ranges](#) or the entire sheet.
2. On the **Format** menu, click **Cells**, and then click the **Protection** tab.
3. Select the **Hidden** check box.
4. Click **OK**.
5. On the **Tools** menu, point to **Protection**, and then click **Protect Sheet**.
6. Make sure the **Protect worksheet and contents of locked cells** check box is selected.

[Show formulas that were previously hidden by removing protection](#)

1. If the workbook is [shared](#), unshare it.

[How?](#)

**Note** Unsharing the workbook deletes the [change history](#). If you want to keep a copy of this information, print out the [History worksheet](#) or copy it to another workbook.

[How?](#)

1. On the **Tools** menu, point to **Track Changes**, and then click **Highlight Changes**.
2. In the **When** box, click **All**.

3. Clear the **Who** and **Where** check boxes.
4. Select the **List changes on a new sheet** check box, and then click **OK**.
5. Do one or more of the following:
  - To print the History worksheet, click **Print** .
  - To copy the history to another workbook, select the cells you want to copy, click **Copy** , switch to another workbook, click where you want the copy to go, and click **Paste** .

**Note** You may also want to save or print the current version of the workbook, because this history might not apply to later versions. For example, cell locations, including row numbers, in the copied history may no longer be current.

1. On the **Tools** menu, click **Share Workbook**, and then click the **Editing** tab.
  2. Make sure that you are the only person listed in the **Who has this workbook open now** box.
  3. Clear the **Allow changes by more than one user at the same time** check box.
  4. When prompted about the effects on other users, click **Yes**.
2. On the **Tools** menu, point to **Protection**, and then click **Unprotect Sheet**.
  3. Select the range of cells whose formulas you want to unhide.
  4. On the **Format** menu, click **Cells**, and then click the **Protection** tab.
  5. Clear the **Hidden** check box.

[Show All](#)

# Display the relationships between formulas and cells

You can display both [precedent cells](#) and [dependent cells](#) of [formulas](#).

1. On the **Tools** menu, click **Options**, and then click the **View** tab.
2. Check that **Show all** or **Show placeholders** is selected under **Objects**.
3. On the **Tools** menu, point to **Formula Auditing**, and then click **Show Formula Auditing Toolbar**.
4. Do one of the following.

## [Trace cells that provide data to a formula \(precedents\)](#)

1. Select the cell that contains the formula for which you want to find precedent cells.
2. To display a [tracer arrow](#) to each cell that directly provides data to the active cell, click **Trace Precedents**  on the **Formula Auditing toolbar**.
3. To identify the next level of cells that provide data to the active cell, click **Trace Precedents**  again.
4. To remove tracer arrows one level at a time, starting with the precedent cell farthest away from the active cell, click **Remove Precedent Arrows** . To remove another level of tracer arrows, click the button again.

## [Trace formulas that reference a particular cell \(dependents\)](#)

1. Select the cell for which you want to identify the dependent cells.
2. To display a [tracer arrow](#) to each cell that is dependent on the active cell, click **Trace Dependents**  on the **Formula Auditing toolbar**.
3. To identify the next level of cells that depend on the active cell, click **Trace Dependents**  again.

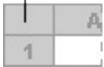
4. To remove tracer arrows one level at a time, starting with the dependent cell farthest away from the active cell, click **Remove Dependent Arrows** . To remove another level of tracer arrows, click the button again.
5. To remove all [tracer arrows](#) on the worksheet, click **Remove All Arrows**  on the **Formula Auditing toolbar**.

**Note** Red arrows show cells that cause errors. If the selected cell is referenced by a cell on another worksheet or workbook, a black arrow points from the selected cell to a worksheet icon . The other workbook must be open before Microsoft Excel can trace these dependencies, however.

### Tips

- To see the color-coded precedents for the [arguments](#) in a formula, select a cell and press F2.
- To select the cell at the other end of an arrow, double-click the arrow. If the cell is in another worksheet or workbook, double-click the black arrow and then double-click the reference you want in the **Go to** list.
- To see all the relationships on a worksheet, in an empty cell type = (equal sign), and then click the **Select All** button. Select the cell, and press **Trace Precedents**  twice.

Select All button



[Show All](#)

# Evaluate a nested formula one step at a time

You can see the different parts of a nested [formula](#) evaluated in the order the formula is calculated. For example, you can see this in the following formula where the function AVERAGE(F2:F5) is shown as its value, 80.

=IF(AVERAGE(F2:F5)>50,SUM(G2:G5),0) as

=IF(80>50,SUM(G2:G5),0)

1. Select the cell you want to evaluate. Only one cell can be evaluated at a time.
2. On the **Tools** menu, point to **Formula Auditing**, and then click **Evaluate Formula**.
3. Click **Evaluate** to examine the value of the underlined reference. The result of the evaluation is shown in italics.

If the underlined part of the formula is a reference to another formula, click **Step In** to display the other formula in the **Evaluation** box. Click **Step Out** to go back to the previous cell and formula.

4. Continue until each part of the formula has been evaluated.
5. To see the evaluation again, click **Restart**.

To end the evaluation, click **Close**.

**Note** The **Step In** button is not available for a reference the second time the reference appears in the formula, or if the formula refers to a cell in a separate workbook.

[Show All](#)

# Find and correct errors in formulas

Formula errors can result in error values as well as cause unintended results. Below are some tools to help find and investigate errors.

[Correct an error value, such as #NAME?](#)

If a formula cannot properly evaluate a result, Microsoft Excel will display an error value. Each error type has different causes, and different solutions.

[#####](#)

Occurs when a column is not wide enough, or a negative date or time is used.

Review the possible causes and solutions.

## Possible causes and solutions

[Column is not wide enough to display the content](#)

**Increase the width of the column** Select the column, point to **Column** on the **Format** menu, click **Width**, and then enter a number.

**Shrink the contents to fit the column** Select the column, then on the **Format** menu, click **Cells**, click the **Alignment** tab, and then select the **Shrink to fit** check box.

**Apply a different number format** In some cases, you can change the cell's number format to make the number fit within the existing cell width. For example, decrease the number of decimal places after the decimal point.

[Dates and times are negative numbers](#)

- If you are using the 1900 date system, dates and times in Microsoft Excel must be positive values.

- When you subtract dates and times, make sure you build the formula correctly.
- If the formula is correct, although the result is a negative value, you can display the value by formatting the cell with a format that is not a date or time format. Click **Cells** on the **Format** menu, click the **Number** tab, and then select a format that is not a date or time format.

 [#VALUE!](#)

Occurs when the wrong type of [argument](#) or [operand](#) is used.

1. Click the cell that displays the error, click the button that appears , and then click **Trace Error** if it appears.
2. Review the possible causes and solutions.

## Possible causes and solutions

 [Entering text when the formula requires a number or a logical value, such as TRUE or FALSE](#)

Microsoft Excel cannot translate the text into the correct data type. Make sure the formula or function is correct for the required operand or argument, and that the cells that are referenced by the formula contain valid values. For example, if cell A5 contains a number and cell A6 contains the text "Not available", the formula =A5+A6 will return the error #VALUE!.

 [Entering or editing an array formula, and then pressing ENTER](#)

Select the cell or range of cells that contains the [array formula](#), press F2 to edit the formula, and then press CTRL+SHIFT+ENTER.

 [Entering a cell reference, a formula, or a function as an array constant](#)

Make sure the array [constant](#) is not a cell reference, formula, or function.

 [Supplying a range to an operator or a function that requires a single value,](#)

[not a range](#)

- Change the range to a single value.
- Change the range to include either the same row or the same column that contains the formula.

[Using a matrix that is not valid in one of the matrix worksheet functions](#)

Make sure the dimensions of the [matrix](#) are correct for the matrix arguments.

[Running a macro that enters a function that returns #VALUE!](#)

Make sure the function is not using an incorrect argument.

[#DIV/0!](#)

Occurs when a number is divided by zero (0).

1. Click the cell that displays the error, click the button that appears , and then click **Trace Error** if it appears.
2. Review the possible causes and solutions.

## Possible causes and solutions

[Entering a formula that contains explicit division by zero \(0\)— for example, =5/0](#)

Change the divisor to a number other than zero.

[Using the cell reference to a blank cell or to a cell that contains zero as a divisor](#)

**Note** If the [operand](#) is a cell that is blank, Microsoft Excel interprets the blank as zero.

- Change the cell reference to another cell.

- Enter a value other than zero in the cell used as a divisor.
- Enter the value **#N/A** into the cell referenced as the divisor, which will change the result of the formula to **#N/A** from **#DIV/0!** to denote that the divisor value is not available.
- Prevent the error value from displaying, using the IF worksheet function. For example, if the formula that creates the error is **=A5/B5**, use **=IF(B5=0,"",A5/B5)** instead. The two quotation marks represent an empty text string.

[Running a macro that uses a function or a formula that returns #DIV/0!](#)

Make sure the divisor in the function or formula is not zero or blank.

[#NAME?](#)

Occurs when Microsoft Excel doesn't recognize text in a formula.

1. Click the cell that displays the error, click the button that appears , and then click **Trace Error** if it appears.
2. Review the possible causes and solutions.

## Possible causes and solutions

[Using a function that is part of the Analysis Toolpak add-in, without the add-in being loaded](#)

Install and load the Analysis Toolpak [add-in](#).

[How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

### [Using a name that does not exist](#)

Make sure the [name](#) exists. On the **Insert** menu, point to **Name**, and then click **Define**. If the name is not listed, add the name by using the **Define** command.

### [Misspelling the name](#)

Verify the spelling. Select the name in the [formula bar](#)  , press F3, click the name you want to use, and then click **OK**.

### [Using a label in a formula, without labels being allowed](#)

Allow labels to be used. On the **Tools** menu, click **Options**, and then click the **Calculation** tab. Under **Workbook options**, select the **Accept labels in formulas** check box.

### [Misspelling the name of a function](#)

Correct the spelling. Insert the correct function name into the formula by clicking **Function** on the **Insert** menu.

### [Entering text in a formula without enclosing the text in double quotation marks](#)

(Excel tries to interpret your entry as a name even though you intended it to be used as text.)

Enclose text in the formula in double quotation marks. For example, the following formula joins the piece of text "The total amount is " with the value in cell B50:

```
= "The total amount is "&B50
```

### [Omitting a colon \(:\) in a range reference](#)

Make sure all range references in the formula use a colon (:); for example, SUM(A1:C10).

## [Referencing another sheet not enclosed in single quotation marks](#)

If the formula refers to values or cells on other worksheets or workbooks and the name of the other workbook or worksheet contains a nonalphabetical character or a space, you must enclose its name within single quotation marks ( ' ).

## [#N/A](#)

Occurs when a value is not available to a function or formula.

1. Click the cell that displays the error, click the button that appears , and then click **Trace Error** if it appears.
2. Review the possible causes and solutions.

## **Possible causes and solutions**

### [Missing data, and #N/A or NA\(\) has been entered in its place](#)

Replace #N/A with new data.

**Note** You can enter #N/A in those cells where data is not yet available. Formulas that refer to those cells will then return #N/A instead of attempting to calculate a value.

### [Giving an inappropriate value for the lookup\\_value argument in the HLOOKUP, LOOKUP, MATCH, or VLOOKUP worksheet function](#)

Make sure the lookup\_value [argument](#) is the correct type of value— for example, a value or a cell reference, but not a range reference.

### [Using the VLOOKUP, HLOOKUP, or MATCH worksheet function to locate a value in an unsorted table](#)

By default, functions that look up information in tables must be sorted in ascending order. However, the VLOOKUP and HLOOKUP worksheet functions contain a range\_lookup [argument](#) that instructs the function to find an exact match even if the table is not sorted. To find an exact match, set the

range\_lookup argument to FALSE.

The MATCH worksheet function contains a match\_type argument that specifies the order the list must be sorted in to find a match. If the function cannot find a match, try changing the match\_type argument. To find an exact match, set the match\_type argument to 0.

[Using an argument in an array formula that is not the same number of rows or columns as the range that contains the array formula](#)

If the [array formula](#) has been entered into multiple cells, make sure the ranges referenced by the formula have the same number of rows and columns, or enter the array formula into fewer cells. For example, if the array formula has been entered into a range 15 rows high (C1:C15) and the formula refers to a range 10 rows high (A1:A10), the range C11:C15 will display #N/A. To correct this error, enter the formula into a smaller range (for example, C1:C10), or change the range to which the formula refers to the same number of rows (for example, A1:A15).

[Omitting one or more required arguments from a built-in or custom worksheet function](#)

Enter all [arguments](#) in the function.

[Using a custom worksheet function that is not available](#)

Make sure the workbook that contains the worksheet function is open and the function is working properly.

[Running a macro that enters a function that returns #N/A](#)

Make sure the [arguments](#) in the function are correct and in the correct position.

[#REF!](#)

Occurs when a [cell reference](#) is not valid.

1. Click the cell that displays the error, click the button that appears , and

then click **Trace Error** if it appears.

2. Review the possible causes and solutions.

## Possible causes and solutions

[Deleting cells referred to by other formulas, or pasting moved cells over cells referred to by other formulas](#)

Change the formulas, or restore the cells on the worksheet by clicking **Undo**  immediately after you delete or paste the cells.

[Using a link to a program that is not running](#)

Start the program.

[Linking to a Dynamic Data Exchange \(DDE\) topic such as "system" that is not available](#)

Make sure that you're using the correct DDE topic.

[Running a macro that enters a function that returns #REF!](#)

Check the function to see if an [argument](#) refers to a cell or range of cells that is not valid. For example, if the macro enters a function that refers to a cell above the function, and the cell that contains the function is in row 1, the function will return #REF! because there are no cells above row 1.

[#NUM!](#)

Occurs with invalid numeric values in a formula or function.

1. Click the cell that displays the error, click the button that appears , and then click **Trace Error** if it appears.
2. Review the possible causes and solutions.

## Possible causes and solutions

## [Using an unacceptable argument in a function that requires a numeric argument](#)

Make sure the [arguments](#) used in the function are numbers. For example, even if the value you want to enter is \$1,000, enter **1000** in the formula.

## [Using a worksheet function that iterates, such as IRR or RATE, and the function cannot find a result](#)

Use a different starting value for the worksheet function.

Change the number of times Microsoft Excel iterates formulas.

## [How?](#)

1. On the **Tools** menu, click **Options**, and then click the **Calculation** tab.
2. Select the **Iteration** check box.
3. To set the maximum number of times Microsoft Excel will recalculate, type the number of iterations in the **Maximum iterations** box. The higher the number of iterations, the more time Excel needs to calculate a worksheet.
4. To set the maximum amount of change you will accept between calculation results, type the amount in the **Maximum change** box. The smaller the number, the more accurate the result and the more time Excel needs to calculate a worksheet.

## [Entering a formula that produces a number that is too large or too small to be represented in Microsoft Excel](#)

Change the formula so that its result is between  $-1 \times 10^{307}$  and  $1 \times 10^{307}$ .

## [#NULL!](#)

Occurs when you specify an intersection of two areas that do not intersect. The intersection operator is a space between references.

1. Click the cell that displays the error, click the button that appears , and

then click **Trace Error** if it appears.

2. Review the possible causes and solutions.

## Possible causes and solutions

### [Using an incorrect range operator](#)

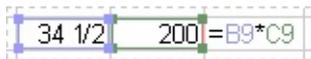
- To refer to a contiguous range of cells, use a colon (:) to separate the reference to the first cell in the range from the reference to the last cell in the range. For example, SUM(A1:A10) refers to the range from cell A1 to cell A10 inclusive.
- To refer to two areas that don't intersect, use the union operator, the comma (,). For example, if the formula sums two ranges, make sure a comma separates the two ranges (SUM(A1:A10,C1:C10)).

### [Ranges do not intersect](#)

Change the reference so that it intersects.

### [How?](#)

When you enter or edit a [formula](#), cell references and the borders around the corresponding cells are color-coded.



Color-coded cell references

If there are no squares at each corner of the color-coded border, then the reference is to a [named](#) range.

### [Change references that are not to a named range](#)

1. Double-click the cell that contains the formula you want to change. Microsoft Excel highlights each cell or range of cells with a different color.
2. Do one of the following:

- To move a cell or range reference to a different cell or range, drag the color-coded border of the cell or range to the new cell or range.
- To include more or fewer cells in a reference, drag a corner of the border.
- In the formula, select the reference, and type a new one.

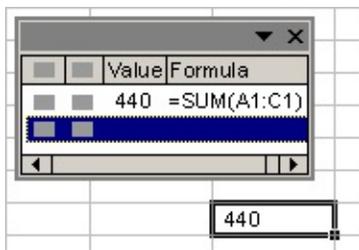
3. Press ENTER.

### [Change references that are to a named range](#)

1. Do one of the following:
  - Select the range of cells that contains formulas in which you want to replace references with names.
  - Select a single cell to change the references to names in all formulas on the worksheet.
2. On the **Insert** menu, point to **Name**, and then click **Apply**.
3. In the **Apply names** box, click one or more names.

### [Watch a formula and result of a cell](#)

Watch cells and their [formulas](#) on the **Watch Window toolbar**, even when the cells are out of view.



Watch Window toolbar

1. Select the cells you want to watch.

To select all cells on a worksheet with formulas, click **Go To** on the **Edit** menu, click **Special**, and then click **Formulas**.

2. On the **Tools** menu, point to **Formula Auditing** menu, and then click **Show Watch Window**.
3. Click **Add Watch** .
4. Click **Add**.
5. Move the **Watch Window** toolbar to the top, bottom, left, or right side of the window.
6. To change the width of a column, drag the boundary on the right side of the column heading.
7. To display the cell that an entry in **Watch Window** toolbar refers to, double-click the entry.

**Note** Cells that have [links](#) to other workbooks are displayed in the **Watch Window** toolbar only when the other workbook is open.

 [Calculate a nested formula one step at a time](#)

You can see the different parts of a nested [formula](#) evaluated in the order the formula is calculated. For example, you can see this in the following formula where the function AVERAGE(F2:F5) is shown as its value, 80.

=IF(AVERAGE(F2:F5)>50,SUM(G2:G5),0) as

=IF(80>50,SUM(G2:G5),0)

1. Select the cell you want to evaluate. Only one cell can be evaluated at a time.
2. On the **Tools** menu, point to **Formula Auditing** menu, and then click **Evaluate Formula**.
3. Click **Evaluate** to examine the value of the underlined reference. The result of the evaluation is shown in italics.

If the underlined part of the formula is a reference to another formula, click **Step In** to display the other formula in the **Evaluation** box. Click **Step Out** to go back to the previous cell and formula.

4. Continue until each part of the formula has been evaluated.

5. To see the evaluation again, click **Restart**.

To end the evaluation, click **Close**.

**Note** The **Step In** button is not available for a reference the second time the reference appears in the formula, or if the formula refers to a cell in a separate workbook.

### [Trace the relationships between formulas and cells](#)

You can display both [precedent cells](#) and [dependent cells](#) of [formulas](#).

1. On the **Tools** menu, click **Options**, and then click the **View** tab.
2. Check that **Show all** or **Show placeholders** is selected under **Objects**.
3. On the **Tools** menu, point to **Formula Auditing**, and then click **Show Auditing Toolbar**.
4. Do one of the following.

### [Trace cells that provide data to a formula \(precedents\)](#)

1. Select the cell that contains the formula for which you want to find precedent cells.
2. To display a [tracer arrow](#) to each cell that directly provides data to the active cell, click **Trace Precedents**  on the **Formula Auditing toolbar**.
3. To identify the next level of cells that provide data to the active cell, click **Trace Precedents**  again.
4. To remove tracer arrows one level at a time, starting with the precedent cell farthest away from the active cell, click **Remove Precedent Arrows** . To remove another level of tracer arrows, click the button again.

### [Trace formulas that reference a particular cell \(dependents\)](#)

1. Select the cell for which you want to identify the dependent cells.
2. To display a [tracer arrow](#) to each cell that is dependent on the active cell, click **Trace Dependents**  on the **Formula Auditing toolbar**.

3. To identify the next level of cells that depend on the active cell, click **Trace Dependents**  again.
4. To remove tracer arrows one level at a time, starting with the dependent cell farthest away from the active cell, click **Remove Dependent Arrows** . To remove another level of tracer arrows, click the button again.
5. To remove all [tracer arrows](#) on the worksheet, click **Remove All Arrows**  on the **Formula Auditing toolbar**.

**Note** Red arrows show cells that cause errors. If the selected cell is referenced by a cell on another worksheet or workbook, a black arrow points from the selected cell to a worksheet icon . The other workbook must be open before Microsoft Excel can trace these dependencies, however.

### [Tips](#)

- To see the color-coded precedents for the [arguments](#) in a formula, select a cell and press F2.
- To select the cell at the other end of an arrow, double-click the arrow. If the cell is in another worksheet or workbook, double-click the black arrow and then double-click the reference you want in the **Go to** list.
- To see all the relationships on a worksheet, in an empty cell type = (equal sign), and then click the **Select All** button. Select the cell, and press **Trace Precedents**  twice.



### [Correct common problems in formulas](#)

Like a grammar checker, Microsoft Excel uses certain rules to check for problems in formulas. These rules do not guarantee that your spreadsheet is problem-free, but they can go a long way to finding common mistakes. You can turn these rules on or off individually. Both methods used below present the same options.

## [Change which common problems Excel checks for](#)

1. On the **Tools** menu, click **Options**, and then click the **Error Checking** tab.
2. Select or clear the check box you want.

## [Correct common formula problems one at a time, like a spelling checker](#)

**Caution** If the worksheet has previously been checked for problems and the problems were ignored, the problems will not appear until the ignored problems have been reset.

1. Select the worksheet you want to check for errors.
2. If the worksheet is manually calculated, press F9 to recalculate now.
3. On the **Tools** menu, click **Error Checking**.
4. If you have previously ignored errors, and want to recheck them, click **Options**, click **Reset Ignored Errors**, click **OK**, and then click **Resume**.
5. Position the **Error Checking** dialog just below the [formula bar](#) . The formula bar is where it is most convenient to make changes to a formula while using the Error Checker.
6. Click a button on the right of the dialog. The options are different for each type of problem.

If you click **Ignore Error**, the problem is marked to be ignored for each consecutive check.

7. Click **Next**.
8. Continue until the error check is complete.

## [Mark common formula problems on the worksheet and correct them there](#)

If a cell contains a formula that breaks one of the rules, a triangle appears in the top-left corner of the cell.



1. Cell with a formula problem
2. On the **Tools** menu, click **Options**, and then click the **Error Checking** tab.
3. Select the **Enable background error checking** check box.
4. To change the color of the triangle that marks where a problem occurs, in the **Error Indicator Color** box, select a new color.
5. Select a cell with a triangle in the top-left corner of a cell.
6. Next to the cell, click the button that appears , and then click the option you want. The options are different for each type of problem, and the first entry describes the problem.

If you click **Ignore Error**, the problem is marked to be ignored for each consecutive check.

7. Repeat the two previous steps.

[Show All](#)

# Replace a formula with its result

You can "freeze" a formula so that it no longer recalculates by replacing a formula with its calculated value. If you want to freeze only part of a formula, you can replace only the part you don't want to recalculate.

[Replace a formula with its calculated value](#)

**Caution** When you replace a formula with its value, Microsoft Excel permanently removes the formula. If you accidentally replace a formula with a value and want to restore the formula, click **Undo**  immediately after you enter or paste the value.

1. Select the cell that contains the formula.

If the formula is an [array formula](#), select the range that contains the array formula.

[How?](#)

1. Click a cell in the array formula.
2. On the **Edit** menu, click **Go To**.
3. Click **Special**.
4. Click **Current array**.
2. Click **Copy** .
3. Click **Paste**  on the **Standard toolbar**.
4. Click the arrow next to **Paste Options** , and then click **Values Only**.

[Replace part of a formula with its calculated value](#)

**Caution** When you replace part of a formula with its value, it cannot be restored.

1. Click the cell that contains the formula.
2. In the [formula bar](#) , select the portion of the formula you want to replace with its calculated value. When you select the part of the formula

you want to replace, make sure to include the entire [operand](#). For example, if you select a function, you must select the entire function name, the opening parenthesis, the [arguments](#), and the closing parenthesis.

3. To calculate the selected portion, press F9.
4. To replace the selected portion of the formula with its calculated value, press ENTER.

If the formula is an [array formula](#), press CTRL+SHIFT+ENTER.

[Show All](#)

# Remove cells from a Watch Window

1. If the **Watch Window** [toolbar](#) is not displayed, point to **Formula Auditing** on the **Tools** menu and then click **Show Watch Window**.
2. Select the cells you want to remove.

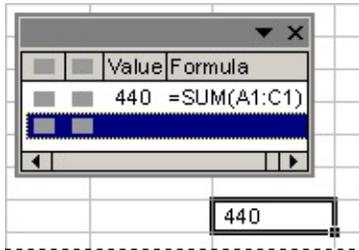
To select multiple cells, press CTRL and then click the cells.

3. Click **Delete Watch** .

[Show All](#)

# Watch a formula and its result

Watch cells and their [formulas](#) on the **Watch Window toolbar**, even when the cells are out of view.



Watch Window toolbar

1. Select the cells you want to watch.

To select all cells on a worksheet with formulas, click **Go To** on the **Edit** menu, click **Special**, and then click **Formulas**.

2. On the **Tools** menu, point to **Formula Auditing** menu, and then click **Show Watch Window**.
3. Click **Add Watch** .
4. Click **Add**.
5. Move the **Watch Window** toolbar to the top, bottom, left, or right side of the window.
6. To change the width of a column, drag the boundary on the right side of the column heading.
7. To display the cell that an entry in **Watch Window** toolbar refers to, double-click the entry.

**Note** Cells that have [links](#) to other workbooks are displayed in the **Watch Window** toolbar only when the other workbook is open.

[Show All](#)

# Troubleshoot tracing dependent, precedent, and error cells

 [When I change my worksheet, the tracer arrows disappear.](#)

All [tracer arrows](#) disappear if you change the formula the arrows point to, insert or delete columns or rows, or delete or move cells. To restore the tracer arrows after making any of these changes, you must use auditing commands on the worksheet again.

 [Tip](#)

To keep track of the original tracer arrows, print the worksheet with the tracer arrows displayed before you make the changes.

 [Microsoft Excel beeps when I click the \*\*Trace Dependents\*\* button or the \*\*Trace Precedents\*\* button.](#)

If Microsoft Excel beeps when you click **Trace Dependents**  or **Trace Precedents**  on the **Formula Auditing toolbar**, either Excel has traced all levels of the formula, or you are attempting to trace an item that cannot be traced. The following items on worksheets that can be referenced by formulas cannot be traced by using the auditing tools:

- References to text boxes, [embedded charts](#), or pictures on worksheets
- [PivotTable reports](#)
- References to named [constants](#)
- Formulas located in another workbook that refer to the active cell if the other workbook is closed

 [When I try to trace errors, Excel stops before it finds the source of the error.](#)

- If more than one error path exists, Excel stops tracing at the branch point when you use **Trace Error** . To continue tracing the error, click **Trace**

**Error**  again.

- If the formula that displays the error contains a reference to another worksheet or workbook, double-click the arrow that displays the worksheet icon . In the **Go to** list, double-click the reference you want to locate. Then, click **Trace Error**  again.

[I receive an error when I try to go to a cell in another workbook.](#)

When you are tracing formula [dependencies](#) or [precedents](#), Excel cannot go to a cell in a workbook that is not open. Open the workbook that contains the cell, and then try going to the cell again.

[Show All](#)

# Correct a ##### error

Occurs when a column is not wide enough, or a negative date or time is used.

Review the possible causes and solutions.

## Possible causes and solutions

[Column is not wide enough to display the content](#)

**Increase the width of the column** Select the column, point to **Column** on the **Format** menu, click **Width**, and then enter a number.

**Shrink the contents to fit the column** Select the column, then on the **Format** menu, click **Cells**, click the **Alignment** tab, and then select the **Shrink to fit** check box.

**Apply a different number format** In some cases, you can change the cell's number format to make the number fit within the existing cell width. For example, decrease the number of decimal places after the decimal point.

[Dates and times are negative numbers](#)

- If you are using the 1900 date system, dates and times in Microsoft Excel must be positive values.
- When you subtract dates and times, make sure you build the formula correctly.
- If the formula is correct, although the result is a negative value, you can display the value by formatting the cell with a format that is not a date or time format. Click **Cells** on the **Format** menu, click the **Number** tab, and then select a format that is not a date or time format.

[Show All](#)

# Correct a #DIV/0! error

Occurs when a number is divided by zero (0).

1. Click the cell that displays the error, click the button that appears , and then click **Trace Error** if it appears.
2. Review the possible causes and solutions.

## Possible causes and solutions

[Entering a formula that contains explicit division by zero \(0\)— for example, =5/0](#)

Change the divisor to a number other than zero.

[Using the cell reference to a blank cell or to a cell that contains zero as a divisor](#)

**Note** If the [operand](#) is a cell that is blank, Microsoft Excel interprets the blank as zero.

- Change the cell reference to another cell.
- Enter a value other than zero in the cell used as a divisor.
- Enter the value **#N/A** into the cell referenced as the divisor, which will change the result of the formula to #N/A from #DIV/0! to denote that the divisor value is not available.
- Prevent the error value from displaying, using the IF worksheet function. For example, if the formula that creates the error is =A5/B5, use =IF(B5=0,"",A5/B5) instead. The two quotation marks represent an empty text string.

[Running a macro that uses a function or a formula that returns #DIV/0!](#)

Make sure the divisor in the function or formula is not zero or blank.

[Show All](#)

# Correct a #N/A error

Occurs when a value is not available to a function or formula.

1. Click the cell that displays the error, click the button that appears , and then click **Trace Error** if it appears.
2. Review the possible causes and solutions.

## Possible causes and solutions

 [Missing data, and #N/A or NA\(\) has been entered in its place](#)

Replace #N/A with new data.

**Note** You can enter #N/A in those cells where data is not yet available. Formulas that refer to those cells will then return #N/A instead of attempting to calculate a value.

 [Giving an inappropriate value for the lookup\\_value argument in the HLOOKUP, LOOKUP, MATCH, or VLOOKUP worksheet function](#)

Make sure the lookup\_value [argument](#) is the correct type of value— for example, a value or a cell reference, but not a range reference.

 [Using the VLOOKUP, HLOOKUP, or MATCH worksheet function to locate a value in an unsorted table](#)

By default, functions that look up information in tables must be sorted in ascending order. However, the VLOOKUP and HLOOKUP worksheet functions contain a range\_lookup [argument](#) that instructs the function to find an exact match even if the table is not sorted. To find an exact match, set the range\_lookup argument to FALSE.

The MATCH worksheet function contains a match\_type argument that specifies the order the list must be sorted in to find a match. If the function cannot find a match, try changing the match\_type argument. To find an exact match, set the

match\_type argument to 0.

[Using an argument in an array formula that is not the same number of rows or columns as the range that contains the array formula](#)

If the [array formula](#) has been entered into multiple cells, make sure the ranges referenced by the formula have the same number of rows and columns, or enter the array formula into fewer cells. For example, if the array formula has been entered into a range 15 rows high (C1:C15) and the formula refers to a range 10 rows high (A1:A10), the range C11:C15 will display #N/A. To correct this error, enter the formula into a smaller range (for example, C1:C10), or change the range to which the formula refers to the same number of rows (for example, A1:A15).

[Omitting one or more required arguments from a built-in or custom worksheet function](#)

Enter all [arguments](#) in the function.

[Using a custom worksheet function that is not available](#)

Make sure the workbook that contains the worksheet function is open and the function is working properly.

[Running a macro that enters a function that returns #N/A](#)

Make sure the [arguments](#) in the function are correct and in the correct position.

[Show All](#)

# Correct a #NAME? error

Occurs when Microsoft Excel doesn't recognize text in a formula.

1. Click the cell that displays the error, click the button that appears , and then click **Trace Error** if it appears.
2. Review the possible causes and solutions.

## Possible causes and solutions

[Using a function that is part of the Analysis Toolpak add-in, without the add-in being loaded](#)

Install and load the Analysis Toolpak [add-in](#).

[How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

[Using a name that does not exist](#)

Make sure the [name](#) exists. On the **Insert** menu, point to **Name**, and then click **Define**. If the name is not listed, add the name by using the **Define** command.

[Misspelling the name](#)

Verify the spelling. Select the name in the [formula bar](#)  , press F3, click the name you want to use, and then click **OK**.

[Using a label in a formula, without labels being allowed](#)

Allow labels to be used. On the **Tools** menu, click **Options**, and then click the **Calculation** tab. Under **Workbook options**, select the **Accept labels in formulas** check box.

[Misspelling the name of a function](#)

Correct the spelling. Insert the correct function name into the formula by clicking **Function** on the **Insert** menu.

[Entering text in a formula without enclosing the text in double quotation marks](#)

(Excel tries to interpret your entry as a name even though you intended it to be used as text.)

Enclose text in the formula in double quotation marks. For example, the following formula joins the piece of text "The total amount is " with the value in cell B50:

```
= "The total amount is "&B50
```

[Omitting a colon \(:\) in a range reference](#)

Make sure all range references in the formula use a colon (:); for example, SUM(A1:C10).

[Referencing another sheet not enclosed in single quotation marks](#)

If the formula refers to values or cells on other worksheets or workbooks and the name of the other workbook or worksheet contains a nonalphabetical character or a space, you must enclose its name within single quotation marks ( ' ).

[Show All](#)

# Correct a #NULL! error

Occurs when you specify an intersection of two areas that do not intersect. The intersection operator is a space between references.

1. Click the cell that displays the error, click the button that appears , and then click **Trace Error** if it appears.
2. Review the possible causes and solutions.

## Possible causes and solutions

### [Using an incorrect range operator](#)

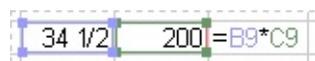
- To refer to a contiguous range of cells, use a colon (:) to separate the reference to the first cell in the range from the reference to the last cell in the range. For example, SUM(A1:A10) refers to the range from cell A1 to cell A10 inclusive.
- To refer to two areas that don't intersect, use the union operator, the comma (.). For example, if the formula sums two ranges, make sure a comma separates the two ranges (SUM(A1:A10,C1:C10)).

### [Ranges do not intersect](#)

Change the reference so that it intersects.

### [How?](#)

When you enter or edit a [formula](#), cell references and the borders around the corresponding cells are color-coded.



Color-coded cell references

If there are no squares at each corner of the color-coded border, then the reference is to a [named](#) range.

#### [Change references that are not to a named range](#)

1. Double-click the cell that contains the formula you want to change.  
Microsoft Excel highlights each cell or range of cells with a different color.
2. Do one of the following:
  - To move a cell or range reference to a different cell or range, drag the color-coded border of the cell or range to the new cell or range.
  - To include more or fewer cells in a reference, drag a corner of the border.
  - In the formula, select the reference, and type a new one.
3. Press ENTER.

#### [Change references that are to a named range](#)

1. Do one of the following:
  - Select the range of cells that contains formulas in which you want to replace references with names.
  - Select a single cell to change the references to names in all formulas on the worksheet.
2. On the **Insert** menu, point to **Name**, and then click **Apply**.
3. In the **Apply names** box, click one or more names.

[Show All](#)

# Correct a #NUM! error

Occurs with invalid numeric values in a formula or function.

1. Click the cell that displays the error, click the button that appears , and then click **Trace Error** if it appears.
2. Review the possible causes and solutions.

## Possible causes and solutions

[Using an unacceptable argument in a function that requires a numeric argument](#)

Make sure the [arguments](#) used in the function are numbers. For example, even if the value you want to enter is \$1,000, enter **1000** in the formula.

[Using a worksheet function that iterates, such as IRR or RATE, and the function cannot find a result](#)

Use a different starting value for the worksheet function.

Change the number of times Microsoft Excel iterates formulas.

[How?](#)

1. On the **Tools** menu, click **Options**, and then click the **Calculation** tab.
2. Select the **Iteration** check box.
3. To set the maximum number of times Microsoft Excel will recalculate, type the number of iterations in the **Maximum iterations** box. The higher the number of iterations, the more time Excel needs to calculate a worksheet.
4. To set the maximum amount of change you will accept between calculation results, type the amount in the **Maximum change** box. The smaller the

number, the more accurate the result and the more time Excel needs to calculate a worksheet.

[Entering a formula that produces a number that is too large or too small to be represented in Microsoft Excel](#)

Change the formula so that its result is between  $-1 * 10^{307}$  and  $1 * 10^{307}$ .

[Show All](#)

# Correct a #REF! error

Occurs when a [cell reference](#) is not valid.

1. Click the cell that displays the error, click the button that appears , and then click **Trace Error** if it appears.
2. Review the possible causes and solutions.

## Possible causes and solutions

[Deleting cells referred to by other formulas, or pasting moved cells over cells referred to by other formulas](#)

Change the formulas, or restore the cells on the worksheet by clicking **Undo**  immediately after you delete or paste the cells.

[Using a link to a program that is not running](#)

Start the program.

[Linking to a Dynamic Data Exchange \(DDE\) topic such as "system" that is not available](#)

Make sure that you're using the correct DDE topic.

[Running a macro that enters a function that returns #REF!](#)

Check the function to see if an [argument](#) refers to a cell or range of cells that is not valid. For example, if the macro enters a function that refers to a cell above the function, and the cell that contains the function is in row 1, the function will return #REF! because there are no cells above row 1.

[Show All](#)

# Correct a #VALUE! error

Occurs when the wrong type of [argument](#) or [operand](#) is used.

1. Click the cell that displays the error, click the button that appears , and then click **Trace Error** if it appears.
2. Review the possible causes and solutions.

## Possible causes and solutions

[Entering text when the formula requires a number or a logical value, such as TRUE or FALSE](#)

Microsoft Excel cannot translate the text into the correct data type. Make sure the formula or function is correct for the required operand or argument, and that the cells that are referenced by the formula contain valid values. For example, if cell A5 contains a number and cell A6 contains the text "Not available", the formula =A5+A6 will return the error #VALUE!.

[Entering or editing an array formula, and then pressing ENTER](#)

Select the cell or range of cells that contains the [array formula](#), press F2 to edit the formula, and then press CTRL+SHIFT+ENTER.

[Entering a cell reference, a formula, or a function as an array constant](#)

Make sure the array [constant](#) is not a cell reference, formula, or function.

[Supplying a range to an operator or a function that requires a single value, not a range](#)

- Change the range to a single value.
- Change the range to include either the same row or the same column that contains the formula.

[Using a matrix that is not valid in one of the matrix worksheet functions](#)

Make sure the dimensions of the [matrix](#) are correct for the matrix arguments.

[Running a macro that enters a function that returns #VALUE!](#)

Make sure the function is not using an incorrect argument.

[Show All](#)

# About euro currency

Some of the content in this topic may not be applicable to some languages.



[Microsoft Excel built-in euro currency support](#)

**Operating system support** For Excel to recognize euro values, your operating system must support the euro sign. Microsoft Windows 2000 Professional, Microsoft Windows NT 4.0 with Service Pack 4 or later, Windows Millennium Edition, and Windows 98 have built-in euro support.

**Fonts that display the euro sign** The fonts that can display the euro sign are Arial, Courier New, Lucida Console, MS Sans Serif, Tahoma, and Times New Roman. Depending on your operating system, not all fonts may be available.

**How Excel recognizes euro values** Excel recognizes the regional currency symbol (such as the dollar sign \$) designated by regional settings in Windows **Control Panel**, as currency and not, for example, as text. Excel also recognizes the euro sign as currency, even if you haven't designated it as your regional currency symbol in **Control Panel**.

**Note** You can convert euro member currencies to euro currency by using the Euro Currency Tools add-in, which is included in Excel 2002 and later. However, you don't have to install or load this add-in program for Excel to recognize both euro currency values and values in your local currency.

**Typing euro currency values** If the font you are using supports the euro currency symbol, you can enter the euro sign by pressing ALT+0128 on the numeric keypad.

You can type values with the euro sign € before or after the number, and include or omit a space between the number and the euro sign. For example, if you type any of the following values, Excel recognizes them as one euro:

€1 1€ € 1 1 €

**Formatting euro currency values** When you type a value in euros, Excel

formats the cell as currency and includes two decimal places, if the number you type includes any decimal places. For example, if you type € 1.2, Excel displays € 1.20. If you type 2.359€, Excel stores all three decimal places but displays 2.36 €, rounding up the last decimal place. However, if you type € 1, Excel displays € 1.

If you enter a value in euros and then click **Undo** , Excel removes the currency format from the cell along with the data.

You can also create your own euro currency style to format cells.

**Printing values with the euro sign** If your printer does not have the euro sign in its resident fonts, a box is printed instead of the euro sign. Contact your printer vendor to find out how to update your printer fonts to include the euro sign. You can also adjust your printer setup not to use resident fonts. Look for an option called **Print fonts as graphics** in printer setup properties.

**Bringing euro data into Excel** When you import external data, Excel recognizes euro and local currency values the way you type them. However, when you copy and paste data from another program into Excel, Excel does not recognize euro values.

**Using euro values in macros** You can also record and play back [macros](#) that uses euro values, just as you can record and play back macros that use values in your local currency. You should not use the euro symbol in the name of the module or in procedure names.

 [Euro Currency Tool add-in](#)

The Microsoft Excel Euro Currency Tools [add-in](#) program, available by selecting the **Euro Currency Tools** check box under **Add-ins** on the **Tools** menu, provides the following tools to work with euros and the national currency units of the European Union (EU) members that have adopted the euro.

- A **EuroValue** [toolbar](#) that you can use to view converted values
- A **Standard** toolbar button called **Euro**  to format euro values
- A toolbar button  and **Euro Conversion** menu command to convert values to and from the euro and between the other euro member currencies, and also convert formulas to use the euro or another euro

- member currency
- The EUROCONVERT worksheet function

## [Converting Excel formulas](#)

The Euro Currency Tools add-in acts upon all cells in a source range that you define. If the source range contains formulas, you can convert them all at the same time according to global options that you set, or Excel can prompt you to define how you want to convert each formula. Whether you convert formulas one at a time or all at once, you can specify a method you want to use for the conversion.

**Convert formulas to values** When you use this method, Excel calculates the formulas in the source range, converts the results to the new currency, and returns the converted values to the destination range.

Use this method when you won't need to recalculate the converted results later if the values in the referenced cells in the source formula change. This is the default method.

**Link new formulas to original data** This method creates new formulas in the destination range that refer to the cells that contain the source formulas. The resulting linked formulas convert the results of the source formulas to the new currency by using the EUROCONVERT worksheet function.

Use this method when you plan to update the values in the cells referred to by the source formulas, and will want to recalculate the converted results. Consider using this method whenever you don't convert any of the cells referred to by the source formulas, and you want to perform calculations using the source currency before converting to the new currency.

**Copy the original formula but do not apply EuroConvert** This method copies the source formulas to new cells and adjusts their [relative cell references](#) to refer to the destination cells that contain the converted values.

Use this method when you convert all of the cells that the source formulas refer to and you want the new formulas to use the converted values to calculate their results.

**Leave the destination cell blank** This method skips over the formula without converting or copying it, and does not enter a value in the destination cell for the formula. If you previously selected either **Currency** or **ISO** output, this method does copy the cell formatting, including borders and font, from the source cell to the destination cell.

Use this method for formulas you don't want to include in the destination range.

**Edit new formula** You can write your own formula based on the source formula, or create a new formula. For example, you can modify the formula to calculate a different value or refer to different cells, or you can add any worksheet function to the formula.

Use this method when none of the other methods meet your requirements.



#### [Working with euro currency in earlier versions of Excel](#)

Tools for working with euro currency in product versions earlier than Excel 2000 are available on the Microsoft Office Web site. If you use earlier Excel product versions, you can view euro values in workbooks that were created in Excel 2002 or later and saved in a compatible format. The tool supports only formatting, however, so workbooks with cells containing the EUROCONVERT function will return #NAME?.

**If you have Excel 2000** Excel 2000 supports the EUROCONVERT function if the Euro Currency Tool add-in is installed.

**If you have Excel 98 for the Macintosh** For information about the availability of euro features for Excel 98 for the Macintosh, go to the Microsoft Office Web site. See Help for Excel 98 for information about working with Excel for Windows files on the Macintosh.

To display the euro sign, you must first install fonts that include the euro sign. You can obtain these fonts for your version of the Macintosh operating system from Apple Computer, Inc. When you open a workbook on the Macintosh that does not have fonts that include the euro sign, the euro sign will appear as an underscore ( \_ ) instead of €. If you update links or calculate formulas that include the EUROCONVERT worksheet function, the formulas display the #NAME? error.

**If you have Excel 97** The add-in for Excel 97 includes only formatting support. Without the add-in you must create the number format for euro currency yourself.

**If you have product versions earlier than Excel 97** No add-in program is available for versions of Excel for Windows or Macintosh earlier than Excel 97. For information about euro fonts for Windows 3.x, see the Microsoft Office Web site. If you save an Excel 2002 or later workbook with euro values and formulas in a format compatible with a version of Excel earlier than Excel 95 and then open the workbook in that version, and you don't have operating system support for the euro sign, the euro sign does not appear. If you update links or calculate formulas that include the EUROCONVERT worksheet function, the formulas display the #NAME? error.

**Note** No matter what operating system you're running, if you save your document in an earlier Excel file type or in a file format other than Excel, the euro symbol will not display or displays as a different character.

To use a worksheet that contains EUROCONVERT formulas with a version of Excel that does not support the function (Excel 97 or earlier), you can open the workbook in Excel 2002 or later, copy and paste only the values of the cells on a new worksheet, and then save the workbook in a format compatible with the earlier version of Excel.



#### [Conversion rates and new member currencies](#)

The tools you use to convert currencies have fixed conversion rates and conversion tools established by the EU. For information about the rules and rates currently in effect, see the European Commission publications about the euro or the Microsoft Office Web site.

For a list of the current euro member currencies, see the EUROCONVERT worksheet function. For information about updates currently available for download from the Web, see the Microsoft Office euro Web site. For information about other ways to obtain updates, contact Microsoft Product Support Services or your Microsoft Office vendor.

[Show All](#)

# Convert values or formulas to euros or another currency

Some of the content in this topic may not be applicable to some languages.

1. On the **Tools** menu, click **Euro Conversion**. If the **Euro Conversion** command is not available on the **Tools** menu, you need to install the **Euro Currency Tools** [add-in](#).

[How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. If the [add-in](#) you want to use is not listed in the **Add-Ins available** box, click **Browse**, and then locate the add-in.
3. In the **Add-Ins available** box, select the check box next to the add-in you want to load, and then click **OK**.
4. If necessary, follow the instructions in the setup program.
2. In the **Euro Conversion** dialog box, in the **Source range** box under **Data to Euro convert**, enter or select the cell or a single range that contains the values you want to convert. All values in the range must be in a single currency.

**Note** Excel may convert dates and times in the source range to values in the new currency in the destination range.

3. Under **Data to Euro convert**, click the **Destination range** box, and enter or select the upper left cell of the range where you want to paste the converted values. The destination range must not include any of the cells in the source range.
4. Under **Currency conversion**, in the **From** list, click the currency of the values you're converting, and in the **To** list, click the currency to which you want to convert the values.
5. If your source range contains formulas, click **Advanced**, and select one of

the conversion options under **Formula options** in the **Advanced Euro Options** dialog box.

You can also use this dialog box to control rounding.



Set either or both of the following options:

- If you want the converted values that are stored by Excel to include all significant digits without rounding, select the **Output full precision** check box.
- If you are converting between two euro member currencies and want to set the number of decimal places to use for rounding the intermediate values in euros, select the **Set triangulation precision to** check box, and then click the number of significant digits (3 or greater) you want in the **digits** box.

6. In the **Output format** list, click one of the following to indicate the number formatting you want to apply to the converted values:

**Currency** To apply a currency format for the currency selected in the **To** list and copy the cell formatting, including borders and font, from the source cells.

**ISO** To display the International Standards Organization code for the converted currency and copy the cell formatting from the source cells. For a list of the ISO codes, see the EUROCONVERT worksheet function.

**None** To keep the current number format and cell formatting of the destination cells.

7. Click **OK**. If the **Euro Conversion** dialog box appears, select an option to convert the current formula. Click **OK** to move to the next formula, or click **Apply to all** to use the same settings for all formulas.

## Notes

- Excel converts constant values in the source range to values in the new

currency in the destination range.

- Excel copies text in the source range without conversion.

[Show All](#)

# Format values in euro currency style

Some of the content in this topic may not be applicable to some languages.

This process does not convert cell values.

1. Select the cells that you want to format as euro currency style.
2. Click **Euro** € on the **Formatting toolbar**. If **Euro** € is not available, you must load the Euro Currency Tools [add-in](#) program.

[How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. If the [add-in](#) you want to use is not listed in the **Add-Ins available** box, click **Browse**, and then locate the add-in.
3. In the **Add-Ins available** box, select the check box next to the add-in you want to load, and then click **OK**.
4. If necessary, follow the instructions in the setup program.

**Note** The regional settings for currency in Microsoft Windows **Control Panel** determine the position of the euro sign € (that is, whether the symbol appears before or after the number and whether a space separates the symbol and the number). To change this positioning, create a Custom currency style. The regional settings for currency in **Control Panel** also determine the decimal symbol and the thousands separator.

# How to type the euro sign

Some of the content in this topic may not be applicable to some languages.

Microsoft Office Excel 2003 provides full support for entering the euro sign € and for working with values in euro currency with Microsoft Windows 2000, Windows Millennium Edition, Windows 98 and Windows NT 4.0 with Service Pack 4 or later.

**Entering the euro currency symbol** To type the euro currency symbol, use the following keys.

<b>Press</b>	<b>On these keyboard layouts</b>
ALT+0136 (numeric keypad, NUM LOCK must be on)	Belgian (French KBD120), Belgian Dutch 120, Croatian/Slovenian, Czech, Czech 101, Czech Programmer's, Danish, Dutch KBD143, Estonian, Faroese, Finnish, French, German (IBM), German (Standard), Icelandic, Italian, Italian 142, Latvian, Lithuanian, Lithuanian (New), FYRO Macedonian (Cyrillic), Norwegian, Portuguese KBD163, Serbian (Cyrillic), Serbian (Latin), Slovak, Slovak (QWERTY), Spanish, Swedish, Swiss French, Swiss German, Turkish F 440, Turkish Q 179
AltGr+E	Greek IBM 220, Greek IBM 319, Greek IBM 220 Latin, Greek IBM 319 Latin
AltGr+4	Irish, Latvian (QWERTY), United Kingdom
AltGr+5	Greek Latin, U.S. (International)
AltGr+U	Hungarian, Hungarian 101, Polish, Polish Programmer's
ALT+0128 (numeric keypad, NUM LOCK must be on)	Others

be on)

## Notes

- If your keyboard doesn't have an AltGr key, use the right Alt key. The AltGr combinations are not implemented on U.S. keyboards.
- Excel recognizes the euro sign as currency, even if you haven't designated it as your regional currency symbol in Microsoft Windows **Control Panel**.
- An alternate method for inserting the euro currency symbol is to click **Symbol** on the **Insert** menu and enter "20AC" as the **Character code** from the Unicode character set.

[Show All](#)

# View converted values for euros and other currencies

Some of the content in this topic may not be applicable to some languages.

1. Point to **Toolbars** on the **View** menu, and then click **EuroValue**. If the **EuroValue toolbar** is not available, you need to load the Euro Currency Tools [add-in](#) program.



1. On the **Tools** menu, click **Add-Ins**.
2. If the [add-in](#) you want to use is not listed in the **Add-Ins available** box, click **Browse**, and then locate the add-in.
3. In the **Add-Ins available** box, select the check box next to the add-in you want to load, and then click **OK**.
4. If necessary, follow the instructions in the setup program.
2. Click the arrow next to the list box on the **EuroValue** toolbar, and then click the conversion you want to view.

For a list of the International Standards Organization (ISO) codes that identify the currencies, see the EUROCONVERT function.

3. Do one of the following:
  - To view the converted value for a single cell, click the cell.
  - To view the converted sum of the values in a range, select a range of cells.

**Note** You can't copy the value that's displayed on the **EuroValue** toolbar to your worksheet. To copy converted values to your worksheet, follow the procedure to convert values.

[Show All](#)

# Troubleshoot euro currency conversion

Some of the content in this topic may not be applicable to some languages.

## Converting and Viewing

[I can't find the Euro Conversion command or button.](#)

If you don't see the **Euro Conversion** command on the **Tools** menu, click **Add-Ins** on the **Tools** menu, and then select the **Euro Currency Tools** check box to load the [add-in](#) program.

If **Euro Currency Tools** isn't listed in the **Add-Ins** dialog box, you must install the add-in program, then return to the **Add-Ins** dialog box and select the **Euro Currency Tools** check box to load the add-in program.

[Install the add-in](#)

If you originally installed your Microsoft Office program from a network file server or from a shared folder, you must install or remove components from that location. If you installed your Office program from a CD-ROM and you've mapped your CD-ROM drive to a new drive letter since installing the Office program, reinstall from the CD-ROM. If you're running any Office program files from the CD-ROM, you must uninstall the Office program and then reinstall it from the CD-ROM.

1. Quit all programs.
2. Double-click the **Add/Remove Programs** icon in the Windows **Control Panel**.
3. Do one of the following:
  - For Windows 2000 and Windows Millennium Edition:

If you installed your Office program as part of Microsoft Office, click **Microsoft Office** in the **Currently installed programs** box, and then click the **Change** button.

If you installed your Office program individually, click the name of your program in the **Currently installed programs** box, and then click the **Change** button.

- For Windows 98 and Windows NT 4.0:

If you installed your Office program as part of Microsoft Office, click **Microsoft Office** on the **Install/Uninstall** tab, and then click the **Add/Remove** button.

If you installed your Office program individually, click the name of your program on the **Install/Uninstall** tab, and then click the **Add/Remove** button.

4. Follow the instructions on the screen.

[Values were copied but not converted.](#)

The Euro Conversion tool converts numbers only. Text that Microsoft Excel cannot interpret as a number (such as alphanumeric text) and numbers formatted as dates are copied but not converted. Make sure the values you are trying to convert are numbers that are not formatted as dates.

[My formulas disappear or are changed.](#)

When you convert formulas using the Euro Conversion tool, the default setting is to convert the formulas to values. You can use the options in the **Advanced** dialog box (click **Advanced** in the **Euro Conversion** dialog box) to change how formulas are converted. Use **Prompt to convert formulas** for more options for each formula.

[I used the EUROCONVERT function, and the resulting value is not rounded correctly or has the wrong number of digits.](#)

The EUROCONVERT function uses the European Union rates, or conversion factors, that express one euro in each of the euro member national currency units. Each conversion factor has six significant digits.

If you don't want rounding to occur, set Full\_Precision to TRUE, and make sure the number format for the cell isn't currency.

[The EuroValue toolbar is blank, displays "Off," or does not show my converted values correctly.](#)

The **EuroValue** [toolbar](#) shows different results depending on:

- whether the conversion rate is set to Off.
- whether you have one cell or a range of cells selected.
- the type of data in the cells you have selected.
- whether you display the toolbar before or after selecting the cells for which you want to see converted values.

**Conversion list set to Off** If you click the arrow next to the box on the right side of the **EuroValue** toolbar, and click **Off**, the toolbar remains on your screen but displays the word **Off** rather than a converted value. To see a converted value in the toolbar, click the arrow next to the box that displays the word **Off**, and then click the desired conversion from the list.

**Range of cells selected** When you select more than one cell that contains numbers, the value shown in the **EuroValue** toolbar is the converted sum of the numbers. If you don't want to see a sum, select an individual cell instead.

**Text selected** The **EuroValue** toolbar may show a zero value if you select cells that contain text. Select cells that contain currency values instead.

**Dates or times selected** If the cell you select contains a date or time, the tool converts the serial number of the date or time. Select a cell that contains a currency value instead.

**Hidden cells selected** If the cells you select contain hidden columns or rows, the result shown in the **EuroValue** toolbar includes the values in the hidden cells. If you do not want these values to be included in the converted sum, select the individual cells you do want included by holding down the CTRL key while you click each one. Or, unhide the hidden rows or columns and move them elsewhere on the worksheet.

**Toolbar is redisplayed** When the conversion value list in the **EuroValue** toolbar is not set to Off, the toolbar updates when the toolbar is displayed and you click on a cell or range of cells, and when you click a conversion value from the box on the right side of the toolbar. If you hide the **EuroValue** toolbar, select different cells, and then redisplay the toolbar, the **EuroValue** toolbar will show the values resulting from the cells previously selected. To update the toolbar to reflect conversion values for the currently selected cells, select a cell other than the cells for which you want to see converted values, and then reselect the cells

for which you want to see converted values.

[Euro conversions look different on another computer.](#)

For euro conversions to calculate properly, the Euro Currency Tools [add-in](#) program must be installed on the computer you are using, and you must be using the appropriate version of Microsoft Excel.

Also, your operating system must support the euro sign. For example, if you have Microsoft Windows NT 4.0 with Service Pack 3 or earlier, you may need to download the Microsoft Euro Currency Support product update to input and display the euro sign in programs that support the euro sign. For more information, see the [Microsoft Office Web site](#).

[The currency I want to convert from or to isn't listed.](#)

The Microsoft Excel Euro Currency Tools [add-in](#) program provides tools to work with euros and the national currency units of the European Union (EU) members that have adopted the euro. The tools do not convert currencies of non-euro-member countries/regions. As additional countries or regions adopt the euro, Microsoft makes updates to the tools available. If you do not see the national currency you want in the list, check to make sure the country or region is a euro member state, and if it is, check for an updated version of the tools on the [Microsoft Office Web site](#).

[I converted or formatted values and \*\*Undo\*\* is not available.](#)

After you convert values to or from the euro or to another euro member currency, or after you format values as euros, neither the **Undo** command nor the **Undo** button are available. To return your workbook to its previous state, close the workbook without saving changes. However, any other changes you made since your last save will also be lost.

[I converted several values, and some values don't look right.](#)

The source range you specified may contain times or dates. The Euro Conversion tool converts all numbers, including the serial numbers of times and the serial numbers of dates that are formatted with the General format (so that

the serial number of the date is displayed). Numbers formatted as dates are copied but not converted. When you specify the source range you want to convert, make sure the range does not contain times or dates that are not formatted as dates.

## Formatting and Printing

[I converted some values but the currency format is wrong.](#)

**Output format** The output format in the **Euro Conversion** dialog box may not be set for the formatting you want. Click **Euro Conversion** again, and check to make sure the proper format is selected in the **Output format** box.

**Microsoft Windows Control Panel** The regional settings for currency in Microsoft Windows **Control Panel** determine the position of the euro sign € (that is, whether the symbol appears before or after the number and whether a space separates the symbol and the number). To change this positioning, create a Custom currency style.

**Microsoft Windows NT 4.0** If you have Windows NT 4.0, you may need to download the Euro Currency Support product update to input and display the euro sign in programs that support the euro sign. For more information, see the [Microsoft Office Web site](#).

[I imported or exported a text file, and currencies are not shown correctly.](#)

**Importing** When you import text files into Microsoft Excel, Excel recognizes only the currency symbol that is designated by the regional settings in Windows **Control Panel**, and the euro sign. When you import a file and want to show national currencies other than the default or euro currencies, you can create custom number formats and apply the desired formats to the values you want after the file is imported. To keep your changes, save the file as an Excel workbook.

**Exporting** When you save a workbook in one of the following file formats, the euro sign is not retained: all dBase file formats, all Lotus 1-2-3 file formats, Quattro Pro/DOS file format, Microsoft Excel 2.1 Worksheet, Microsoft Excel 3.0 Worksheet, Microsoft Excel 4.0 Worksheet, Microsoft Excel 4.0 Workbook, and Microsoft Excel 5.0/95 Workbook. The euro sign is converted to a question mark in the following file formats: CSV (MS-DOS), Text (MS-DOS), and DIF (Data Interchange Format). The euro sign is converted to an s in the following file formats: CSV (Macintosh) and Text (Macintosh). For more information, see

Help for the program you're exporting to for information about how that program handles euro currency.

[The euro sign does not print correctly.](#)

Microsoft Excel and your operating system provide the support you need to print the euro sign correctly on most printers. However, the euro sign may not print correctly on some printers using some fonts. Check with your printer manufacturer for more information.

For more information about operating system support for the euro sign, see the [Microsoft Office Web site](#).

[I copied the euro sign in text from another program, but it did not paste in Microsoft Excel.](#)

When you copy text that includes the euro sign from another program such as Microsoft Word, the euro sign is not pasted in Excel. You must reapply euro formatting or add the symbol manually to the pasted value.

## Error Messages

[I get a message about my source range.](#)

You may not have specified a source range in the **Source range** box in the **Euro Conversion** dialog box, or you may have selected nonadjacent ranges. Be sure you have a single source range entered in the **Source range** box before you click **OK**.

[I get a message about the destination range.](#)

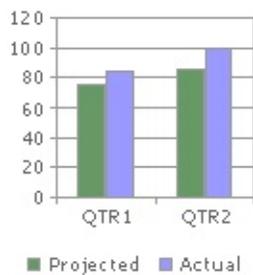
**Specify a single rectangular destination range** You may not have specified a destination range in the **Destination range** box, or you may have selected nonadjacent destination ranges. Click in the **Destination range** box, and then select a single cell to use as the upper left corner of the range you want to fill.

**Make sure the source and destination ranges don't overlap** The destination range must not include any of the cells in the source range.

[Show All](#)

# About charts

Charts are visually appealing and make it easy for users to see comparisons, patterns, and trends in data. For instance, rather than having to analyze several columns of worksheet numbers, you can see at a glance whether sales are falling or rising over quarterly periods, or how the actual sales compare to the projected sales.

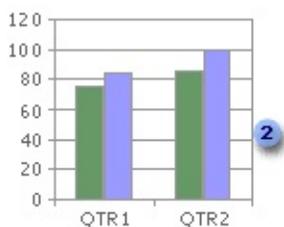


## [Creating charts](#)

You can create a chart on its own sheet or as an embedded object on a worksheet. You can also publish a chart on a Web page. To create a chart, you must first enter the data for the chart on the worksheet. Then select that data and use the Chart Wizard to step through the process of choosing the chart type and the various chart options, or use the **Chart** toolbar to create a basic chart that you can format later.

	QTR1	QTR2
Projected	75	85
Actual	84	99

**1**



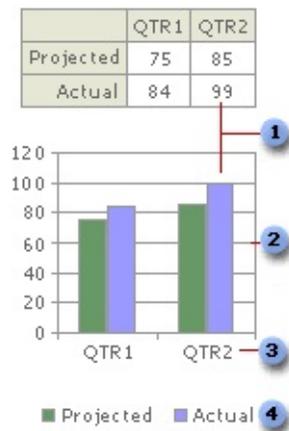
**1** Worksheet data

**2** Chart created from worksheet data

A PivotChart report is an interactive summary of data in a chart format. It is created differently than regular Microsoft Excel charts. After you create a PivotChart report, you can view different levels of detail or reorganize the layout of the chart by dragging its fields and items.

## [How worksheet data is represented in a chart](#)

A chart is linked to the worksheet data it's created from and is updated automatically when you change the worksheet data.



- 1 Data Marker
- 2 Major gridline
- 3 Category names
- 4 Chart data series names

**Data marker** Each [data marker](#) represents one number from the worksheet. Data markers with the same pattern represent one [data series](#). In the example above, the rightmost data marker represents the Qtr2 Actual value of 99.

**Major gridline** Microsoft Excel creates axis values from the worksheet data. Note that the axis values in the example above range from 0 to 120, which encompasses the range of values on the worksheet. Major [gridlines](#) mark the major intervals on the axis. You can also display minor gridlines on a chart, which mark the intervals between the major intervals.

**Category names** Excel uses column or row headings in the worksheet data for

category axis names. In the example above, the worksheet row headings QTR1 and QTR2 appear as category axis names.

**Chart data series names** Excel also uses column or row headings in the worksheet data for series names. Series names appear in the chart [legend](#). In the example above, the row headings Projected and Actual appear as series names.

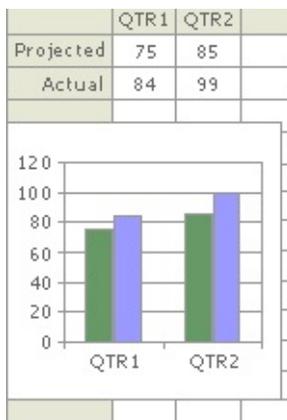
**Chart Tips** When you rest your pointer over a chart item, a chart tip containing the name of the item appears. For example, when you rest the pointer over a legend, a chart tip that contains the word Legend appears.



### [Embedded charts and chart sheets](#)

You can create a chart on its own [chart sheet](#) or as an [embedded chart](#) on a worksheet. Either way, the chart is linked to the source data on the worksheet, which means the chart is updated when you update the worksheet data.

**Embedded charts** An embedded chart is considered a graphic object and is saved as part of the worksheet on which it is created. Use embedded charts when you want to display or print one or more charts with your worksheet data.



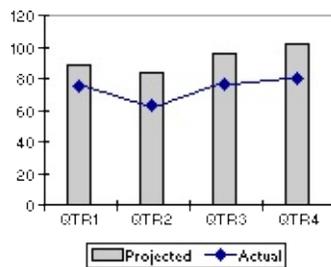
**Chart sheets** A chart sheet is a separate sheet within your workbook that has its own sheet name. Use a chart sheet when you want to view or edit large or complex charts separately from the worksheet data or when you want to preserve screen space as you work on the worksheet.



[Show All](#)

# About combination charts

**Combination charts** A combination chart uses two or more chart types to emphasize that the chart contains different kinds of information. The chart in the example shows one [data series](#) (Projected) as a column chart type and the other (Actual) as a line. To create this kind of overlay effect, select a custom chart type in Step 1 of the Chart Wizard when you create a chart. This example uses the Line – Column chart type. You can change an existing chart to a combination chart by selecting the data series you want to change and then changing the chart type for that series.



**Secondary axis** When the range of values for different data series varies widely, or when you have mixed types of data, you can plot one or more data series on a secondary value (y) axis. The scale of the secondary axis reflects the values for the associated series. The chart in the example shows the number of homes sold on the left y-axis and the average price on the right y-axis.



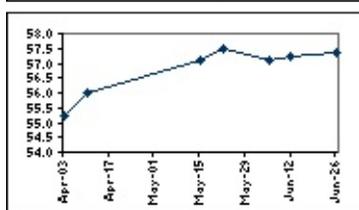
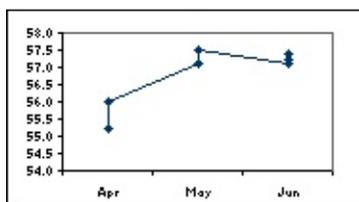
[Show All](#)

# About using dates in charts

When you create a chart from worksheet data that uses dates, and the dates make up the category (x) axis in the chart, Microsoft Excel automatically uses a time-scale category axis.

**Display of dates** The time-scale category axis displays dates in chronological order at specific intervals, or "base units," even if the dates on the worksheet are not in order or in the same base units.

Date	Price
26-Jun	57.38
22-May	57.50
10-Apr	56.00
5-Jun	57.10
15-May	57.13
12-Jun	57.25
3-Apr	55.20



Excel initially sets the time-scale base units (days, months, or years) according to the smallest difference between any two dates in the data. For example, if you have data for stock prices where the smallest difference between dates is seven days, Excel presets the time-scale base unit to days.

You can change the base unit to months to see the performance of the stock over a shorter or longer period of time, as in the first chart in the example. To change the base unit, click the axis, click **Selected Axis** on the **Format** menu, and then click the options you want on the **Scale** tab.

**Time-scale charts and times** You can't create time-scale charts from data that is measured at intervals of hours, minutes, or seconds. Only days, months, and

years are considered base units in time-scale charts.

**Chart types that can use a time-scale axis** Time-scale [axes](#) are available on stock charts and on 2-D and 3-D line, column, bar, and area charts, except when these charts have [multiple-level category labels](#). Time scale axes are not available on [PivotChart reports](#).

**Note** You cannot have a time-scale axis if the dates in your chart appear in the [legend](#). You can change the way data is plotted in the chart so that the dates appear on the category axis instead.

[Show All](#)

# Change the default chart type

1. To activate the **Chart** menu, click a chart.
2. On the **Chart** menu, click **Chart Type**.
3. Do one of the following:

[Select a standard chart type](#)

1. Click the **Standard Types** tab and click the built-in chart type you want to be the default.
2. Click **Set As Default Chart**, and then click **Yes**.
3. Click **OK**.

[Select a custom chart type or the current chart](#)

1. Click the **Custom Types** tab, and click the custom chart type you want. Or, if you want the current chart to be the default, do not make a selection.
2. Click **Set As Default Chart**, and then click **Yes**.
3. If the **Add Custom Chart Type** dialog box appears, type a name in the **Name** box, type a description in the **Description** box, and then click **OK**.
4. Click **OK**.

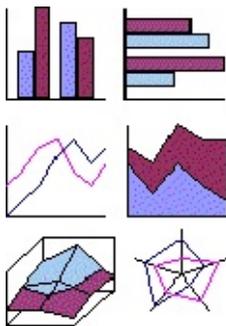
[Show All](#)

# Create a chart

1. Make sure the data on your worksheet is arranged properly for the type of chart you want to use.



[For a Column, Bar, Line, Area, Surface or Radar chart](#)



Arrange your data in columns, like this:

Lorem Ipsum

1	2
3	4

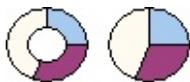
or in rows, like this:

Lorem 1 3

Ipsum 2 4



[For a Pie or Doughnut chart](#)



Regular pie charts (like the chart on the right in the example) have only one series of data, so you should use only one column of data. You can also use one column of labels for the data, like this:

A 1

B 2  
C 3

or use one row of data, and, if you like, one row of labels:

A B C  
1 2 3

Stacked pie charts and doughnut charts can have more than one series of data, so you can use more than one column of data, like this:

A 1 2  
B 3 4  
C 5 6

or more than one row of data, like this:

A B C  
1 2 3  
4 5 6

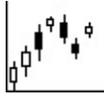
[For an XY scatter or Bubble chart](#)



Arrange your data in columns, with x values in the first column and corresponding y values and/or bubble size values in adjacent columns, like this:

X Y Bubble  
1 2 3  
4 5 6

[For a Stock chart](#)



Arrange your data in this order: high values, low values, and closing values. Use names or dates as labels, like this:

Date	High	Low	Close
1/1/2002	46.125	42	44.063

2. Do one of the following:

[Customize your chart as you create it.](#)

1. Select the cells that contain the data you want to use for your chart.
2. Click **Chart Wizard** .
3. Follow the instructions in the Chart Wizard.

[Create a basic chart that you can customize later.](#)

1. Display the **Chart** toolbar. To show the **Chart** toolbar, point to **Toolbars** on the **View** menu and then click **Chart**.
2. Select the cells that contain the data you want to use for your chart.
3. Click **Chart Type** .

[Tip](#)

If the cells you want to select for your chart are not in a continuous range, do the following:

Select the first group of cells that contain the data you want to include. While holding down CTRL, select any additional cell groups you want to include. The nonadjacent selections must form a rectangle.

The nonadjacent selections ...

	1997	1998
Japan	4.3	4.9
Korea	2.7	4.2
China	3.9	4.6

... are treated as a single rectangular range.

	1997	1998
Japan	4.3	4.9
China	3.9	4.6

[Show All](#)

# Create, share, or delete your own chart types

You can create custom chart types by changing any of the standard or custom built-in chart types. You can even share these custom chart types with other users. For example, if you want the same title information to appear on all your company charts, you can create a chart with that title, save the chart as a user-defined custom chart type, and then share it with others to use like a template.

**Note** Custom chart types are stored in workbooks. Built-in custom chart types are stored in XL8GALRY.XLS. If you have added your own custom chart types, Microsoft Excel stores them in XLUSRGAL.XLS.



## [Add your own custom chart type to apply to other charts](#)

1. Click the chart you want to save as a custom chart type.
2. On the **Chart** menu, click **Chart Type**.
3. On the **Custom Types** tab, click **User-defined**.
4. Click **Add**.
5. In the **Name** box, type a name.
6. If you want to add a description, type it in the **Description** box.
7. Click **OK**.



## [Share a custom chart type with other users](#)

1. On each user's machine, open the copy of the workbook that contains the custom chart type you want to share.
2. Click the chart you want to save as a custom chart type.
3. On the **Chart** menu, click **Chart Type**.
4. On the **Custom Types** tab, click **User-defined**.
5. Click **Add**.
6. In the **Name** box, type a name.
7. If you want to add a description, type it in the **Description** box.
8. Click **OK**.

## [Delete a user-defined custom chart type](#)

1. To activate the **Chart** menu, click a chart.
2. On the **Chart** menu, click **Chart Type**.
3. On the **Custom Types** tab, click **User-defined**.
4. In the **Chart type** box, click the format you want to delete.
5. Click **Delete**, and then click **OK**.

**Note** You cannot delete a built-in custom chart type.

[Show All](#)

# Select a different chart type

For most 2-D charts, you can change the chart type of either a [data series](#) or the entire chart. For bubble charts, you can change only the type of the entire chart. For most 3-D charts, changing the chart type affects the entire chart. For 3-D bar and column charts, you can change a data series to the cone, cylinder, or pyramid chart type.

1. To change the chart type, do one of the following:
  - For the entire chart, click the chart.
  - For a data series, click the data series.
2. On the **Chart** menu, click **Chart Type**.
3. On the **Standard Types** tab, click the chart type you want.

If you are changing the chart type for one data series and not the entire chart, be sure the **Apply to selection** check box is selected.

To apply the cone, cylinder, or pyramid chart type to a 3-D bar or column data series, click **Cylinder**, **Cone**, or **Pyramid** in the **Chart type** box on the **Standard Types** tab, and then select the **Apply to selection** check box.

[Show All](#)

# Select chart items

To select a chart item by using the mouse, do one of the following:

- Click the chart item you want.

[Data series](#), [data labels](#), and the [legend](#) have individual elements that can be selected after you select the group. For example, to select a single [data marker](#) in a data series, click the data series, and then click the data marker. Microsoft Excel displays the name of a chart item in a tip when you rest the pointer over the item if you have the **Show names** check box selected (**Tools** menu, **Options** command, **Chart** tab).

- Click the chart.

Click the arrow next to the **Chart Objects** box  on the **Chart** toolbar, and then click the item you want.

To select a chart item by using the keyboard, use the arrow keys.

To cancel a selection, press ESC.

[Show All](#)

# Set up a chart for printing

## An embedded chart

You can adjust where the chart will print on the page by sizing and moving the chart with the mouse in [page break view](#).

1. Click the worksheet outside of the [chart area](#).
2. Click **Page Break Preview** on the **View** menu.

## A chart sheet

You can size and scale the chart area, specify how it should be placed on the printed page, and then view it in the preview window.

1. Click the tab for the [chart sheet](#).
2. Click **Page Setup** on the **File** menu.
3. Select the options you want on the **Chart** tab.

**Note** To move and size the chart area of a chart sheet by using the mouse, you must click **Custom** on the **Chart** tab and then click **OK** to return to the chart sheet.

### [Tips](#)

- To print an [embedded chart](#) without its associated worksheet data, click the embedded chart to select it, and then follow the instructions for chart sheets. You can move and size the chart area of an embedded chart without using the **Custom** option on the **Chart** tab (**File** menu, **Page Setup** command).
- You can hide the display of field buttons in a [PivotChart report](#) before printing. Click **PivotChart** on the **PivotTable** toolbar, and then click **Hide PivotChart Field Buttons**.

[Show All](#)

# Troubleshoot charts

## Data and text in charts

[My xy \(scatter\) chart doesn't use my values along the horizontal \(x\) axis.](#)

**Make sure you didn't select a line chart.** If your category axis displays numbers like 1, 2, 3, 4 instead of the values you want, you may have selected a line chart instead of an xy (scatter) chart when you created the chart. Delete the chart, select the worksheet data that you want to plot, and then click **Chart Wizard** . In the **Chart Wizard - Step 1 of 4 - Chart Type** dialog box, click **XY (scatter)** in the **Chart type** box. If you want lines to connect the [data markers](#), click one of the xy (scatter) subtypes that has a line.

**Make sure to enter the data for the xy (scatter) chart in the correct order on the worksheet.** The top row (or left column) of your data selection represents the x series, and each successive row (or column) represents a y series.

**Make sure that your x values are formatted as numbers.** Numbers formatted as text may appear as 0, 1, 2, 3 instead of the values you want.

**Note** You can also create an xy (scatter) chart with a different x value for each set of y values. On the **Series** tab in the **Source Data** dialog box (**Chart** menu), select the series for which you want to change the x values. Then, in the **X values** box, enter a cell reference or type the x values you want, separated by commas; for example **.02, .03, .04**.

[I'm using dates in my chart, but I don't get a time-scale axis.](#)

**Time-scale option** Make sure that the **Time-scale** option on the **Axes** tab in the **Chart options** dialog box (**Chart** menu) is selected. If this option is not available, either you are not using the correct chart type or you don't have dates on the category axis of your chart.

**Chart type** The time-scale axis is available only on 2-D or 3-D line, column, bar, area, or stock chart types.

**PivotChart reports** The time-scale axis is not available on a [PivotChart report](#).

**Dates on category axis** Make sure the dates are on the category axis of your chart.

**Multiple-level category labels** You cannot use a time-scale axis with [multiple-level category labels](#). To change to one-level category labels in a chart created from worksheet data, do not include multiple rows of labels in the source data for the chart.

 [Text is missing along the horizontal axis of the chart.](#)

There may not be enough room in the chart to display all of the axis labels. If some of the category names aren't visible along the horizontal axis of the chart, try one of the following:

- If the chart is an [embedded chart](#), click the chart, and then drag one of the black sizing handles to enlarge the chart. By default, the fonts in the chart scale proportionally as you resize the chart.
- Click the axis, click the arrow next to **Font Size** , and then click a smaller font size.
- Double-click the axis labels, and then change the rotation angle on the **Alignment** tab. If the angle is 0, 90, or – 90 degrees, the text will wrap.

 [I typed new text or numbers on the worksheet, but the chart wasn't updated.](#)

If you type text or values for the [data series](#) and categories on the **Series** tab of the **Source Data** dialog box (**Chart** menu, **Source Data** command), Microsoft Excel breaks the links between the chart and the worksheet data that the chart is based on. Excel also breaks the links between [data labels](#) and the worksheet data that the labels are based on if you type information directly in the label in the chart. You can reestablish each of these links by using one of the following methods.

**Chart sheets** To reestablish links between the worksheet and a [chart sheet](#), redefine the range of cells used to create the chart.

## [How?](#)

1. Click the chart you want to change.
2. On the **Chart** menu, click **Source Data**, and then click the **Data Range** tab.
3. Make sure the entire reference in the **Data range** box is selected.
4. On the worksheet, select the cells that contain the data you want to appear in the chart.

If you want the column and row labels to appear in the chart, include the cells that contain them in the selection.

**Embedded charts** To reestablish links between the worksheet and an [embedded chart](#), redefine the cell range, or drag and resize the color-coded ranges on the worksheet to include the data you want.

**Data labels** To reestablish links between worksheet data and data labels, select the **Automatic text** check box on the **Data Labels** tab of the **Chart Options** dialog box (**Chart** menu) for the selected series or the entire chart.

**Additional data** If you typed additional labels and values on the worksheet that are outside the range of data that the chart is based on, you need to add the new data to the chart.

## [How?](#)

To add data to a [chart sheet](#), copy and paste the data from the worksheet to the chart.

To add data to an [embedded chart](#) created from adjacent worksheet cells, use the color-coded ranges that surround the data on the worksheet. You can also add data to an embedded chart by dragging the data from the worksheet to the chart. If your embedded chart is created from [nonadjacent selections](#), use the copy and paste procedure.

## [Add data to a chart by copying and pasting](#)

1. Select the cells that contain the data you want to add to the chart. If you want the column or row label for the new data to appear in the chart, include the cell that contains the label in the selection.
2. Click **Copy** .
3. Click the chart.
4. Do one of the following:
  - To have Microsoft Excel automatically paste the data in the chart, click **Paste** .
  - To specify how you want to plot the data in the chart, click **Paste Special** on the **Edit** menu, and then select the options you want.

#### [Add data to a chart by using color-coded ranges](#)

The embedded chart must be created from adjacent selections and be on the same worksheet as the data used to create it.

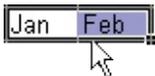
1. Type the data and labels you want to add on the worksheet in the cells next to the existing data.
2. Select the [chart area](#) by clicking the blank area between the border of the chart and the [plot area](#).
3. Do one of the following:
  - To add new categories and [data series](#) to the chart, on the worksheet, drag the blue sizing handle to include the new data and labels in the rectangle.
  - To add new data series only, on the worksheet, drag the green sizing handle to include the new data and labels in the rectangle.
  - To add new categories and data points, on the worksheet, drag the purple sizing handle to include the new data and labels in the rectangle.

## [Add data to a chart by dragging](#)

1. Select the cells that contain the data you want to add to the chart. The cells must be next to each other on the worksheet.

If you want the column or row label for the new data to appear in the chart, include the cell that contains the label in the selection.

2. Point to the border of the selection.



3. Drag the selection to the embedded chart you want to update.

If Microsoft Excel needs more information to plot the data, the **Paste Special** dialog box appears. Select the options you want.

**Note** If you cannot drag the selection, make sure that the **Allow cell drag and drop** check box is selected. To check this setting, click **Options** on the **Tools** menu, and then click the **Edit** tab.

**PivotChart reports** A [PivotChart report](#) is not linked to worksheet data. Instead, it uses a copy of your data that is stored in memory. If you made a change to your source data and the PivotChart report wasn't updated, try to refresh the PivotChart report.

## [How?](#)

**Note** If the report is based on an [offline cube file](#), refreshing it completely rebuilds the cube file from the [OLAP](#) server and may take as long as initial creation of the cube file.

1. Click the report.
2. On the **PivotTable toolbar**, click **Refresh Data** .
3. If you want Microsoft Excel to refresh the report automatically when you open the workbook, set this option.

[How?](#)

1. On the **PivotTable** toolbar, click **PivotTable** or **PivotChart**, and then click **Table Options** or **Options**.
2. Select the **Refresh on open** check box.
4. If the report is based on external data, and you want Excel to refresh it at timed intervals, set this option.

[How?](#)

1. On the **PivotTable** toolbar, click **PivotTable** or **PivotChart**, and then click **Table Options** or **Options**.
2. Select the **Refresh every** check box, and then enter the interval you want in the **minutes** box.

**Note** When you refresh a PivotChart report or its [associated PivotTable report](#), some chart formatting may be lost.

[Tip](#)

If your database prompts for a password every time you refresh, you can have Excel save the password so you won't have to enter it repeatedly. On the **PivotTable** toolbar, click **PivotTable** or **PivotChart**, click **Table Options** or **Options**, and then select the **Save password** check box. This option saves the password as readable text, so if security is a greater concern than convenience, you may not want to use this option.

[I published a chart, but it's empty when I view it in the browser.](#)

You must include both x and y values in an xy (scatter) chart and x, y, and bubble size values in a bubble chart that you want to publish to the Web. Microsoft Excel supplies default values if x values are not included in your data selection. These values appear in the chart in Excel, but they are not published. If you didn't include all necessary values in your chart, type them in an adjacent column and then add them to the chart.

## Formatting

[Why does the font size in my chart keep changing?](#)

By default, fonts in a chart scale proportionally when you resize an [embedded chart](#) or the [chart area](#) of a [chart sheet](#). If you want the font sizes in a chart to remain constant, select the chart area by clicking the blank area between the border of the chart and the [plot area](#). On the **Format** menu, click **Selected Chart Area**, click the **Font** tab, and then clear the **Auto scale** check box.

[There are gaps between the dates plotted in my chart.](#)

If the worksheet data for the category axis contains date number formatting, Microsoft Excel automatically uses a special type of axis in your chart called a time-scale axis. A time-scale axis shows a blank category for dates for which you have no data. If you do not want to see these gaps— for example, if you have data for 1-Jan, 15-Jan, 3-Feb, 12-Feb, and 2-Mar, and you want to plot the days next to each other— you can change the time-scale axis to a standard category axis. Click the chart to select it, and then click **Chart Options** on the **Chart** menu. Then on the **Axes** tab, click **Category** under **Category (X) axis**.

[The multiple-level category labels in my chart are positioned differently than when I created the chart.](#)

**Chart linked to a closed workbook** When your chart is linked to data in a workbook that is closed, [multiple-level category labels](#) are displayed differently than when you originally created the chart. For example, the bottom level of labels may be left-aligned instead of centered. You can change the position of labels by opening the workbook that contains the source data for the chart. To do this, click **Links** on the **Edit** menu in the workbook that contains the chart. In the list, click the source file that contains the chart data, and then click **Open Source**. When the source workbook is open, the labels should return to their original positions.

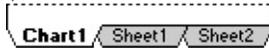
**Chart viewed in an earlier version of Microsoft Excel** Multiple-level category labels might also look different if you save your workbook by using an earlier version format and then open the workbook in an earlier version of Excel.

[I made or moved a chart, but I can't find it.](#)

Do one of the following:

If you moved or created a sheet tab for the chart at the bottom of the worksheet window.

Click to switch to the chart sheet.



If you moved or created an [embedded chart](#), you can locate it on the worksheet by clicking **Go To** on the **Edit** menu, and then clicking **Special**. Click **Objects**, and then click **OK**.

[The text box, picture, or floating text I added to my user-defined chart type is not included when I create a chart.](#)

Text boxes, pictures, and floating text on charts are not saved in user-defined charts. Add these objects after you create the chart that is based on the user-defined chart.

## PivotChart reports

[Troubleshoot PivotChart reports](#)

# Creating a report

 [An 'insufficient memory' message appears](#)

## Check the memory use setting

1. Click **OK** in the message dialog box.
2. Create the report again, and in step 3 of the PivotTable and PivotChart Wizard, click **Options**.
3. Select the **Optimize memory** check box.

**Use page fields to save memory** If you still can't create the report, set up one or more of the [page fields](#) to retrieve the data as you select each [item](#).

1. In step 3 of the wizard, click **Layout**.
2. Drag one or more fields to the PAGE area.
3. Double-click each page field.
4. Click **Advanced**.
5. Click **Query external data source as you select each page field item**.

**Simplify the report** The number of fields you can add depends on the amount of memory in your computer and the amount of [source data](#) used for the report. When you want to use a large number of fields, add them as [series fields](#) or page fields. Page fields use the least memory. Series fields use less memory than [category fields](#).

**Base multiple reports for the same data on one report** When you create a PivotChart report, Microsoft Excel creates a storage area in memory for the report. If you plan to create several reports from the same source data, select **Another PivotTable report or PivotChart report** in step 1 of the wizard so that the reports all use the same storage area.

**Simplify the file** Reduce the number of reports in the workbook.

**Create the report in a separate file** If your report is based on worksheet data, create the report in a different workbook from the workbook that contains the data. That way, the original data and the report do not have to be in memory at the same time. Keep in mind that when you create a PivotChart report, its [associated PivotTable report](#) must be in the same workbook.

[The report I want isn't listed in the PivotTable and PivotChart Wizard](#)

**The wizard only lists PivotTable reports** If you want to base the new report on another PivotChart report, select the [associated PivotTable report](#) for the other PivotChart report. To determine which report that is, click the PivotChart report, click **PivotChart** on the **PivotTable** toolbar, and then click **Options**. The **Name** box contains the name of the associated PivotTable report.

**Check the location of the report** The wizard lists only the PivotTable reports in the workbook where you started the wizard. If the report you want to use as the source is in a different workbook, copy the report into the active workbook.

**Check the page field settings** The PivotTable report you want may have [page fields](#) that are set to query for external data as you select each item. To use a report as the source for another report, its page fields must all be set to retrieve external data for all items at once. Click the source report, double-click each page field, click **Advanced**, and then check the settings under **Page field options**.

[I'm having problems with an OLAP data source](#)

## Creating OLAP cubes

### [Date or time fields have incorrect levels](#)

**Check the date or time field in the source database** If you don't see the [levels](#) you expect in the date or time [dimensions](#) in source data from the OLAP Cube Wizard in Microsoft Query, check the date or time field from the underlying relational database that supplied the data for the cube. The database may store dates and times as text instead of a date or time format that the wizard can recognize. If you suspect this is the case, consult the database administrator for the relational database to verify and correct the date or time format for the field.

**Check the top level of the dimension** When you add date and time fields as lower levels of a dimension, the OLAP Cube Wizard does not automatically break the data out into year/quarter/month/week and hour/minute/second levels. The wizard does this only when you add the date or time field as the top level of a new dimension. If the date or time field is not the top level, modify the cube by opening the .oqy file in Microsoft Query, or contact the person who created the cube to make these changes.

### [The summary function I want is missing](#)

In the OLAP Cube Wizard, the only summary functions available for data fields are Sum, Count, Min, and Max.

**Create the report directly from the database records** If you can simplify and reduce your [query](#) to where your system can handle the amount of data it returns, try returning the data directly to Microsoft Excel from Microsoft Query without creating a cube. When you create a PivotTable or PivotChart report directly from records in a database, you have access to the full set of PivotTable summary functions (Sum, Count, Average, Max, Min, Product, Count Nums, StdDev, StdDevp, Var, and Varp).

**Consider setting up an OLAP server for the database** The Microsoft OLAP server product, Microsoft SQL Server OLAP Services, lets you set up a wider range of summary fields than the OLAP client software included in Microsoft

Office.

[I can't change my OLAP cube](#)

**Make sure the original database is available** To edit an OLAP cube, you must have access to the original server database that supplied the cube data. Check to make sure the database hasn't been renamed or moved. Make sure the server is available and you can connect to it.

**Check for changes to the original database** If you used the OLAP Cube Wizard to create the cube from a relational database, tables in the database might have been renamed or deleted so that the cube can no longer locate the original data. Connect to the database in Microsoft Query, and check for any changes to the organization, or schema, of the database. If the database has changed, you'll need to create a new cube.

[A 'Data has been lost' message appears](#)

A field you included in the cube is no longer available in the source database.

**Check for changes to the original database** If the cube is an [offline cube file](#) that was created from an OLAP server database, reconnect a report to the server database and check the fields available in the **PivotTable Field List** window. If the field is no longer available from the server, you can use the **Offline OLAP** command on the **PivotTable** menu to create a new offline cube file.

If you created the cube in Microsoft Query, use Query to open the .dqy [query](#) file that you used to create the cube, or if you did not keep a .dqy file, create a new query connecting to the original relational database. Check what fields are available. For full instructions, see Help in Microsoft Query. If fields have been removed from the database, you can create a new cube.

[Saving the cube file is taking a long time](#)

If you included a large subset of the OLAP data in the cube file, the file may be time consuming to create.

- To cancel saving the file, click **Stop** in the **Create Cube File – Progress** dialog box.

- To reduce the size of the file, eliminate data that you don't need to view in your report. In step 2 of the Offline Cube Wizard, select only the dimensions and levels within each dimension that you need to see. In step 3, select only the measures that you're using as [data fields](#) in the report, and in each dimension eliminate any [items](#) you don't need.

### [I run out of disk space while saving a cube](#)

OLAP databases are designed to manage very large amounts of detailed data, and as a result, the server database might occupy a much larger amount of disk storage than your local hard disk provides. If you specify a large subset of this data for your offline cube file, you might run out of space.

**Free up disk space or find another disk** Try deleting files you don't need from your disk before saving the cube file. Or try saving the file on a network drive.

**Include less data in the offline cube file** Consider how you can minimize the amount of data in the file and still have what you need for your PivotTable or PivotChart report. Try the following:

- **Eliminate dimensions** In step 2 of the Offline Cube Wizard, select only the dimensions that you actually have displayed as fields in your PivotTable or PivotChart report.
- **Eliminate levels of detail** Click the  box next to each selected dimension in step 2 of the wizard, and clear the check boxes for levels lower than those displayed in your report.
- **Eliminate data fields** In step 3 of the wizard, click the  box next to **Measures**, and select only the [data fields](#) you're using in the report.
- **Eliminate items of data** Click the  box next to each dimension in step 3, and clear the check boxes for items you don't need to see in the report.

**Stay connected to the server** If you've eliminated all possible data and still cannot save an offline cube file, you'll need to continue using the connection to the server OLAP database to interact with your report.

## Using OLAP cubes

### [Data is missing from my report after I create a cube file](#)

When you selected the contents for the offline cube file, you might have left out some of the data for the fields used in the report. As a result, when you change the report to display different data, data you expected to see isn't available from the offline cube file.

Use the **Offline OLAP** command on the **PivotTable** menu to reconnect the report to the server database, and make sure the report displays the data you want to see. Then edit the offline cube file, making sure you include all dimensions, data fields, and levels of detail used in the report.

### [My report is using fields from the query instead of my cube](#)

If the **PivotTable Field List** window is showing you the fields from the relational database that you queried to create the cube, you returned the data from your query to Microsoft Excel instead of opening the .oqy file created by the OLAP Cube Wizard. This file stores the cube definition, and if you saved a .cub offline cube file, provides access to that file. If you did not specify a new location for the .oqy file, the file was saved in either My documents\My data sources or Winnt\Profiles\*your user name*\My data sources, depending on your version of the Windows operating system.

To base a report on your new cube, click **Open** on the Excel **File** menu, click **Query Files** in the **Files of type** list, and then locate and double-click the .oqy file. If you want a PivotChart report, click the PivotTable report that's created when you open the .oqy file, and then click **Chart Wizard**  on the **PivotTable** toolbar.

### [Data I know is in the database is missing from my cube](#)

Cubes created from OLAP server databases or relational databases don't necessarily include all of the data in the original database. Only the data that you select in the Offline Cube Wizard or OLAP Cube Wizard is included in the cube.

**Wait for data retrieval to complete** When you change your PivotTable or PivotChart report to display different data, new data is retrieved from the cube. When you [refresh](#) the report, new data is retrieved from the original database and the cube is completely reconstructed. This process might take a while.

**Check with the person who created the cube** If you got the cube from someone else, and the **PivotTable Field List** window is missing fields that you need or levels of detail that you wanted are unavailable, ask the creator of the cube to change it so that it includes additional data.

**Change the contents of an offline cube file** If you created the offline cube file in Microsoft Excel from an OLAP server database, use the **Offline OLAP** command on the **PivotTable** menu to change the file. Make sure you include all dimensions, data fields, and levels of detail used in the report.

**Check the contents of a cube that was created in Query** You cannot add data to cubes created with the OLAP Cube Wizard in Microsoft Query, but you can change how the cube is organized and delete data from the cube. If the cube is missing fields from the original relational database, you can create a new cube in Query to include those fields. In Query, open the .dqy file that you used to query the data for the OLAP cube, or create a new query if you did not keep a .dqy file. Add to the query any additional fields that you want in the cube, and then use the **Create OLAP Cube** command on the Query **File** menu create a new cube. For full instructions, see Help in Microsoft Query.



[New data doesn't appear in my report when I refresh](#)

The [offline cube file](#), or the cube created in Microsoft Query, might not be able to connect with the original server database to retrieve new data.

**Make sure the original database is available** Check that the original server database that supplied the data for the cube hasn't been renamed or moved. Make sure the server is available and you can connect to it.

**Make sure new data is available** Check with the database administrator to determine whether the database has been updated in the areas included in your report.

**Make sure the database organization hasn't changed** If an OLAP server

cube has been rebuilt, or a relational database supplying data to a cube has been reorganized, you might need to reorganize your report or create a new offline cube file or OLAP Cube Wizard cube to access the changed data. Contact the database administrator to find out about changes to the database.

 [Microsoft Excel can't find my offline cube file](#)

The .cub might have been renamed or moved.

**Make sure you have the file** If someone else gave you the .oqy file you're opening, make sure you also have access to the .cub file.

**Browse for the file** If you're trying to connect to the offline cube file from the **Offline OLAP Settings** dialog box, click **Browse**, and locate the .cub file.

**Reconnect to the original database** If you cannot locate the file, you might be able to reconnect the report to the original OLAP server database. Click the report, click **Offline OLAP** on the **PivotTable** menu, and then click **On-line OLAP**. You can then create a new offline cube file.

**Note** For further help with problems with OLAP Cube Wizard cubes, see Help in Microsoft Query.

## Laying out a report

[The field buttons are gone, and I can't change the layout](#)

**Check whether the buttons are hidden** Click the report, click **PivotChart** on the **PivotTable** toolbar, and make sure the **Hide PivotChart Field Buttons** command is not checked.

**Check whether the report was converted to a static chart** Excel converts a PivotChart report to a static chart when you delete its [associated PivotTable report](#), copy or move the PivotChart report to another workbook, or save the workbook in Microsoft Excel 95 or earlier format or a non-Excel format.

[Data takes a long time to appear when I add a field](#)

When a report is based on a large amount of external data or an OLAP Cube Wizard data source, delays can be lengthy when you drag fields from the field list onto the worksheet.

**Drop data items last** Drop fields in the series, category, and page areas first. Drop fields in the [data area](#) last. This approach minimizes the amount of data Microsoft Excel has to display for interim steps.

**Turn off series and category item display** On the **PivotTable** toolbar, make sure **Always Display Items**  is turned off. The [items](#) won't appear as you drag fields to the series and category areas, but will appear once you add a [data field](#).

**Use the wizard to change the layout** If the response is still too slow, you can return to the PivotTable and PivotChart Wizard to lay out the report. On the **Data** menu, click **PivotTable and PivotChart Report**, and then click **Layout**.

[I can't drag a field](#)

**Check the page field settings** If the field you want to drag is set to query for external data as you select each item, the field may be locked in the page position. Double-click the field, click **Advanced**, and clear the **Disable pivoting**

**of this field** check box under **Page field options**. If you drag the field to another area, Microsoft Excel retrieves the external data for all items in the field at once.

**Check for OLAP source data** In reports with [OLAP](#) source data, some fields can be used only as [series](#), [category](#), or [page fields](#). These fields have  icons in the **PivotTable Field List** window. Fields with  icons can be used only as [data fields](#).

**Check for VBA macros** A Visual Basic for Applications (VBA) [macro](#) can turn off the ability to change the layout by dragging fields. If the cancel symbol appears over the pointer when you try to drag the field, dragging has been turned off for that field. For help with this case, contact the author of the macros in your workbook.

**Check for protection** If the chart sheet or the worksheet containing the [associated PivotTable report](#) is protected, you cannot move fields or make changes to the PivotChart report. Unprotect the chart sheet or worksheet, or contact the person who protected it.

 [The field list is missing](#)

**Click the report** The list of fields appears only when the report is selected.

**Display the field list** If you still don't see the field list, click **Show Field List**  on the **PivotTable** toolbar.

 [A field doesn't have a dropdown arrow](#)

**Check whether it's the only data field** The Data field appears next to the [category fields](#) with a dropdown arrow only when you've added two or more [data fields](#) to a report. If the report has a single data field, the field appears at the top of the report, below the page area.

**Check whether the field is in an OLAP dimension** In reports with [OLAP](#) source data, [dimension](#) fields in the series and category areas have an arrow  in the [field button](#) only if the field is the topmost field in the dimension. You can use the arrow in this field to display or hide different levels of detail throughout the dimension.

**Check whether upper levels are hidden** When upper [levels](#) of a dimension are hidden, the topmost field is hidden, and none of the displayed fields have the arrow . Right-click any field button in the dimension, and then click **Show Levels** on the shortcut menu.

 [The dropdown arrow for a field doesn't work](#)

On the **PivotTable** toolbar, make sure **Always Display Items**  is turned on. If you don't want to turn on this feature, drag a field to the [data area](#). Once you have a field in the data area, the dropdown arrows will work for all fields in the report.

## Formatting a report

### [Formatting, trendlines, and error bars disappeared](#)

**Check for changes to the data displayed** When you make changes that affect what data is displayed in a PivotChart report or its [associated PivotTable report](#), Microsoft Excel discards any formatting you've applied to [data labels](#), [data points](#), and [data series](#), including any [trendlines](#) and [error bars](#) you've added.

Changes that result in lost formatting include changing the layout, adding or removing [fields](#), displaying or hiding [items](#), displaying a different page in a [page field](#), grouping or ungrouping items, displaying or hiding detail, sorting, changing the [summary function](#) for a field, changing the display of subtotals, specifying different [source data](#) including changing the [query](#) for external data, and [refreshing](#) the report.

**Finish making changes before you add formatting** Make sure you are satisfied with the layout and data displayed in the PivotChart report before you make formatting changes.

**Record a macro to apply formatting** If you change the report frequently, you can record a [macro](#) as you apply the desired formatting and then run the macro when you need to reapply your formatting.

### [I can't move or resize the legend, titles, or plot area](#)

In a PivotChart report, you can't move or resize the [legend](#), [titles](#), or [plot area](#) as you would in a regular, noninteractive chart. Microsoft Excel automatically resizes the plot area to accommodate changes to the report.

**Repositioning the legend** You can't change the size of the legend, but you can change where it appears in the chart: on the **Chart** menu, click **Chart Options**, click the **Legend** tab, and then click an option under **Placement**.

**Resizing titles** You can't move a title, but you can change its size by changing the font size: click the title, click **Selected Chart Title** on the **Format** menu, click the **Font** tab, and then select the size you want.

## [The report doesn't use the position or size of items in my user-defined chart type](#)

You can't move or resize the [legend](#), [titles](#), or [plot area](#) in a PivotChart report. Microsoft Excel automatically positions and sizes these elements as needed each time you change the report. As a result, when you specify a user-defined chart type for a PivotChart report, the report uses its automatic position and size for the legend, titles, and plot area instead of any sizes and positions you've saved in the chart type.

## [Number formatting doesn't match the source data](#)

Microsoft Excel doesn't use the number formatting from Excel source data in the value axis in a PivotChart report. The value axis initially reflects the number formatting of the [data area](#) of the [associated PivotTable report](#).

To change the value axis formatting, click the axis, click **Selected Axis** on the **Format** menu, click **Number**, and then select the formatting you want. This change does not affect the number formatting in the associated PivotTable report.

## Data and calculations

[The \*\*Source Data\*\* command is unavailable on the \*\*Chart\*\* menu](#)

When you want to change the position of your series or category data, or redefine the source data to be included, you cannot use the **Source data** command on the **Chart** menu, as you can in a regular, noninteractive chart.

To change [series fields](#) to [category fields](#) or vice versa, drag the fields to the appropriate [drop areas](#). To include different source data in the report, click the report, click **PivotTable and PivotChart Wizard** on the **Data** menu, click **Back**, and use step 2 of the wizard to specify different Excel source data or get different external source data for the report.

[The page field options are unavailable.](#)

**Check the type of field** The [field](#) you selected might not be a page field. These settings are available only for page fields.

**Check for external source data** The report might not be based on external data. These settings are not available for reports based on worksheet data.

**Check for OLAP source data** These settings are not available for reports that are based on [OLAP](#) source data. The field list has  and  icons in OLAP-based reports.

**Check the data type for the field** The page field settings are unavailable for memo fields or fields that contain [OLE](#) objects.

**Check for parameter query support** The [ODBC driver](#) for your external database might not support [parameter queries](#). These settings are available only if the driver for your [data source](#) supports parameter queries.

The ODBC drivers supplied with Microsoft Query all support parameter queries. To find out whether a third-party driver supports parameter queries, contact your driver vendor.

**Check for reports based on another PivotTable report** When you base more

than one PivotChart report on an existing PivotTable report, page field settings are not available for any of the reports.

**Check whether the field is grouped** In the [associated PivotTable report](#), drag the field to the row or column area, right-click any grouped [items](#), point to **Group and Show Details** on the shortcut menu, click **Ungroup**, and then drag the field back to the page area to make the page field settings available.

[While a query is running, I can't change the sheet](#)

**Check whether the area you're editing is being updated** While a query is running in the background, you can't change the report you're currently updating, or any other reports based on the report.

**Wait for the query to complete, or cancel it** To check the progress or cancel a query, double-click the  icon in the status bar, and if desired click **Stop Refresh**.

**Run the query in the background** On the **PivotTable** toolbar, click **PivotChart**, click **Options**, and then select the **Background query** check box.

[A data field is using Count instead of Sum](#)

**Check for text or blank items in the field** If your data field contains any text values or blank cells, the field uses the Count [summary function](#) by default. Double-click the field and click **Sum** in the **Summarize by** box.

**Check for OLAP source data** In reports based on [OLAP](#) source data, the available summary functions are determined on the OLAP server, and you cannot change them in the Microsoft Excel report. The field list has  and  icons in OLAP-based reports.

[Data is missing after the report is refreshed](#)

**Set page fields to view all data** Select **All** in every [page field](#) before you refresh the report.

If a page field does not include **All**, either the field is set to query for external data one item at a time, or the [source data](#) doesn't include information for an **All**

item. In both cases, the data is refreshed whenever you select a different item.

**Check the location of the missing data** For reports based on worksheet data, the new data might have been added outside the source range you originally specified, or the source data could have been moved to a new location.

1. On the **Data** menu, click **PivotTable and PivotChart Report**.
2. Click **Back**.
3. Change the source range specification to include the new data or to specify the new location.
4. Click **Finish**.

**Check that the query is selecting the right data** For reports based on external data, review the query in Microsoft Query to make sure it is retrieving the data you want.

**Check the cube or cube file** If the report is based on a [cube](#) created by the OLAP Cube Wizard, open the .oqy file in Microsoft Query and check the contents of the cube to make sure it contains the data you want. If the report is based on a cube file, check the cube file contents: click the [associated PivotTable report](#) for the PivotChart report, click **PivotTable** on the **PivotTable** toolbar, click **Offline OLAP**, and then click **Edit offline data file**. If the report is based on source data from an OLAP server database, contact your database administrator to find out whether the database has changed.



[The report looks completely different after refresh, or can't be refreshed](#)

**Check the availability of the source database** Make sure you can still connect to the external database and view data.

**Check for changes to the source database** If the report is based on [OLAP](#) source data, changes may have been made to the data available in the cube on the server. Contact the administrator of the OLAP server for more information.

[Show All](#)

# Change colors in a surface chart

To format the colors of the levels in a surface chart, you must format the [legend key](#).

1. If the chart doesn't have a [legend](#), add one.

[How?](#)

1. Click the chart to which you want to add a [legend](#).
2. On the **Chart** menu, click **Chart Options**, and then click the **Legend** tab.
3. Select the **Show legend** check box.
4. Under **Placement**, click the option you want.

**Note** When you click one of the **Placement** options, the legend moves, and the [plot area](#) automatically adjusts to accommodate it. If you move and size the legend by using the mouse, the plot area does not automatically adjust. When you use the **Placement** options, the legend loses any custom sizing you may have already applied by using the mouse.

2. Click the legend once to select it, and then click the legend key that represents the surface level you want to change.
3. On the **Format** menu, click **Selected Legend Key**, and then click the **Patterns** tab.
4. Click the color you want, and then repeat for each level you want to format.

**Note** You can delete the legend when you're done changing colors, and the colors you specified will remain in the surface chart.

[Show All](#)

# Change fills and lines in charts

Use this procedure to change colors, apply a texture or pattern, or change the line width or border style for [data markers](#), the [chart area](#), the [plot area](#), [gridlines](#), [axes](#), and [tick marks](#) in 2-D and 3-D charts, [trendlines](#) and [error bars](#) in 2-D charts, and the [walls and floor](#) in 3-D charts.

1. Double-click the chart item you want to change.
2. If necessary, click the **Patterns** tab, and then select the options you want.

To specify a fill effect, click **Fill Effects**, and then select the options you want on the **Gradient**, **Texture**, or **Pattern** tabs.

**Note** Formatting applied to an axis is also applied to the tick marks on that axis. Gridlines are formatted independently of axes.

[Show All](#)

# Change number formats in charts

**Note** If you change the number formatting in a chart, the number formatting is no longer linked to the worksheet cells.

1. To format [labels](#) along an axis, double-click the appropriate axis.

To format [data labels](#) or a [trendline label](#), double-click the item.

2. On the **Number** tab, select the options you want.

[Show All](#)

# Change the display size of a chart sheet

1. Click the tab for the [chart sheet](#).
2. To zoom in or out of a chart sheet, click **Zoom** on the **View** menu, and then click the option you want.

To size the chart sheet so that it fills the entire workbook window, click **Sized with Window** on the **View** menu. When a chart sheet is sized with the window, you cannot zoom in or out of it.

[Show All](#)

# Change the plot area size of a pie-of-pie or bar-of-pie chart

1. Click a [data series](#) in the pie chart you want to change.
2. On the **Format** menu, click **Selected Data Series**, and then click the **Options** tab.
3. In the **Size of second plot** box, enter a value between 5 and 200 to specify the size of the second pie or bar as a percentage of the first pie chart. For example, 105 makes the second pie or bar 5 percent larger than the first.

[Show All](#)

# Change the view of a 3-D chart

## [Change the height and perspective in a 3-D chart](#)

1. Click the 3-D chart you want to change.
2. On the **Chart** menu, click **3-D View**.
3. Select the options you want.

When the **Right angle axes** check box is cleared, you can set the **Perspective** and **Height** options.

When the **Right angle axes** check box is selected, you can either set the **Height** option or turn the **Auto scaling** option on.

The **Perspective** option is not available for 3-D bar charts, for which the **Right angle axes** check box is always selected.

## [Change the rotation and elevation in a 3-D chart](#)

### Using the menus

1. Click the 3-D chart you want to change.
2. On the **Chart** menu, click **3-D View**.
3. Select the options you want.

### Using the mouse

1. Click the intersection of any two axes to select the corners of the chart.
2. Drag a corner to adjust the elevation and rotation in the chart.

To view the [data markers](#), hold down CTRL while you drag.

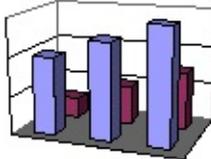
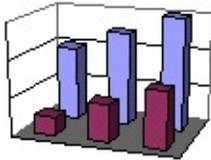
## [Change the depth and width in a 3-D chart](#)

You can change the chart depth in 3-D charts that have [axes](#), the gap depth in 3-

D perspective charts, and the gap width in 3-D bar or column charts.

1. Click a [data series](#) in the 3-D chart you want to change.
2. On the **Format** menu, click **Selected Data Series**, and then click the **Options** tab.
3. Select the options you want.

[Change the plot order of the data series so that large 3-D data markers do not block smaller ones](#)



1. Click a [data series](#) in the chart you want to change.

To change the plotting order of data series in a surface chart, click a [legend key](#).

2. On the **Format** menu, click **Selected Data Series** or **Selected Legend Key**, and then click the **Series Order** tab.
3. In the **Series order** box, click the series you want to move.
4. To place the series in the order you want, click **Move Up** or **Move Down**.

[Show All](#)

# Clear a picture or fill effect from a chart item

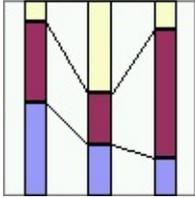
Use this procedure to clear a picture or other fill effect from the [chart area](#), the [plot area](#), or the [legend](#) in 2-D and 3-D charts, or the [walls and floor](#) in 3-D charts.

1. Double-click the chart item you want to change, and then click the **Patterns** tab.
2. To clear the picture or fill effect and return the object to the default formatting, click **Automatic** under **Area**.

To clear all formatting, including the picture or fill effect, click **None** under **Area**.

[Show All](#)

# Make chart data easier to read by adding bars or lines



You can add [series lines](#) to connect [data series](#) in 2-D stacked bar and column charts. [Drop lines](#) are available in 2-D and 3-D area and line charts. [High-low lines](#) and [up-down bars](#) are available in 2-D line charts. Stock charts already have high-low lines and up-down bars.

1. Click a [data series](#) in the chart that you want to add bars or lines to.
2. On the **Format** menu, click **Selected Data Series**, and then click the **Options** tab.
3. Select the option for the type of lines or bars you want.

[Show All](#)

# Move and resize chart items with the mouse

Microsoft Excel automatically sizes [titles](#) to accommodate their text. You can move titles with the mouse but you cannot resize them.

1. Click the [chart area](#), the [plot area](#), or the [legend](#) you want to move or resize.
2. To move an item, point to the item, and then drag it to another location.

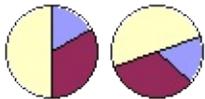
To resize an item, point to a sizing handle. When the pointer changes to a double-headed arrow, drag the sizing handle until the item is the size you want.



[Show All](#)

# Move the slices in a doughnut or pie chart

The order in which Microsoft Excel plots [data series](#) in pie and doughnut charts is determined by the order of the data on the worksheet.



Use this procedure to "rotate" slices within the 360 degrees of the pie or doughnut circle.

1. Click a data series in the pie or doughnut chart you want to change.
2. On the **Format** menu, click **Selected Data Series**, and then click the **Options** tab.
3. In the **Angle of first slice** box, type a value between 0 (zero) and 360 to specify the angle at which you want the first slice to appear.

[Show All](#)

# Place a chart on a worksheet or on its own chart sheet

1. Click the chart that you want to move or change.
2. On the **Chart** menu, click **Location**.
3. To place the chart on a new [chart sheet](#), click **As new sheet**, and then type a name for the new chart sheet in the **As new sheet** box.

To place the chart as an embedded object on a worksheet, click **As object in**, click a sheet name in the **As object in** box, and then click **OK**. Drag the [embedded chart](#) where you want it on the worksheet.

[Show All](#)

# Smooth the angles of line charts

When you use this procedure to soften the jagged edges of a line chart, your data is not affected.

1. Click the line [data series](#) you want to smooth.
2. On the **Format** menu, click **Selected Data Series**, and then click the **Patterns** tab.
3. Select the **Smoothed line** check box.

[Show All](#)

# Use a picture in a chart

## Most charts or chart items

1. Click the [data markers](#) in column, bar, area, bubble, 3-D line, and filled radar charts, the [chart area](#), the [plot area](#), or the [legend](#) in 2-D and 3-D charts, or the 3-D [walls or floor](#) that you want to use a picture for.
2. Click the arrow next to **Fill Color** , click **Fill Effects**, and then click the **Picture** tab.
3. To specify a picture, click **Select Picture**.
4. In the **Look in** box, click the drive, folder, or Internet location that contains the picture, and then double-click the picture you want.
5. On the **Picture** tab, select the options you want.

## 2-D line, scatter or unfilled radar chart data markers

1. Select the picture on the worksheet, [chart sheet](#), or in a picture editing program.
2. Click **Copy** (**Edit** menu).
3. Click the [data series](#).
4. Click **Paste** (**Edit** menu).

[Show All](#)

# View an embedded chart in a separate window

1. Click the [embedded chart](#) you want to see in its own window.
2. On the **View** menu, click **Chart Window**.

[Show All](#)

# Vary colors in the same data series

You can vary the colors of [data markers](#) within the same [data series](#) in doughnut charts and in single-series charts. The colors of slices in pie charts and doughnut charts are varied by default.

1. Click the data series you want to change the colors for.
2. On the **Format** menu, click **Selected Data Series** or **Selected Data Point**, and then click the **Options** tab.
3. Select the **Vary colors by point** check box or the **Vary colors by slice** check box.

[Show All](#)

# Add a second axis

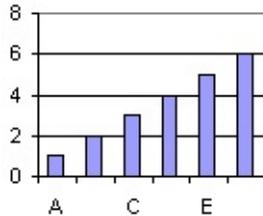
When the range of values for different [data series](#) in a 2-D chart varies widely, or when you have mixed types of data (such as price and volume), you can plot one or more data series on a secondary value (y) axis. The scale of the secondary axis reflects the values for the associated series.

1. Click the data series you want to plot along a secondary value axis.
2. On the **Format** menu, click **Selected Data Series**, and then click the **Axis** tab.
3. Click **Secondary axis**.

[Show All](#)

# Change a chart category axis

[Change the number of categories between labels or tick marks on the category axis](#)



1. Click the category [axis](#) with the [labels and tick marks](#) you want to change.
2. On the **Format** menu, click **Selected Axis**, and then click the **Scale** tab.
3. Do one or both of the following:
  - **Specify the frequency at which you want categories on the category (x) axis to be labeled**

In the **Number of categories between tick-mark labels** box, type **1** to label every category, type **2** to label every other category, type **3** to label every third category, and so on.

- **Specify the number of categories you want between each pair of tick marks on the category (x) axis**

Type a number in the **Number of categories between tick marks** box.

**Note** When you have more than one line of category axis labels, you cannot change the number of categories between tick mark labels or the number of categories between tick marks.

[Change where the value \(y\) axis crosses the category \(x\) axis](#)

1. Click the category [axis](#) you want to change.
2. On the **Format** menu, click **Selected Axis**, and then click the **Scale** tab.
3. Do one of the following:

[Specify the category number where you want the value \(y\) axis to cross the category \(x\) axis](#)

- Type the number in the **Value (Y) axis crosses at category number** box.
- Select the **Value (Y) axis crosses between categories** box to have the value (y) axis cross the category (x) axis at the edge of the category indicated in the **Value (Y) axis crosses at category number** box.

If this box is selected, data points are plotted between [tick marks](#); if this box is cleared, points are plotted at the tick-mark positions.

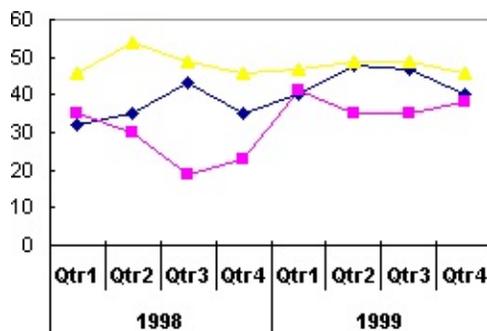
- To have the edges of an area chart meet the edges of the [plot area](#), clear the **Value (Y) axis crosses between categories** box.

[Specify that the value \(y\) axis cross the category \(x\) axis after the last category on the x-axis](#)

Select the **Value (Y) axis crosses at maximum category** box. This option overrides the **Value (Y) axis crosses at category number** value.

**Note** When you have more than one line of category axis labels or when you are working with a 3-D chart, you cannot change where the value (y) axis crosses between categories.

[Change the alignment and spacing of multiple-level category labels](#)



When you have [multiple-level category labels](#) in your chart, you can change the alignment of all but the first level of labels. You can also change the amount of space between each level of labels.

1. Click the category axis you want to change.
2. On the **Format** menu, click **Selected Axis**, and then click the **Alignment** tab.
3. To change the label alignment, click the position you want in the **Alignment** box.

To change the spacing between the levels, select a value in the **Offset** box. The higher the value, the more space between each level.

[Change chart category axis labels](#)

### **On the worksheet**

1. Click the cell that contains the label name you want to change.
2. Type the new name, and then press ENTER.

### **On the chart**

1. Click the chart, and then click **Source Data** on the **Chart** menu.
2. In the **Category axis labels** box on the **Series** tab, specify the worksheet range you want to use as category axis labels. You can also type the labels you want to use, separated by commas, for example:

**Division A, Division B, Division C**

If you type the label text in the **Category axis labels** box, the category axis text is no longer linked to a worksheet cell.

[Show All](#)

# Change a chart value axis

1. Click the value axis you want to change.
2. On the **Format** menu, click **Selected Axis**, and then click the **Scale** tab.
3. Do one of the following:

[Change the number at which the value axis starts and ends](#)

Enter a different number in the **Minimum** box or the **Maximum** box.

[Change the interval of tick marks and gridlines](#)

Enter a different number in the **Major unit** box or **Minor unit** box.

[Change the units displayed on the value axis](#)

If your chart values consist of large numbers, you can make the axis text shorter and more readable by changing the display unit of the axis. For example, if the chart values range from 1,000,000 to 50,000,000, you can display the numbers as 1 to 50 on the axis and show a label that indicates that the units express millions.

1. In the **Display units** list, click the units you want or type a numeric value.
2. To show a label that describes the units expressed, select the **Show display units label on chart** check box.

[Change the value axis to logarithmic](#)

Select the **Logarithmic scale** check box.

[Reverse the order of values](#)

To reverse values so that you can flip bars or columns or other [data markers](#), select the **Values in reverse order** check box.

[Change where the category \(x\) axis crosses the value axis](#)

Do one of the following:

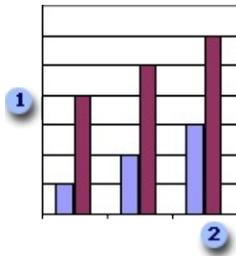
To have the category (x) axis cross at a number on the value axis that you specify, enter the number in the **Category X crosses at** box.

To have the x-axis cross the value axis at the highest value, select the **Category (X) axis crosses at maximum value** check box. When selected, the **Category (X) axis crosses at maximum value** check box overrides the setting in the **Category X crosses at** box.

[Show All](#)

# Change chart axes

Charts typically have two [axes](#) used to categorize and measure data: a category (x) axis and a value (y) axis. 3-D charts have a third (z) axis. Pie and doughnut charts do not have axes.



1 Value (y) axis

2 Category (x) axis

[Display or hide axes, axes labels, and tick marks](#)

1. Click the chart in which you want to display or hide axes, axes labels, and [tick marks](#).
2. On the **Chart** menu, click **Chart Options**, and then click the **Axes** tab.
3. Select or clear the check boxes for the axes you want to display or hide.

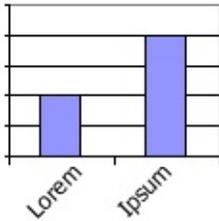
[Add an axis title](#)

1. Click the chart to which you want to add a [title](#).
2. On the **Chart** menu, click **Chart Options**, and then click the **Titles** tab.
3. Click in the appropriate box for each axis title you want to add (for example, to add a title to the category axis, click in the **Category (X) axis** box), and then type the text you want.

[Tip](#)

To insert a line break in an axis title, click the text on the chart, click where you want to insert the line break, and then press ENTER.

## [Align or rotate text on an axis](#)



1. Click the [axis title](#) you want to align.
2. Click **Selected Axis Title** on the **Format** menu.
3. Click the **Alignment** tab.

If you don't see the **Alignment** tab, click **Cancel**, click outside of the text you want to format, and then repeat the process.

4. Select the options you want.

## [Tip](#)

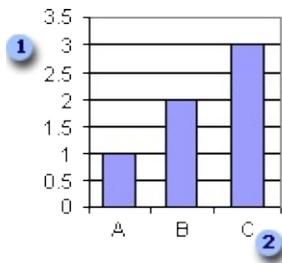
To quickly change the horizontal alignment of selected chart titles and text boxes, click **Align Left** , **Center** , or **Align Right**  on the **Formatting** toolbar.

## [Format numbers on an axis](#)

If you change the number formatting in a chart, the number formatting is no longer linked to the worksheet cells.

1. Double-click the appropriate axis.
2. On the **Number** tab, select the options you want.

## [Change tick mark appearance and label placement on an axis](#)



1 Major and minor tick marks and tick mark labels on value axis

2 Major tick marks and tick mark labels on category axis

1. Click the axis with the [tick marks](#) you want to change.
2. On the **Format** menu, click **Selected Axis**, and then click the **Patterns** tab.
3. Under **Tick mark type** and **Tick mark labels**, select the options you want.

[Tip](#)

To hide major or minor tick marks, or to hide both types of tick marks, click **None**.

[Link an axis title to a worksheet cell](#)

1. Click the axis title you want to link.
2. In the [formula bar](#), type an equal sign (=).
3. Select the worksheet cell that contains the data or text you want shown in your chart.

You can also type the reference to the worksheet cell. Include the sheet name, followed by an exclamation point; for example:

**Sheet1!F2**

4. Press ENTER.

[Reverse the plotting order of categories, values, or series](#)

You can reverse the plotting order of categories or values for most charts, as well as of [data series](#) for 3-D charts with a third axis. You cannot reverse the plotting

order of values in a radar chart.

1. Click the axis for the categories, values, or series whose plotting order you want to change.
2. On the **Format** menu, click **Selected Axis**, and then click the **Scale** tab.
3. To reverse the plotting order, do one of the following:
  - For categories, select the **Categories in reverse order** check box.
  - For values, select the **Values in reverse order** check box.
  - For series in 3-D charts, select the **Series in reverse order** check box.

#### [Add a second axis](#)

When the range of values for different [data series](#) in a 2-D chart varies widely, or when you have mixed types of data (such as price and volume), you can plot one or more data series on a secondary value (y) axis. The scale of the secondary axis reflects the values for the associated series.

1. Click the data series you want to plot along a secondary value axis.
2. On the **Format** menu, click **Selected Data Series**, and then click the **Axis** tab.
3. Click **Secondary axis**.

#### [Change a value axis](#)

1. Click the value axis you want to change.
2. On the **Format** menu, click **Selected Axis**, and then click the **Scale** tab.
3. Do one of the following:

##### [Change the number at which the value axis starts and ends](#)

Enter a different number in the **Minimum** box or the **Maximum** box.

##### [Change the interval of tick marks and gridlines](#)

Enter a different number in the **Major unit** box or **Minor unit** box.

##### [Change the units displayed on the value axis](#)

If your chart values consist of large numbers, you can make the axis text shorter and more readable by changing the display unit of the axis. For example, if the chart values range from 1,000,000 to 50,000,000, you can display the numbers as 1 to 50 on the axis and show a label that indicates that the units express millions.

1. In the **Display units** list, click the units you want or type a numeric value.
2. To show a label that describes the units expressed, select the **Show display units label on chart** check box.

[Change the value axis to logarithmic](#)

Select the **Logarithmic scale** check box.

[Reverse the order of values](#)

To reverse values so that you can flip bars or columns or other [data markers](#), select the **Values in reverse order** check box.

[Change where the category \(x\) axis crosses the value axis](#)

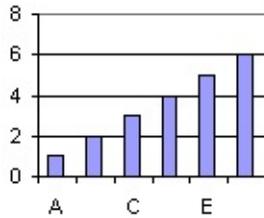
Do one of the following:

To have the category (x) axis cross at a number on the value axis that you specify, enter the number in the **Category X crosses at** box.

To have the x-axis cross the value axis at the highest value, select the **Category (X) axis crosses at maximum value** check box. When selected, the **Category (X) axis crosses at maximum value** check box overrides the setting in the **Category X crosses at** box.

[Change a chart category axis](#)

[Change the number of categories between labels or tick marks on the category axis](#)



1. Click the category [axis](#) with the [labels and tick marks](#) you want to change.
2. On the **Format** menu, click **Selected Axis**, and then click the **Scale** tab.
3. Do one or both of the following:
  - **Specify the frequency at which you want categories on the category (x) axis to be labeled**

In the **Number of categories between tick-mark labels** box, type **1** to label every category, type **2** to label every other category, type **3** to label every third category, and so on.

- **Specify the number of categories you want between each pair of tick marks on the category (x) axis**

Type a number in the **Number of categories between tick marks** box.

**Note** When you have more than one line of category axis labels, you cannot change the number of categories between tick mark labels or the number of categories between tick marks.

[Change where the value \(y\) axis crosses the category \(x\) axis](#)

1. Click the category [axis](#) you want to change.
2. On the **Format** menu, click **Selected Axis**, and then click the **Scale** tab.
3. Do one of the following:

[Specify the category number where you want the value \(y\) axis to cross the category \(x\) axis](#)

- Type the number in the **Value (Y) axis crosses at category number** box.
- Select the **Value (Y) axis crosses between categories** box to have the value (y) axis cross the category (x) axis at the edge of the category indicated in the **Value (Y) axis crosses at category number** box.

If this box is selected, data points are plotted between [tick marks](#); if this box is cleared, points are plotted at the tick-mark positions.

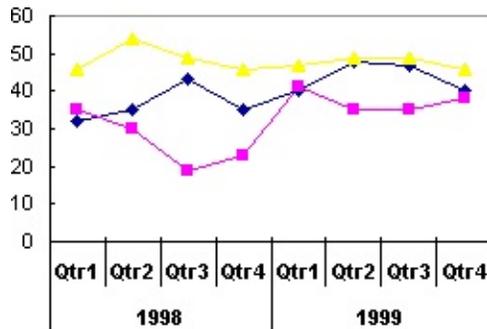
- To have the edges of an area chart meet the edges of the [plot area](#), clear the **Value (Y) axis crosses between categories** box.

[Specify that the value \(y\) axis cross the category \(x\) axis after the last category on the x-axis](#)

Select the **Value (Y) axis crosses at maximum category** box. This option overrides the **Value (Y) axis crosses at category number** value.

**Note** When you have more than one line of category axis labels or when you are working with a 3-D chart, you cannot change where the value (y) axis crosses between categories.

[Change the alignment and spacing of multiple-level category labels](#)



When you have [multiple-level category labels](#) in your chart, you can change the alignment of all but the first level of labels. You can also change the amount of space between each level of labels.

1. Click the category axis you want to change.
2. On the **Format** menu, click **Selected Axis**, and then click the **Alignment** tab.
3. To change the label alignment, click the position you want in the **Alignment** box.

To change the spacing between the levels, select a value in the **Offset** box. The higher the value, the more space between each level.

 [Change chart category axis labels](#)

### **On the worksheet**

1. Click the cell that contains the label name you want to change.
2. Type the new name, and then press ENTER.

### **On the chart**

1. Click the chart, and then click **Source Data** on the **Chart** menu.
2. In the **Category axis labels** box on the **Series** tab, specify the worksheet range you want to use as category axis labels. You can also type the labels you want to use, separated by commas, for example:

**Division A, Division B, Division C**

If you type the label text in the **Category axis labels** box, the category axis text is no longer linked to a worksheet cell.

[Show All](#)

# Add a chart title

1. Click the chart to which you want to add a [title](#).
2. On the **Chart** menu, click **Chart Options**, and then click the **Titles** tab.
3. Click in the **Chart title** box, and then type the text you want.



To insert a line break in a chart title, click the text on the chart, click where you want to insert the line break, and then press ENTER.

[Show All](#)

# Add a legend to a chart

1. Click the chart to which you want to add a [legend](#).
2. On the **Chart** menu, click **Chart Options**, and then click the **Legend** tab.
3. Select the **Show legend** check box.
4. Under **Placement**, click the option you want.

**Note** When you click one of the **Placement** options, the legend moves, and the [plot area](#) automatically adjusts to accommodate it. If you move and size the legend by using the mouse, the plot area does not automatically adjust. When you use the **Placement** options, the legend loses any custom sizing you may have already applied by using the mouse.

# Add a text box to a chart

1. Click the chart to which you want to add a text box.
2. On the **Drawing** toolbar, click **Text Box** .
3. Click where you want one corner of the text box, and then drag until the box is the size you want.
4. Type the text you want in the box. The text will wrap inside the box.

To start a new line inside the box, press ENTER.

5. When you finish typing, press ESC or click outside of the text box.

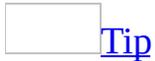
[Show All](#)

# Add data labels to a chart

1. To add [data labels](#) to a [data series](#), click the data series.

To add a data label to a single data point, click the data series that contains the [data marker](#) you want to label, and then click the data marker for the data point you want to label.

2. On the **Format** menu, click **Selected Data Series** or **Data Point**.
3. On the **Data Labels** tab, select the options you want.



You can quickly label all data points. Click the chart, click **Chart Options** on the **Chart** menu, and then select the options you want on the **Data Labels** tab.

[Show All](#)

# Align text in chart titles and text boxes

1. Click the [title](#) or the border of the [text box](#) you want to align.
2. For an axis title, click **Selected Axis Title** on the **Format** menu.

For a chart title, click **Selected Chart Title** on the **Format** menu.

For a text box, click **Selected Object** on the **Format** menu.

3. Click the **Alignment** tab.

If you don't see the **Alignment** tab, the title or border is not selected. Click **Cancel**, click outside of the text you want to format, and then repeat the procedure.

4. Select the options you want.



To quickly change the horizontal alignment of selected chart titles and text boxes, click **Align Left** , **Center** , or **Align Right**  on the **Formatting** toolbar.

[Show All](#)

# Change data labels

## On the worksheet

1. Click the cell that contains the information you want to change.
2. Type the new text or value, and then press ENTER.

## On the chart

1. Click once on the [data label](#) you want to change to select the data labels for the entire series, and then click again to select the individual data label.
2. Type the new text or value, and then press ENTER.

If you change the data label text on the chart, it is no longer linked to a worksheet cell.

[Show All](#)

# Change data markers in a line, xy (scatter), or radar chart

1. Click the line with the [data markers](#) you want to change.
2. On the **Format** menu, click **Selected Data Series**, and then click the **Patterns** tab.
3. Under **Marker**, select the options you want.

[Show All](#)

# Change data series names or legend text

## On the worksheet

1. Click the cell that contains the [data series](#) name you want to change.
2. Type the new name, and then press ENTER.

## On the chart

1. Click the chart, and then click **Source Data** on the **Chart** menu.
2. On the **Series** tab, click the data series name you want to change.
3. In the **Name** box, specify the worksheet cell you want to use as the [legend](#) text or data series name.

You can also type the name you want to use. If you type a name in the **Name** box, the legend text or data series name is no longer linked to a worksheet cell.

[Show All](#)

# Change the position of data labels automatically

You can change the position of a single [data label](#) by dragging it. Use this procedure to place all labels for a [data series](#) in a standard position on their [data markers](#) in 2-D bar, column, and line charts; 2-D and 3-D pie charts; and scatter and bubble charts.

1. Click the chart outside of the data labels that you want to change.
2. Click one of the data labels in the series that you want to change.
3. On the **Format** menu, click **Selected Data Labels**, and then click the **Alignment** tab.
4. In the **Label position** box, click the location you want.

[Show All](#)

# Change the font used in a chart

1. Click the chart text, or select the individual characters you want to format.

If a chart [title](#) or [text box](#) is linked to a worksheet cell, you can change the formatting of all characters in the title or text box at the same time, but you cannot change individual characters.

To change the formatting for all of the text in the chart at the same time, click the blank area between the border of the chart and the [plot area](#) to select the [chart area](#).

2. On the **Formatting** toolbar, click a button for the format you want.

To see other font options, such as superscript and subscript, click the text you want to change. On the **Format** menu, click the command for the chart item you want to format— for example, **Selected Axis Title** or **Selected Object**. (The name of the command depends on the chart item selected.) Then select the options you want on the **Font** tab.

[Show All](#)

# Change the spacing between data markers in bar and column charts

1. Click a [data series](#) in the chart you want to change. You need to select only a single data series to change the overlap or spacing of all data series of the same chart type.
2. On the **Format** menu, click **Selected Data Series**, and then click the **Options** tab.
3. To change the overlap of the [data markers](#) in each category, enter a value between -100 and 100 in the **Overlap** box. The higher the value, the greater the overlap within the category.

To change the spacing between categories of data markers, enter a value between 0 (zero) and 500 in the **Gap width** box. The higher the value, the greater the distance between each category.

# Delete data labels, titles, or legends in a chart

1. Click the item you want to delete.
2. Press DELETE.

[Show All](#)

# Display or hide a data table in a chart

1. Click the line, area, column or bar chart to which you want to add a [data table](#).
2. On the **Chart** menu, click **Chart Options**, and then click the **Data Table** tab.
3. To display or hide the chart data in a grid at the bottom of the chart, select or clear the **Show data table** check box.

## Notes

- In bar charts and charts with time-scale [axes](#), the data table does not replace an axis of the chart but is aligned to the chart.
- To attach the data table to the category axis in a 3-D chart, click **3-D View** on the **Chart** menu, and then select the **Right angle axes** check box.

[Show All](#)

# Display or hide gridlines in a chart

1. Click the chart to which you want to add [gridlines](#).
2. On the **Chart** menu, click **Chart Options**, and then click the **Gridlines** tab.
3. Select or clear the check boxes for the gridlines you want to display or hide.

[Show All](#)

# Display or hide chart tips

1. On the **Tools** menu, click **Options**, and then click the **Chart** tab.
2. To see the name of a chart item when you rest the pointer over it, select the **Show names** check box.

To see the value of a [data marker](#) when you rest the pointer over it, select the **Show values** check box.

To hide all tips, clear both check boxes.

# **Edit chart and axis titles**

1. Click the title you want to change.
2. Type the new text you want.
3. Press ENTER.

[Show All](#)

# Link a chart title or text box to a worksheet cell

You can link an existing chart title to a worksheet cell or create a new text box that is linked to a worksheet cell.

1. Click the title or, to create a new text box, click the [chart area](#).
2. In the [formula bar](#), type an equal sign (=).
3. Select the worksheet cell that contains the data or text you want shown in your chart.

You can also type the reference to the worksheet cell. Include the sheet name, followed by an exclamation point; for example:

**Sheet1!F2**

4. Press ENTER.

[Show All](#)

# Link chart data labels to worksheet cells

If you have changed the [data label](#) text on a chart, the data label is no longer linked to a worksheet cell.

1. Click a [data marker](#) in the [data series](#) associated with the data labels whose links you want to reestablish.
2. On the **Format** menu, click **Selected Data Series**, and then click the **Data Labels** tab.
3. Select the **Automatic text** check box.

**Note** In [PivotChart reports](#), this procedure reestablishes links between data labels and source data (not worksheet cells).

## To reestablish links between data labels and worksheet cells for all data series in the chart

1. Click the chart, and then click **Chart Options** on the **Chart** menu.
2. On the **Data Labels** tab, select the **Automatic text** check box.

[Show All](#)

# Rotate chart title text or axis text

1. Click the title or the axis you want to format.
2. If you clicked a chart title, click **Selected Chart Title** on the **Format** menu.

If you clicked an axis or axis title, click **Selected Axis** or **Selected Axis Title** on the **Format** menu.

3. Click the **Alignment** tab.

If you don't see the **Alignment** tab, click **Cancel**, click outside of the text you want to format, and then repeat the procedure.

4. To rotate text, under **Orientation**, click a degree point, or drag the indicator to the position you want.

**Note** When you have more than one level of category axis labels, only the first level (the level closest to the axis) can be rotated.

 **Tip**

To quickly rotate selected text 45 degrees up or down, click **Angle Text Upward**  or **Angle Text Downward**  on the **Chart** toolbar.

[Show All](#)

# Add data to a chart

To add data to a [chart sheet](#), copy and paste the data from the worksheet to the chart.

To add data to an [embedded chart](#) created from adjacent worksheet cells, use the color-coded ranges that surround the data on the worksheet. You can also add data to an embedded chart by dragging the data from the worksheet to the chart. If your embedded chart is created from [nonadjacent selections](#), use the copy and paste procedure.

## [Add data to a chart by copying and pasting](#)

1. Select the cells that contain the data you want to add to the chart. If you want the column or row label for the new data to appear in the chart, include the cell that contains the label in the selection.
2. Click **Copy** .
3. Click the chart.
4. Do one of the following:
  - To have Microsoft Excel automatically paste the data in the chart, click **Paste** .
  - To specify how you want to plot the data in the chart, click **Paste Special** on the **Edit** menu, and then select the options you want.

## [Add data to a chart by using color-coded ranges](#)

The embedded chart must be created from adjacent selections and be on the same worksheet as the data used to create it.

1. Type the data and labels you want to add on the worksheet in the cells next to the existing data.
2. Select the [chart area](#) by clicking the blank area between the border of the chart and the [plot area](#).
3. Do one of the following:
  - To add new categories and [data series](#) to the chart, on the worksheet,

drag the blue sizing handle to include the new data and labels in the rectangle.

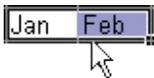
- To add new data series only, on the worksheet, drag the green sizing handle to include the new data and labels in the rectangle.
- To add new categories and data points, on the worksheet, drag the purple sizing handle to include the new data and labels in the rectangle.

### [Add data to a chart by dragging](#)

1. Select the cells that contain the data you want to add to the chart. The cells must be next to each other on the worksheet.

If you want the column or row label for the new data to appear in the chart, include the cell that contains the label in the selection.

2. Point to the border of the selection.



3. Drag the selection to the embedded chart you want to update.

If Microsoft Excel needs more information to plot the data, the **Paste Special** dialog box appears. Select the options you want.

**Note** If you cannot drag the selection, make sure that the **Allow cell drag and drop** check box is selected. To check this setting, click **Options** on the **Tools** menu, and then click the **Edit** tab.

[Show All](#)

# Change values in a chart

The values in a chart are linked to the worksheet from which the chart is created. When you change one, the other is also changed.

## [Change values directly in worksheet cells](#)

1. Open the worksheet that contains the data plotted in the chart.
2. In the cell that contains the value you want to change, type a new value.
3. Press ENTER.

## [Change values by dragging data markers in the chart](#)

To change values generated from worksheet formulas in 2-D column, bar, pie, doughnut, line, xy (scatter), and bubble charts, drag the [data marker](#) in the chart and use [goal seeking](#). When you change the value of a data marker by dragging, Microsoft Excel also changes the underlying value on the worksheet.

To change values generated from worksheet formulas in 3-D, surface, radar, and area charts, use goal seeking on the worksheet.

1. Click the [data series](#) that contains the data marker you want to change, and then click the data marker.
2. Do one of the following:
  - If the data marker is a bubble, line, or xy (scatter) data marker, drag the data marker.
  - If the data marker is a bar or column data marker, drag the top-center selection handle.
  - If the data marker is a pie or doughnut chart data marker, drag the largest selection handle on the outer edge of the data marker.

**Note** If the value of the data marker was generated from a formula, the value can be changed only by adjusting one of the values that the formula refers to. To accomplish this, the **Goal Seek** dialog box is displayed after you drag the data marker. Click the worksheet cell that contains the formula value you want to

adjust, and then click **OK** in the **Goal Seek** dialog box.

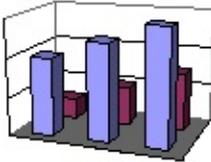
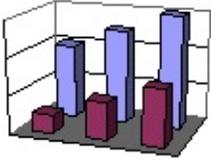
[Show All](#)

# Change the hole size in a doughnut chart

1. Click a [data series](#) in the doughnut chart you want to change.
2. On the **Format** menu, click **Selected Data Series**, and then click the **Options** tab.
3. In the **Doughnut hole size** box, type a value between 10 and 90 to specify the diameter of the hole.

[Show All](#)

# Change the plotting order of data series



1. Click a [data series](#) in the chart you want to change.

To change the plotting order of data series in a surface chart, click a [legend key](#).

2. On the **Format** menu, click **Selected Data Series** or **Selected Legend Key**, and then click the **Series Order** tab.
3. In the **Series order** box, click the series you want to move.
4. To place the series in the order you want, click **Move Up** or **Move Down**.

[Show All](#)

# Change the way data is shown in a chart

You can change the order, placement, and worksheet orientation of [data series](#) in a chart.

## [Plot data series from worksheet rows or columns](#)

1. Click the chart.
2. On the **Chart** menu, click **Source Data**, and then click the **Data Range** tab.
3. Click **Series in rows** or **Series in columns**.

## [Add a second axis](#)

When the range of values for different [data series](#) in a 2-D chart varies widely, or when you have mixed types of data (such as price and volume), you can plot one or more data series on a secondary value (y) axis. The scale of the secondary axis reflects the values for the associated series.

1. Click the data series you want to plot along a secondary value axis.
2. On the **Format** menu, click **Selected Data Series**, and then click the **Axis** tab.
3. Click **Secondary axis**.

## [Reverse the plotting order of categories, values, or series](#)

You can reverse the plotting order of categories or values for most charts, as well as of [data series](#) for 3-D charts with a third axis. You cannot reverse the plotting order of values in a radar chart.

1. Click the axis for the categories, values, or series whose plotting order you want to change.
2. On the **Format** menu, click **Selected Axis**, and then click the **Scale** tab.
3. To reverse the plotting order, do one of the following:
  - For categories, select the **Categories in reverse order** check box.

- For values, select the **Values in reverse order** check box.
- For series in 3-D charts, select the **Series in reverse order** check box.

### [Control the way empty cells are plotted in a chart](#)

1. Click the chart.
2. On the **Tools** menu, click **Options**, and then click the **Chart** tab.
3. Under **Plot empty cells as**, click the option you want.

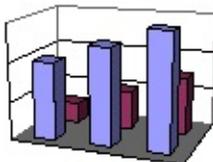
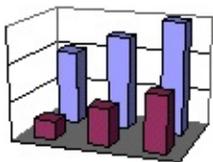
### [Change the points plotted in a pie-of-pie or bar-of-pie chart](#)

1. Click a slice in the pie chart you want to change.
2. On the **Format** menu, click **Selected Data Point**, and then click the **Options** tab.
3. Select the options you want.

### [Tip](#)

You can also change which slices appear in the pie-of-pie or bar-of-pie chart by dragging. Click a slice or bar segment on the main chart, and then drag it to the pie-of-pie or bar-of-pie chart, or vice versa.

### [Change the plotting order of data series](#)



1. Click a [data series](#) in the chart you want to change.

To change the plotting order of data series in a surface chart, click a [legend key](#).

2. On the **Format** menu, click **Selected Data Series** or **Selected Legend Key**, and then click the **Series Order** tab.
3. In the **Series order** box, click the series you want to move.
4. To place the series in the order you want, click **Move Up** or **Move Down**.

# Change the cell range the chart is based on

1. Click the chart you want to change.
2. On the **Chart** menu, click **Source Data**, and then click the **Data Range** tab.
3. Make sure the entire reference in the **Data range** box is selected.
4. On the worksheet, select the cells that contain the data you want to appear in the chart.

If you want the column and row labels to appear in the chart, include the cells that contain them in the selection.

# Control the display of hidden worksheet data in a chart

1. Click the chart.
2. On the **Tools** menu, click **Options**, and then click the **Chart** tab.
3. Do one of the following:
  - To show all worksheet data in the chart, even if some rows or columns are hidden, clear the **Plot visible cells only** check box.
  - To prevent hidden rows or columns from displaying in the chart, select the **Plot visible cells only** check box.

[Show All](#)

# Delete data from a chart

## Delete data from both the worksheet and the chart

Delete the data from the worksheet. The chart will be updated automatically.

## Delete data from the chart only

1. Click the [data series](#) you want to delete.
2. Press DELETE.

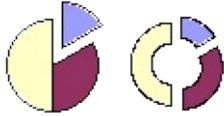
[Show All](#)

# Format numbers in a chart like numbers on the worksheet

1. Do one of the following:
  - To format [labels](#) along an axis, double-click the appropriate axis.
  - To format [data labels](#) or a [trendline label](#), double-click the item.
2. On the **Number** tab, select the **Linked to source** check box.

[Show All](#)

# Pull out slices in pie and doughnut charts



[Pull out slices in a pie chart](#)

**All of the slices in a pie chart** Click the pie, and then drag away from the center of the chart.

**Only one slice in a pie chart** Click the pie, click the slice you want to move, and then drag the slice away from the center of the chart.

[Pull out slices in the outer ring of a doughnut chart](#)

**All of the slices** Click the outer ring, and then drag away from the center of the chart.

**Only one slice** Click the outer ring, click the slice you want to move, and then drag the slice away from the center of the chart.

**Note** In a doughnut chart, you can pull out only the slices of the outer ring.

[Show All](#)

# Reverse the plotting order of categories, values, or series

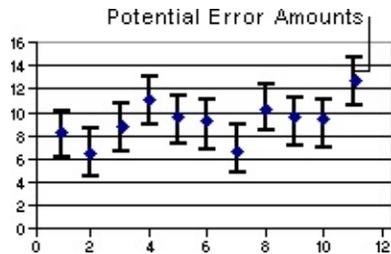
You can reverse the plotting order of categories or values for most charts, as well as of [data series](#) for 3-D charts with a third axis. You cannot reverse the plotting order of values in a radar chart.

1. Click the axis for the categories, values, or series whose plotting order you want to change.
2. On the **Format** menu, click **Selected Axis**, and then click the **Scale** tab.
3. To reverse the plotting order, do one of the following:
  - For categories, select the **Categories in reverse order** check box.
  - For values, select the **Values in reverse order** check box.
  - For series in 3-D charts, select the **Series in reverse order** check box.

[Show All](#)

# About error bars in charts

Error bars graphically express potential error amounts relative to each [data marker](#) in a [data series](#). For example, you could show 5 percent positive and negative potential error amounts in the results of a scientific experiment:



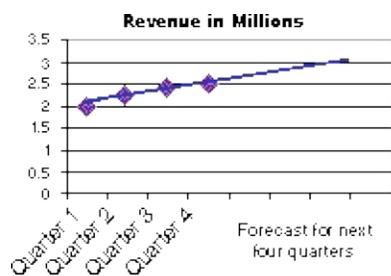
**Chart types that support error bars** You can add error bars to data series in 2-D area, bar, column, line, xy (scatter), and bubble charts. For xy (scatter) and bubble charts, you can display error bars for the x values, the y values, or both.

[Show All](#)

# About forecasting and showing trends in charts

## What are trendlines?

Trendlines are used to graphically display trends in data and to analyze problems of prediction. Such analysis is also called [regression analysis](#). By using regression analysis, you can extend a trendline in a chart beyond the actual data to predict future values. For example, the following chart uses a simple linear trendline that is forecast ahead four quarters to clearly show a trend toward rising revenue.



**Moving Average** You can also create a [moving average](#), which smoothes out fluctuations in data and shows the pattern or trend more clearly.

**Chart types that support trendlines** You can add trendlines to [data series](#) in unstacked 2-D area, bar, column, line, stock, xy (scatter), and bubble charts. You cannot add trendlines to data series in 3-D, stacked, radar, pie, surface, or doughnut charts. If you change a chart or data series so that it can no longer support the associated trendline— for example, by changing the chart type to a 3-D chart or by changing the view of a [PivotChart report](#) or [associated PivotTable report](#)— you lose the trendlines.

**Creating line data without a chart** Use AutoFill or one of the statistical functions such as GROWTH() or TREND() to create data for best-fit linear or exponential lines.



[Types of trendlines: choosing the right one for your data](#)

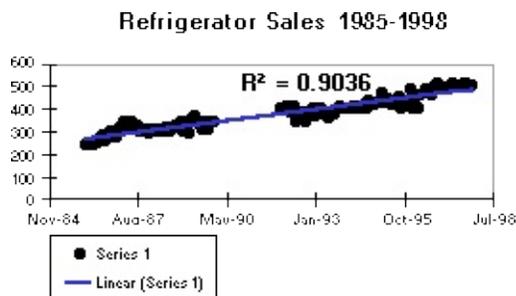
When you want to add a trendline to a chart in Microsoft Excel, you can choose any of the six different trend/regression types. The type of data you have determines the type of trendline you should use.

**Trendline reliability** A trendline is most reliable when its [R-squared value](#) is at or near 1. When you fit a trendline to your data, Excel automatically calculates its R-squared value. If you want, you can display this value on your chart.

## [Linear](#)

A linear trendline is a best-fit straight line that is used with simple linear data sets. Your data is linear if the pattern in its data points resembles a line. A linear trendline usually shows that something is increasing or decreasing at a steady rate.

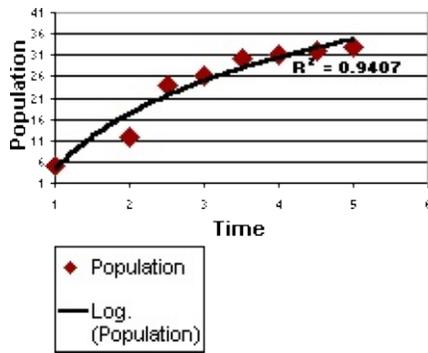
In the following example, a linear trendline clearly shows that refrigerator sales have consistently risen over a 13-year period. Notice that the R-squared value is 0.9036, which is a good fit of the line to the data.



## [Logarithmic](#)

A logarithmic trendline is a best-fit curved line that is used when the rate of change in the data increases or decreases quickly and then levels out. A logarithmic trendline can use negative and/or positive values.

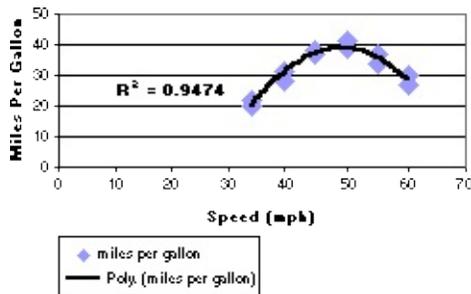
The following example uses a logarithmic trendline to illustrate predicted population growth of animals in a fixed-space area, where population leveled out as space for the animals decreased. Note that the R-squared value is 0.9407, which is a relatively good fit of the line to the data.



## Polynomial

A polynomial trendline is a curved line that is used when data fluctuates. It is useful, for example, for analyzing gains and losses over a large data set. The order of the polynomial can be determined by the number of fluctuations in the data or by how many bends (hills and valleys) appear in the curve. An Order 2 polynomial trendline generally has only one hill or valley. Order 3 generally has one or two hills or valleys. Order 4 generally has up to three.

The following example shows an Order 2 polynomial trendline (one hill) to illustrate the relationship between speed and gasoline consumption. Notice that the R-squared value is 0.9474, which is a good fit of the line to the data.

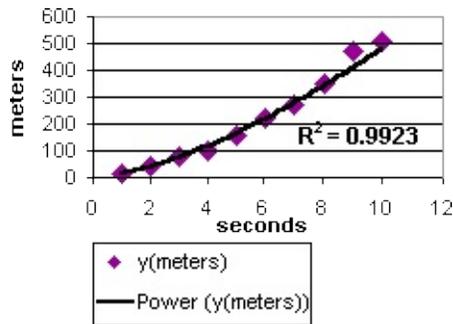


## Power

A power trendline is a curved line that is used with data sets that compare measurements that increase at a specific rate— for example, the acceleration of a race car at 1-second intervals. You cannot create a power trendline if your data contains zero or negative values.

In the following example, acceleration data is shown by plotting distance in meters by seconds. The power trendline clearly demonstrates the increasing

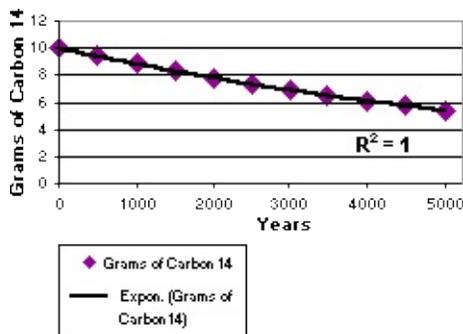
acceleration. Note that the R-squared value is 0.9923, which is a nearly perfect fit of the line to the data.



## Exponential

An exponential trendline is a curved line that is used when data values rise or fall at increasingly higher rates. You cannot create an exponential trendline if your data contains zero or negative values.

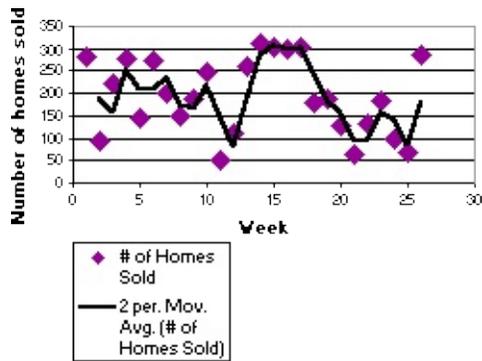
In the following example, an exponential trendline is used to illustrate the decreasing amount of carbon 14 in an object as it ages. Note that the R-squared value is 1, which means the line fits the data perfectly.



## Moving Average

A moving average trendline smoothes out fluctuations in data to show a pattern or trend more clearly. A moving average uses a specific number of data points (set by the **Period** option), averages them, and uses the average value as a point in the line. If **Period** is set to 2, for example, then the average of the first two data points is used as the first point in the moving average trendline. The average of the second and third data points is used as the second point in the trendline, and so on.

In the following example, a moving average trendline shows a pattern in number of homes sold over a 26-week period.



[Show All](#)

# Add a trendline to a chart

1. Click the [data series](#) to which you want to add a [trendline](#) or [moving average](#).
2. On the **Chart** menu, click **Add Trendline**.
3. On the **Type** tab, click the type of regression trendline or moving average you want.
  - If you select **Polynomial**, enter in the **Order** box the highest power for the independent variable.
  - If you select **Moving Average**, enter in the **Period** box the number of periods to be used to calculate the moving average.

## Notes

- The **Based on series** box lists all the data series in the chart that support trendlines. To add a trendline to another series, click the name in the box, and then select the options you want.
- If you add a moving average to an xy (scatter) chart, the moving average is based on the order of the x values plotted in the chart. To get the result you want, you might need to sort the x values before adding a moving average.

[Show All](#)

# Add error bars to a chart

1. Click the [data series](#) to which you want to add [error bars](#).
2. On the **Format** menu, click **Selected Data Series**.
3. On the **X Error Bars** tab or the **Y Error Bars** tab, select the options you want.

**Note** If you change the worksheet values or formulas associated with the data points in the series, the error bars are adjusted to reflect your changes.

[Show All](#)

# Change error bar settings

1. Click the [error bar](#) or [data series](#) that has the error bars you want to change. When you select an error bar, any changes you make affect all of the error bars in its associated data series.
2. On the **Format** menu, click **Selected Data Series**.
3. Click the **Y Error Bars** tab or the **X Error Bars** tab, depending on the type of error bars you want to change.
  - To select a different type of error bar, click the type you want under **Display**.
  - To change the method used to determine the error, select the method you want under **Error amount**.
  - To change a custom error amount, click **Custom**. In the **Plus** and **Minus** boxes, specify the worksheet range to use as error amount values, or enter the values you want to use, separated by commas; for example, **0.4, 0.3, 0.8**.

[Show All](#)

# Change trendline settings

1. Click the [trendline](#) you want to change.
2. On the **Format** menu, click **Selected Trendline**.
3. On the **Options** tab, select the options you want.

To change the name of the trendline or [moving average](#), type a name in the **Custom** box.

[Show All](#)

# Delete a trendline

1. Click the [trendline](#) you want to delete.
2. Press DELETE.

[Show All](#)

# Delete error bars

1. To delete all [error bars](#) in a [data series](#), click any error bar.
2. Press DELETE.

[Show All](#)

# Display the R-squared value for a trendline

1. Click the [trendline](#) for which you want to display the [R-squared value](#).
2. On the **Format** menu, click **Selected Trendline**.
3. On the **Options** tab, select **Display R-squared value on chart**.

**Note** You cannot display an R-squared value for a [moving average](#).

[Show All](#)

# Equations for calculating the error amount

## [Standard Deviation](#)

$$S. D. = \sqrt{\frac{\sum_{s=1}^m \sum_{i=1}^n (y_{is} - M)^2}{(n_y - 1)}}$$

$$M = \frac{\sum_{s=1}^m \sum_{i=1}^n y_{is}}{n_y}$$

where:

$s$  = series number

$i$  = point number in series  $s$

$m$  = number of series for point  $y$  in chart

$n$  = number of points in each series

$y_{is}$  = data value of series  $s$  and the  $i$ th point

$n_y$  = total number of data values in all series

$M$  = arithmetic mean

## [Standard Error](#)

$$S. E. = \sqrt{\frac{\sum_{s=1}^m \sum_{i=1}^n y_{is}^2}{(n_y - 1)(n_y)}}$$

where:

$s$  = series number

$i$  = point number in series  $s$

$m$  = number of series for point  $y$  in chart

$n$  = number of points in each series

$y_{is}$  = data value of series  $s$  and the  $i$ th point

$n_y$  = total number of data values in all series

[Show All](#)

# Equations for calculating trendlines

## [Linear](#)

Calculates the least squares fit for a line represented by the following equation:

$$y = mx + b$$

where  $m$  is the slope and  $b$  is the intercept.

## [Polynomial](#)

Calculates the least squares fit through points by using the following equation:

$$y = b + c_1x + c_2x^2 + c_3x^3 + \dots + c_6x^6$$

where  $b$  and  $c_1 \dots c_6$  are constants.

## [Logarithmic](#)

Calculates the least squares fit through points by using the following equation:

$$y = c \ln x + b$$

where  $c$  and  $b$  are constants, and  $\ln$  is the natural logarithm function.

## [Exponential](#)

Calculates the least squares fit through points by using the following equation:

$$y = ce^{bx}$$

where  $c$  and  $b$  are constants, and  $e$  is the base of the natural logarithm.

## [Power](#)

Calculates the least squares fit through points by using the following equation:

$$y = cx^b$$

where  $c$  and  $b$  are constants.

### [R-squared value](#)

$$R^2 = 1 - \frac{SSE}{SST}$$

where

$$SSE = \sum (Y_j - \hat{Y}_j)^2$$

and

$$SST = \left( \sum Y_j^2 \right) - \frac{\left( \sum Y_j \right)^2}{n}$$

**Note** The [R-squared value](#) you can display with a [trendline](#) is not an adjusted R-squared value. For logarithmic, power, and exponential trendlines, Microsoft Excel uses a transformed regression model.

### [Moving average](#)

$$\bar{F}_t = \frac{A_t + A_{t-1} + \dots + A_{t-n+1}}{n}$$

**Note** The number of points in a [moving average trendline](#) equals the total number of points in the series less the number you specify for the period.

[Show All](#)

# About drawing objects and pictures

You can add graphics to your worksheets and charts to make them more visually appealing, to create eye-catching reports, or to add emphasis. For example, you can display a logo on your worksheet, create a flowchart, and use graphics in chart [data markers](#). You can make your worksheet interactive by using graphic objects as [hyperlinks](#) or by assigning buttons to macros.

## Types of graphics



[About pictures](#)

When you're creating art or designs with Microsoft Office programs, it's helpful to know which types— bitmaps or drawn pictures— you're using. Your formatting and editing options will vary, depending on the type of picture you're working with.



[What is a bitmap?](#)

Bitmap pictures (also called paint-type or raster images) are made from a series of small dots, much like a piece of graph paper with specific squares filled in to form an image. Bitmaps are created with and edited in paint programs, such as Microsoft Paint. All scanned graphics and photographs are bitmaps. When they are resized, they lose definition, and the individual dots that make up the picture become visible.

You can change the way colors look in a bitmap picture by adjusting the brightness and contrast, converting color to black and white or grayscale, or creating transparent areas. To change specific colors in a bitmap, you need to use a photo editing program.

Bitmap pictures are often saved with a .bmp, .png, .jpg, or .gif extension.



[What is a drawn picture?](#)

Drawn pictures (also called vector drawings) are created from lines, curves,

rectangles, and other objects. The individual lines can be edited, moved, and rearranged. When a drawn picture is resized, the computer redraws the lines and shapes so that they retain their original definition and perspective. [AutoShapes](#) are drawn pictures.

Because a drawn picture is made of lines and shapes, you can group and ungroup, reorder, and change the color of one or all parts of the picture.

Drawn pictures are saved in the format of the application that created them. For example, Microsoft Windows [Metafiles](#) are saved with a .wmf extension.

### [About reducing a picture's file size](#)

When you insert a [picture](#) with a file size that is greater than a certain threshold, your Microsoft Office program presents you with the option to compress the picture before inserting it. The program automatically selects the type of compression that best suits the type of picture.

By compressing the picture's file size, you will help control the size of the file you are inserting it into. However, the picture might lose some quality.

To save room on your hard disk or to reduce download time, when you're formatting a picture you can use the **Compress Pictures** feature to do the following:

- Reduce resolution (to 96 dots per inch (dpi) for Web and 200 dpi for print), and unnecessary information is discarded.
- Discard extra information. For example, when a picture has been [cropped](#) or resized, the "hidden" parts of the picture are stored in the file.
- Compress the picture, if possible.

## **Finding clips**

### [About the Clip Organizer](#)

The Microsoft [Clip Organizer](#) contains drawings, photographs, sounds, videos, and other media files— called [clips](#)— that you can insert and use in presentations, publications, and other Microsoft Office documents.

In an Office program, you can find, add, and organize media clips by using:

**Insert Clip Art** This command opens a [task pane](#) where you can search for clips. Although this task pane resembles the Office **Basic Search** task pane, you use it to find media clips, not documents. You can search for media files based on descriptive keywords, file name, [file format](#), and [clip collections](#).

**Microsoft Clip Organizer** This link can be found at the bottom of the **Insert Clip Art** task pane and opens the main Clip Organizer window. You can use Clip Organizer to browse through clip collections, add clips, or catalog clips in ways that make sense to you. For example, you can create a collection to group the clips you use most frequently, or let Clip Organizer automatically add and catalog media files on your hard disk.

**Clip Organizer Online** If you have an Internet connection open, clip art search results will automatically include content from Clip Organizer Online. Or, you can visit the site yourself by clicking the link at the bottom of the task pane.

**Microsoft Office Online** If you have an Internet connection, you can use the **Office on the Web** tools to purchase a variety of clip-related options.

 [About finding clips](#)

Using the **Insert Clip Art** [task pane](#), you can quickly and easily find photographs, drawings, sound effects, music, videos, and other media files — called [clips](#)— to use in Microsoft Office documents.

You can search for clips by entering search keywords or phrases in normal, everyday language— for example, "buildings" or "people at work." If you find a clip that is close to what you're looking for, you can find more clips based on a similar artistic style.

If you want to narrow your search, you can specify the [clip collections](#) you want to search or ignore, or choose to search only for certain types of media files.

 [Search results](#)

As soon as you start a search, the **Insert Clip Art** task pane begins listing [thumbnails](#) of drawings, photos, sounds, and other media files.

If a clip isn't installed on your computer, you'll see an icon in the lower-left corner of the thumbnail that tells you where the clip can be found.

<b>Icon</b>	<b>Clip location</b>
	CD-ROM or DVD
	Microsoft <a href="#">Clip Organizer</a> Online site
	Microsoft Provider Web site (free)
	Microsoft Partner Web site (available for purchase)
	Unavailable

If a clip is an [animated](#) GIF, you'll see this icon in the lower-right corner of the thumbnail: 

 [Search tips](#)

You can use everyday language to describe the clip you want to find. The following guidelines can help you refine keyword searches.

<b>Type this keyword</b>	<b>To find</b>
<b>car</b>	Clips with "car" as the exact search keyword
<b>blue car</b>	Clips with the search key words "blue" and "car"
<b>"blue car"</b>	Clips with the phrase "blue car"
<b>blue, car</b>	Clips with the search key word "blue" or "car"

You can also search by entering the file name of the media clip you want to find. If you don't know the exact file name, you can substitute wildcard characters for one or more real characters.

- Use the asterisk (\*) as a substitute for zero or more characters in a file name. For example, type **car\*.jpg** to locate file names like "cardboard.jpg" or "carton.jpg".
- Use the question mark (?) as a substitute for a single character in a file name. For example, type **car?.jpg** to locate file names like "car1.jpg" or "car2.jpg", but not "carton.jpg".

 [The Microsoft Clip Organizer window](#)

If you don't find what you need by using the **Insert Clip Art** task pane, you can open the main [Clip Organizer](#) window, where you can browse through organized collections of media clips. The clips in Clip Organizer are sorted into collections — for example, **Office Collections** contains the media files that are included as part of Microsoft Office.

Clip Organizer has its own Help system, where you'll find such information as how to organize your clips in collections, how to assign keywords to clips for easy searching, and how to work with the Clip Organizer by using [shortcut keys](#).

## Shapes

 [About Shapes](#)

Shapes can be resized, rotated, flipped, colored, and combined to make more complex shapes. Many have an [adjustment handle](#) that you can use to change the most prominent feature of a shape— for example, you can change the size of the point on an arrow.

The [AutoShapes](#) available on the **Drawing toolbar** include several categories of shapes: lines, connectors, basic shapes, flowchart elements, stars and banners, and callouts. More shapes can be found in the [Clip Organizer](#) as well.

You can add text to shapes. The text you add becomes part of the shape— if you rotate or flip the shape, the text rotates or flips with it.

[Text boxes](#) can be treated as shapes. They are formatted in many of the same ways shapes are formatted, including adding colors, fills, and borders.

 [About positioning text in shapes](#)

Some types of shapes can include associated text. Shapes with this feature include most [AutoShapes](#) (except lines, connectors, and [freeforms](#)), [text boxes](#), and [WordArt](#).

When you type text directly into an AutoShape or text box, the text is attached to the shape, and you can:

- Adjust and position the text within it.

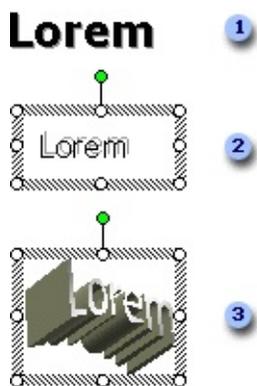
- Make the text wrap in the shape or place it in the top, bottom, or middle of the shape.
- Change the margins between the text and the edge of the shape.
- Resize the shape to fit the text precisely.

If the shape is WordArt, you can create shadowed, skewed, rotated, and stretched text, as well as text that has been fitted to predefined shapes. Text in WordArt does not wrap or need margin settings, because the text is an object.

### [About text shadows and 3-D effects](#)

Depending on the effect you want, you can shadow or emboss text in three different ways:

- Add a shadow or embossed effect directly to the text. When you use this method, you can't change such shadow features as offset or color.
- Add a shadow or embossed effect to an unfilled object that contains text. With this method, the text takes on the same shadow options as the object, and you can control and change shadow features.
- Insert WordArt— a [drawing object](#) that contains special text effects such as shadowing and perspective.

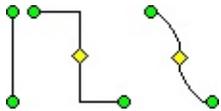


- 1** Add shadow directly to text
- 2** Add shadow to a [text box](#) (unfilled object)

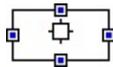
### 3 Add [WordArt](#)

#### [About connector lines](#)

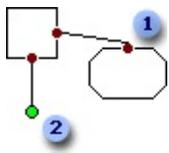
There are three types of connector lines to connect objects— straight, elbow (angled), and curved.



After you choose a connector [AutoShape](#), blue connector sites appear on objects as you move the mouse pointer over them. These points indicate where you can attach a connector line.



When you rearrange objects that are joined with a connector line, the connectors remain attached to the objects and move with the objects. If you move either end of a connector, that end unlocks or detaches from the object. You can then lock it to another connection site on the same object, or you can lock it to another object. Once the connector locks on a connection site, the connector stays connected to the objects, no matter how you move each object.



1 Locked connector

2 Unlocked connector

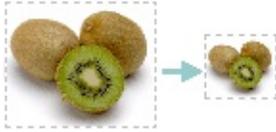
After you rearrange connected objects, some connectors might need to be rerouted to make the most direct connections and keep connectors from crossing objects.

## Changing drawing objects or graphics

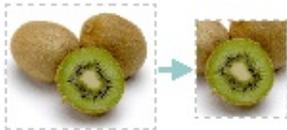
#### [About resizing or cropping an object](#)

There are two ways that you can change the size of a [picture](#)— resizing and cropping.

Resizing changes the dimensions of the picture by stretching or shrinking it.



Cropping reduces the size of the picture by removing the vertical or horizontal edges. Cropping is often used to hide or trim a part of a picture, either for emphasis or to remove unwanted portions.



You can also outcrop, which adds a margin around a picture.

You can always restore a resized or a cropped picture to its original size. If you're certain you won't want to undo your work, then after you crop the picture, use the **Optimize Pictures** feature to delete the cropped parts of the picture from the file completely.

#### [About transparent areas](#)

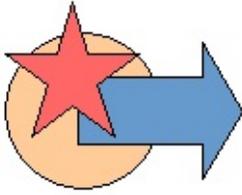
When printed, transparent areas in pictures are the same color as the paper on which they're printed. In an electronic display— such as a Web page — transparent areas are the same color as the background. Metafiles, such as those with shapes, usually have transparent areas.

Although you cannot change the transparency of an [animated GIF](#) picture by using the **Picture toolbar**, you can make these changes in an animated GIF editing program, and then insert the file.

#### [About stacking objects](#)

[Objects](#) automatically stack in individual layers as you add them. You see the stacking order when objects overlap— the top object covers a portion of objects

beneath it.



You can move individual objects or [groups](#) of objects in a stack. For example, you can move objects up or down within a stack one layer at a time, or you can move them to the top or bottom of a stack in one move. You can overlap objects when you draw to create different effects.

[About grouping and ungrouping objects](#)

When you group [objects](#), you combine them so you can work with them as though they were a single object. You can flip, rotate, and resize or scale all objects in a group as a single unit. You can also change the [attributes](#) of all objects in a group at one time—for example, you might change the fill color or add a shadow to all objects in the group. Or, you can select an item within a group and apply an attribute, without ungrouping. You can also create groups within groups to help you build complex drawings.

You can ungroup a group of objects at any time and then regroup them later.

## Excel applications for graphics

[Using graphics as data markers](#)

You can add graphic objects to embedded charts and chart sheets, and you can also use graphics as data markers.



[Using graphics as hyperlinks](#)

You can make graphics and buttons "hot" by using them as hyperlinks. When

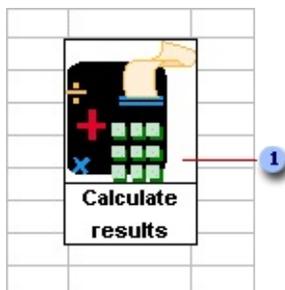
you click the graphic, you go to a specified location in the current document or Web page, to a different Microsoft Excel workbook or Web page, or to a file that was created in a different program. For example, you can insert a graphic that represents your company's stock symbol and then use it as a hyperlink to go to a page that contains your company's current stock prices.

<b>Blue Sky Airlines Stock History</b>			
<a href="#">Click here to go to current stock quote Web page.</a>			
<i>Date</i>	<i>High</i>	<i>Low</i>	
3-Apr	56 3/8	55 1/4	
10-Apr	56	54 1/8	
17-Apr	56 3/8	56	
24-Apr	55 7/8	54 3/4	

### 1 Hyperlinked graphic

 [Using macros with graphics](#)

You can assign a macro—that is, an automated Visual Basic for Applications program—to run when you click a graphic or button. You can even use graphics on worksheets to create an integrated workbook interface for your automated program. For example, you can create a graphic that represents a calculator and assign a macro to it that finds and displays the current monthly budget for your company.



### 1 Graphic assigned a macro

 [Creating pictures of cells, charts, and other objects](#)

You can create pictures of worksheet data, charts, and other objects and use them as illustrations on a worksheet or in a document created in another program. You can resize, move, and change a picture as you can any drawing object.

You can also create a linked picture of worksheet data so that the picture can be updated when the source data changes.

[Show All](#)

# Graphics file types Excel can use

You can insert many popular graphics file formats into your workbook either directly or with the use of separate graphics filters. You don't need a separate graphics filter installed to insert the following graphics file formats: Enhanced [Metafile \(.emf\)](#), Joint Photographic Experts Group (.jpg), [Portable Network Graphics \(.png\)](#), Microsoft Windows [Bitmap \(.bmp, .rle, .dib\)](#), [Graphics Interchange Format \(.gif\)](#), and Windows Metafile (.wmf) graphics. However, you do need a graphics filter installed to insert all other graphics file formats in this list. If you didn't install the filter you need when you installed Microsoft Excel on your computer, you can add the graphics filter.

**Note** Filters for the following graphics file formats are available only if you installed Microsoft Office: Computer Graphics Metafile (.cgm), Enhanced Metafile (.emf), Kodak Photo CD (.pcd), Windows Bitmap (.bmp, .rle, .dib), Windows Metafile (.wmf), and WordPerfect Graphics (.wpg).

## [Computer Graphics Metafile graphics filter](#)

The Computer Graphics Metafile graphics filter (Cgmimp32.flt) supports Version 1 of CGM 1992. The filter handles all three encodings and interprets and supports all elements, and will correctly handle all valid .cgm graphics files.

The major industry profiles of ATA (Air Transport Association) and CALS (Continuous Acquisition and Life Cycle Support) are fully supported by the Computer Graphics Metafile filter. The filter has been certified as ATA-compliant and CALS-compliant by testing administered by the National Institute of Standards and Technology (NIST).

If you install the filter during Setup, the following files are installed: Cgmimp32.flt, Cgmimp32.fnt, Cgmimp32.cfg, and Cgmimp32.hlp.

This filter has the following limitation: CGM 1992 Versions 2, 3, and 4 are not supported.

## [CorelDRAW graphics filter](#)

The CorelDRAW graphics filter (Cdrimp32.flt) supports .cdr, .cdt, .cmx, and .pat files from CorelDRAW 3.0 through 9.0.

This filter has the following limitations:

- Object and PostScript texture fills are replaced with solid gray fills.
- Gradient fills are split into monocolored stripes.
- There is no support for:
  - CorelDRAW preferences, such as page size and orientation, units, grid, and guidelines.
  - Lenses and powerclips.
  - Pages, layers, and groups.
  - OLE objects.
  - Rotated bitmaps.
  - Vector fills.
  - Multiarea paragraph text.



#### [Encapsulated PostScript \(.eps\) graphics filter](#)

The Encapsulated PostScript (EPS) graphics filter (Epsimp32.flt) supports the Adobe Systems Encapsulated PostScript Specification versions 3.0 and earlier. The filter supports .eps images from [Tagged Image File Format \(TIFF\)](#) and Windows Metafile (.wmf) embedded previews.

If an EPS graphics file contains an embedded TIFF or Windows Metafile preview, a representation of the image appears on the screen. The quality of the preview depends on the resolution of the TIFF or Windows Metafile image embedded in the EPS file when it is created. Low, medium, and high resolutions are generally available for creating an EPS file. The higher the resolution of the preview image, the larger the EPS file size will be. Because such previews are intended primarily to be used to position images on the page, resolution is often low. A high-resolution preview is not necessary because it is discarded when the EPS file is printed to a PostScript printer.

If an embedded TIFF or Windows Metafile preview is not included in the EPS graphic you import, the graphic displays a message instead of a preview of the graphic in your workbook. However, the graphic prints correctly to a PostScript printer. If you print an EPS graphic to a non-PostScript printer, the preview image is printed as it appears on the screen.

EPS graphics are designed to be printed on a PostScript printer.

### [Enhanced Metafile \(.emf\)](#)

The Enhanced Metafile graphics filter (Emfimp32.flt) converts Enhanced Metafiles (.emf) to Windows Metafiles (.wmf). You must have the Enhanced Metafile filter installed to insert an .emf file into a Microsoft Excel workbook as a Microsoft Clip Gallery object or a Microsoft Photo Editor object. However, to insert an .emf file directly into a Microsoft Excel workbook, you don't need the Windows Metafile filter.

**Note** The Enhanced Metafile graphics filter is available only if you installed Microsoft Office.

### [Graphics Interchange Format \(.gif\) filter](#)

The Graphics Interchange Format filter (Gifimp32.flt) supports file format versions GIF87a (including interlacing) and GIF89a (including interlacing and transparency).

You don't need the GIF filter to import and export GIF files, nor do you need the filter to save a workbook that contains GIF images as a Web page (\*.htm or \*.html). You must have the GIF filter installed to import and export GIF images to the Microsoft Clip Gallery and to import pictures into Microsoft Photo Editor. You also need to have the GIF filter installed to export a single chart to a GIF file by using Microsoft Visual Basic for Applications.

You don't need the GIF filter to insert animated GIF images into Excel workbooks. When you save a workbook that contains an animated GIF image as a Web page, the animation is preserved. You cannot perform certain editing operations—such as cropping or changing the fill, border, or shadow—on an animated GIF image. Make these changes in an animated GIF editing program, and then insert the file again.

The GIF filter imports only the first image of a multi-image GIF file.

### [JPEG File Interchange Format file](#)

The Joint Photographic Experts Group (JPEG) graphics filter (Jpegim32.flt)

supports Version 6.0 of the JPEG File Interchange Format (JFIF). The filter supports cyan-magenta-yellow-black (CMYK) JPEG files. You must have the JPEG filter installed to insert a JPEG file into a Microsoft Excel workbook as a Microsoft Clip Gallery object or a Microsoft Photo Editor object. The JPEG filter is also used to export a single chart to a JPEG file by using Microsoft Visual Basic for Applications. However, to insert a JPEG file directly into a Microsoft Excel workbook, you don't need the JPEG filter.

The filter does not support JPEG Tagged Interchange Format (JTIF) files.

#### [Macintosh PICT \(.pct\) graphics filter](#)

The Macintosh PICT graphics filter (Pictim32.flt) is used to import Macintosh PICT graphics. Rename your Macintosh PICT files with the .pct extension when you copy them to a computer that uses Microsoft Windows so that Microsoft Office for Windows can recognize the files as PICT graphics. For example, if you have a graphics file named Bear on the Macintosh, you should rename the file to Bear.pct before you insert the file into a file for Windows.

#### [Tagged Image File Format \(TIFF\) graphics filter](#)

The [Tagged Image File Format \(TIFF\)](#) graphics filter (Tiffim32.flt) supports all image types and compressions that conform to TIFF Specification Revision 5.0 and 6.0, Part1: Baseline TIFF. These types include monochrome, grayscale, palette color, and RGB Full Color images. The filter handles a single 8-bit alpha channel stored with an RGB Full Color image. The TIFF filter also supports the TIFF Extension for CMYK images.

Only the first image of a TIFF file with multiple images (sub files) is imported.

#### [Windows Bitmap \(.bmp, .rle, .dib\) files](#)

The Windows Bitmap graphics filter (Bmpimp32.flt) supports Windows and OS/2 bitmaps, Run Length Encoded (RLE) bitmaps, and device-independent bitmaps (DIB). You must have the Windows Bitmap filter installed to insert a bitmap file into a Microsoft Excel workbook as a Microsoft Clip Gallery object or a Photo Editor object. However, to insert a bitmap file directly into a Microsoft Excel workbook, you don't need the Windows Bitmap filter.

**Note** The Windows Bitmap graphics filter is available only if you installed Microsoft Office.

### [Windows Metafile \(.wmf\)](#)

The Windows Metafile graphics filter (Wmfimp32.flt) supports the Windows Metafile format. You must have the Windows Metafile filter installed to insert a Windows Metafile into a Microsoft Excel workbook as a Microsoft Clip Gallery object. However, to insert a Windows Metafile directly into a Microsoft Excel workbook, you don't need the Windows Metafile filter.

**Note** The Windows Metafile graphics filter is available only if you installed Microsoft Office.

### [WordPerfect Graphics \(.wpg\) import filter](#)

The WordPerfect Graphics import filter (Wpgimp32.flt) supports WordPerfect Graphics Versions 1.0, 1.0e, and 2.0, which correspond to WordPerfect Version 6.x and earlier. For .wpg images created in DrawPerfect, the picture frame size is the size of the screen.

This filter has the following limitations:

- PostScript information is lost in Encapsulated PostScript images embedded in WordPerfect Graphics files.
- WordPerfect Graphics files with large, embedded bitmaps might not appear properly on computers that use the Mach series video drivers from ATI. If you think you have this problem, try running Microsoft Windows Setup and changing your video driver to the 8514/a drivers supplied with Windows.

### [Hanako \(.jsh, .jah, and .jbh\) graphics filters](#)

The Hanako graphics filter is used for the Japanese language version of Microsoft Office 2000.

The Hanako graphics filter (Jshimp.flt, Jahimp.flt, and Jbhimp.flt) supports and converts .jsh, .jah, and .jbh files from Hanako 2.0 and 3.0 to the Microsoft Windows Metafile format.

The filter has the following limitations:

- Image data will be deleted when the files are opened.
- Files with large amounts of data might take time to convert, or might not convert. If this occurs, delete any unnecessary data or objects, or resave the file as multiple files, and then try reopening the files.
- Complex text formatting or image properties that can't be expressed in the Windows Metafile format will be deleted or simplified when the file is opened. This might affect the alignment of text or images.

 [Other graphics filters](#)

From the Microsoft Office Web site, you can download other graphics filters that allow you to insert many popular graphics file formats into your documents. For more information, see the Microsoft Office Web site.

You can also go to the Microsoft Office Web site at any time by clicking **Microsoft Office Online** on the **Help** menu.

# Show or hide the Drawing toolbar

- Click **Drawing** .

[Show All](#)

# Troubleshoot drawing objects and pictures

## Importing

 [A graphic won't import.](#)

You might not have the correct graphics filter installed in the correct folder, or the filter might be corrupted. Graphics filters are stored as files under C:\Program Files\Common Files\Microsoft Shared\Grphflt folder. Browse to this folder and rename the appropriate filter file with the .flt extension. Then perform a Detect and Repair installation of Microsoft Office.

 [How?](#)

1. On the **Help** menu, click **Detect and Repair**.

To restore the program shortcuts to the Windows **Start** menu, make sure the **Restore my shortcuts while repairing** check box is selected.

2. Click **Start**.

## Notes

- This feature is not available for Office applications earlier than Office 2000.
- This procedure detects and repairs problems such as missing files and registry settings associated with all installed Microsoft Office programs. It will not repair personal files, such as spreadsheets or documents.
- If the **Detect and Repair** command does not fix the problem, you might need to reinstall Microsoft Office.

## Appearance

[The lines in my drawing are jagged.](#)

Try the following:

- Curved lines, and straight lines that are not absolutely vertical or horizontal, will have some degree of jaggedness on the screen. The curves will appear smooth on the printed page.
- **Curve**  and **Freeform**  give your drawing a smoother look than **Scribble** .

Click **AutoShapes** on the **Drawing toolbar**, click **Lines** , and then click **Curve**  or **Freeform** .

- To view your drawing in more detail, increase the magnification in **Zoom**  to 200 percent.
- To have greater control when you draw, change your mouse setting to the slowest tracking speed in Microsoft Windows **Control Panel**.
- Adjust the shape of freeforms to make them look smoother.
  1. Increase the magnification in **Zoom**  to 200 percent.
  2. Click the shape, click **Edit Points** on the **Draw** menu, and then drag any vertex.
- You can smooth freeforms by removing individual vertexes.

Click the shape, click **Edit Points** on the **Draw** menu, point to the vertex you want to delete, and then press CTRL as you click the vertex.

[I can't resize an object.](#)

Either the **Resize object to fit text** option or the **Lock aspect ratio** option is selected. Select the object and then do one of the following:

- On the **Format** menu, click **AutoShape** or **Text Box**, and then click the **Text Box** tab. Clear the **Resize AutoShape to fit text** check box.
- On the **Format** menu, click the command for the type of object you selected— for example, **AutoShape** or **Picture**. Click the **Size** tab, and then

clear the **Lock aspect ratio** check box.

[Colors within objects aren't smooth.](#)

If your monitor is capable of showing only 16 colors, colors might not appear smooth. Objects are displayed best on monitors that have more than 256 colors.

[I can't make an area transparent.](#)

It might be difficult to see the transparent effect in a photograph or picture; the color you select might appear in a very small area. What might appear to be a single color, such as blue sky, can actually be a range of subtle color variations.

[Text in a drawing object doesn't rotate or flip.](#)

In Microsoft Excel, text that is attached to an [AutoShape](#) will move with the shape, but it will not rotate or flip— for example, appear at an angle or upside-down— when you rotate or flip the shape. To change the position of text within a shape, click the border of the shape, click **AutoShape** on the **Format** menu, and then select the options you want on the **Alignment** and **Margins** tabs.

## Aligning and arranging

[Freeforms I drew won't align evenly.](#)

- Instead of using the **Align or Distribute** (**Drawing** toolbar, **Draw** menu) command, try aligning the objects by moving them.
- Hold down CTRL and press the ARROW keys to nudge the freeform in 1-pixel increments.
- If **Snap to Grid** (**Drawing** toolbar, **Draw** menu) is selected, temporarily turn it off by pressing ALT as you drag a freeform.

[I aligned my drawing objects, and they are stacked on top of each other.](#)

Depending on the alignment option you click, objects will move straight up, down, left, or right and might cover an object already there. You can undo the alignment with the **Undo** command (**Edit** menu) and move the drawing objects to new positions before you align them.

[Items on the \*\*Align or Distribute\*\* menu are dimmed, and I can't select them.](#)

You must select at least two drawing objects to make the alignment options available and at least three objects to make the distribution options available.

[I can't rotate a graphic.](#)

Only drawing objects can be flipped or rotated. If you can convert an object to a drawing object by ungrouping it and then grouping it again, you can flip or rotate it. You can't convert a [bitmap](#) to a drawing object.

- To convert an object, select it, click **Ungroup** on the **Draw** menu (**Drawing toolbar**), and then click **Group**.
- If you can't convert the object, open it in another drawing program, rotate it there, and then save it. When you reopen it in Microsoft Excel, it will appear rotated.

# Drawing

 [Freehand drawing is hard to control.](#)

- Try increasing the magnification in the **Zoom** box. It's easier to draw details at 200 percent.
- Use the **Freeform** tool  instead of the **Scribble** tool .
- Try setting your mouse to the slowest tracking speed available in the Windows Control Panel. You have greater control when you draw at a slow speed.
- You can adjust the shape of freeforms to make them look smoother.

## Editing

[I can't change the color of some parts of a picture.](#)

- If the image is a drawn picture ([vector-based](#)), select the picture and then click **Recolor Picture**  on the **Picture** toolbar.
- If the picture is [clip art](#), try ungrouping the image, and then use the drawing tools to change the colors.

[I can't ungroup an imported picture.](#)

The image is a [bitmap](#), which can't be ungrouped and converted to an [object](#).

You can modify the image in an imaging program, and then insert it into your work.

[I can't change an animated GIF picture.](#)

You cannot crop or change the fill, border, shadow, or transparency of an animated GIF picture by using the **Picture** or **Drawing** toolbar or the **Format Picture** dialog box. Make these changes in an animated GIF editing program, and then insert the file again.

## Moving and selecting

[The \*\*AutoShape\*\*, \*\*Text Box\*\*, \*\*Picture\*\*, \*\*WordArt\*\*, or \*\*Object\*\* command isn't on the \*\*Format\*\* menu.](#)

The **AutoShape**, **Text Box**, **Picture**, **WordArt**, or **Object** command is available only if you've first selected the drawing object, text box, imported graphic, text effect, [picture](#), or other object you want to format.

[I ungrouped a group of drawing objects and can't regroup them.](#)

If you are working with multiple groups of drawing objects, make sure to select a drawing object in the group that you want to regroup. If you close Microsoft Excel and later want to regroup the objects, select the objects by holding down SHIFT as you click each object, and then click **Group** on the **Draw** menu (**Drawing toolbar**).

[When I click a drawing object or graphic to move or edit it, a macro runs.](#)

A macro has been assigned to run when you click the drawing object or graphic. To select the object without running the macro, do one of the following:

- Right-click the object to select it and display a shortcut menu.
- On the **Drawing toolbar**, click **Select Objects** , and then drag around the object to select it.

[When I try to move a drawing object, it resizes.](#)

- To move an [AutoShape](#) that does not have text attached to it, drag the body or border of the shape, but not a [sizing handle](#) or the [adjustment handle](#). If the AutoShape has text attached to it, or if it has no fill (for example, shows only the outline of the shape), drag its border. If you click the body of a shape that has attached text, you select the text.
- To resize a selected AutoShape, drag one of the sizing handles or the adjustment handle. If you drag the center or the border of the shape, you will either select text in the shape or move the shape instead of resizing it.

 [I added a drawing object or graphic to my embedded chart, but it doesn't move when I move the chart.](#)

You must select the [embedded chart](#) before you add a shape or graphic. Otherwise, the shape or graphic is added to the worksheet instead of the chart. Click the embedded chart first, click the command you want to use on the **Drawing toolbar**, and then click the chart.

 [Drawing objects and imported graphics aren't sorted with the underlying cells.](#)

**Size and placement** The objects can be no taller than the row or no wider than the column you want to sort. For example, if you want to reorder rows of cells, objects can be no taller than a single row. If you want to reorder columns left to right, objects can be no wider than a single column. If necessary, adjust the row height or column width before you sort the data.

When you select the range of cells to sort, make sure you include all parts of the objects in the selection. For example, if an object extends into a blank row or column outside the filled-in cells you want to sort, include the blank row or column in the selection.

**Settings** The objects' settings may have been changed so that the objects do not move with cells. To set objects so that they can be sorted with cells, click **Select Objects**  on the **Drawing toolbar**, and then drag around the objects you want to change. Click **AutoShape**, **Picture**, **Text Box**, **WordArt**, **Control**, or **Object** on the **Format** menu, and then click **Move but don't size with cells** on the **Properties** tab.

# Printing

 [I can't print AutoShapes or objects copied or imported from other programs.](#)

1. Right-click the object you want to print.

If an AutoShape has text attached to it, or if it has no fill (for example, shows only the outline of the shape), right-click its border.

2. On the [shortcut menu](#), click **Format *object type***, and then click the **Properties** tab.
3. Select the **Print object** check box.

**Note** If the object you want to print is an [ActiveX control](#), you must display the **Control Toolbox** and change the control properties in design mode.

[Show All](#)

# Create a picture from cells, a chart, or an object

1. Clear cell gridlines if you do not want them displayed in your picture.

 [How?](#)

- Click **Options** on the **Tools** menu, click the **View** tab, and then clear the **Gridlines** check box.
2. On the worksheet or chart sheet, select the cells or click the chart or object you want to copy as a picture.
  3. Hold down SHIFT and click **Copy Picture** on the **Edit** menu.
  4. For the best picture quality, make sure **As shown on screen** and **Picture** are selected, and then click **OK**.

**Note** To preserve picture quality, an item copied using the **As shown on screen** and **Picture** options is pasted at 100% of its original size. For example, if you scale a worksheet at 75%, an item copied from it may appear larger when pasted because it is pasted at actual size. The display of some items in charts— such as vertical as opposed to angled axis text — may also be affected.

5. Click the worksheet or other document where you want to paste the picture.
6. Click **Paste** .

You can use the **Picture toolbar** to change the image.

 [Tip](#)

To paste information you've copied from another program as a picture in Microsoft Excel, hold down SHIFT and click **Paste Picture** or **Paste Picture Link** on the **Edit** menu.

[Show All](#)

# Delete a picture or shape

1. Select the [AutoShape](#) or graphic object you want to delete.
2. Press DELETE.

# Display or hide drawing objects or pictures

Hide drawing objects and graphics if you want to speed up printing or scrolling on the screen.

1. On the **Tools** menu, click **Options**, and then click the **View** tab.
2. To display or hide the drawing objects and graphics, under **Objects** click **Show all** or **Hide All**.

**Note** To print only the objects on your worksheet, you can click **Show placeholders**.

[Show All](#)

# Add or format an object border

## [Add a border to an object](#)

1. Select the object you want to add a border to.
2. To add a border, do one of the following:
  - To add a solid border, click **Line Style**  on the **Drawing toolbar**, and then click the style you want.
  - To add a dashed line border, click **Dash Style**  and then click the style you want.

## [Format an object border](#)

1. Select the [object](#) you want to change.
2. Do one of the following:

### [Change the color of an object border](#)

1. On the **Drawing toolbar**, click the arrow next to **Line Color** .
2. Do one of the following:
  - To change to the default color, click **Automatic**.
  - To change to another color, click one of the colors below **Automatic**.
  - To change to a color that isn't displayed, click **More Line Colors**. Click the color you want on the **Standard** tab, or click the **Custom** tab to mix your own color, and then click **OK**.

### [Change the style of an object border](#)

1. On the **Drawing toolbar**, click **Line Style** .
2. Click the style you want; or click **More Lines**, and then click a style.

[Show All](#)

# Add, change, or remove a fill

You can use the **Fill Color** tool to add a fill to any picture except an [animated GIF](#) picture. Make these changes in an animated GIF editing program, and then insert the picture file again.

1. Select the [picture](#), [AutoShape](#), [text box](#), or [WordArt](#) you want to change.
2. On the **Drawing toolbar**, click the arrow next to **Fill Color** .
3. Do one or more of the following:

[Add or change a fill color](#)

Do one of the following:

- To change the fill color, click one of the colors.
- To change to a color that isn't in the color scheme, click **More Fill Colors**. On the **Standard** tab, click the color you want, or click the **Custom** tab to mix your own color.

[Add or change a gradient, patterned, textured, or picture fill](#)

1. Click **Fill Effects**, and then click the **Gradient**, **Texture**, **Picture** or **Pattern** tab.
2. Select the options you want.

[Remove a fill](#)

Click **No Fill**.

[Show All](#)

# Change font in a shape or text box

1. Select the text in the [AutoShape](#) or text box with the font you want to change.
2. If you selected an AutoShape, click **AutoShape** on the **Format** menu.

If you selected a text box, click **Text Box** on the **Format** menu.

3. Select the options you want on the **Font** tab.

[Show All](#)

# Change the color of a shadow

1. Select the object you want to change.
2. On the **Drawing** toolbar, click **Shadow Style** , and then click **Shadow Settings**.
3. On the **Shadow Settings** toolbar, click the arrow next to **Shadow Color** .
4. Click the color you want.

If you don't see the color you want, click **More Shadow Colors**. Click a color on the **Standard** tab, or click the **Custom** tab to mix your own color, and then click **OK**.

 **Tip**

To change the shadow color so you can see through it, click **Shadow Color** , and then click **Semitransparent Shadow**.

[Show All](#)

# Change the margins around text in a shape or text box

1. Click the border of the [AutoShape](#) or text box you want to change.
2. If you selected an AutoShape, click **AutoShape** on the **Format** menu, and then click the **Margins** tab.

If you selected a text box, click **Text Box** on the **Format** menu, and then click the **Margins** tab.

3. Under **Internal margin**, adjust the measurements to increase or decrease the distance between the text and the outer border of the object.

[Show All](#)

# Resize a picture or shape

1. Click the [picture](#), [AutoShape](#), [WordArt](#), or [text box](#) you want to resize.
2. Do one of the following:

## [Resize by using the mouse](#)

1. Position the mouse pointer over one of the [handles](#).
2. Do one of the following:

**Increase or decrease the size in one or more directions** Drag the mouse away from or toward the center.

**Keep the center of an object in the same place** Hold down CTRL while dragging the mouse.

**Maintain the object's proportions** Hold down SHIFT while dragging the mouse.

**Maintain the proportions while keeping the center in the same place** Hold down CTRL and SHIFT while dragging the mouse.

3. Release the mouse, and then release CTRL or SHIFT.

## [Resize by entering measurements](#)

1. Click **Format**, click the command for the type of object you selected, and then click the **Size** tab.
2. Enter measurements for the height and width of the object or click the up or down arrow keys to move the height and width.
3. To maintain the object's proportions, select the **Lock aspect ratio** check box.

**Note** You can reset the original height and width at any time by clicking **Reset**.

[Show All](#)

# Restore a picture to its original size

1. Select the [picture](#) you want to restore.
2. On the **Format** menu, click **Picture**, and then click the **Size** tab.
3. Click **Reset**.



To restore size and formatting options for a picture, select the picture, and then click **Reset Picture**  on the **Picture** [toolbar](#).

[Show All](#)

# Resize a shape or text box to fit its text

1. Click the border of the [AutoShape](#) or text box you want to resize.
2. If you selected an AutoShape or a text box, click **AutoShape** or **Text Box** on the **Format** menu, and then click the **Alignment** tab.
3. Select the **Automatic size** check box.

**Note** If you later change the size of the AutoShape or text box, you must fit the AutoShape or text box to the text again by selecting the **Automatic size** check box.

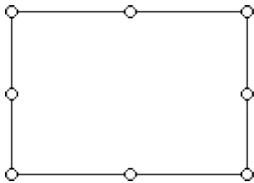
[Show All](#)

# Symbols for drawing object manipulation

Symbols are used to indicate the state of a drawing object and how it can be manipulated. Not all drawing objects can be manipulated or changed in the same way, so not all drawing objects use every symbol.

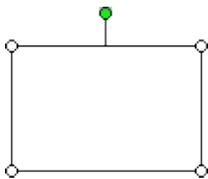
## Sizing handles

These appear on a drawing object when it is selected. When you drag these handles, the size of the object is reduced or enlarged.



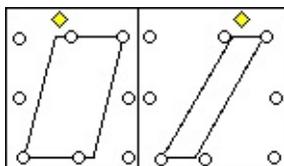
## Rotate handle

A green rotate handle appears when you select an object. You can then rotate the object by dragging the handle.



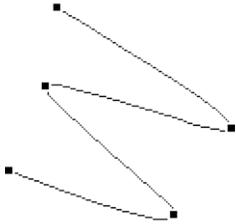
## Adjustment handle

A yellow adjustment handle on [AutoShapes](#) that allows shape manipulation. In the illustration, the handle was dragged toward the middle of the shape to make the shape thinner.



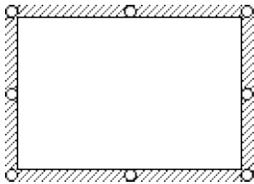
## Vertex

These are black squares that appear at the ends and intersections of lines or curves in selected curves and freeform drawing objects when you click **Edit Points** on the **Draw** menu. You can drag them to change the shape of the object.



## Hatched border

When a text box is surrounded by a hatched border, you can enter, delete, select, and format the text inside.



## Dotted border

When a text box is surrounded by a dotted border, you can format the text box itself. To get the dotted border, click the hatched border.



[Show All](#)

# Add text to a shape or text box

[Add text to a shape](#)

[Add text that moves with the shape](#)

Select any [AutoShape](#) and start typing. New text is added to the end of any existing text within the shape.

**Note** You cannot add text to a line, connector, or [freeform](#) this way; use a [text box](#) to place text near or on these drawing objects.

[Add text that is independent of the shape](#)

1. On the **Drawing toolbar**, click **Text Box** .
2. Click near or on the [AutoShape](#) where you want to add the text, and start typing.
3. Size the text box by dragging the [sizing handles](#).

**Note** The [text box](#) will not move when you move the shape.

[Add text to a text box](#)

1. On the **Drawing toolbar**, click **Text Box** .
2. Do one of the following:
  - To add text that stays on one line (doesn't wrap), click where you want to add the text, and then start typing.
  - To add text that wraps, drag to create a box the size you want, and then start typing.

[Tip](#)

The text box must have a fill for you to see the new shape. To change the shape of a [text box](#) to any [AutoShape](#), select the text box, click **Draw** on the **Drawing**

toolbar, point to **Change AutoShape**, point to a category, and then click the shape you want.

[Show All](#)

# Display cell contents in a shape or text box

1. Click the [AutoShape](#) or text box you want to link.
2. In the [formula bar](#), type an equal sign (=).
3. Click the worksheet cell that contains the data or text you want to link to.

You can also type the reference to the worksheet cell. Include the sheet name, followed by an exclamation point, for example:

**Sheet1!F2**

4. Press ENTER.

**Note** You cannot use this procedure in a freeform, scribble, line, or connector.

[Show All](#)

# Align objects

## [Align objects by their edges](#)

Aligning [objects](#) may cause them to stack on top of each other. Make sure objects are positioned relative to one another the way you want before executing the command.

1. Select the objects you want to align.

To select multiple objects, hold down shift while you click each object.

2. On the **Drawing toolbar**, click **Draw**, point to **Align or Distribute**, and then click one of the following options:
  - **Align Top** 
  - **Align Bottom** 
  - **Align Left** 
  - **Align Right** 

## [Align objects horizontally or vertically](#)

The **Align Middle** command aligns [objects](#) horizontally through the middle of the objects. The **Align Center** command aligns objects vertically through the centers of the objects.

1. Select the objects you want to align.
2. On the **Drawing toolbar**, click **Draw**, point to **Align or Distribute**, and then click **Align Middle**  or **Align Center** .

## [Align objects with cells](#)

1. On the **Drawing toolbar**, click **Draw**, and then point to **Snap**.
2. To automatically align objects with the cell grid when you move or draw them, click **To Grid**.

To automatically align objects with the vertical and horizontal edges of

other shapes when you move or draw them, click **To Shape**.



Tip

You can also snap the object to the cell grid by holding down ALT while you move, draw, or resize a drawing object.

[Show All](#)

# Group, ungroup, or regroup objects

Do one of the following:

## [Group objects](#)

1. Select the objects you want to group.

To select multiple objects, hold down SHIFT while you select each object.

2. On the **Drawing toolbar**, click **Draw**, and then click **Group**.

## [Ungroup objects](#)

1. Select the group you want to ungroup.
2. On the **Drawing toolbar**, click **Draw**, and then click **Ungroup**.

To continue ungrouping, click **Yes** when the message box appears.

To change an individual object, continue to select and ungroup objects until the one you want becomes available.

3. Use the tools on the **Drawing toolbar** to change the object.

## [Regroup objects](#)

1. Select any one of the objects that was previously grouped.
2. On the **Drawing toolbar**, click **Draw**, and then click **Regroup**.

**Note** After you have grouped [objects](#), you can still select any single object within the [group](#) by first selecting the group. Then, click the object you want to select.

[Show All](#)

# Move a text box

- Click, hold, and drag the text box border.

Make sure to drag the border and not one of the [sizing handles](#). If you drag a sizing handle, the text box will change shape but stay in the same place on the sheet.

[Show All](#)

# Move an object in increments

1. Select the object you want to move.
2. On the **Drawing toolbar**, click **Draw**, point to **Nudge**, and then click the direction you want to move the object.

On a worksheet, you can also move an object by selecting it and pressing the arrow keys. Press CTRL and the arrow keys to move it in single [pixel](#) increments.

**Note** You cannot move an object in a chart with the arrow keys.

[Show All](#)

# Prevent objects from moving and sizing with cells

1. Select the object, [multiple selection](#), or [group](#) you want to change.

On an [embedded chart](#), select the [chart area](#) by clicking the blank area between the border of the chart and the [plot area](#).

2. On the **Format** menu, click the command for the type of object you selected, for example **Object** or **Selected Chart Area**, and then click the **Properties** tab.
3. Under **Object Positioning**, select an option to **Move but don't size with cells** or **Don't move or size with cells**.

[Show All](#)

# Insert a picture from a file

1. Click the worksheet where you want to insert the picture.
2. On the **Drawing toolbar**, click **Insert Picture From File** .
3. In the **Insert Picture** dialog box, locate the folder that contains the picture that you want to insert, and then click the picture file.
4. Click **Insert** to embed the picture in the worksheet.

[Show All](#)

# Insert a scanned or digital picture

To complete this procedure, your device (a scanner or digital camera) must be connected to your computer and be [TWAIN](#)-compatible. Make sure the device you have installed supports TWAIN by checking the device documentation or contacting the manufacturer.

1. Open the worksheet in which you want to insert the picture.
2. If you're using a scanner, set up the picture in the scanning device.
3. In Microsoft Excel, point to **Picture** on the **Insert** menu, and then click **From Scanner or Camera**.
4. If you have more than one device connected to your computer, under **Device**, click the device you want to use.
5. If you're using a scanner, choose one of the following:
  - Click **Web Quality** to use a lower resolution or if you intend for your document to be viewed on screen.
  - Click **Print Quality** to use a higher resolution or if you intend for your document to be printed.
6. Do one of the following:
  - Click **Insert** if you're using a scanner and you want to use predefined settings to scan your picture.
  - Click **Custom Insert** if you're using a scanner and you want to change the image settings, or if you're using a camera. Then follow the instructions that came with the device you're using.

**Note** The **Insert** button might be unavailable when using some scanners because the scanner software doesn't support automatic scanning. If so, you can use the **Custom Insert** button instead.

7. Use the options to select the image and transfer it to your worksheet.

After the image is transferred to the worksheet, you can use the tools on the

**Picture [toolbar](#)** to make changes such as cropping the picture, and adjusting its brightness, contrast, and color.

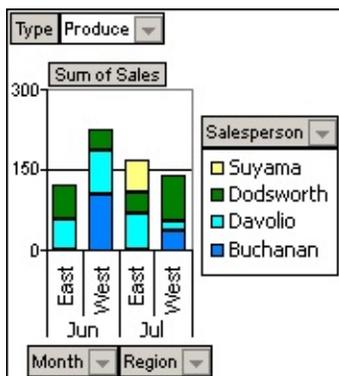
[Show All](#)

# About PivotChart reports

A PivotChart report provides a graphical representation of the data in a [PivotTable report](#). You can change the layout and data displayed in a PivotChart report just as you can in a PivotTable report.

	A	B	C	D
1	Type	Produce		
2				
3	Sales		Salesperson	
4	Month	Region	Buchanan	Davolio
5	Jun	East		5720
6		West	10201	8375
7	Jun Total		10201	14095
8	Jul	East		6879
9		West	3435	1861
10	Jul Total		3435	8740

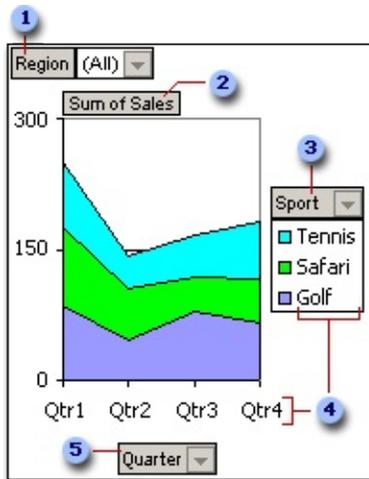
A PivotTable report of sales data



A PivotChart report of the same data

[PivotChart terminology](#)

PivotChart reports have some specialized elements in addition to the [series](#), categories, [data markers](#), and [axes](#) of regular Microsoft Excel charts.



- 1 Page field
- 2 Data field
- 3 Series field
- 4 Items
- 5 Category field

**Page field** A field that you use to filter data by specific items. In the example, the Region page field displays data for all regions. To display data for a single region, you can click the drop-down arrow next to **(All)** and select the region.

**Data field** A field from the underlying [source data](#) that provides values to compare or measure. In the example, Sum of Sales is a data field that summarizes quarterly sales in each region for each sport. The first category data marker (Qtr1) reaches nearly 250 on the value (y) axis. This amount is the sum of Tennis, Safari, and Golf sales in the first quarter. Depending on the source data you use for the report, you can change the [summary function](#) to Average, Count, Product, or another calculation.

**Series field** A field that you assign to a series orientation in a PivotChart report. The items in the field provide the individual data series. In the example, Sport is a series field with three items: Tennis, Safari, and Golf.

**Item** Items represent the unique entries in a field, and appear in the drop-down lists for page fields, category fields, and series fields. In the example, Qtr1, Qtr2,

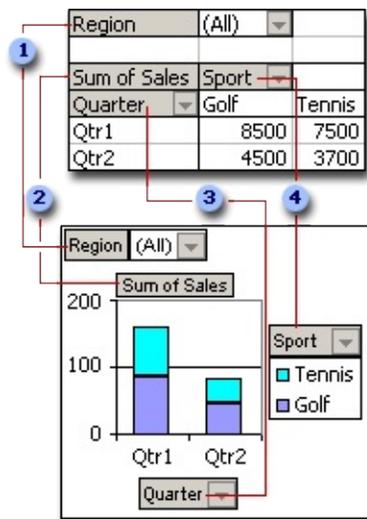
Qtr3, and Qtr4 are items in the Quarter category field, while Tennis, Safari, and Golf are items in the Sport series field.

**Category field** A field from the source data that is assigned to a category orientation in a PivotChart report. A category field provides the individual categories for which data points are charted. In the example, Quarter is a category field.

### [How a PivotChart report represents data](#)

A PivotChart report always has an [associated PivotTable report](#). Both reports have fields that correspond to each other. When you change the position of a field in one report, the corresponding field in the other report also moves.

The following example shows the correspondence between the fields in each type of report:



- 1 Page fields
- 2 Data fields
- 3 Row field, corresponds to category field
- 4 Column field, corresponds to series field

When you create a PivotChart report from a PivotTable report, the layout of the PivotChart report—that is, the position of its fields—is determined initially by

the layout of the PivotTable report. When you create the PivotChart report first, you determine the chart layout by dragging fields from the **PivotTable Field List** window to the [drop areas](#) on the [chart sheet](#). Microsoft Excel automatically creates an associated PivotTable report that uses a corresponding layout.

## [Differences between PivotChart reports and regular, noninteractive charts](#)

With regular charts, you create one chart for each view of the data that you want to see. With PivotChart reports, you can create a single chart and view the data in different ways by changing the report layout or the detail displayed.

If you are familiar with regular charts, you will find that most operations are the same in PivotChart reports. However, there are some differences:

**Chart types** The default chart type for a regular chart is a clustered column chart, which compares values across categories. The default chart type for a PivotChart report is a stacked column chart, which compares the contribution of each value to a total across categories. You can change a PivotChart report to any type except xy (scatter), stock, or bubble.

**Chart location** Regular charts are [embedded](#) on worksheets by default. PivotChart reports are created on [chart sheets](#) by default. Once created, you can relocate a PivotChart report to a worksheet.

**Creating the chart** To create a regular chart in Microsoft Excel, you use the Chart Wizard. To create a PivotChart report, you can use the Chart Wizard, or you can use the PivotTable and PivotChart Wizard if you already have a PivotTable report to serve as the source data for the PivotChart report.

**Source data** Regular charts are linked directly to worksheet cells. PivotChart reports can be based on several different types of data, including Excel [lists](#) and databases, multiple data ranges that you want to consolidate, and external sources, such as Microsoft Access databases and [OLAP](#) databases.

**Chart elements** PivotChart reports contain the same elements as regular charts but also contain fields and items that can be added to, rotated, or removed to display different views of your data. Categories, series, and data in regular charts are category fields, series fields, and data fields in PivotChart reports. PivotChart reports can also contain page fields. Each of these fields contains items, which in

regular charts are displayed as category labels or series names in [legends](#). You can hide the [field buttons](#) and [drop area](#) outlines for printing or publishing to the Web.

**Formatting** Some types of formatting are lost after you change the layout or [refresh](#) a PivotChart report. These types of formatting include [trendlines](#) and [error bars](#), changes to [data labels](#), and changes to data series. Regular charts do not lose this formatting once applied.

**Moving or resizing items** In a PivotChart report, you cannot move or resize the [plot area](#), legend, chart titles, or axis titles, though you can select one of several preset positions for the legend and you can change the font size of titles. In a regular chart, you can move and resize all of these elements.

## [Creating a PivotChart report](#)

**Starting with a PivotTable report** Make sure your PivotTable report has at least one [row field](#), to become the category field in the PivotChart report, and a [column field](#) to become the series field. If your PivotTable report is in indented format, move at least one field to the column area before you create the chart.

**Starting from scratch** In the PivotTable and PivotChart Wizard, you specify the type of [source data](#) you want to use, and set options for how the data is used. You then lay out the PivotChart report in a manner similar to a PivotTable report. If your workbook doesn't contain a PivotTable report, Microsoft Excel creates one when you create the PivotChart report. When you change the PivotChart report, its [associated PivotTable report](#) changes, and vice versa.

**Customizing the report** You then change the chart type and other options — such as the [titles](#), the [legend](#) placement, the [data labels](#), the chart location, and so on— by using the Chart Wizard and commands on the **Chart** menu.

**When to use page fields** Using page fields is a convenient way to summarize and quickly focus on a subset of data without having to modify your series and category information. For instance, if you're giving a presentation, you can click **(All)** in the Year page field to show sales for all years, and then focus on specific years by clicking one year at a time. Each page of your chart has the same category and series layout for different years, so the data for each year can be easily compared. Also, by allowing you to retrieve one page at a time from a

large set of data, page fields can conserve memory when your chart uses external source data.

[Show All](#)

# About PivotTable reports

1

	A	B	C
1	<b>Sport</b>	<b>Quarter</b>	<b>Sales</b>
2	Golf	Qtr3	\$1,500
3	Golf	Qtr4	\$2,000
4	Tennis	Qtr3	\$600
5	Tennis	Qtr4	\$1,500
6	Tennis	Qtr3	\$4,070
7	Tennis	Qtr4	\$5,000
8	Golf	Qtr3	\$6,430

2

3

E	F	G
Sum of Sales	Quarter ▼	
Sport ▼	Qtr3	Qtr4
Golf	4 \$7,930	\$2,000
Tennis	\$4,670	\$6,500
Grand Total	\$12,600	\$8,500

4

- 1 Source data
- 2 Source values for Qtr3 Golf summary
- 3 PivotTable report
- 4 Summary of source values in C2 and C8

A PivotTable report is an interactive table that quickly combines and compares large amounts of data. You can rotate its rows and columns to see different summaries of the source data, and you can display the details for areas of interest.

[When should I use a PivotTable report?](#)

Use a PivotTable report when you want to analyze related totals, especially when you have a long list of figures to sum and you want to compare several facts about each figure. In the report illustrated above, you can easily see how the third-quarter golf sales in cell F3 stack up against sales for another sport or quarter, or the total sales. Because a PivotTable report is interactive, you can change the view of the data to see more details or calculate different summaries, such as counts or averages.

## [How does it organize my data?](#)

In a PivotTable report, each column or field in your source data becomes a PivotTable field that summarizes multiple rows of information. In the example above, the Sport column becomes the Sport field, and each record for Golf is summarized in a single Golf item.

A data field, such as Sum of Sales, provides the values to be summarized. Cell F3 in the report above contains the sum of the Sales value from every row in the source data for which the Sport column contains Golf and the Quarter column contains Qtr3.

## [How do I create a PivotTable report?](#)

To create a PivotTable report, you run the PivotTable and PivotChart Wizard. In the wizard, you select the source data you want from your worksheet list or external database. The wizard then provides you with a worksheet area for the report and a list of the available fields. As you drag the fields from the list window to the outlined areas, Microsoft Excel summarizes and calculates the report for you automatically.

If you're using an Office Data Connection to retrieve [external data](#) for your report, you can return the data directly to a PivotTable report, without running the PivotTable and PivotChart Wizard. Office Data Connections are the recommended method of retrieving external data for your reports when you don't need to combine data from more than one [table](#) in the external [database](#) or filter the data to select specific records before creating the report, and for retrieving data from [OLAP](#) databases.

After you create a PivotTable report, you can customize it to focus on the information you want: change the layout, change the format, or drill down to display more detailed data.

[Show All](#)

# PivotTable terminology demystified

## Data

[Source data](#)

Quarter	Region	Sport	Sales
Qtr1	East	Golf	\$5,000
Qtr1	East	Safari	\$9,000
Qtr1	East	Tennis	\$1,500
Qtr2	East	Golf	\$2,000
Qtr2	East	Safari	\$6,000
Qtr2	East	Tennis	\$500
Qtr1	West	Golf	\$3,500
Qtr1	West	Tennis	\$6,000
Qtr2	West	Golf	\$2,500
Qtr2	West	Tennis	\$3,200

Source data for the illustrations in this topic.

The underlying rows or database records that provide the data for a PivotTable report. You can create a PivotTable report from a Microsoft Excel list, an external database, multiple Excel worksheets, or another PivotTable report.

[Field](#)

	A	B	C
1	Region	(All) ▼	
2			
3	Sum of Sales	Quarter ▼	
4	Sport ▼	Qtr1	Qtr2
5	Golf	8,500	4,500

Region, Sum of Sales, Quarter, and Sport are fields.

A category of data that's derived from a field in the source list or database. The Sport field, for example, might come from a column in the source list that's labeled Sport and contains the names of various sports (Golf, Tennis) for which the source list has sales figures.

[Item](#)

	A	B	C
1	Region	(All) ▼	
2			
3	Sum of Sales	Quarter ▼	
4	Sport ▼	Qtr1	Qtr2
5	Golf	8,500	4,500

Golf, Qtr1, Qtr2, and (All) are items.

A subcategory, or member, of a field. Items represent the unique entries from the field in the source data. For example, the item Golf represents all rows of data in the source list for which the Sport field contains the entry Golf.

### [Summary function](#)

The type of calculation used to combine values in a data field. PivotTable reports usually use Sum for data fields that contain numbers and Count for data fields that contain text. You can select additional summary functions such as Average, Min, Max, and Product.

### [Refresh](#)

To update a PivotTable report with the most recent data from the source list or database. For example, if a PivotTable report is based on data from a database, refreshing the report runs the query that retrieves data for the report. For reports based on worksheet data, when you change the worksheet data, you can click a button to refresh the report with the changes.

# Field types

## Row field

	A	B	C
1	Region	(All) ▼	
2			
3	Sum of Sales	Quarter ▼	
4	Sport ▼	Qtr1	Qtr2
5	Golf	8,500	4,500

The blue field is a row field.

A PivotTable report that has more than one row field has one inner row field (Sport, in the example below), the one closest to the data area. Any other row fields are outer row fields (Region, in the example below). Items in the outermost row field are displayed only once, but items in the rest of the row fields are repeated as needed.

	A	B	C
3	Sum of Sales		Quarter ▼
4	Region ▼	Sport ▼	Qtr1
5	East	Golf	5,000
6		Safari	9,000
7		Tennis	1,500
8	East Total		15,500
9	West	Golf	3,500

Region is an outer row field; Sport is an inner row field.

## Column field

	A	B	C
1	Region	(All) ▼	
2			
3	Sum of Sales	Quarter ▼	
4	Sport ▼	Qtr1	Qtr2
5	Golf	8,500	4,500

The blue field is a column field.

## Page field

	A	B	C
1	Region	(All)	▼
2			
3	Sum of Sales	Quarter	▼
4	Sport	Qtr1	Qtr2
5	Golf	8,500	4,500

The blue field is a page field.

Page fields allow you to filter the entire PivotTable report to display data for a single item or all the items.

[Data field](#)

	A	B	C
1	Region	(All)	▼
2			
3	Sum of Sales	Quarter	▼
4	Sport	Qtr1	Qtr2
5	Golf	8,500	4,500

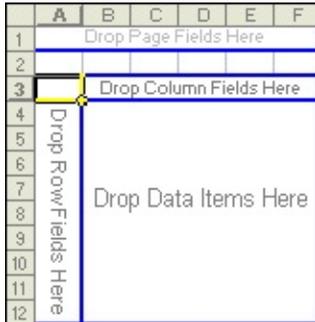
The blue field is a data field.

Data fields provide the data values to be summarized. Usually data fields contain numbers, which are combined with the Sum summary function, but data fields can also contain text, in which case the PivotTable report uses the Count summary function.

If a report has more than one data field, a single field button named Data appears in the report for access to all of the data fields.

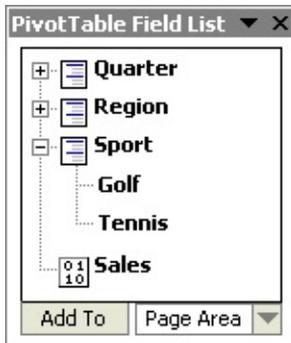
# Layout

 [Drop areas](#)



The blue outlined regions you see when you finish the steps of the PivotTable and PivotChart wizard. To lay out a PivotTable report, you drag fields from the field list window and drop them onto the drop areas.

 [Field list](#)



A window that lists all of the fields available from the source data for use in the PivotTable report. If a field is organized in levels of detail, you can click  or  to show or hide the lower levels. To display the data from a field in the PivotTable report, drag the field from the field list to one of the drop areas.

 [Field drop-down list](#)



A list of the items available for display in a field. If the field is organized in levels of detail, you can click  or  to see which lower-level items are selected for display. A double check mark means that some or all of the lower-level items are displayed.

### Data area

	A	B	C
4	Sport	Qtr1	Qtr2
5	Golf	8,500	4,500
6	Safari	9,000	6,000
7	Tennis	7,500	3,700

The blue cells are in the data area.

The part of a PivotTable report that contains summary data for the row and column fields. For example, cell B5 contains a summary of all of the sales amounts for Golf in Qtr1.

### Indented format

3	Sum of Sales	Quarter	
4	Sport	Qtr1	Qtr2
5	Golf	8,500	4,500
6	Safari	9,000	6,000
7	Tennis	7,500	3,700

### Classic format

3	Quarter	Sport	Sales
4	Qtr1		
5		Golf	8,500
6		Safari	9,000
7		Tennis	7,500
8	Qtr1 Total		25,000
9			
10	Qtr2		
11		Golf	4,500

### Indented format

In a PivotTable report in indented format, the data for each row field is indented. The summarized figures for each data field appear in a single column.

# OLAP terms

## [OLAP](#)

OLAP stands for On-Line Analytical Processing, a way to organize very large business databases. OLAP data is set up to fit the way you analyze and manage data, so that it takes less time and effort to find the information you need.

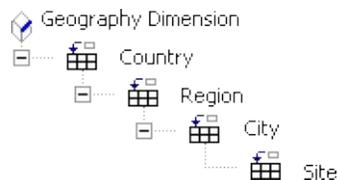
## [Cube](#)

A data structure that contains OLAP data, organized in dimensions and data fields. For example, a cube could provide a Geography dimension with levels Country, Region, and City, and a Product dimension with levels Product Type and Product Name. A Sales Amount data field could then provide sales figures for each product and type in each city, region, and country.

## [Dimension](#)

A field that organizes a single type of data into a hierarchy with levels of detail. For example, an OLAP database could contain a Time dimension providing data for levels Year, Month, Week, and Day, allowing you to create reports that let you compare day-to-day sales results or view a summary of your sales for an entire year.

## [Level](#)



One rung on the ladder of detail for a dimension. For example, the Geography dimension illustrated above has four levels: Country, Region, City, and Site. In a PivotTable report that contains this dimension field, you can display a high-level summary by country, or drill down to view detailed data for specific regions and cities.

## [Property fields](#)

Additional information that's available about the items in an OLAP dimension field. For example, if a Geography dimension has property fields Population and Average Income available, you could create a PivotTable report that displays the sales figures for cities where your products are selling well. By displaying and analyzing the population and income figures for these cities, you could target cities with similar demographics for your marketing campaign.

[Show All](#)

# What's different after you export a PivotTable list from a Web page to Excel

Some of the content in this topic may not be applicable to some languages.

Microsoft Office provides an interactive Web component, called a PivotTable list, that is similar to a Microsoft Excel PivotTable report. For information about preparing a PivotTable list on a Web page for successful export to Excel, click the **Help** button in the PivotTable list. When you export from a Web page to Excel, you may notice differences in the following areas.

## [Command and feature names](#)

**Access to commands** In Excel, you access commands and features from the **PivotTable** toolbar instead of the toolbar in the PivotTable list. Many commands have different names in Excel. To find the Excel command you want, ask the Office Assistant.

**Data fields** Excel PivotTable reports have [data fields](#) instead of total fields.

**Page fields** In PivotTable reports, filter fields are called [page fields](#).

## [Feature differences](#)

**Layouts** A PivotTable list on a Web page can simultaneously display summarized data and underlying detail records. Excel PivotTable reports cannot display both simultaneously, and as a result, some PivotTable list layouts cannot be exported to Excel. However, Excel PivotTable reports allow indented layouts that aren't available for PivotTable lists on the Web.

**Showing and hiding detail** [Items](#) in PivotTable lists on the Web display  to show detail and  to hide detail. In Excel PivotTable reports, you can show and hide detail by double-clicking items, using the field drop-down arrows, or

clicking **Show Detail**  and **Hide Detail**  on the **PivotTable** toolbar.

**Sort order** When you initially bind data to a PivotTable list on a Web page, items in the PivotTable list are displayed in the order in which they are received from the [source data](#). Depending on the type of source data, items may initially be sorted in ascending order in an Excel PivotTable report.

**Filtering** In PivotTable lists on the Web, when you filter the lower levels of items, your filtering remains in effect when these fields aren't displayed. In Excel PivotTable reports, these filter settings aren't retained, but you can refilter the lower levels when you display them.

**Formatting** In a PivotTable list on a Web page, formatting applies only to selected parts of the list, not to cells. You can select and format fields, items, and totals with character and cell formats. In an Excel PivotTable report, you can format cells or selected parts of the report, and you can change what's displayed for errors and empty cells.

**Refresh** PivotTable lists on the Web are always refreshed when you initially open them in the [browser](#). Excel PivotTable reports are usually refreshed only when you click **Refresh Data** , but you can set them to be refreshed when you open the file and at timed intervals.

**Help** Help for PivotTable lists on the Web is provided as a list of topics that you can search. In Excel, the Office Assistant is available to provide help.



[PivotTable list features that Excel does not have](#)

**Displaying detail** In a PivotTable list on a Web page, you can display all of the available source data in [list](#) format, without summarizing any of the data. When data is summarized, the list can show full underlying detail for any item if the detail is available from the source data. In Excel PivotTable reports, you can display the underlying detail, if available from the source data, for only one cell in the data area at a time, and Excel puts this data on a separate worksheet.

**Editing detail data** Excel PivotTable reports do not have this feature. A PivotTable report in Excel can display only data that's present in the underlying source list or database.

**Calculated fields in the detail area** Because an Excel PivotTable report has no equivalent for the detail area of a PivotTable list on the Web, calculated fields located in the detail area aren't exported to Excel.

**Filter by selection** In PivotTable lists on the Web, you can filter the data to match a selected cell. In Excel PivotTable reports, you can filter data only by showing and hiding items.

**Filtering for top and bottom items** Although Excel also has this feature, some top or bottom filters from PivotTable lists on Web pages can't be displayed in Excel.

**Grouping items by text type** Excel doesn't have the ability to group items by text, such as grouping all the items that start with the same letter. Groups of this type aren't displayed in Excel.

**Grouping date items by week** Excel PivotTable reports don't allow items to be grouped by week. Items grouped by week in a PivotTable list on a Web page are displayed in Excel grouped by month.

**OLAP property fields** Excel can display [property fields](#) within a PivotTable report, but does not display them as ScreenTips when you rest the pointer over an item. PivotTable lists have some display and filtering options available through [Web scripts](#) that Excel does not provide, and as a result, some property fields displayed on a Web page don't appear when the PivotTable list is exported to Excel.

**Setting report size** A PivotTable list on a Web page fills a window of a certain size within the Web page. Excel PivotTable reports, contained on an Excel worksheet, use as many cells on the worksheet as are necessary to display the data.

**Hyperlinks** Excel PivotTable reports don't support hyperlinks. Only the text of the hyperlinks from PivotTable lists appears in Excel.

**Charts** If a Web page has both a PivotTable list and an associated chart, you cannot export both the list and the chart to Excel and have them continue to be linked together in Excel. However, you can export the PivotTable list to Excel and then create a new Excel [PivotChart report](#) based on it.

[Show All](#)

# Troubleshoot PivotChart reports

## Creating a report

 [An 'insufficient memory' message appears](#)

### Check the memory use setting

1. Click **OK** in the message dialog box.
2. Create the report again, and in step 3 of the PivotTable and PivotChart Wizard, click **Options**.
3. Select the **Optimize memory** check box.

**Use page fields to save memory** If you still can't create the report, set up one or more of the [page fields](#) to retrieve the data as you select each [item](#).

1. In step 3 of the wizard, click **Layout**.
2. Drag one or more fields to the PAGE area.
3. Double-click each page field.
4. Click **Advanced**.
5. Click **Query external data source as you select each page field item**.

**Simplify the report** The number of fields you can add depends on the amount of memory in your computer and the amount of [source data](#) used for the report. When you want to use a large number of fields, add them as [series fields](#) or page fields. Page fields use the least memory. Series fields use less memory than [category fields](#).

**Base multiple reports for the same data on one report** When you create a PivotChart report, Microsoft Excel creates a storage area in memory for the report. If you plan to create several reports from the same source data, select

**Another PivotTable report or PivotChart report** in step 1 of the wizard so that the reports all use the same storage area.

**Simplify the file** Reduce the number of reports in the workbook.

**Create the report in a separate file** If your report is based on worksheet data, create the report in a different workbook from the workbook that contains the data. That way, the original data and the report do not have to be in memory at the same time. Keep in mind that when you create a PivotChart report, its [associated PivotTable report](#) must be in the same workbook.

[The report I want isn't listed in the PivotTable and PivotChart Wizard](#)

**The wizard only lists PivotTable reports** If you want to base the new report on another PivotChart report, select the [associated PivotTable report](#) for the other PivotChart report. To determine which report that is, click the PivotChart report, click **PivotChart** on the **PivotTable** toolbar, and then click **Options**. The **Name** box contains the name of the associated PivotTable report.

**Check the location of the report** The wizard lists only the PivotTable reports in the workbook where you started the wizard. If the report you want to use as the source is in a different workbook, copy the report into the active workbook.

**Check the page field settings** The PivotTable report you want may have [page fields](#) that are set to query for external data as you select each item. To use a report as the source for another report, its page fields must all be set to retrieve external data for all items at once. Click the source report, double-click each page field, click **Advanced**, and then check the settings under **Page field options**.

[I'm having problems with an OLAP data source](#)

## Creating OLAP cubes

### [Date or time fields have incorrect levels](#)

**Check the date or time field in the source database** If you don't see the [levels](#) you expect in the date or time [dimensions](#) in source data from the OLAP Cube Wizard in Microsoft Query, check the date or time field from the underlying relational database that supplied the data for the cube. The database may store dates and times as text instead of a date or time format that the wizard can recognize. If you suspect this is the case, consult the database administrator for the relational database to verify and correct the date or time format for the field.

**Check the top level of the dimension** When you add date and time fields as lower levels of a dimension, the OLAP Cube Wizard does not automatically break the data out into year/quarter/month/week and hour/minute/second levels. The wizard does this only when you add the date or time field as the top level of a new dimension. If the date or time field is not the top level, modify the cube by opening the .oqy file in Microsoft Query, or contact the person who created the cube to make these changes.

### [The summary function I want is missing](#)

In the OLAP Cube Wizard, the only summary functions available for data fields are Sum, Count, Min, and Max.

**Create the report directly from the database records** If you can simplify and reduce your [query](#) to where your system can handle the amount of data it returns, try returning the data directly to Microsoft Excel from Microsoft Query without creating a cube. When you create a PivotTable or PivotChart report directly from records in a database, you have access to the full set of PivotTable summary functions (Sum, Count, Average, Max, Min, Product, Count Nums, StdDev, StdDevp, Var, and Varp).

**Consider setting up an OLAP server for the database** The Microsoft OLAP server product, Microsoft SQL Server OLAP Services, lets you set up a wider range of summary fields than the OLAP client software included in Microsoft

Office.

[I can't change my OLAP cube](#)

**Make sure the original database is available** To edit an OLAP cube, you must have access to the original server database that supplied the cube data. Check to make sure the database hasn't been renamed or moved. Make sure the server is available and you can connect to it.

**Check for changes to the original database** If you used the OLAP Cube Wizard to create the cube from a relational database, tables in the database might have been renamed or deleted so that the cube can no longer locate the original data. Connect to the database in Microsoft Query, and check for any changes to the organization, or schema, of the database. If the database has changed, you'll need to create a new cube.

[A 'Data has been lost' message appears](#)

A field you included in the cube is no longer available in the source database.

**Check for changes to the original database** If the cube is an [offline cube file](#) that was created from an OLAP server database, reconnect a report to the server database and check the fields available in the **PivotTable Field List** window. If the field is no longer available from the server, you can use the **Offline OLAP** command on the **PivotTable** menu to create a new offline cube file.

If you created the cube in Microsoft Query, use Query to open the .dqy [query](#) file that you used to create the cube, or if you did not keep a .dqy file, create a new query connecting to the original relational database. Check what fields are available. For full instructions, see Help in Microsoft Query. If fields have been removed from the database, you can create a new cube.

[Saving the cube file is taking a long time](#)

If you included a large subset of the OLAP data in the cube file, the file may be time consuming to create.

- To cancel saving the file, click **Stop** in the **Create Cube File – Progress** dialog box.

- To reduce the size of the file, eliminate data that you don't need to view in your report. In step 2 of the Offline Cube Wizard, select only the dimensions and levels within each dimension that you need to see. In step 3, select only the measures that you're using as [data fields](#) in the report, and in each dimension eliminate any [items](#) you don't need.

### [I run out of disk space while saving a cube](#)

OLAP databases are designed to manage very large amounts of detailed data, and as a result, the server database might occupy a much larger amount of disk storage than your local hard disk provides. If you specify a large subset of this data for your offline cube file, you might run out of space.

**Free up disk space or find another disk** Try deleting files you don't need from your disk before saving the cube file. Or try saving the file on a network drive.

**Include less data in the offline cube file** Consider how you can minimize the amount of data in the file and still have what you need for your PivotTable or PivotChart report. Try the following:

- **Eliminate dimensions** In step 2 of the Offline Cube Wizard, select only the dimensions that you actually have displayed as fields in your PivotTable or PivotChart report.
- **Eliminate levels of detail** Click the  box next to each selected dimension in step 2 of the wizard, and clear the check boxes for levels lower than those displayed in your report.
- **Eliminate data fields** In step 3 of the wizard, click the  box next to **Measures**, and select only the [data fields](#) you're using in the report.
- **Eliminate items of data** Click the  box next to each dimension in step 3, and clear the check boxes for items you don't need to see in the report.

**Stay connected to the server** If you've eliminated all possible data and still cannot save an offline cube file, you'll need to continue using the connection to the server OLAP database to interact with your report.

## Using OLAP cubes

### [Data is missing from my report after I create a cube file](#)

When you selected the contents for the offline cube file, you might have left out some of the data for the fields used in the report. As a result, when you change the report to display different data, data you expected to see isn't available from the offline cube file.

Use the **Offline OLAP** command on the **PivotTable** menu to reconnect the report to the server database, and make sure the report displays the data you want to see. Then edit the offline cube file, making sure you include all dimensions, data fields, and levels of detail used in the report.

### [My report is using fields from the query instead of my cube](#)

If the **PivotTable Field List** window is showing you the fields from the relational database that you queried to create the cube, you returned the data from your query to Microsoft Excel instead of opening the .oqy file created by the OLAP Cube Wizard. This file stores the cube definition, and if you saved a .cub offline cube file, provides access to that file. If you did not specify a new location for the .oqy file, the file was saved in either My documents\My data sources or Winnt\Profiles\*your user name*\My data sources, depending on your version of the Windows operating system.

To base a report on your new cube, click **Open** on the Excel **File** menu, click **Query Files** in the **Files of type** list, and then locate and double-click the .oqy file. If you want a PivotChart report, click the PivotTable report that's created when you open the .oqy file, and then click **Chart Wizard**  on the **PivotTable** toolbar.

### [Data I know is in the database is missing from my cube](#)

Cubes created from OLAP server databases or relational databases don't necessarily include all of the data in the original database. Only the data that you select in the Offline Cube Wizard or OLAP Cube Wizard is included in the cube.

**Wait for data retrieval to complete** When you change your PivotTable or PivotChart report to display different data, new data is retrieved from the cube. When you [refresh](#) the report, new data is retrieved from the original database and the cube is completely reconstructed. This process might take a while.

**Check with the person who created the cube** If you got the cube from someone else, and the **PivotTable Field List** window is missing fields that you need or levels of detail that you wanted are unavailable, ask the creator of the cube to change it so that it includes additional data.

**Change the contents of an offline cube file** If you created the offline cube file in Microsoft Excel from an OLAP server database, use the **Offline OLAP** command on the **PivotTable** menu to change the file. Make sure you include all dimensions, data fields, and levels of detail used in the report.

**Check the contents of a cube that was created in Query** You cannot add data to cubes created with the OLAP Cube Wizard in Microsoft Query, but you can change how the cube is organized and delete data from the cube. If the cube is missing fields from the original relational database, you can create a new cube in Query to include those fields. In Query, open the .dqy file that you used to query the data for the OLAP cube, or create a new query if you did not keep a .dqy file. Add to the query any additional fields that you want in the cube, and then use the **Create OLAP Cube** command on the Query **File** menu create a new cube. For full instructions, see Help in Microsoft Query.



[New data doesn't appear in my report when I refresh](#)

The [offline cube file](#), or the cube created in Microsoft Query, might not be able to connect with the original server database to retrieve new data.

**Make sure the original database is available** Check that the original server database that supplied the data for the cube hasn't been renamed or moved. Make sure the server is available and you can connect to it.

**Make sure new data is available** Check with the database administrator to determine whether the database has been updated in the areas included in your report.

**Make sure the database organization hasn't changed** If an OLAP server

cube has been rebuilt, or a relational database supplying data to a cube has been reorganized, you might need to reorganize your report or create a new offline cube file or OLAP Cube Wizard cube to access the changed data. Contact the database administrator to find out about changes to the database.

 [Microsoft Excel can't find my offline cube file](#)

The .cub might have been renamed or moved.

**Make sure you have the file** If someone else gave you the .oqy file you're opening, make sure you also have access to the .cub file.

**Browse for the file** If you're trying to connect to the offline cube file from the **Offline OLAP Settings** dialog box, click **Browse**, and locate the .cub file.

**Reconnect to the original database** If you cannot locate the file, you might be able to reconnect the report to the original OLAP server database. Click the report, click **Offline OLAP** on the **PivotTable** menu, and then click **On-line OLAP**. You can then create a new offline cube file.

**Note** For further help with problems with OLAP Cube Wizard cubes, see Help in Microsoft Query.

## Laying out a report

[The field buttons are gone, and I can't change the layout](#)

**Check whether the buttons are hidden** Click the report, click **PivotChart** on the **PivotTable** toolbar, and make sure the **Hide PivotChart Field Buttons** command is not checked.

**Check whether the report was converted to a static chart** Excel converts a PivotChart report to a static chart when you delete its [associated PivotTable report](#), copy or move the PivotChart report to another workbook, or save the workbook in Microsoft Excel 95 or earlier format or a non-Excel format.

[Data takes a long time to appear when I add a field](#)

When a report is based on a large amount of external data or an OLAP Cube Wizard data source, delays can be lengthy when you drag fields from the field list onto the worksheet.

**Drop data items last** Drop fields in the series, category, and page areas first. Drop fields in the [data area](#) last. This approach minimizes the amount of data Microsoft Excel has to display for interim steps.

**Turn off series and category item display** On the **PivotTable** toolbar, make sure **Always Display Items**  is turned off. The [items](#) won't appear as you drag fields to the series and category areas, but will appear once you add a [data field](#).

**Use the wizard to change the layout** If the response is still too slow, you can return to the PivotTable and PivotChart Wizard to lay out the report. On the **Data** menu, click **PivotTable and PivotChart Report**, and then click **Layout**.

[I can't drag a field](#)

**Check the page field settings** If the field you want to drag is set to query for external data as you select each item, the field may be locked in the page position. Double-click the field, click **Advanced**, and clear the **Disable pivoting**

**of this field** check box under **Page field options**. If you drag the field to another area, Microsoft Excel retrieves the external data for all items in the field at once.

**Check for OLAP source data** In reports with [OLAP](#) source data, some fields can be used only as [series](#), [category](#), or [page fields](#). These fields have  icons in the **PivotTable Field List** window. Fields with  icons can be used only as [data fields](#).

**Check for VBA macros** A Visual Basic for Applications (VBA) [macro](#) can turn off the ability to change the layout by dragging fields. If the cancel symbol appears over the pointer when you try to drag the field, dragging has been turned off for that field. For help with this case, contact the author of the macros in your workbook.

**Check for protection** If the chart sheet or the worksheet containing the [associated PivotTable report](#) is protected, you cannot move fields or make changes to the PivotChart report. Unprotect the chart sheet or worksheet, or contact the person who protected it.

 [The field list is missing](#)

**Click the report** The list of fields appears only when the report is selected.

**Display the field list** If you still don't see the field list, click **Show Field List**  on the **PivotTable** toolbar.

 [A field doesn't have a dropdown arrow](#)

**Check whether it's the only data field** The Data field appears next to the [category fields](#) with a dropdown arrow only when you've added two or more [data fields](#) to a report. If the report has a single data field, the field appears at the top of the report, below the page area.

**Check whether the field is in an OLAP dimension** In reports with [OLAP](#) source data, [dimension](#) fields in the series and category areas have an arrow  in the [field button](#) only if the field is the topmost field in the dimension. You can use the arrow in this field to display or hide different levels of detail throughout the dimension.

**Check whether upper levels are hidden** When upper [levels](#) of a dimension are hidden, the topmost field is hidden, and none of the displayed fields have the arrow . Right-click any field button in the dimension, and then click **Show Levels** on the shortcut menu.

 [The dropdown arrow for a field doesn't work](#)

On the **PivotTable** toolbar, make sure **Always Display Items**  is turned on. If you don't want to turn on this feature, drag a field to the [data area](#). Once you have a field in the data area, the dropdown arrows will work for all fields in the report.

## Formatting a report

### [Formatting, trendlines, and error bars disappeared](#)

**Check for changes to the data displayed** When you make changes that affect what data is displayed in a PivotChart report or its [associated PivotTable report](#), Microsoft Excel discards any formatting you've applied to [data labels](#), [data points](#), and [data series](#), including any [trendlines](#) and [error bars](#) you've added.

Changes that result in lost formatting include changing the layout, adding or removing [fields](#), displaying or hiding [items](#), displaying a different page in a [page field](#), grouping or ungrouping items, displaying or hiding detail, sorting, changing the [summary function](#) for a field, changing the display of subtotals, specifying different [source data](#) including changing the [query](#) for external data, and [refreshing](#) the report.

**Finish making changes before you add formatting** Make sure you are satisfied with the layout and data displayed in the PivotChart report before you make formatting changes.

**Record a macro to apply formatting** If you change the report frequently, you can record a [macro](#) as you apply the desired formatting and then run the macro when you need to reapply your formatting.

### [I can't move or resize the legend, titles, or plot area](#)

In a PivotChart report, you can't move or resize the [legend](#), [titles](#), or [plot area](#) as you would in a regular, noninteractive chart. Microsoft Excel automatically resizes the plot area to accommodate changes to the report.

**Repositioning the legend** You can't change the size of the legend, but you can change where it appears in the chart: on the **Chart** menu, click **Chart Options**, click the **Legend** tab, and then click an option under **Placement**.

**Resizing titles** You can't move a title, but you can change its size by changing the font size: click the title, click **Selected Chart Title** on the **Format** menu, click the **Font** tab, and then select the size you want.

## [The report doesn't use the position or size of items in my user-defined chart type](#)

You can't move or resize the [legend](#), [titles](#), or [plot area](#) in a PivotChart report. Microsoft Excel automatically positions and sizes these elements as needed each time you change the report. As a result, when you specify a user-defined chart type for a PivotChart report, the report uses its automatic position and size for the legend, titles, and plot area instead of any sizes and positions you've saved in the chart type.

## [Number formatting doesn't match the source data](#)

Microsoft Excel doesn't use the number formatting from Excel source data in the value axis in a PivotChart report. The value axis initially reflects the number formatting of the [data area](#) of the [associated PivotTable report](#).

To change the value axis formatting, click the axis, click **Selected Axis** on the **Format** menu, click **Number**, and then select the formatting you want. This change does not affect the number formatting in the associated PivotTable report.

## Data and calculations

[The \*\*Source Data\*\* command is unavailable on the \*\*Chart\*\* menu](#)

When you want to change the position of your series or category data, or redefine the source data to be included, you cannot use the **Source data** command on the **Chart** menu, as you can in a regular, noninteractive chart.

To change [series fields](#) to [category fields](#) or vice versa, drag the fields to the appropriate [drop areas](#). To include different source data in the report, click the report, click **PivotTable and PivotChart Wizard** on the **Data** menu, click **Back**, and use step 2 of the wizard to specify different Excel source data or get different external source data for the report.

[The page field options are unavailable.](#)

**Check the type of field** The [field](#) you selected might not be a page field. These settings are available only for page fields.

**Check for external source data** The report might not be based on external data. These settings are not available for reports based on worksheet data.

**Check for OLAP source data** These settings are not available for reports that are based on [OLAP](#) source data. The field list has  and  icons in OLAP-based reports.

**Check the data type for the field** The page field settings are unavailable for memo fields or fields that contain [OLE](#) objects.

**Check for parameter query support** The [ODBC driver](#) for your external database might not support [parameter queries](#). These settings are available only if the driver for your [data source](#) supports parameter queries.

The ODBC drivers supplied with Microsoft Query all support parameter queries. To find out whether a third-party driver supports parameter queries, contact your driver vendor.

**Check for reports based on another PivotTable report** When you base more

than one PivotChart report on an existing PivotTable report, page field settings are not available for any of the reports.

**Check whether the field is grouped** In the [associated PivotTable report](#), drag the field to the row or column area, right-click any grouped [items](#), point to **Group and Show Details** on the shortcut menu, click **Ungroup**, and then drag the field back to the page area to make the page field settings available.

[While a query is running, I can't change the sheet](#)

**Check whether the area you're editing is being updated** While a query is running in the background, you can't change the report you're currently updating, or any other reports based on the report.

**Wait for the query to complete, or cancel it** To check the progress or cancel a query, double-click the  icon in the status bar, and if desired click **Stop Refresh**.

**Run the query in the background** On the **PivotTable** toolbar, click **PivotChart**, click **Options**, and then select the **Background query** check box.

[A data field is using Count instead of Sum](#)

**Check for text or blank items in the field** If your data field contains any text values or blank cells, the field uses the Count [summary function](#) by default. Double-click the field and click **Sum** in the **Summarize by** box.

**Check for OLAP source data** In reports based on [OLAP](#) source data, the available summary functions are determined on the OLAP server, and you cannot change them in the Microsoft Excel report. The field list has  and  icons in OLAP-based reports.

[Data is missing after the report is refreshed](#)

**Set page fields to view all data** Select **All** in every [page field](#) before you refresh the report.

If a page field does not include **All**, either the field is set to query for external data one item at a time, or the [source data](#) doesn't include information for an **All**

item. In both cases, the data is refreshed whenever you select a different item.

**Check the location of the missing data** For reports based on worksheet data, the new data might have been added outside the source range you originally specified, or the source data could have been moved to a new location.

1. On the **Data** menu, click **PivotTable and PivotChart Report**.
2. Click **Back**.
3. Change the source range specification to include the new data or to specify the new location.
4. Click **Finish**.

**Check that the query is selecting the right data** For reports based on external data, review the query in Microsoft Query to make sure it is retrieving the data you want.

**Check the cube or cube file** If the report is based on a [cube](#) created by the OLAP Cube Wizard, open the .oqy file in Microsoft Query and check the contents of the cube to make sure it contains the data you want. If the report is based on a cube file, check the cube file contents: click the [associated PivotTable report](#) for the PivotChart report, click **PivotTable** on the **PivotTable** toolbar, click **Offline OLAP**, and then click **Edit offline data file**. If the report is based on source data from an OLAP server database, contact your database administrator to find out whether the database has changed.



[The report looks completely different after refresh, or can't be refreshed](#)

**Check the availability of the source database** Make sure you can still connect to the external database and view data.

**Check for changes to the source database** If the report is based on [OLAP](#) source data, changes may have been made to the data available in the cube on the server. Contact the administrator of the OLAP server for more information.

[Show All](#)

# Troubleshoot PivotTable reports

## Creating a report

 [An 'insufficient memory' message appears.](#)

### Check the memory use setting

1. Click **OK** in the message dialog box.
2. Create the report again, and in step 3 of the PivotTable and PivotChart Wizard, click **Options**.
3. Select the **Optimize memory** check box.

**Use page fields to save memory** If you still can't create the report, set up one or more of the [page fields](#) to retrieve the data as you select each [item](#).

1. In step 3 of the wizard, click **Layout**.
2. Drag one or more fields to the PAGE area.
3. Double-click each page field.
4. Click **Advanced**.
5. Click **Query external data source as you select each page field item**.

**Simplify the report** The number of fields you can add depends on the amount of memory in your computer and the amount of [source data](#) used for the report. When you want to use a large number of fields, add them as [row fields](#) or page fields. Page fields use the least memory. Row fields use less memory than [column fields](#).

**Base multiple reports for the same data on one report** When you create a PivotTable report, Microsoft Excel creates a storage area in memory for the report. If you plan to create several reports from the same source data, select

**Another PivotTable report or PivotChart report** in step 1 of the wizard so that the reports all use the same storage area.

**Simplify the file** Reduce the number of reports in the workbook.

**Create the report in a separate file** If your report is based on worksheet data, create the report in a different workbook from the workbook that contains the data. That way, the original data and the report do not have to be in memory at the same time.

[Step 2 of the PivotTable and PivotChart Wizard doesn't list the report I want.](#)

**Check the location of the report** The wizard lists only the reports in the workbook where you started the wizard. If the report you want to use as the source is in a different workbook, copy the report into the active workbook.

**Check the page field settings** The PivotTable report you want may have [page fields](#) that are set to query for external data as you select each item. To use a report as the source for another report, its page fields must all be set to retrieve external data for all items at once. Click the source report, double-click each page field, click **Advanced**, and then check the settings under **Page field options**.

[Importing or pasting from a Web page didn't work right.](#)

**Use export instead of copy and paste** If you used the **Copy** command from a [PivotTable list](#) on a Web page and then pasted the data into Microsoft Excel, only the cell values are pasted, creating a noninteractive table on the worksheet. To copy the data to Excel as a PivotTable report, use the **Export to Microsoft Excel** command in the PivotTable list.

**Adjust the layout before you export** A PivotTable list on a Web page can display detail data at the same time that it displays summarized data. As a result, some layouts possible in a PivotTable list can't be produced in an Excel PivotTable report. For more information about preparing a PivotTable list for export to Excel, click the Help button on the toolbar in the PivotTable list.

[I'm having problems with an OLAP data source.](#)

## Creating OLAP cubes

### [Date or time fields have incorrect levels](#)

**Check the date or time field in the source database** If you don't see the [levels](#) you expect in the date or time [dimensions](#) in source data from the OLAP Cube Wizard in Microsoft Query, check the date or time field from the underlying relational database that supplied the data for the cube. The database may store dates and times as text instead of a date or time format that the wizard can recognize. If you suspect this is the case, consult the database administrator for the relational database to verify and correct the date or time format for the field.

**Check the top level of the dimension** When you add date and time fields as lower levels of a dimension, the OLAP Cube Wizard does not automatically break the data out into year/quarter/month/week and hour/minute/second levels. The wizard does this only when you add the date or time field as the top level of a new dimension. If the date or time field is not the top level, modify the cube by opening the .oqy file in Microsoft Query, or contact the person who created the cube to make these changes.

### [The summary function I want is missing](#)

In the OLAP Cube Wizard, the only summary functions available for data fields are Sum, Count, Min, and Max.

**Create the report directly from the database records** If you can simplify and reduce your [query](#) to where your system can handle the amount of data it returns, try returning the data directly to Microsoft Excel from Microsoft Query without creating a cube. When you create a PivotTable or PivotChart report directly from records in a database, you have access to the full set of PivotTable summary functions (Sum, Count, Average, Max, Min, Product, Count Nums, StdDev, StdDevp, Var, and Varp).

**Consider setting up an OLAP server for the database** The Microsoft OLAP server product, Microsoft SQL Server OLAP Services, lets you set up a wider range of summary fields than the OLAP client software included in Microsoft

Office.

[I can't change my OLAP cube](#)

**Make sure the original database is available** To edit an OLAP cube, you must have access to the original server database that supplied the cube data. Check to make sure the database hasn't been renamed or moved. Make sure the server is available and you can connect to it.

**Check for changes to the original database** If you used the OLAP Cube Wizard to create the cube from a relational database, tables in the database might have been renamed or deleted so that the cube can no longer locate the original data. Connect to the database in Microsoft Query, and check for any changes to the organization, or schema, of the database. If the database has changed, you'll need to create a new cube.

[A 'Data has been lost' message appears](#)

A field you included in the cube is no longer available in the source database.

**Check for changes to the original database** If the cube is an [offline cube file](#) that was created from an OLAP server database, reconnect a report to the server database and check the fields available in the **PivotTable Field List** window. If the field is no longer available from the server, you can use the **Offline OLAP** command on the **PivotTable** menu to create a new offline cube file.

If you created the cube in Microsoft Query, use Query to open the .dqy [query](#) file that you used to create the cube, or if you did not keep a .dqy file, create a new query connecting to the original relational database. Check what fields are available. For full instructions, see Help in Microsoft Query. If fields have been removed from the database, you can create a new cube.

[Saving the cube file is taking a long time](#)

If you included a large subset of the OLAP data in the cube file, the file may be time consuming to create.

- To cancel saving the file, click **Stop** in the **Create Cube File – Progress** dialog box.

- To reduce the size of the file, eliminate data that you don't need to view in your report. In step 2 of the Offline Cube Wizard, select only the dimensions and levels within each dimension that you need to see. In step 3, select only the measures that you're using as [data fields](#) in the report, and in each dimension eliminate any [items](#) you don't need.

### [I run out of disk space while saving a cube](#)

OLAP databases are designed to manage very large amounts of detailed data, and as a result, the server database might occupy a much larger amount of disk storage than your local hard disk provides. If you specify a large subset of this data for your offline cube file, you might run out of space.

**Free up disk space or find another disk** Try deleting files you don't need from your disk before saving the cube file. Or try saving the file on a network drive.

**Include less data in the offline cube file** Consider how you can minimize the amount of data in the file and still have what you need for your PivotTable or PivotChart report. Try the following:

- **Eliminate dimensions** In step 2 of the Offline Cube Wizard, select only the dimensions that you actually have displayed as fields in your PivotTable or PivotChart report.
- **Eliminate levels of detail** Click the  box next to each selected dimension in step 2 of the wizard, and clear the check boxes for levels lower than those displayed in your report.
- **Eliminate data fields** In step 3 of the wizard, click the  box next to **Measures**, and select only the [data fields](#) you're using in the report.
- **Eliminate items of data** Click the  box next to each dimension in step 3, and clear the check boxes for items you don't need to see in the report.

**Stay connected to the server** If you've eliminated all possible data and still cannot save an offline cube file, you'll need to continue using the connection to the server OLAP database to interact with your report.

## Using OLAP cubes

[Data is missing from my report after I create a cube file](#)

When you selected the contents for the offline cube file, you might have left out some of the data for the fields used in the report. As a result, when you change the report to display different data, data you expected to see isn't available from the offline cube file.

Use the **Offline OLAP** command on the **PivotTable** menu to reconnect the report to the server database, and make sure the report displays the data you want to see. Then edit the offline cube file, making sure you include all dimensions, data fields, and levels of detail used in the report.

[My report is using fields from the query instead of my cube](#)

If the **PivotTable Field List** window is showing you the fields from the relational database that you queried to create the cube, you returned the data from your query to Microsoft Excel instead of opening the .oqy file created by the OLAP Cube Wizard. This file stores the cube definition, and if you saved a .cub offline cube file, provides access to that file. If you did not specify a new location for the .oqy file, the file was saved in either my documents\my data sources or winnt\profiles\*your user name*\my data sources, depending on your version of the Windows operating system.

To base a report on your new cube, click **Open** on the Excel **File** menu, click **Query Files** in the **Files of type** list, and then locate and double-click the .oqy file. If you want a PivotChart report, click the PivotTable report that's created when you open the .oqy file, and then click **Chart Wizard**  on the **PivotTable** toolbar.

[Data I know is in the database is missing from my cube](#)

Cubes created from OLAP server databases or relational databases don't necessarily include all of the data in the original database. Only the data that you select in the Offline Cube Wizard or OLAP Cube Wizard is included in the cube.

**Wait for data retrieval to complete** When you change your PivotTable or PivotChart report to display different data, new data is retrieved from the cube. When you [refresh](#) the report, new data is retrieved from the original database and the cube is completely reconstructed. This process might take a while.

**Check with the person who created the cube** If you got the cube from someone else, and the **PivotTable Field List** window is missing fields that you need or levels of detail that you wanted are unavailable, ask the creator of the cube to change it so that it includes additional data.

**Change the contents of an offline cube file** If you created the offline cube file in Microsoft Excel from an OLAP server database, use the **Offline OLAP** command on the **PivotTable** menu to change the file. Make sure you include all dimensions, data fields, and levels of detail used in the report.

**Check the contents of a cube that was created in Query** You cannot add data to cubes created with the OLAP Cube Wizard in Microsoft Query, but you can change how the cube is organized and delete data from the cube. If the cube is missing fields from the original relational database, you can create a new cube in Query to include those fields. In Query, open the .dqy file that you used to query the data for the OLAP cube, or create a new query if you did not keep a .dqy file. Add to the query any additional fields that you want in the cube, and then use the **Create OLAP Cube** command on the Query **File** menu create a new cube. For full instructions, see Help in Microsoft Query.



[New data doesn't appear in my report when I refresh](#)

The [offline cube file](#), or the cube created in Microsoft Query, might not be able to connect with the original server database to retrieve new data.

**Make sure the original database is available** Check that the original server database that supplied the data for the cube hasn't been renamed or moved. Make sure the server is available and you can connect to it.

**Make sure new data is available** Check with the database administrator to determine whether the database has been updated in the areas included in your report.

**Make sure the database organization hasn't changed** If an OLAP server

cube has been rebuilt, or a relational database supplying data to a cube has been reorganized, you might need to reorganize your report or create a new offline cube file or OLAP Cube Wizard cube to access the changed data. Contact the database administrator to find out about changes to the database.

#### [Microsoft Excel can't find my offline cube file](#)

The .cub might have been renamed or moved.

**Make sure you have the file** If someone else gave you the .oqy file you're opening, make sure you also have access to the .cub file.

**Browse for the file** If you're trying to connect to the offline cube file from the Offline OLAP Settings dialog box, click the **Edit offline data file** button and then use the **Browse** button in step 4 of the Create Cube File wizard to locate the file.

**Reconnect to the original database** If you cannot locate the file, you might be able to reconnect the report to the original OLAP server database. Click the report, click **Offline OLAP** on the **PivotTable** menu, and then click **On-line OLAP**. You can then create a new offline cube file.

**Note** For further help with problems with OLAP Cube Wizard cubes, see Help in Microsoft Query.

## Laying out a report

 [Data takes a long time to appear when I add a field.](#)

When a report is based on a large amount of external data or an OLAP Cube Wizard data source, delays can be lengthy when you drag fields from the field list onto the worksheet.

**Drop data items last** Drop fields in the row, column, and page areas first. Drop fields in the [data area](#) last. This approach minimizes the amount of data Microsoft Excel has to display for interim steps.

**Turn off row and column item display** On the **PivotTable** toolbar, make sure **Always Display Items**  is turned off. The [items](#) won't appear as you drag fields to the row and column areas, but will appear once you add a data field.

**Use the wizard to change the layout** If the response is still too slow, you can return to the PivotTable and PivotChart Wizard to lay out the report. Click the report, click **PivotTable and PivotChart Report** on the **Data** menu, and then click **Layout**.

 [I can't drag a field.](#)

**Check the page field settings** If the field you want to drag is set to query for external data as you select each item, the field may be locked in the page position. Double-click the field, click **Advanced**, and clear the **Disable pivoting of this field** check box under **Page field options**. If you drag the field to another area, Microsoft Excel retrieves the external data for all items in the field at once.

**Check for OLAP source data** In reports with [OLAP](#) source data, some fields can be used only as [row](#), [column](#), or [page fields](#). These fields have  icons in the **PivotTable Field List** window. Fields with  icons can be used only as data fields.

**Check for VBA macros** A Visual Basic for Applications (VBA) macro can turn off the ability to change the layout by dragging fields. If the cancel symbol

appears over the pointer when you try to drag the field, dragging has been turned off for that field. For help with this case, contact the author of the macros in your workbook.

**Check for protection** If the worksheet was protected with the **Use PivotTable reports** check box cleared in the **Protect Sheet** dialog box, you cannot move fields or make changes. Unprotect the worksheet, or contact the person who protected it.

[I can't get data fields in the order I want.](#)

Right-click a data field, point to **Order** on the shortcut menu, and use the commands on the **Order** menu to move the field to the position you want.

[The field list is missing.](#)

**Click the report** The list of fields appears only when the report is selected.

**Display the field list** If you still don't see the field list, click **Show Field List**  on the **PivotTable** toolbar.

[A field doesn't have a dropdown arrow.](#)

**Check whether it's the only data field** The Data field appears with a dropdown arrow only when you've added two or more [data fields](#) to a report.

**Check whether the field is in an OLAP dimension** In reports with [OLAP](#) source data, [dimension](#) fields in the row and column areas have an arrow  in the [field button](#) only if the field is the topmost field in the dimension. You can use the arrow in this field to display or hide different levels of detail throughout the dimension.

**Check whether upper levels are hidden** When upper [levels](#) of a dimension are hidden, the topmost field is hidden, and none of the displayed fields have the arrow . Right-click any field button for the dimension, and then click **Show Levels** on the shortcut menu.

[The dropdown arrow for a field doesn't work.](#)

On the **PivotTable** toolbar, click **Always Display Items** . If you don't want to use this feature, drag a field to the data area. Once you have a field in the data area, the dropdown arrows will work for all fields in the report.

## Formatting and customizing a report

[Formatting disappears when I refresh or change the layout.](#)

**Check the preserve setting** Click **PivotTable** on the **PivotTable** toolbar, click **Table Options**, and make sure the **Preserve formatting** check box is selected.

**Cell borders aren't retained** Microsoft Excel does not keep cell borders when you change the layout or refresh the report.

**Conditional formatting does not work** If you try to apply [conditional formats](#) to cells in a PivotTable report, you will get unpredictable results.

[An AutoFormat changed the layout.](#)

**Undo the autoformat** Try clicking **Undo** . If you changed the report to an indented format recently, you may be able to restore it to its previous format and layout.

**Move fields** Some autoformats change [column fields](#) in the report to [row fields](#), and other autoformats change a single row field to a column field. Drag the fields back to their original positions.

[Number formatting doesn't match the source data.](#)

Microsoft Excel doesn't use the number formatting from Excel source data in a PivotTable report. By default, numbers are displayed with no decimal places, no 1000 separator, and a minus sign for negative numbers.

To change this format, right-click a cell in the [data area](#), click **Field Settings**, click **Number**, and then click the category and options you want. Repeat for each field in the data area.

[Renamed numeric items aren't formatted or sorted right.](#)

By default, numeric [items](#) in PivotTable [fields](#) are formatted to match the type of the underlying source data. For example, an item named 2.0 would get numeric

formatting. When you rename a numeric PivotTable item, the item is then formatted as text even if it contains a number. Because Microsoft Excel sorts text separately from numbers, renamed numeric items no longer sort in sequence with the rest of the numbers.

You can reorder the text items manually by dragging them to new positions.

 [Features I expect to see are missing.](#)

The report may be based on [OLAP](#) source data. For example, OLAP databases provide different summary functions as separate data fields, rather than as a PivotTable setting.

To determine whether a report is based on OLAP source data, check the **PivotTable Field List** window. If the field list has  and  icons, the report has OLAP source data.

 [Property fields I selected aren't displayed.](#)

**Move the field to the row area** In column fields, [property fields](#) are displayed only for the lowest level of detail, not for other levels of detail in the report. In row fields, you can display property fields for all levels of detail.

**Check the layout setting for the field** Double-click the field for which you're displaying property fields, click **Layout**, and make sure **Show items in outline form** is selected.

**Make sure the level with the property fields is displayed** Property fields are associated with specific levels of a dimension field. Right-click the field, and if **Show Levels** appears on the shortcut menu, levels have been hidden. Click **Show Levels** to redisplay them. Click the field and then click **Show Detail**  to display additional levels.

**Make sure the cube has data for the property fields** Check with the administrator for your OLAP server to make sure data is available for the property fields you selected.

## Retrieving and refreshing data

 [A 'PivotTable is invalid' message appears.](#)

**Refresh the report** For some types of [source data](#), you will see this message when you first try to use a report that was saved as a Web page if a source field has more than one type of data— for example, both text and numbers. Click **Refresh Data**  .

**Check the source range** If the report is based on worksheet data, make sure that the source data has not been deleted. If the source is a [named range](#) and you used the name to specify the source data when you created the report, make sure that the name has not been deleted from the source workbook.

**Check the external data source** For reports that are based on external data, make sure the database is available and you can connect to it.

**Check available memory** If a report is not valid when you open a workbook, close any files and quit any programs you don't need so that more memory is available, and then try to open the workbook again.

**Wait for the refresh to complete before copying a report** When you refresh a report, make sure the refresh is complete and the status bar displays "Ready" before you copy or paste the report into another workbook.

**Check the file format** If you are opening a report that was created in Microsoft Excel 97, and the report has [calculated fields](#) or has a [page field](#) that's set to retrieve data for each item individually, make sure you save the report in Excel workbook format (click **Save As** on the **File** menu, and click **Microsoft Excel Workbook** in the **Save as type** box). Then, if you need to, you can save the workbook in an earlier Excel format.

 [While a query is running, I can't change my worksheet.](#)

**Check whether the area you're editing is being updated** While a query is running in the background, you can't change the report you're currently updating, or any other reports based on the report.

**Wait for the query to complete, or cancel it** To check the progress or cancel a query, double-click the  icon in the status bar, and if desired click **Stop Refresh**.

**Run the query in the background** On the **PivotTable** toolbar, click **PivotTable**, click **Table Options**, and then select the **Background query** check box.

 [Data is missing after refresh.](#)

**Set page fields to view all data** Select **All** in every [page field](#) before you refresh the report.

If a page field does not include **All**, either the field is set to query for external data one item at a time, or the [source data](#) doesn't include information for an **All** item. In both cases, the data is refreshed whenever you select a different item.

**Check the location of the missing data** For reports based on worksheet data, the new data might have been added outside the source range you originally specified, or the source data could have been moved to a new location.

1. On the **Data** menu, click **PivotTable and PivotChart Report**.
2. Click **Back**.
3. Change the source range specification to include the new data or to specify the new location.
4. Click **Finish**.

**Check that the query is selecting the right data** For reports based on external data, review the query in Microsoft Query to make sure it is retrieving the data you want.

**Check the cube or cube file** If the report is based on a [cube](#) created by the OLAP Cube Wizard, open the .oqy file in Microsoft Query and check the contents of the cube to make sure it contains the data you want. If the report is based on a cube file, check the cube file contents: on the **PivotTable** toolbar, click **PivotTable**, click **Offline OLAP**, and then click **Edit offline data file**. If the report is based on source data from an OLAP server database, contact your

database administrator to find out whether the database has changed.

[The report looks completely different after refresh, or can't be refreshed.](#)

**Check the availability of the source database** Make sure you can still connect to the external database and view data.

**Check for changes to the source database** If the report is based on [OLAP](#) source data, changes may have been made to the data available in the cube on the server. Contact the administrator of the OLAP server for more information.

[The page field options are unavailable.](#)

**Check the type of field** The [field](#) you selected might not be a [page field](#). These settings are available only for page fields.

**Check for external source data** The report might not be based on external data. These settings are not available for reports based on worksheet data.

**Check for OLAP source data** These settings are not available for reports that are based on [OLAP](#) source data. The field list has  and  icons in OLAP-based reports.

**Check the data type for the field** The page field settings are unavailable for memo fields or fields that contain [OLE](#) objects.

**Check for parameter query support** The [ODBC driver](#) for your external database might not support [parameter queries](#). These settings are available only if the driver for your [data source](#) supports parameter queries.

The ODBC drivers supplied with Microsoft Query all support parameter queries. To find out whether a third-party driver supports parameter queries, contact your driver vendor.

**Check for reports based on another PivotTable report** When you base another PivotTable report or more than one PivotChart report on an existing PivotTable report, page field settings are not available for any of the reports.

**Check whether the field is grouped** Drag the field to the row or column area, right-click any grouped [items](#), click **Ungroup**, and then drag the field back to the

page area to make the page field settings available.

[I changed my source data, but the report did not update.](#)

Click the report, and then click **Refresh Data**  on the **PivotTable** toolbar.

## Summarizing and calculating

[A data field is using Count instead of Sum.](#)

**Check for text or blank items in the field** If your data field contains any text values or blank cells, the field uses the Count [summary function](#) by default. Double-click the field and click **Sum** in the **Summarize by** box.

**Check for OLAP source data** In reports based on [OLAP](#) source data, the available summary functions are determined on the OLAP server, and you cannot change them in the Microsoft Excel report. The field list has  and  icons in OLAP-based reports.

[My formula isn't calculating what I expected.](#)

[Calculated fields](#) and [calculated items](#) are calculated in different ways. Formulas for calculated fields operate on the sum of the underlying data for any fields referenced in the formula. For example, the formula =`'Order Amount' * 1.2` multiplies the sum of the order amounts for each product and salesperson by 1.2; it does not multiply each individual order by 1.2 and then sum the multiplied amounts.

Formulas for calculated items, however, operate on the individual records; the calculated item formula =`Seafood * 115%` multiplies each individual order for Seafood times 115%, after which the multiplied amounts are summarized together in the [data area](#).

**Check the formulas** Make sure the formulas for all calculated fields and items in the report are what you intended. To display a list of the formulas, click **PivotTable** on the **PivotTable** toolbar, point to **Formulas**, and then click **List Formulas**.

**Check the order of calculation** If you created more than one formula for the cells of a calculated item, make sure the order in which the formulas are calculated is correct: click **PivotTable** on the **PivotTable** toolbar, point to **Formulas**, and then click **Solve Order**.

[I can't change the summary function for a calculated field.](#)

You cannot change the [summary function](#) for a calculated field. Calculated fields always use the Sum summary function.

[There are asterisks after my totals.](#)

The asterisks indicate that subtotals and grand totals include the values for all items in the field, including any items that you have hidden.

**Exclude hidden items from totals** On the **PivotTable** toolbar, click **Include Hidden Items in Totals** .

**Turn the asterisks off** If you want totals to include hidden items but don't want the asterisks, click **PivotTable** on the **PivotTable** toolbar, click **Table Options**, and then clear the **Mark Totals with \*** check box.

[Show All](#)

# PivotTable and PivotChart Wizard

Use the PivotTable and PivotChart Wizard to create PivotTable reports and PivotChart reports.

[Step 1](#)

[Specify the source of data.](#)

[Microsoft Excel list or database.](#)

Creates a PivotTable or PivotChart report from data organized in labeled rows and columns on a Microsoft Excel worksheet.

[External data source.](#)

Creates a PivotTable or PivotChart report from data stored in a file or database outside the current workbook or Microsoft Excel.

[Multiple consolidation ranges.](#)

Creates one PivotTable or PivotChart report from multiple Microsoft Excel worksheet ranges.

[Another PivotTable report or PivotChart report.](#)

Creates a PivotTable or PivotChart report from another PivotTable report in the same workbook.

[Specify the type or report to create](#)

[PivotTable](#)

Creates a PivotTable report.

[\*\*PivotChart report \(with PivotTable report\).\*\*](#)

Creates a PivotChart report and an associated PivotTable report that shares the same data and reflects all changes to the PivotChart report. A PivotChart report must have an associated PivotTable report in the same workbook.

[\*\*Step 2a\*\*](#)

When you create a PivotTable or PivotChart report from multiple consolidation ranges, you can use page fields to display data for one item independent of other items in a field. When you select an item in a page field, the data shown in the PivotTable or PivotChart report changes.

[\*\*Create a single page for me.\*\*](#)

Creates only one page field for a PivotTable or PivotChart report that you create from multiple Microsoft Excel consolidation ranges. With a single page field, you can view and combine all of your consolidated ranges with a drop-down list.

[\*\*I will create the page fields.\*\*](#)

Customizes page fields for a PivotTable or PivotChart report that you create from multiple Microsoft Excel consolidation ranges. You can assign separate names to your ranges in as many as four page fields.

[\*\*Step 2b\*\*](#)

[\*\*Range\*\*](#)

Specify the range for each consolidation source you want in your PivotTable or PivotChart report. Type the sheet name and range reference in the **Range** box. The **Collapse Dialog** button at the right end of this box temporarily moves the dialog box so that you enter the range by selecting cells on the worksheet. When you finish, you can click the button again to display the entire dialog box. If the range is from another workbook, type the workbook name and sheet name in the **Range** box, using this syntax: ([workbookname]sheetname!range) Click **Add** to enter the reference in the **All ranges** box. Repeat this procedure for each range you want to consolidate in your PivotTable or PivotChart report.

## [All ranges](#)

Lists all the worksheet ranges that will be consolidated or combined in your PivotTable or PivotChart report.

## [Step 3](#)

Specify the location of your PivotTable report. If you are creating a PivotChart report, an associated PivotTable report will be created in the location you specify. This PivotTable report must be in the same workbook as the PivotChart report. If you specify a location in another workbook, the PivotChart report will also be created in that workbook. To set advanced options, click **Options**.

## [Layout](#)

Click to lay out the PivotTable or PivotChart report in a dialog box rather than using on-sheet layout with certain external database sources, including large databases. For example, data retrieval is likely to be slow if you use on-sheet layout for a report based on a cube created by using the OLAP Cube Wizard in Microsoft Query. You can also use this dialog box to change the page field settings to create page fields that retrieve data for each item separately. Page field options are available only for reports based on external non-OLAP source data.

## [Options](#)

Sets advanced formatting, layout, memory management, and external data options for your PivotTable or PivotChart report.

[Show All](#)

# About PivotTable and PivotChart source data

When you create a [PivotTable](#) or [PivotChart report](#), you can use any of several different types of [source data](#).

## [Microsoft Excel lists or databases](#)

You can use data from an Excel worksheet as the basis for a report. The data should be in [list](#) format, with column labels in the first row, the rest of the rows having similar items in the same column, and no blank rows or columns within the range of data. Excel uses your column labels for the [field](#) names in the report.

**Selecting the data automatically** Click a cell in the list or in the row below the list before running the PivotTable and PivotChart Wizard. The wizard fills in a reference to the entire list for you.

**Using a named range** To make the report easier to update, [name](#) the source range and use the name when you create the report. If the named range expands to include more data, you can [refresh](#) the report to include the new data.

**Using filtered data** Excel ignores any [filters](#) you have applied to a list with the commands from the **Filter** submenu of the **Data** menu. To create a report that includes only the filtered data, use the **Advanced Filter** command to extract the data you want to another worksheet location, and then base the report on the extracted range.

**Including totals** Excel automatically creates subtotals and grand totals in a PivotTable report. If the source list contains automatic subtotals and grand totals created with the **Subtotals** command on the **Data** menu, use that command to remove them before you create the report.

## [External data sources](#)

To summarize and analyze data from outside Microsoft Excel, such as your company's sales records in a database, you can retrieve data from external sources including [databases](#), text files, and sites on the Internet.

**Prerequisites for retrieving data** To retrieve data from a Web site, you need to be connected to your intranet or the Internet.

To retrieve other types of external data, you must install Microsoft Query and the appropriate [open database connectivity \(ODBC\)](#) drivers or [data source drivers](#). Query provides drivers for many types of external data, including Microsoft SQL Server, Microsoft Access, and text file databases.

**Using the PivotTable and PivotChart Wizard** You can usually retrieve the data you want from within the wizard. From the wizard, you can create [data sources](#), run saved [queries](#), and create new queries.

In step 2 of the wizard, when you get the external data, you're launching Microsoft Query. You have access to all of Query's features: you can select an existing data source, query, or OLAP cube data source, or define a new one. You can follow the Query Wizard steps to select the data you want, and then return to the PivotTable and PivotChart Wizard in the last step of the Query Wizard, or customize your query directly in Microsoft Query. When you finish working directly in Query and return the data to Excel, you're returned to the PivotTable and PivotChart Wizard.

**Using other Excel methods** In the following situations, retrieve the data into Excel first, before you create your PivotTable or PivotChart report:

- **Web queries** To use a [Web query](#) to get data from the Internet, create or run the web query, and then base the report on the worksheet range from the query.
- **Parameter queries** To use a [parameter query](#) to get the data, create or run the parameter query, and then base the report on the worksheet range that the query retrieves.
- **Report templates and query files** To open a query (.dqy) file, or use a [report template](#) (.xlt) that does not already include a PivotTable report, first open the query file or template in Excel. Base your report on the worksheet range retrieved by the query or template.
- **Office Data Connection files** To use an .odc file to get data from a table

in an external database, open the .odc file in Excel. You then have two choices: you can import the data directly into a PivotTable report, or you can import the data into a worksheet and base your report on the worksheet range.

**OLAP source data** When you retrieve source data from an [OLAP](#) database or [cube](#) file, the data can be returned to Excel only as a PivotTable report. You can then create PivotChart reports from this PivotTable report. You use Microsoft Query to set up a [data source](#) to access the database.

### [Multiple consolidation ranges](#)

When you have several Microsoft Excel [lists](#) with similar categories of data and you want to summarize the data from the lists together on one worksheet, one option is to use a PivotTable or PivotChart report. Excel also provides other ways to consolidate, including formulas with [3D references](#) and the **Consolidate** command on the **Data** menu, that work with lists in all kinds of formats and layouts.

**Setting up the source data** Each range of data should be in list format, with column labels in the first row, row labels in the first column, the rest of the rows having similar items in the same row and column, and no blank rows or columns within the range. The lists or worksheets must have matching row and column names for items that you want to summarize together. Do not include any total rows or total columns from the source data when you specify the data for the report.

**Using named ranges** To make the report easier to update, [name](#) each source range and use the names when you create the PivotTable or PivotChart report. If a named range expands to include more data, you can [refresh](#) the report to include the new data.

**Page fields in consolidations** A consolidation uses custom [page fields](#) that contain [items](#) representing one or more of the source ranges. For example, if you're consolidating budget data from the Marketing, Sales, and Manufacturing departments, a page field could include one item to display the data for each department plus an item to show the combined data.

After you click **Multiple consolidation ranges** in step 1 of the PivotTable and

PivotChart Wizard, you can choose the kind of page fields you want.

- **A single page field** To include one page field with an item for each source range plus an item that consolidates all of the ranges, click **Create a single page field for me** in step 2a of the wizard.
- **Multiple page fields** You can create as many as four page fields and assign your own item names for each source range, allowing you to create partial or full consolidations. For example, one page field could consolidate Marketing and Sales apart from Manufacturing, and another page field could consolidate all three departments. Alternatively, you can simply combine the data from all the ranges, creating a consolidation that doesn't have page fields. Click **I will create the page fields** in step 2a of the wizard, and then use step 2b to create the page fields and assign the ranges to them as items.

[Another PivotTable report](#)

Each time you create a new PivotTable or PivotChart report, Microsoft Excel stores a copy of the data for the report in memory, and saves this storage area as part of the workbook file. Thus each new report requires additional memory and disk space. However, when you use an existing PivotTable report as the source for a new report in the same workbook, both reports share the same copy of the data. Because you reuse the same storage area, the size of the workbook file is reduced and less data is kept in memory.

**Location requirements** To use a PivotTable report as the source for another report, both reports must be in the same workbook. If the source PivotTable report is in a different workbook, copy the source report to the workbook where you want the new report to appear. PivotTable and PivotChart reports in different workbooks are separate, each with their own copy of the data in memory and in the workbook files.

**Page field settings** The source PivotTable report cannot contain any page fields that are set to query for external data as you select each item. Reports with this setting don't appear in step 2 of the wizard. To check the setting, double-click each [page field](#), click **Advanced**, and make sure **Retrieve external data for all page field items** is selected.

**Changes affect both reports** When you [refresh](#) the data in the new report,

Excel also updates the data in the source report, and vice versa. When you group or ungroup items in one report, both are affected. When you create [calculated fields](#) or [calculated items](#) in one report, both reports are affected.

**PivotChart reports** You can base a new PivotTable or PivotChart report on another PivotTable report, but not directly on another PivotChart report. However, Excel creates an [associated PivotTable report](#) from the same data whenever you create a PivotChart report, so you can base a new report on the associated report.

Changes to a PivotChart report affect the associated PivotTable report, and vice versa. If you want to be able to change the layout or display different data without these changes affecting both reports, create a new PivotTable report based on the same source data as the PivotChart report, rather than basing it on the associated PivotTable report.

**PivotTable lists from Web pages** You can export a [PivotTable list](#) from your Web browser to Excel and view and save the list as a PivotTable report. The new PivotTable report and the PivotTable list both use the same source data, but no link is maintained between the list and the report.

#### [Changing an existing report's source data](#)

Changes in the [source data](#) can result in different data being available for analysis. You can update a PivotTable or PivotChart report with new data that falls within your original source data specification by [refreshing](#) the report.

To include additional data or different data, you can redefine the source data for the report. If the data is substantially different with many new or additional fields, it may be easier to create a new report.

**Displaying new data brought in by refresh** Refreshing a report can also change the data available for display. For reports based on worksheet lists, Microsoft Excel retrieves new fields within the source range or [named](#) range that you specified. For reports based on external data, Excel retrieves new data that meets the criteria for the underlying [query](#) or becomes available in an OLAP [cube](#). You can view any new fields in the field list and add them to the report.

**Including different Excel source data** For reports based on Excel data, you

can run the PivotTable and PivotChart wizard, return to step 2, and redefine the source range to include different data.

**Querying for different external data** When new fields become available in an external database, or you want to select different records for the report, you can run the PivotTable and PivotChart wizard, return to step 2, and use the **Get Data** button to start Microsoft Query. In Query, you can change the query to select different data.

**Changing OLAP cubes that you create** Reports based on OLAP data always have access to all data in the cube. If you created an [offline cube file](#) containing a subset of the data in a server cube, you can use the **Offline OLAP** command on the **PivotTable** menu to edit your cube file so that it contains different data from the server. If you used the OLAP Cube Wizard in Microsoft Query to define a cube from another database, you can't add more fields from the original database, but you can use the wizard to delete fields or reorganize your cube. You can update both types of cubes with the most recent data from the server cube or the original database by refreshing a report based on the cube.

[Show All](#)

# Change a PivotChart report to a static chart

1. Find and click the [associated PivotTable report](#) for the PivotChart report.

 [How?](#)

This report has the same name as the PivotChart report. To check the name:

1. Click the PivotChart report.
  2. Click **PivotChart** on the **PivotTable** [toolbar](#).
  3. Click **Options**, and note the name in the **Name** box.
  4. Click each PivotTable report in the workbook, click **PivotTable** on the **PivotTable** toolbar, click **Table Options**, and check for the same name in the **Name** box.
2. On the **PivotTable** toolbar, click **PivotTable**, point to **Select**, and then click **Entire Table**.
  3. Press DELETE.

 [Tip](#)

If the worksheet containing the associated PivotTable report doesn't have any data you want to keep, you can delete the entire worksheet instead of deleting just the report. On the **Edit** menu, click **Delete Sheet**.

[Show All](#)

# Create a chart from data in a PivotTable report

This procedure creates a regular, noninteractive chart rather than a [PivotChart report](#).

1. Select the data in the PivotTable report that you want to use in your chart. To include [field buttons](#) and data in the first row and column of the report, start dragging from the lower-right corner of the data you're selecting.
2. Click **Copy** .
3. Click a cell in a blank area.
4. On the **Edit** menu, click **Paste Special**.
5. Click **Values**, and then click **OK**.
6. Click **Chart Wizard**  and follow the instructions in the wizard to create the chart.

[Show All](#)

# Create a PivotChart report

[Create a PivotChart report from an existing PivotTable report](#)

Do one of the following:

[Make a default chart in one step](#)

- Click the PivotTable report, and then click **Chart Wizard** .

[Use the Chart Wizard to create a customized chart](#)

1. Click a cell outside and not adjacent to the PivotTable report.
2. Click **Chart Wizard** .
3. Click a chart type in step 1 of the wizard. You can use any chart type except xy (scatter), bubble, or stock.
4. In step 2 of the wizard, click the PivotTable report, so that the reference in the **Data range** box expands to include the entire report.
5. Follow the instructions in the remaining Chart Wizard steps.

[Create a PivotChart report from other data](#)

When you create a PivotChart report, Microsoft Excel also creates an [associated PivotTable report](#) in the same workbook to supply the [source data](#) for the chart.

1. If you are basing the report on a [Web query](#), [parameter query](#), [report template](#), Office Data Connection file, or [query](#) file, retrieve the data into the workbook and then base the report on the worksheet range containing the retrieved data, or if your query resulted in a PivotTable report instead of a worksheet range, click the report, click **Chart Wizard** , and then follow the steps below to lay out the report onscreen.

If you are basing the report on an Excel [list](#) or database, click a cell in the list or database.

2. On the **Data** menu, click **PivotTable and PivotChart Report**.
3. In step 1 of the PivotTable and PivotChart Wizard, click the type of source data you're using, and then under **What kind of report do you want to create?**, click **PivotChart (with PivotTable)**.
4. Follow the instructions in step 2 of the wizard.
5. In step 3 of the wizard, specify where you want to put the associated PivotTable report. Then decide whether to lay out the PivotChart report on the screen or in the wizard.

Usually you can lay out the report on the screen. Use the wizard to lay out the report if you expect retrieval from a large external data source to be slow, or you need to set [page fields](#) to retrieve data one page at a time. If you aren't sure, try laying out the report on the screen. You can return to the wizard if necessary.

6. Do one of the following:

[Lay out the report on the screen](#)

1. From the **PivotTable Field List** window, drag the fields that you want to display on the category axis to the area on the PivotChart diagram labeled Drop Category Fields Here.

If you don't see the field list, click within the outlines of the [drop areas](#), and if necessary click **Show Field List**  on the **PivotTable toolbar** to display the field list.

To see what levels of detail are available in fields that have levels, click  next to the field.

2. Drag fields that you want to display as series (items shown in the [legend](#)) to the area labeled Drop Series Fields Here.
3. Drag fields that you want to use as page fields to the area labeled Drop Page Fields Here.
4. Drag fields that contain the data that you want to compare or measure to the area labeled Drop Data Items Here.

Only fields that have the  or  icon can be dragged to this area.

5. To rearrange fields, drag them from one area to another. To remove a field, drag it out of the PivotChart report.

**Note** If data is very slow to appear as you lay out the report, click the [associated PivotTable report](#) for the PivotChart report and then click **Always Display Pivot Items**  on the **PivotTable** toolbar to turn off initial data display. If retrieval is still very slow or error messages appear, click the associated PivotTable report for the PivotChart report, click **PivotTable and PivotChart Report** on the **Data** menu, and then lay out the report in the wizard.

 [Lay out the report in the wizard](#)

If you've exited from the wizard, click **PivotTable and PivotChart Report** on the **Data** menu to return to it.

1. In step 3 of the wizard, click **Layout**.
2. From the group of [field buttons](#) on the right, drag the fields that you want to display on the category axis onto the ROW area in the diagram.
3. Drag fields that you want to display as series (items shown in the [legend](#)) onto the COLUMN area.
4. Drag the fields that contain the data that you want to compare or measure onto the DATA area.
5. Drag fields that you want to use as page fields onto the PAGE area.

If you want Excel to retrieve external data one page at a time, so that you can work with large amounts of source data, double-click the page field, click **Advanced**, click **Query external data source as you select each page field item**, and then click **OK** twice.

6. To rearrange fields, drag them from one area to another. Some fields can only be used in some of the areas; if you drop a field in an area where it can't be used, the field won't appear in the area.
7. To remove a field, drag it out of the diagram.
8. When you are finished laying out the report, click **OK**, and then click **Finish**.

9. If you want, change the chart type and options to customize your chart.

 [How?](#)

1. Click the [chart sheet](#).
2. Click **Chart Wizard** , and then select the chart type you want.
3. Click **Next**, and then select the options you want for titles, [axes](#), gridlines, legend, [data labels](#), and data table.

 [Tip](#)

If you don't want to see the [associated PivotTable report](#) for your PivotChart report, you can hide it. Click the worksheet containing the PivotTable report, point to **Sheet** on the **Format** menu, and then click **Hide**.

[Show All](#)

# Create a PivotTable report

1. Open the workbook where you want to create the [PivotTable report](#).
  - If you are basing the report on a [Web query](#), [parameter query](#), [report template](#), Office Data Connection file, or query file, retrieve the data into the workbook, and then click a cell in the Microsoft Excel [list](#) containing the retrieved data.

If the retrieved data is from an [OLAP](#) database, or the Office Data Connection returns the data as a blank PivotTable report, continue with step 6 below.

- If you are basing the report on an Excel list or database, click a cell in the list or database.
2. On the **Data** menu, click **PivotTable and PivotChart Report**.
  3. In step 1 of the PivotTable and PivotChart Wizard, follow the instructions, and click **PivotTable** under **What kind of report do you want to create?**
  4. Follow the instructions in step 2 of the wizard.
  5. Follow the instructions in step 3 of the wizard, and then decide whether to lay out the report onscreen or in the wizard.

Usually you can lay out the report onscreen, and this method is recommended. Use the wizard to lay out the report only if you expect retrieval from a large external data source to be slow, or you need to set [page fields](#) to retrieve data one page at a time. If you aren't sure, try laying out the report onscreen. You can return to the wizard if necessary.

6. Do one of the following:

[Lay out the report onscreen](#)

1. From the **PivotTable Field List** window, drag the fields with data that you want to display in rows to the drop area labeled Drop Row Fields Here.

If you don't see the field list, click within the outlines of the PivotTable drop areas, and make sure **Show Field List**  is pressed in.

To see what levels of detail are available in fields that have levels, the click  next to the field.

2. Drag fields with data that you want to display across columns to the drop area labeled Drop Column Fields Here.
3. Drag fields that contain the data that you want to summarize to the area labeled Drop Data Items Here.

Only fields that have the  or  icon can be dragged to this area.

If you add more than one data field, arrange these fields in the order you want: Right-click a data field, point to **Order** on the shortcut menu, and use the commands on the **Order** menu to move the field.

4. Drag fields that you want to use as page fields to the area labeled Drop Page Fields Here.
5. To rearrange fields, drag them from one area to another. To remove a field, drag it out of the PivotTable report.

To hide the drop area outlines, click a cell outside the PivotTable report.

**Note** If data is very slow to appear as you lay out the report, click **Always Display Items**  on the **PivotTable** toolbar to turn off initial data display. If retrieval is still very slow or error messages appear, click **PivotTable and PivotChart Report** on the **Data** menu, and lay out the report in the wizard.

 [Lay out the report in the wizard](#)

If you've exited from the wizard, click **PivotTable and PivotChart Report** on the **Data** menu to return to it.

1. In step 3 of the wizard, click **Layout**.
2. From the group of field buttons on the right, drag the fields that you want onto the ROW and COLUMN areas in the diagram.

3. Drag the fields that contain the data that you want to summarize onto the DATA area.
4. Drag fields that you want to use as page fields onto the PAGE area.

If you want Excel to retrieve data one page at a time, so you can work with large amounts of source data, double-click the page field, click **Advanced**, click **Query external data source as you select each page field item**, and then click **OK** twice. (This option is unavailable for some types of source data, including OLAP databases and Office Data Connections.)

5. To rearrange fields, drag them from one area to another. Some fields can only be used in some of the areas; if you drop a field in an area where it can't be used, the field won't appear in the area.
6. To remove a field, drag it out of the diagram.
7. When you are satisfied with the layout, click **OK**, and then click **Finish**.

[Show All](#)

# Select different source data for a PivotTable or PivotChart report

If you returned data from an Office Data Connection file (.odc extension) directly to a PivotTable report, or your report is based on [OLAP](#) source data, you cannot use different source data in the report.

1. Click the [PivotTable report](#). For a [PivotChart report](#), click the [associated PivotTable report](#).
2. On the **Data** menu, click **PivotTable and PivotChart Report**
3. In step 3 of the wizard, click **Back**.

If the **Back** button is unavailable, your report is based on OLAP data, and you cannot change it to use different source data. If you want a report based on a different OLAP [cube](#), create a new report.

4. In step 2 of the wizard, notice whether the report is based on an Microsoft Excel range (the step has an edit box labeled **Range:**) or external data (the step has a **Get Data** button), and then do one of the following:

[Specify a different Excel range](#)

1. If the data you want is on a different worksheet, click the worksheet.
2. Select the new source data range.

[Specify different external data](#)

1. Click **Get Data**.
  2. In Microsoft Query, make changes to the [query](#). For help with the specifics of changing the query, see Help in Microsoft Query.
  3. On the Query **File** menu, click **Return data to Microsoft Excel**.
5. Click **Finish**.
  6. Drag any new fields that you want to display from the **PivotTable Field List** window onto the report.

**Note** After you make this change to a PivotChart report or its associated PivotTable report, some chart formatting may be lost.

# Convert an Excel 4.0 crosstab table to a PivotTable report

1. Open the workbook that contains the crosstab table in the current version of Microsoft Excel
2. Click a cell in the crosstab table.
3. On the **Data** menu, click **PivotTable and PivotChart Report**.
4. Click **Finish**, and click **OK** in response to the prompts.
5. Save the workbook in the current version of Excel.

You cannot use **Undo**  to change the PivotTable report back to a crosstab table. If you want to keep a copy of the crosstab table, keep an extra copy of the Excel 4.0 file.

**Note** The new PivotTable report does not use the outline from the crosstab table. To remove the outline, point to **Group and Outline** on the **Data** menu, and then click **Clear Outline**.

[Show All](#)

# Delete a PivotTable report

1. Click the [PivotTable report](#).
2. On the **PivotTable** [toolbar](#), click **PivotTable**, point to **Select**, and then click **Entire Table**.
3. On the **Edit** menu, point to **Clear**, and then click **All**.

**Note** Deleting the [associated PivotTable report](#) for a [PivotChart report](#) freezes the chart so that you can no longer change it.

[Show All](#)

# Ways to customize PivotTable reports

You can customize the appearance and content of a PivotTable report to get the presentation you need. In a new report, first display the data you want to see, and then work on the appearance.

## [Adding and removing fields](#)

When you click a PivotTable report, blue drop area guidelines appear along with the **PivotTable** toolbar and the **PivotTable Field List** window, so that you can customize the report.

To add a field, you can drag it from the field list to the area of the report where you want it, or use the **Add To** button and dropdown in the field list. To remove a field, drag it out of the report or drag it back onto the field list. Fields that you remove remain available in the field list.

You can use fields with  icons in the field list only as [row](#), [column](#), or [page fields](#), and fields with  icons only as [data fields](#). If your fields have these icons, each field can be used in the report only once.

If your fields have  icons, you can use any field in any area, and you can add a field to both to the data area and to one of the row, column, or page areas, or display it more than once in the data area, as long as your report doesn't have any [calculated items](#).

You can change the order in which fields appear by dragging them, or in the case of multiple data fields, by using the **Order** commands on the **PivotTable** menu.

## [Changing the layout](#)

1

	A	B	C
1	Sales	Sport	
2	Region	Golf	Tennis
3	East	10,500	4,100
4	West	17,020	18,270
5	Grand Tot	27,520	22,370

2

3

	A	B	C
1	Sales		
2	Region	Sport	Total
3	East	Golf	10,500
4		Tennis	4,100
5	East Total		14,600
6	West	Golf	17,020
7		Tennis	18,270
8	West Total		35,290
9	Grand Total		49,890

- 1 Click a column field
- 2 Drag it to the row area
- 3 Sport becomes a row field like Region

When you move a field, it retains most settings you've made using the  arrow in the field or the **Field Settings** command, including [page field](#) options and layout settings. For example, if you set page field settings and move the field to the row area, then later move the field back to the page area, the settings remain in effect.

### [Indented and nonindented formats](#)

You can display a PivotTable report in an indented format similar to traditional banded or formatted database reports, in which the summarized data from each [data field](#) appears in a single column. New reports are displayed in a nonindented or crosstabulated format, with data field values in a grid. Switching to indented format may change the layout of the report, and it applies an [autoformat](#) to the report.

Use **Format Report**  on the **PivotTable** toolbar to select an indented or nonindented format. The autoformats available for other worksheet areas are not available for PivotTable reports.

**Indented formats** Formats **Report 1** through **Report 10** are indented formats. Applying these formats moves all column fields in the report to the row area. Data fields move to the right of [row fields](#), and the field names change to omit the summary function name. For example, Sum of Sales becomes Sales. After you apply a format, you can rearrange the fields as in any PivotTable report.

**Setting indented format manually** If you don't want to apply an autoforamt, you can move all column fields to the row area, double-click each row field, click **Layout**, and then click **Show items in outline form**. This setting is retained if you move the field to another area, but the field is displayed in indented format only when it is in the row area.

**Nonindented formats** Formats **PivotTable Classic** and **Table 1** through **Table 10** are nonindented, for use with PivotTable reports that have [column fields](#). **Table 1** through **Table 10** move the leftmost row field to the column area. **Table 1** through **Table 5** and **Table 7** also add a blank line after each item in the outermost row field.

## [Character, cell, and number formats](#)

You can change cell formats in a PivotTable report, such as font, background color, and alignment, as you do for other worksheet cells. You can set number formats for individual cells or for all cells of a data field.

Most formatting is retained when you [refresh](#) a report or change its layout, provided the **Preserve formatting** check box in the **PivotTable Options** dialog box is selected. Cell border changes, however, aren't retained.

**Changing what's displayed for errors and empty cells** Instead of displaying error values, such as #REF! or #N/A, and blanks for empty cells, you can specify different values for these cells in a PivotTable report.

**Using merged cells** By default, the labels for items in outer row and column fields appear left justified at the top of the item group. You can center the items horizontally and vertically by selecting the **Merge labels** check box in the **PivotTable Options** dialog box.

**Adding blank rows between item groups** For outer [row fields](#), you can add a blank line after each item or its total row.

**Removing formats** To remove all character and cell formats in a report, use the **None** format available from the **Format Report** command.

## [Sorting](#)

In a new report, the [items](#) in each field appear either in the order received from the source database, or in ascending order. [Refreshing](#) a report places new items at the ends of the rows or columns.

Microsoft Excel uses the following ascending sort order: numbers, text, logical values, error values such as #REF and #VALUE, and blank cells. When you sort in descending order, Excel sorts in the reverse order except for blank cells, which are always sorted last. If you want a sorting sequence such as Jan, Feb, Mar, and so forth, you can use a custom sort order, and you can also define your own sorting sequence.

If your report has fields organized in levels, you can sort lower-level items together by hiding the upper levels before you sort. For example, if you display both the Country and City levels, cities are sorted separately under each country, but if you hide the Country level, you can sort cities from different countries together.

You can manually reorder items by clicking and dragging the item labels.

## [Showing and hiding detail](#)

Your options for varying the amount of detail displayed in a report depend on the type of [source data](#) the report is based on.

For [OLAP](#) source data ( and  icons in the field list), fields are organized in levels of detail, and you can display and hide both individual items and entire levels. Summary values are usually calculated on the OLAP server, so underlying detail records for data values usually aren't available for display. However, your database may have other information available for items, called [property fields](#), that you can display or hide. For example, if your database has a City field, you might be able to display population or climate figures for individual cities.

For other types of source data () icons in the field list), you can display and hide

individual items and also display underlying detail records for data values and items, if this option hasn't been disabled. You can't directly select multiple items in a [page field](#), but you can move the field temporarily to the row or column area, hide some of the items, and move the field back to the page area, so that the **(All)** item then displays a summary that omits the hidden items.

For both types of source data, you can automatically display the top or bottom items in a field—for example, the top ten sales reps or the five least expensive products. If you set this type of display for an OLAP field, your setting affects only the current level and lower levels in the [dimension](#), and remains in effect only if you don't hide the level you set it for.

## [Grouping items](#)

You can use grouping to view less detailed summaries—for example, to view data by quarter instead of week. You can group dates, times, or numbers, and selected [items](#) in a report. Grouping works differently for different types of [source data](#).

For [OLAP](#) source data ( and  icons in the field list), when you select and group individual items, the rest of the items in the field appear in a group named Other. The new group and the Other group become another level of detail that you can show or hide, so that you can still display the individual items that you've grouped. To group items in a page field, you can move the field temporarily to the row or column area, group the items, and then move the field back to the page area. You can also select multiple page field items to display as a combined summary.

For other types of source data ( icons in the field list), when you select and group individual items, the items are combined in a new item named Group1 (which you can rename). You can't display the individual items unless you ungroup them. The rest of the items in the field are unchanged by adding the group. While items in a field are grouped, you can't add [calculated items](#) to the field. To group items in a page field, you can move the field temporarily to the row or column area, group the items, and then move the field back to the page area.

## [Totals, calculations, and formulas](#)

PivotTable and [PivotChart reports](#) provide several types of calculations. [Data fields](#) use [summary functions](#) to combine values from the underlying [source data](#). You can also use [custom calculations](#) to compare data values, or add your own formulas that use elements of the report or other worksheet data.

[How PivotTable and PivotChart reports summarize data](#)

Region	Month	Sales
South	May	8677
South	Apr	450
North	Apr	1500
South	May	3802
East	Mar	2741
North	Apr	9291
West	May	5477
East	May	5416
East	Apr	9136

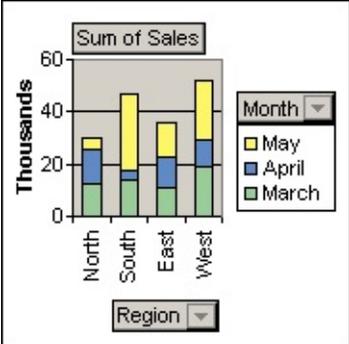
Source data

The values in the [data area](#) summarize the underlying source data in the report.

Sum of Sales	Month	
Region	March	April
North	12270	13559
South	13847	2928
East	11075	11034
West	18900	9643
Grand Total	56092	37164

PivotTable report made from the above source data

The Month [column field](#) provides [items](#) March and April. The Region [row field](#) provides items North, South, East, and West. The value at the intersection of the April column and the North row is the total sales revenue from the records in the source data that have Month values of April and Region values of North.



PivotChart report made from the example PivotTable report

In a PivotChart report, the Region field might be a [category field](#) that shows North, South, East, and West as categories. The Month field could be a [series field](#) that shows the items March, April, and May as series represented in the legend. A data field called Sum of Sales could contain [data markers](#) that represent the total revenue in each region for each month. For example, one data marker would represent, by its position on the [value axis](#), the total sales for April in the North region.

Values and calculations in a PivotChart report reflect those in the [associated PivotTable report](#), and vice versa.

**Custom calculations** A custom calculation shows values based on other items or cells in the data area. For example, you could display values in the Sum of Sales data field as a percentage of March sales, or as a running total of the items in the Month field.

**Formulas** If summary functions and custom calculations don't provide the results you want, you can create your own formulas in [calculated fields](#) and [calculated items](#). For example, you could add a calculated item with the formula for the sales commission, which could be different for each region. The report would then automatically include the commission in the subtotals and grand totals.



[How the type of source data affects calculations](#)

Calculations and options available in a report depend on whether the source data came from an [OLAP](#) database or another type of database.

**OLAP source data** For reports that are created from OLAP [cubes](#), the summarized values are precalculated on the OLAP server before Microsoft Excel displays the results. Therefore, you cannot change how these values are calculated from within the report. You cannot change the [summary function](#) used to calculate data fields or subtotals, or add [calculated fields](#) or [calculated items](#). If the OLAP server provides calculated fields, known as calculated members, you'll see these fields in the PivotTable field list. You'll also see any calculated fields and calculated items that are created by [macros](#) that were written in [Visual Basic for Applications](#) and stored in your workbook, but you won't be able to

change these fields or items. If you need additional types of calculations, contact your OLAP database administrator.

**Other types of source data** In reports based on other types of external data or on worksheet data, Microsoft Excel uses the Sum summary function to calculate data fields that contain numeric data, and the Count summary function to calculate data fields that contain text. You can choose a different summary function— such as Average, Max, or Min— to further analyze and customize your data. You can also create your own formulas that use elements of the report or other worksheet data, by creating a calculated field or a calculated item within a field.

**Hidden items in totals** For OLAP source data, you can include or exclude the values for hidden items when calculating subtotals and grand totals. For other types of source data, values for hidden items are excluded by default, but you can optionally include the hidden items from [page fields](#).

## [Formula syntax](#)

You can create formulas only in reports that are not based on [OLAP](#) source data.

Formulas are available in PivotChart reports and use the same syntax as those in PivotTable reports. For best results when working in a PivotChart report, create and edit formulas in the [associated PivotTable report](#), where you can see the individual values that make up your data, and then view the results in the PivotChart report.

**Formula elements** In formulas you create for [calculated fields](#) and [calculated items](#), you can use [operators](#) and expressions as you do in other worksheet formulas. You can use [constants](#) and refer to data from the report, but you cannot use cell references or defined [names](#). You cannot use worksheet [functions](#) that require cell references or defined names as arguments, and you cannot use [array](#) functions.

**Names in reports** Microsoft Excel provides names to identify the elements of a report in your formulas. The names are composed of the [field](#) and [item](#) names. In the following example, the data in range C3:C9 is named Dairy.

	A	B	C	D
1	Sales		Type	
2	Month	Region	Dairy	Meat
3	March	North	2242	4567
4		South	155	6127
5	March Total		2397	10694
6	April	North	9291	2768
7		South	2478	450
8	April Total		11769	3218
9	Grand Total		14166	13912

In a PivotChart report, the field names are displayed in the field buttons, and item names can be seen in each field drop-down list. Don't confuse these names with those you see in chart tips, which reflect series and data point names instead.

**Examples** A calculated field named Forecast could forecast future orders with a formula such as the following:

=Sales \* 1.2

A calculated item in the Type field that estimates sales for a new product based on Dairy sales could use a formula such as the following:

=Dairy \* 115%

**Formulas operate on sum totals, not individual records** Formulas for calculated fields operate on the sum of the underlying data for any fields in the formula. For example, the formula =Sales \* 1.2 multiplies the sum of the sales for each type and region by 1.2; it does not multiply each individual sale by 1.2 and then sum the multiplied amounts. Formulas for calculated items, however, operate on the individual records; the calculated item formula =Dairy \*115% multiplies each individual sale of Dairy times 115%, after which the multiplied amounts are summarized together in the [data area](#).

**Spaces, numbers, and symbols in names** In a name that includes more than one field, the fields can be in any order. In the example above, cells C6:D6 can be 'April North' or 'North April'. Use single quotation marks around names that are more than one word or include numbers or symbols.

**Totals** Formulas cannot refer to totals (such as March Total, April Total, and Grand Total in the example).

**Field names in item references** You can include the field name in a reference

to an item. The item name must be in square brackets— for example, Region[North]. Use this format to avoid #NAME? errors when two items in two different fields in a report have the same name. For example, if a report has an item named Meat in the Type field and another item named Meat in the Category field, you can prevent #NAME? errors by referring to the items as Type[Meat] and Category[Meat].

**Referring to items by position** You can refer to an item by its position in the report as currently sorted and displayed. Type[1] is Dairy, and Type[2] is Seafood. The item referred to in this way can change whenever the positions of items change or different items are displayed or hidden. Hidden items are not counted in this index.

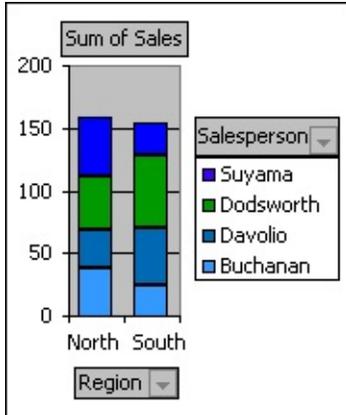
You can use relative positions to refer to items. The positions are determined relative to the calculated item that contains the formula. If South is the current region, Region[-1] is North; if North is the current region, Region[+1] is South. For example, a calculated item could use the formula =Region[-1] \* 3%. If the position you give is before the first item or after the last item in the field, the formula results in a #REF! error.

In calculated item formulas, if you refer to items by their position or relative position, any options you have set under **Top 10 AutoShow** and **AutoSort options** in the **PivotTable Sort and Top 10** or **PivotTable Field Advanced Options** dialog boxes are reset to **Off** or **Manual**, and the options become unavailable.

## [Using formulas in PivotChart reports](#)

The methods and rules used for creating formulas in PivotChart reports are the same as the rules for PivotTable reports. When you create a [calculated field](#) or [calculated item](#) in a PivotChart report, the calculations are reflected in the [associated PivotTable report](#), and vice versa. For best results, create formulas for a PivotChart report in the associated PivotTable report, where you can see the individual values that make up your data, and then view the results graphically in the PivotChart report.

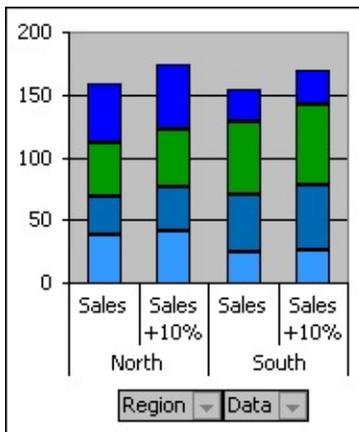
For example, the following PivotChart report shows sales for each salesperson per region:



To see what sales would look like if they were increased by 10 percent, you could create a calculated field with the following formula:

$$=Sales * 110\%$$

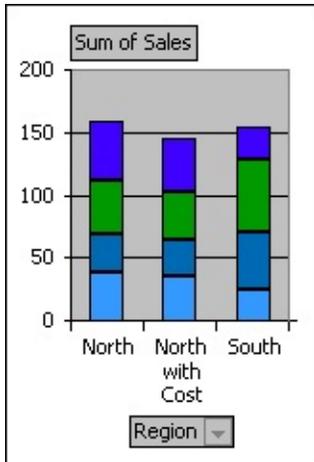
The result would be reflected in the chart like this:



To see a separate [data marker](#) for sales in the North region minus a transportation cost of 8 percent, you could create a calculated item in the Region field with the following formula:

$$=North - (North * 8\%)$$

The result would look like this:



A calculated item created in the Salesperson field, however, would appear as a series represented in the legend and appear in the chart as a data point in each category.

[Show All](#)

# Select data in a PivotTable report

When you apply formatting or change [calculated item](#) formulas in a [PivotTable report](#), you can select either individual cells or sections of the report. Changes you make to sections apply to the elements in the report, and remain in effect when you change the layout or view.

To select cells, use the regular Microsoft Excel selection pointer . To select sections of the report, position the mouse pointer at the tops or left sides of [field buttons](#) and [item](#) labels so that it changes to  or . If you don't see the pointer change shape, click **PivotTable** on the **PivotTable** toolbar, point to **Select**, and make sure **Enable Selection**  is turned on.

You can select the following:

## [Individual cells](#)

1. Point to the first cell you want to select, making sure the pointer is .
2. Click to select a single cell, or click and drag to select multiple cells.

## [An entire report](#)

1. Click the report.
2. Click **PivotTable** on the **PivotTable** toolbar.
3. Point to **Select**, and click **Entire Table**.

## [All items in a field](#)

Point to the top edge of the field button until the pointer changes to , and then click.



	A	B	C
1	Sales	Region ▼	
2	Sport ▼	East	West
3	Golf	5,000	3,500
4	Safari	9,000	

Point to the top of the Region button and then click once to select the East and West items.

[Item labels, data, or both](#)

1. Select the items.
2. Click **PivotTable** on the **PivotTable toolbar**.
3. Point to **Select**, and then click what you want to select:

**Label**  to select only the item labels.

**Data**  to select only the data for the items.

**Label and Data**  to select both.

[All instances of a single item](#)

Point to the top edge of a column field item until the pointer changes to ↓, or the left edge of a row field item until the pointer changes to →, and then click.

	A	B	C
1	Sales		Region ▼
2	Quarter ▼	Sport ▼	East
3	Qtr1 →	Golf	5,000
4		Safari	9,000
5		Tennis	1,500
6	Qtr1 Total		15,500
7	Qtr2	Golf	2,000
8		Safari	6,000

Clicking the left edge of Golf selects both rows for Golf.

[One instance of an item](#)

1. Point to the top edge of a column field item until the pointer changes to ↓,

or the left edge of a row field item until the pointer changes to →.

2. Click once, and then click additional times, waiting between clicks so that you do not double-click.

	A	B	C
1	Sales		Region ▾
2	Quarter ▾	Sport ▾	East
3	Qtr1 →	Golf	5,000
4		Safari	9,000
5		Tennis	1,500
6	Qtr1 Total		15,500
7	Qtr2	Golf	2,000
8		Safari	6,000

Click the left edge of Golf, then click again to select only the row for Qtr1 Golf.

If a PivotTable report has several [row fields](#), click repeatedly until you've selected only the items you want. For example, to select a single instance of an item in the innermost of four row fields, you would click four times.

#### [Multiple items](#)

1. Point to the top edge of a column field item until the pointer changes to ↓, or the left edge of a row field item until the pointer changes to →.
2. Click as many times as necessary to select one of the items you want (see "One instance of an item" above).
3. Hold down SHIFT and click, or hold down CTRL and click to select additional items within the same field.
4. To cancel selection of an item, hold down CTRL and click the item.

#### [Totals and grand totals](#)

1. Point to the top edge of a total in a column field until the pointer changes to ↓, or the left edge of a total in a row field until the pointer changes to →.
2. Click once to select all totals for the field, then click again to select only the current total.

[Show All](#)

# Change the layout of a PivotChart report

Decide whether to make the layout changes on the screen or in the wizard. Usually you can make changes on the screen. If changes result in long delays in retrieving and displaying data, use the wizard.

## [Change the layout on the screen](#)

1. Click the report.
2. Display the [field buttons](#) if they are hidden: click **PivotChart** on the **PivotTable toolbar** and make sure that the **Hide PivotChart Field Buttons** command is not checked.
3. Do one or more of the following:

## [Change the layout on the sheet](#)

1. To move a field from its current position to the series, category, or data area, drag the field button to a new position. For example, to swap the series and categories, drag the [series field](#) to the category area, and then drag the previous [category field](#) to the series area.

Fields with  icons in the **PivotTable Field List** window can be used only in the series, category, and page areas. Fields with  icons can be used only in the data area. Fields with  icons can be used in any area.

2. To create a [page field](#), drag the field to the page area at the top of the report.

## [Add or remove a field on the sheet](#)

1. If the **PivotTable Field List** window is not displayed, click **Show Field List**  on the **PivotTable** toolbar.

2. Do one or more of the following:

**Add a field** Drag the field from the **PivotTable Field List** window to the area of the report for the type of field you want to create.

Fields with  icons in the **PivotTable Field List** window can be used only in the series, category, and page areas. Fields with  icons can be used only in the data area. Fields with  icons can be used in any area.

**Remove a field** Drag the field button out of the report.

 [Use the wizard to change the layout](#)

1. Click the [associated PivotTable report](#) for the PivotChart report.
2. On the **Data** menu, click **PivotTable and PivotChart report**.
3. Click **Layout**.
4. To rearrange fields, drag them from one area to another in the diagram on the left.

Use the COLUMN area for [series fields](#) and the ROW area for [category fields](#).

5. To add fields, drag them from the list of fields on the right to the diagram.

Some fields can only be used in some of the areas. If you drop a field in an area where it can't be used, the field won't appear in the area.

6. To remove a field, drag it out of the diagram.
7. When you're finished changing the layout, click **OK**, and then click **Finish**.

**Note** Changing the layout of a PivotChart report also affects its [associated PivotTable report](#), and some chart formatting may be lost.

[Show All](#)

# Change the layout of a PivotTable report

1. Click the report.
2. If you have multiple [page fields](#), arrange them in rows or columns.

[How?](#)

1. On the **PivotTable** [toolbar](#), click **PivotTable**, and then click **Table Options**.
  2. In the **Page layout** list, click the order in which you want the page fields to appear.
  3. In the **Fields per row** or **Fields per column** box, enter the number of page fields that you want in each row or column.
3. Decide whether to make the layout changes onscreen or in the wizard. Usually you can make changes on the worksheet. If changes result in long delays to retrieve and display data, use the wizard.

If you can work onscreen, do one or more of the following:

[Change the layout on the worksheet](#)

1. If you don't see the blue [drop area](#) outlines, click **Show Field List**  on the **PivotTable** toolbar to display the field list.
2. To move a field from its current position to the row, column, or data area, drag the [field button](#) to a new position.

Fields with  icons in the **PivotTable Field List** window can be used only in the row, column, and page areas. Fields with  icons can be used only in the data area. Fields with  icons can be used in any area.

3. To create a page field, drag the field to the page area at the top of the report.

If the page area is missing (row or column fields start in row 1), use the wizard to change the layout and create page fields.

4. To change the order of the [items](#) within a [row](#) or [column field](#), click an item label, and then point to the bottom border of the cell. When the pointer becomes an arrow, drag the item to a new position:



	Sport	Qtr1
5	Golf	8,500
6	Safari	9,000
7	Tennis	7,500

5. To change the order of the [data fields](#), right-click one, point to **Order** on the shortcut menu, and use the commands on the **Order** menu to move the field.

You can also click a data field and then point to the bottom border of the cell. When the pointer becomes an arrow, drag the data field to a new position.

[Add or remove a field on the worksheet](#)

**Add a field** Drag the field from the **PivotTable Field List** window to the area of the report for the type of field that you want to create.

Fields with  icons in the **PivotTable Field List** window can be used only in the row, column, and page areas. Fields with  icons can be used only in the data area. Fields with  icons can be used in any area.

**Remove a field** Drag the field button out of the report.

If you can't work onscreen:

[Use the wizard to change layout and add and remove fields](#)

1. On the **Data** menu, click **PivotTable and PivotChart report**.
2. Click **Layout**.
3. To rearrange fields, drag them from one area to another in the diagram on the left.
4. To add fields, drag them from the list of fields on the right to the diagram.

Some fields can only be used in some of the areas. If you drop a field in an area where it can't be used, the field won't appear in the area.

5. To remove a field, drag it out of the diagram.
6. When you're finished changing the layout, click **OK**, and then click **Finish**.

## Notes

- **Format Report**  can also affect the layout of the report.
- Changing the layout of a PivotTable report also affects any PivotChart reports that are based on the report, and some chart formatting may be lost.

[Show All](#)

# Format a PivotTable report

Do one or more of the following:

## [Apply indented or nonindented format](#)

1. Click the report.
2. On the **PivotTable** toolbar, click **Format Report** .
3. Do one of the following:

To apply an indented format, click one of options **Report 1** through **Report 10**. These options both apply formatting and move any [column fields](#) in your report to the row area.

To apply a nonindented (crosstabulated) format, click one of options **Table 1** through **Table 10** or **PivotTable Classic**, the default format for new reports. Options **Table 1** through **Table 10** also move the leftmost [row field](#) to the column area.

**Note** To restore the report to its previous layout, click **Undo**  immediately after applying a new format.

## [Display subtotals above or below their items](#)

1. Double-click the outer [row field](#) for which you want to reposition the subtotals.
2. If subtotals aren't turned on, click **Automatic** or **Custom**.
3. Click **Layout**, and then click **Show items in outline form**.
4. To display subtotals above the subtotaed [items](#), select the **Display subtotals at top of group** check box.

To display subtotals below the items, clear the check box.

## [Display or hide blank rows after row field items](#)

1. Double-click the outer [row field](#) for which you want to add or remove blank

rows between [items](#).

2. Click **Layout**.
3. To add or remove the blank rows, select or clear the **Insert blank line after each item** check box.

**Note** You can apply character and cell formatting to the blank rows, but you can't enter data in them.

#### [Use merged or regular cells for outer row and column items](#)

1. Click the report.
2. On the **PivotTable** toolbar, click **PivotTable**, and then click **Table Options**.
3. To use merged cells for outer row and column [items](#), select the **Merge labels** check box.

To use regular cells, clear the check box.

#### [Change the data area number format](#)

1. Click a cell in the data area.
2. On the **PivotTable** toolbar, click **Field Settings** .
3. Click **Number**.
4. In the **Category** list, click the format category you want.
5. Select the options you want for the format, and then click **OK** twice.
6. If the report has more than one [data field](#), repeat these steps for each one.

#### [Change how errors and empty cells are displayed](#)

1. Click the report.
2. On the **PivotTable** toolbar, click **PivotTable**, and then click **Table Options**.
3. Do one or more of the following:

**Change error display** Select the **For error values, show** check box under **Format options**. In the box, type the value you want to display instead of errors. To display errors as blank cells, delete any characters in the box.

**Change empty cell display** Select the **For empty cells, show** check box. In the box, type the value you want to display in empty cells. To display

blank cells, delete any characters in the box. To display zeros, clear the check box.

### [Change other character and cell formatting](#)

1. Make sure formatting will be preserved if you [refresh](#) the report or change its layout: click the report, click **PivotTable** on the **PivotTable** toolbar, click **Table Options**, and then select the **Preserve formatting** check box.
2. Select the part of the PivotTable report you want to format.

If you want formatting applied to all such parts, so that when layout changes display parts not currently onscreen, those parts also have the formatting, click the **(All)** item in the dropdown lists for any [page fields](#), and then make sure the mouse pointer changes to → or ↓ before you click the part you're selecting.

3. To apply the formatting changes you want, use the buttons on the **Formatting** toolbar and the commands on the **Format** menu.

**Note** [Conditional formatting](#) and cell borders aren't preserved when you refresh or change the layout.

### [Return a report to the default formatting](#)

1. Click **PivotTable** on the **PivotTable** toolbar.
2. Click **Table Options**.
3. Clear the **AutoFormat table** check box, and then click **OK**.
4. Click **Format Report**  on the **PivotTable** toolbar.
5. Click the **PivotTable Classic** format.

### [Remove all formatting from a report](#)

1. Click **PivotTable** on the **PivotTable** toolbar.
2. Click **Table Options**.
3. Clear the **AutoFormat table** check box, and then click **OK**.
4. Click **Format Report**  on the **PivotTable** toolbar.

5. Click the **None** format.

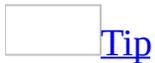
**Note** When you change formatting in a PivotTable report, some formatting may be lost in PivotChart reports based on it.

[Show All](#)

# Show or hide field buttons in a PivotChart report

Hiding the [field buttons](#) also hides the page field [drop area](#), if your report doesn't have any [page fields](#).

1. Click the PivotChart report.
2. On the **PivotTable** [toolbar](#), click **PivotChart**, and then select or clear the **Hide PivotChart Field Buttons** command.



If you hide field buttons but want to label elements of your chart that were previously identified by field button names, you can add axis titles or text boxes to the chart.

[Show All](#)

# Sort a PivotTable or PivotChart report

Microsoft Excel uses the following order for ascending sort: numbers, text, logical values, error values such as #REF! and #VALUE!, and then blank cells. Descending order is the reverse, except for blank cells, which are always sorted last.

1. Click the [field](#) with the [items](#) you want to sort.

For a [PivotChart report](#), click the field in the [associated PivotTable report](#). To sort items in a series field, click the corresponding [column field](#). To sort items in a category field, click the corresponding [row field](#).

2. Do one of the following:

[Sort the items ascending or descending](#)

1. On the **PivotTable** toolbar, click **PivotTable**, and then click **Sort and Top 10**.
2. Under **AutoSort options**, click **Ascending** or **Descending**.
3. In the **Using field** list, do one of the following:

To sort the items by their labels, click the same field that you're sorting.

To sort the items by their values in the [data area](#), click the [data field](#) that supplies the values you want to sort on.

**Note** When you [refresh](#) the report or change its layout, Excel resorts the field in the order you specified.

[Sort the items by a particular data value](#)

1. Click the cell in the [data area](#) that contains the value you want to sort by. For example, if you want to sort your products by a particular

- month's sales value, click the value for that month in the data area.
2. On the **Data** menu, click **Sort**.
  3. Select any options you want, and then click **OK**.

**Note** You'll need to repeat the sort if you [refresh](#) or update the report.

[Sort the items in a custom order](#)

The custom order is not retained if you [refresh](#) the report.

1. On the **Data** menu, click **Sort**.
2. Click **Options**.
3. In the **First key sort order** box, click an option.

If you don't see the option you want, you can create your own custom sort order by clicking **Options** on the **Tools** menu and using the **Custom Lists** tab.

**Note** You can organize items in a custom order manually by selecting and dragging them.

[Stop sorting or return the items to their original order](#)

1. On the **PivotTable** toolbar, click **PivotTable**, and then click **Sort and Top 10**.
2. Under **AutoSort options**, click **Manual** to stop automatic sorting or **Data source order** to return the items to their original order.

**Note** After you sort a PivotChart report or its associated PivotTable report, some chart formatting may be lost.

[Tip](#)

In a field that's organized in levels, you can sort all the items for a lower level together by hiding the upper levels before you sort. To hide an upper level, right-click it and then click **Hide Levels** on the shortcut menu.

[Show All](#)

# Change the amount of detail displayed in a PivotChart report

Determine what kind of [source data](#) your report has: click the report, if the field list is not displayed click **Show Field List**  on the **PivotTable toolbar**, and look at the **PivotTable Field List** window.

- If the field list has  and  icons, the report has [OLAP](#) source data.
- If the field list has  icons, the report does not have OLAP source data.

**For OLAP reports, do one or more of the following:**

## [Display or hide different levels of detail for a field](#)

1. Click the [associated PivotTable report](#) for the PivotChart report.
2. Click the field.
3. To display or hide lower-level detail, click **Show Detail**  or **Hide Detail**  on the **PivotTable toolbar**.
4. To hide upper levels of detail, right-click the [field button](#) for the lowest level you want to hide, and then click **Hide levels** on the shortcut menu.

The level you clicked and all higher levels in the [dimension](#) are removed from view, and the dropdown arrow  is also hidden.

To redisplay hidden upper levels, right-click any field button in the dimension, and then click **Show levels** on the shortcut menu.

**Note** If you hide and then redisplay levels, any renamed items revert to their original names.

## [Display or hide property fields](#)

1. Click the [associated PivotTable report](#) for the PivotChart report.
2. Click the field for which you want to display [property fields](#).

3. On the **PivotTable** toolbar, click **PivotTable**, and then click **Property Fields**.
4. In the **Choose properties from level** list, click each level for which you want to display property fields, and then double-click the property fields you want to see.
5. In the **Properties to display** box, use the  and  buttons to arrange the property fields in the order you want them to appear in the report.
6. Make sure the **Show fields for this dimension in outline form** check box is selected, and then click **OK**.
7. If the levels for which you selected property fields aren't displayed in the report, click the field and then click **Show Detail**  on the **PivotTable** toolbar.

**For non-OLAP reports, do one or more of the following:**

[Display or hide series detail](#)

1. Click the [associated PivotTable report](#) for the PivotChart report.
2. Click the [column field](#) for the [series](#) for which you want to show or hide detail.
3. On the **PivotTable** toolbar, click **Show Detail**  or **Hide Detail** .
4. If prompted, double-click the field that has the detail you want to show.

[Display or hide category item detail](#)

1. Right-click the category label for which you want to show or hide detail, or in a pie or doughnut chart, click the slice or ring for which you want to show or hide detail.
2. On the shortcut menu, click **Show detail *category name*** or **Hide detail *category name***.
3. If prompted, double-click the field that has the detail you want to show.

**Note** When you change the amount of detail displayed in a PivotChart report, some chart formatting may be lost.

[Show All](#)

# Change the amount of detail displayed in a PivotTable report

1. Determine what kind of [source data](#) your report has: click the report, if the field list is not displayed click **Show Field List**  on the **PivotTable** toolbar, and look at the **PivotTable Field List** window.

If the field list has  and  icons, the report has [OLAP](#) source data.

If the field list has  icons, the report does not have OLAP source data.

2. For OLAP reports, display or hide different levels of detail for a field.

 [How?](#)

1. Click the field.
2. To display or hide lower-level detail, click **Show Detail**  or **Hide Detail**  on the **PivotTable** toolbar.
3. To hide upper levels of detail, right-click the [field button](#) for the lowest level you want to hide, and then click **Hide levels** on the shortcut menu.

The level you clicked and all higher levels in the [dimension](#) are removed from view, and the dropdown arrow  is also hidden.

To redisplay hidden upper levels, right-click any field button in the dimension, and then click **Show levels** on the shortcut menu.

**Note** If you hide and then redisplay levels, any renamed items revert to their original names.

For non-OLAP reports, do one or more of the following:

 [Display or hide detail data for an item](#)

1. Click the item.

2. On the **PivotTable** toolbar, click **Show Detail**  or **Hide Detail** .
3. If prompted, click the field that has the detail data you want to see.

### [Display or hide detail for a data cell](#)

1. Double-click a cell in the [data area](#).

Microsoft Excel places the detail data summarized in the cell on a new worksheet.

2. To hide the detail data, delete the new worksheet.

**Note** To prevent access to this detail, click **PivotTable** on the **PivotTable** toolbar, click **Table Options**, and then clear the **Enable drill to details** check box.

3. For OLAP reports, display or hide [property fields](#), if available from your server cube.

### [How?](#)

1. Click the field in the dimension for which you want to display property fields.
2. On the **PivotTable** toolbar, click **PivotTable**, and then click **Property Fields**.
3. In the **Choose properties from level** list, click each level for which you want to display property fields, and then double-click the property fields you want to see.
4. In the **Properties to display** box, use the  and  buttons to arrange the property fields in the order you want them to appear in the report.
5. Make sure the **Show fields for this dimension in outline form** check box is selected, and then click **OK**.
6. If the levels for which you selected property fields aren't displayed in the report, click the field and then click **Show Detail**  on the **PivotTable** toolbar.

**Note** In column fields, property fields are only displayed for [items](#) in the lowest level of detail displayed in the report. To display property fields for other levels, move the field to the row area.

[Show All](#)

# Display a different page in a PivotTable or PivotChart page field

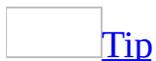
1. Click the arrow  in the cell with the [item](#) currently displayed in the page field.
2. Do one of the following:

**Select a single item** Click the item you want. In fields organized in levels, click  beside a level to display the lower-level items, or click  to display higher-level items, until the item you want appears in the list.

**Select multiple items** In reports based on [OLAP](#) source data, click the **Select multiple items** check box, and then click the items you want. In other types of reports, where this check box is not present, click **OK** and then double-click the field and hold down CTRL while you click the items you don't want to select in the **Hide items** box.

**Display the summary of all items** Click **(All)**, if available. This option is unavailable for some source databases, or if the page field options are set to query the data for each item separately. To check the page field options, click **Field Settings**  on the **PivotTable toolbar**, and then click **Advanced**.

**Note** When you display a different page in a PivotChart report or its [associated PivotTable report](#), some chart formatting may be lost.



For some kinds of source data, you can display each PivotTable page on a separate worksheet. Click the report, click **PivotTable** on the **PivotTable toolbar**, and then click **Show Pages**. If the report has more than one page field, click the one you want.

[Show All](#)

# Display or hide items in a PivotTable or PivotChart field

Hiding an item in a [row field](#) or [column field](#) removes it from the report, but the item still appears in the dropdown list for the field. Hiding an item in a [page field](#) removes it both from the report and from the dropdown list for the field.

Do one or more of the following:

## [Display the top or bottom items in a field](#)

1. Click the field. For a PivotChart report, click the field in its [associated PivotTable report](#).
2. On the **PivotTable** toolbar, click **PivotTable**, and then click **Sort and Top 10**.
3. Under **Top 10 AutoShow**, click **On**.
4. In the **Show** box, click **Top** or **Bottom**, and in the box to the right, enter the number of items to display.
5. In the **Using field** box, click the [data field](#) to use to calculate the top or bottom items.

## [Display or hide items in a row \(category\) or column \(series\) field](#)

1. Click the arrow  in the field.
2. Select the check box for each item that you want to show, and clear the check box for each item that you want to hide.

For fields that are organized in levels, click  to list lower-level items so that you can display or hide them individually. The double-check  indicates that some or all of the lower-level items are displayed, single-check indicates that only the checked item is displayed, and cleared indicates that neither the item nor its lower-level items are displayed.

3. To show or hide items that have no data, double-click the field, and then in the **PivotTable Field** dialog box, select or clear the **Show items with no**

**data** check box. (Some types of [source data](#) don't support this option.)

For example, if there were no sales in April, you will see an item for April sales only if you show items with no data.

#### [Display or hide items in a page field](#)

1. Double-click the page field.
2. If the **Hide items** box is present, select each item that you want to hide, and clear the selection from each item that you want to show.

If the **Hide items** box is missing, your [source data](#) always lists all available items in the dropdown list for the page field.

3. To show or hide items that have no data, select or clear the **Show items with no data** check box. (Some types of [source data](#) don't support this option.)

For example, if there were no sales in April, you will see an item for April sales only if you show items with no data.

#### [Redisplay hidden items in a field](#)

1. Double-click the field.
2. In the **PivotTable Field** dialog box, click **Advanced**.
3. Under **Top 10 AutoShow**, click **Off**.
4. Click **OK**, and if the **Hide items** box is present and has items selected, clear selection from all such items.
5. If the field is a row (category) or column (series) field, click its arrow , and then click **(Show All)**.

**Note** When you display or hide items in a PivotChart report or its [associated PivotTable report](#), some chart formatting may be lost.

#### [Tip](#)

When calculating subtotals and grand totals in PivotTable reports, you can include or exclude the hidden items. On the **PivotTable** toolbar, click **Include Hidden Items in Totals** . If this button is unavailable, your source

data allows you to include or exclude hidden items in page fields: click **PivotTable**, click **Table Options**, and then select or clear the **Subtotal hidden page items** check box.

[Show All](#)

# Group items in a PivotTable or PivotChart field

1. If the field is a [page field](#), check the page field settings, and then move it temporarily to the row or column area.

[How?](#)

For a PivotChart report, work in the [associated PivotTable report](#).

1. Double-click the page field.
  2. Click **Advanced**.
  3. Make sure the **Retrieve external data for all page field items** option is either selected or unavailable.
  4. Click **OK** twice.
  5. Drag the page field to the row or column area.
2. Do one of the following:

[Group numeric items](#)

1. Right-click the field with the numeric items, point to **Group and Show Details** on the shortcut menu, and then click **Group**.
2. In the **Starting at** box, enter the first item to group.
3. In the **Ending at** box, enter the last item to group.
4. In the **By** box, type the number of items that you want in each group.

[Group dates or times](#)

1. Right-click the field with the dates or times, point to **Group and Show Details** on the shortcut menu, and then click **Group**.
2. Enter the first date or time to group in the **Starting at** box, and enter the last date or time to group in the **Ending at** box.
3. In the **By** box, click one or more time periods for the groups.

To group items by weeks, click **Days** in the **By** box, make sure **Days** is the only time period selected, and then click **7** in the **Number of days** box. You can then click additional time periods to group by, such as **Month**, if you want.

#### [Group selected items](#)

1. Select the items to group, either by clicking and dragging, or by holding down CTRL or SHIFT while you click.

For a PivotChart report, select the items in the [associated PivotTable report](#).

2. Right-click the selected items, point to **Group and Show Details** on the shortcut menu, and then click **Group**.

**Note** For fields organized in levels, you can only group items that all have the same next-level item. For example, if the field has levels Country and City, you can't group cities from different countries.

#### [Ungroup items](#)

- Right-click the group, point to **Group and Show Details** on the shortcut menu, and then click **Ungroup**.

In a numeric or date/time field, right-click any group; Excel then ungroups all groups for the field.

3. If the field was formerly a page field, drag it back to the page area.

### Notes

- Grouping numeric [items](#), dates, and times is unavailable for some types of [source data](#).
- When you group or ungroup items in a PivotChart report or its associated PivotTable report, some chart formatting may be lost.

[Show All](#)

# Rename a PivotTable field or item

1. Click the [field](#) or [item](#) you want to rename.
2. Type a new name.
3. Press ENTER.

## Notes

- If you hide and then redisplay levels in PivotTable reports based on [OLAP](#) source data, any renamed fields or items revert to their original names.
- Renaming a numeric item changes it to text, which sorts separately from numeric values and can't be grouped with numeric items.

[Show All](#)

# Rename a field or item in a PivotChart report

## [Rename a field](#)

1. Double-click the [field button](#) for the field you want to rename.
2. In the **PivotTable Field** dialog box, type a new name in the **Name** box.

## [Rename an item](#)

1. Click the [associated PivotTable report](#) for the PivotChart report.
2. Click the item you want to rename.
3. Type a new name and press ENTER.

[Show All](#)

# About printing a PivotTable report

In addition to the print settings on the **Page Setup** dialog box, which apply to all worksheets, Microsoft Excel has print settings that are specific to PivotTable reports. These settings are particularly helpful when you print large reports in indented format (any of formats Report 1 through Report 10, available when you click **Format Report**  on the **PivotTable** toolbar).

To use these settings, you must have only one report on the worksheet, or set a [print area](#) that includes only one report.

## [Using row and column labels as print titles](#)

You can repeat the row and column labels of a report on every printed page. These labels include the field and item labels for all [row](#), [column](#), and [data fields](#). When you change the layout of the report so that the labels are in different worksheet rows and columns, the new label rows and columns are repeated automatically the next time you print the report.

To set this feature, you must first remove any worksheet [print titles](#) you set on the **Sheet** tab in the **Page Setup** dialog box.

## [Repeating item labels for outer row fields](#)

When you have multiple [row fields](#) and a page break falls within a group of row field [items](#), you can automatically repeat the item labels for the outer fields at the top of the next page. In the example below, you might want items East and Qtr2 from outer row fields Region and Qtr to print on the next page after the page break:

Region	Qtr	Sport	Sales
East			
	Qtr1	Golf	5,000
		Tennis	1,500
	Qtr1 Total		6,500
	Qtr2	Golf	2,000
		Safari	6,000
		Tennis	500
	Qtr2 Total		8,500



- 1 Page break within an item group
- 2 Item labels from outer row fields repeat on page 2

### [Setting page breaks per item](#)

You can set automatic page breaks to print each item in an outer [row field](#) on a separate page. (In a report with two or more row fields, all but the rightmost one are outer row fields.)

You can then adjust individual page breaks by moving them, so that they become manual page breaks, or by deleting them. You can also add new manual page breaks.

[Show All](#)

# Print a PivotTable report

1. If you have more than one [PivotTable report](#) on the worksheet, set a [print area](#) that includes only the report you want to print.

[How?](#)

1. Click the report.
2. On the **PivotTable** toolbar, click **PivotTable**, point to **Select**, and then click **Entire Table**.
3. On the **File** menu, point to **Print Area**, and then click **Set Print Area**.
2. On the **File** menu, click **Page Setup**, and adjust the page settings, sheet settings, margins, and headers and footers.
3. If you want to repeat the row and column labels from the report on each page as [print titles](#), clear the **Rows to repeat at top** and **Columns to repeat at left** boxes, and then set PivotTable print titles.

[How?](#)

1. On the **PivotTable** toolbar, click **PivotTable**, and then click **Table Options**.
2. **Under Format options**, select the **Set print titles** check box.
3. If your report has more than one [row field](#) and you also want to repeat outer row field [items](#) on each page, select the **Repeat item labels on each printed page** check box.
4. If your report has more than one [row field](#) and you want automatic page breaks after each [item](#) in one or more outer row fields, set these page breaks.

[How?](#)

1. Double-click the outer row field that has the items you want to print on separate pages.
2. Click **Layout**.
3. Select the **Insert page break after each item** check box.
5. On the **View** menu, click **Page Break Preview**, and make any adjustments

you want to the page breaks.

You can insert new manual page breaks and move and delete automatic page breaks.

6. On the **File** menu, click **Print Preview**, and check your print layout. To make adjustments, you can repeat any of the previous steps as needed.
7. When the preview looks correct, click **Print**.

[Show All](#)

# About calculations and formulas in PivotTable and PivotChart reports

PivotTable and [PivotChart reports](#) provide several types of calculations. [Data fields](#) use [summary functions](#) to combine values from the underlying [source data](#). You can also use [custom calculations](#) to compare data values, or add your own formulas that use elements of the report or other worksheet data.

 [How PivotTable and PivotChart reports summarize data](#)

Region	Month	Sales
South	May	8677
South	Apr	450
North	Apr	1500
South	May	3802
East	Mar	2741
North	Apr	9291
West	May	5477
East	May	5416
East	Apr	9136

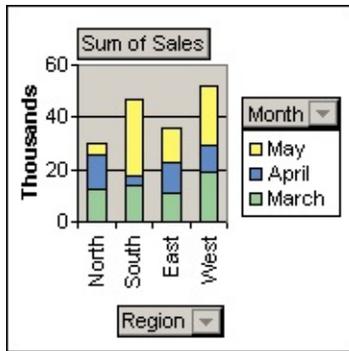
Source data

The values in the [data area](#) summarize the underlying source data in the report.

Sum of Sales	Month	
Region	March	April
North	12270	13559
South	13847	2928
East	11075	11034
West	18900	9643
Grand Total	56092	37164

PivotTable report made from the above source data

The Month [column field](#) provides [items](#) March and April. The Region [row field](#) provides items North, South, East, and West. The value at the intersection of the April column and the North row is the total sales revenue from the records in the source data that have Month values of April and Region values of North.



PivotChart report made from the example PivotTable report

In a PivotChart report, the Region field might be a [category field](#) that shows North, South, East, and West as categories. The Month field could be a [series field](#) that shows the items March, April, and May as series represented in the legend. A data field called Sum of Sales could contain [data markers](#) that represent the total revenue in each region for each month. For example, one data marker would represent, by its position on the [value axis](#), the total sales for April in the North region.

Values and calculations in a PivotChart report reflect those in the [associated PivotTable report](#), and vice versa.

**Custom calculations** A custom calculation shows values based on other items or cells in the data area. For example, you could display values in the Sum of Sales data field as a percentage of March sales, or as a running total of the items in the Month field.

**Formulas** If summary functions and custom calculations don't provide the results you want, you can create your own formulas in [calculated fields](#) and [calculated items](#). For example, you could add a calculated item with the formula for the sales commission, which could be different for each region. The report would then automatically include the commission in the subtotals and grand totals.

[How the type of source data affects calculations](#)

Calculations and options available in a report depend on whether the source data came from an [OLAP](#) database or another type of database.

**OLAP source data** For reports that are created from OLAP [cubes](#), the summarized values are precalculated on the OLAP server before Microsoft Excel displays the results. Therefore, you cannot change how these values are calculated from within the report. You cannot change the summary function used to calculate data fields or subtotals, or add [calculated fields](#) or [calculated items](#). If the OLAP server provides calculated fields, known as calculated members, you'll see these fields in the PivotTable field list. You'll also see any calculated fields and calculated items that are created by [macros](#) that were written in [Visual Basic for Applications](#) and stored in your workbook, but you won't be able to change these fields or items. If you need additional types of calculations, contact your OLAP database administrator.

**Other types of source data** In reports based on other types of external data or on worksheet data, Microsoft Excel uses the Sum summary function to calculate data fields that contain numeric data, and the Count summary function to calculate data fields that contain text. You can choose a different summary function— such as Average, Max, or Min— to further analyze and customize your data. You can also create your own formulas that use elements of the report or other worksheet data, by creating a calculated field or a calculated item within a field.

**Hidden items in totals** For OLAP source data, you can include or exclude the values for hidden items when calculating subtotals and grand totals. For other types of source data, values for hidden items are excluded by default, but you can optionally include the hidden items from [page fields](#).

 [Formula syntax](#)

You can create formulas only in reports that are not based on [OLAP](#) source data.

Formulas are available in PivotChart reports and use the same syntax as those in PivotTable reports. For best results when working in a PivotChart report, create and edit formulas in the [associated PivotTable report](#), where you can see the individual values that make up your data, and then view the results in the PivotChart report.

**Formula elements** In formulas you create for [calculated fields](#) and [calculated items](#), you can use [operators](#) and expressions as you do in other worksheet formulas. You can use [constants](#) and refer to data from the report, but you cannot

use cell references or defined [names](#). You cannot use worksheet [functions](#) that require cell references or defined names as arguments, and you cannot use [array](#) functions.

**Names in reports** Microsoft Excel provides names to identify the elements of a report in your formulas. The names are composed of the [field](#) and [item](#) names. In the following example, the data in range C3:C9 is named Dairy.

	A	B	C	D
1	Sales		Type	
2	Month	Region	Dairy	Meat
3	March	North	2242	4567
4		South	155	6127
5	March Total		2397	10694
6	April	North	9291	2768
7		South	2478	450
8	April Total		11769	3218
9	Grand Total		14166	13912

In a PivotChart report, the field names are displayed in the field buttons, and item names can be seen in each field drop-down list. Don't confuse these names with those you see in chart tips, which reflect series and data point names instead.

**Examples** A calculated field named Forecast could forecast future orders with a formula such as the following:

=Sales \* 1.2

A calculated item in the Type field that estimates sales for a new product based on Dairy sales could use a formula such as the following:

=Dairy \* 115%

**Formulas operate on sum totals, not individual records** Formulas for calculated fields operate on the sum of the underlying data for any fields in the formula. For example, the formula =Sales \* 1.2 multiplies the sum of the sales for each type and region by 1.2; it does not multiply each individual sale by 1.2 and then sum the multiplied amounts. Formulas for calculated items, however, operate on the individual records; the calculated item formula =Dairy \*115% multiplies each individual sale of Dairy times 115%, after which the multiplied amounts are summarized together in the [data area](#).

**Spaces, numbers, and symbols in names** In a name that includes more than

one field, the fields can be in any order. In the example above, cells C6:D6 can be 'April North' or 'North April'. Use single quotation marks around names that are more than one word or include numbers or symbols.

**Totals** Formulas cannot refer to totals (such as March Total, April Total, and Grand Total in the example).

**Field names in item references** You can include the field name in a reference to an item. The item name must be in square brackets— for example, Region[North]. Use this format to avoid #NAME? errors when two items in two different fields in a report have the same name. For example, if a report has an item named Meat in the Type field and another item named Meat in the Category field, you can prevent #NAME? errors by referring to the items as Type[Meat] and Category[Meat].

**Referring to items by position** You can refer to an item by its position in the report as currently sorted and displayed. Type[1] is Dairy, and Type[2] is Seafood. The item referred to in this way can change whenever the positions of items change or different items are displayed or hidden. Hidden items are not counted in this index.

You can use relative positions to refer to items. The positions are determined relative to the calculated item that contains the formula. If South is the current region, Region[-1] is North; if North is the current region, Region[+1] is South. For example, a calculated item could use the formula =Region[-1] \* 3%. If the position you give is before the first item or after the last item in the field, the formula results in a #REF! error.

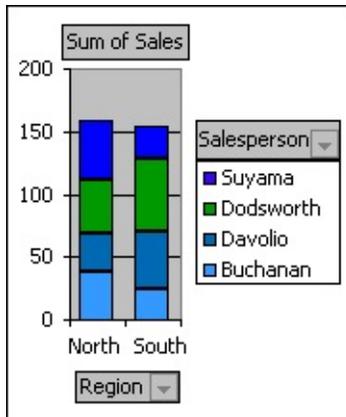
In calculated item formulas, if you refer to items by their position or relative position, any options you have set under **Top 10 AutoShow** and **AutoSort options** in the **PivotTable Sort and Top 10** or **PivotTable Field Advanced Options** dialog boxes are reset to **Off** or **Manual**, and the options become unavailable.

 [Using formulas in PivotChart reports](#)

The methods and rules used for creating formulas in PivotChart reports are the same as the rules for PivotTable reports. When you create a [calculated field](#) or [calculated item](#) in a PivotChart report, the calculations are reflected in the

[associated PivotTable report](#), and vice versa. For best results, create formulas for a PivotChart report in the associated PivotTable report, where you can see the individual values that make up your data, and then view the results graphically in the PivotChart report.

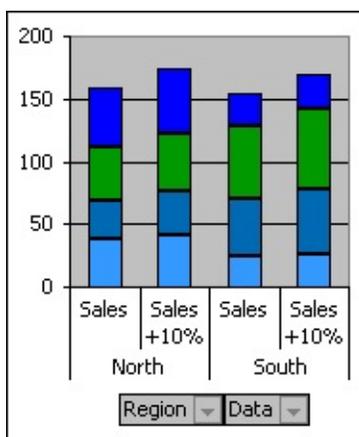
For example, the following PivotChart report shows sales for each salesperson per region:



To see what sales would look like if they were increased by 10 percent, you could create a calculated field with the following formula:

$$=Sales * 110\%$$

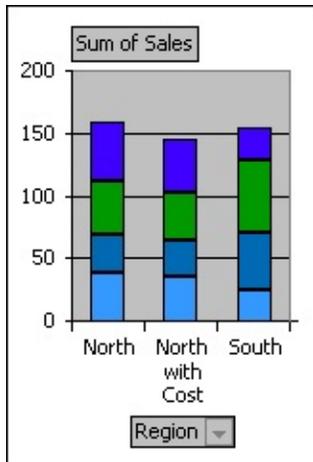
The result would be reflected in the chart like this:



To see a separate [data marker](#) for sales in the North region minus a transportation cost of 8 percent, you could create a calculated item in the Region field with the following formula:

$$= \text{North} - (\text{North} * 8\%)$$

The result would look like this:



A calculated item created in the Salesperson field, however, would appear as a series represented in the legend and appear in the chart as a data point in each category.

[Show All](#)

# Display or hide totals in a PivotTable report

Do one or more of the following:

## [Display subtotals for individual fields](#)

1. Double-click the field.
2. Do one of the following:

**Subtotal an outer row or column field** Click **Automatic** under **Subtotals**. To use a different [summary function](#) or display more than one type of subtotal, click the summary function you want in the box to the right of **Custom** (this option is unavailable for some types of [source data](#)).

**Subtotal an inner row or column field** Click **Custom** under **Subtotals**, if this option is available, and then click a summary function in the box to the right.

**Remove subtotals** Click **None** under **Subtotals**.

**Note** If a field contains a [calculated item](#), you can't change the subtotal summary function.

## [Tip](#)

For outer [row fields](#), you can display subtotals above or below their items. Double-click the field, click **Layout**, click **Show items in outline form**, and then select or clear the **Display subtotals at top of group** check box.

## [Display grand totals for the entire report](#)

1. Click the report.
2. On the **PivotTable toolbar**, click **PivotTable**, and then click **Table Options**.

3. Do one of the following:

**Display grand totals** Select the **Grand totals for columns** check box, the **Grand totals for rows** check box, or both.

**Hide grand totals** Clear either or both check boxes.

**Note** Grand totals for a field use the same [summary function](#) as the subtotals for the field.

[Calculate the totals with or without hidden items](#)

1. Click the report.

2. On the **PivotTable toolbar**, click **Include Hidden Items in Totals**



If this button is unavailable, your source data allows you to include or exclude hidden items in [page fields](#): click **PivotTable**, click **Table Options**, and then select or clear the **Subtotal hidden page items** check box.

**Note** When you display or hide totals, some formatting may be lost in any [PivotChart reports](#) based on the PivotTable report.

[Show All](#)

# Change how PivotTable or PivotChart data is summarized

1. In a [PivotTable report](#), click the [data field](#) or a cell in the data area.

For a [PivotChart report](#), work in the [associated PivotTable report](#).

2. On the **PivotTable toolbar**, click **Field Settings** .
3. In the **Summarize by** box, click the [summary function](#) you want to use.

For some types of [source data](#), and for [calculated fields](#) and fields with [calculated items](#), you can't change the summary function.

4. If you want to use a [custom calculation](#), click **Options**, click the calculation you want in the **Show data as** list, and then select a **Base field** and **Base item**, if these options are available for the calculation you chose, to provide the data for the calculation. The base field should not be the same one you chose in step 1.

**Note** Setting **Show data as** to **Normal** turns off custom calculation.

5. If the report has multiple data fields, repeat these steps for each one that you want to change.
6. If your source data allows you to change the summary function, you can use more than one summary method for the same field. Drag the field from the **PivotTable Field List** window to the data area a second time, and then repeat the steps above for the second instance of the field.

**Note** When you change the summary method in a PivotChart report or its associated PivotTable report, some chart formatting may be lost.

[Show All](#)

# Create your own formula in a PivotTable or PivotChart report

[Source data](#) from [OLAP](#) databases doesn't allow you to create formulas.

1. Decide whether you want a [calculated field](#) or a [calculated item](#) within a field.

Use a calculated field when you want to use the data from another field in your formula. Use a calculated item when you want your formula to use data from one or more specific [items](#) within a field.

2. Do one of the following. For best results in a [PivotChart report](#), work in the [associated PivotTable report](#), where you can see the individual data values that your formula calculates.

## [Add a calculated field](#)

1. Click the report.
2. On the **PivotTable toolbar**, click **PivotTable** or **PivotChart**, point to **Formulas**, and then click **Calculated Field**.
3. In the **Name** box, type a name for the field.
4. In the **Formula** box, enter the formula for the field.

To use the data from another field in the formula, click the field in the **Fields** box, and then click **Insert Field**. For example, to calculate a 15% commission on each value in the Sales field, you could enter = **Sales \* 15%**.

5. Click **Add**, and then click **OK**.

## [Add a calculated item to a field](#)

1. If items in the field are grouped, right-click each group, point to **Group and Outline** on the [shortcut menu](#), and then click **Ungroup**.
2. Click the field where you want to add the calculated item.

3. On the **PivotTable toolbar**, click **PivotTable** or **PivotChart**, point to **Formulas**, and then click **Calculated Item**.
4. In the **Name** box, type a name for the calculated item.
5. In the **Formula** box, enter the formula for the item.

To use the data from an item in the formula, click the item in the **Items** list, and then click **Insert Item** (the item must be from the same field as the calculated item).

6. Click **Add**, and then click **OK**.
  7. If you ungrouped items in step 1, regroup them if you want.
3. For calculated items, you can enter different formulas cell by cell.

[How?](#)

For example, if a calculated item named Strawberries has a formula of =Oranges \* .25 across all months, you can change the formula to =Oranges \*.5 for June, July, and August.

1. Click a cell for which you want to change the formula.

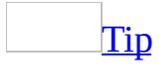
To change the formula for several cells, hold down CTRL and click the additional cells.

2. In the [formula bar](#), type the changes to the formula.
4. If you have multiple calculated items or formulas, adjust the order of calculation.

[How?](#)

1. Click the report.
2. On the **PivotTable toolbar**, click **PivotTable** or **PivotChart**, point to **Formulas**, and then click **Solve Order**.
3. Click a formula, and then click **Move Up** or **Move Down**.
4. Continue until the formulas are in the order that you want them to be calculated.

**Note** When you add a formula to a PivotChart report or its associated PivotTable report, some chart formatting may be lost.



Tip

You can display a list of all the formulas in your report. Click the report, click **PivotTable** or **PivotChart** on the **PivotTable** [toolbar](#), point to **Formulas**, and then click **List Formulas**.

[Show All](#)

# Edit a PivotTable or PivotChart formula

For best results in a [PivotChart report](#), work in the [associated PivotTable report](#) where you can see the individual data values that the formula calculates.

1. Determine whether the formula is in a [calculated field](#) or a [calculated item](#). If the formula is in a calculated item, determine whether the formula is the only one for the calculated item.

[How?](#)

1. Click the report.
2. On the **PivotTable toolbar**, click **PivotTable**, point to **Formulas**, and then click **List Formulas**.
3. In the list of formulas, find the formula you want to change listed under Calculated Field or Calculated Item.

When there are multiple formulas for a calculated item, the default formula entered when the [item](#) was created has the calculated item name in column B. For additional formulas for a calculated item, column B has both the calculated item name and the names of intersecting items.

For example, you might have a default formula for a calculated item named **MyItem**, and another formula for this item identified as **MyItem January Sales**. In the PivotTable report, you'd find this formula in the Sales cell for the MyItem row and January column.

2. Do one of the following:

[Edit a calculated field formula](#)

1. Click the report.
2. On the **PivotTable toolbar**, click **PivotTable** or **PivotChart**, point to

**Formulas**, and then click **Calculated Field**.

3. In the **Name** box, click the calculated field for which you want to change the formula.
4. In the **Formula** box, edit the formula.
5. Click **Modify**, and then click **OK**.

#### [Edit a single formula for a calculated item](#)

1. Click the field that contains the calculated item.
2. On the **PivotTable toolbar**, click **PivotTable** or **PivotChart**, point to **Formulas**, and then click **Calculated Item**.
3. In the **Name** box, click the calculated item.
4. In the **Formula** box, edit the formula.
5. Click **Modify**, and then click **OK**.

#### [Edit individual formulas for specific cells of a calculated item](#)

For example, if a calculated item named Strawberries has a formula of =Oranges \* .25 across all months, you can change the formula to =Oranges \*.5 for June, July, and August.

1. Click a cell for which you want to change the formula.

To change the formula for several cells, hold down CTRL and click the additional cells.

2. In the [formula bar](#), type the changes to the formula.
3. If you have multiple calculated items or formulas, adjust the order of calculation.

#### [How?](#)

1. Click the report.
2. On the **PivotTable toolbar**, click **PivotTable** or **PivotChart**, point to **Formulas**, and then click **Solve Order**.
3. Click a formula, and then click **Move Up** or **Move Down**.
4. Continue until the formulas are in the order that you want them to be calculated.

**Note** When you edit a formula in a PivotChart report or its associated PivotTable report, some chart formatting may be lost.

[Show All](#)

# Delete a PivotTable or PivotChart formula

For best results in a [PivotChart report](#), work in the [associated PivotTable report](#).

1. Determine whether the formula is in a [calculated field](#) or a [calculated item](#).

Calculated fields appear in the PivotTable Field List window. Calculated items appear as [items](#) within other fields.

2. Do one of the following:

## [Delete a calculated field](#)

1. Click the report.
2. On the **PivotTable toolbar**, click **PivotTable** or **PivotChart**, point to **Formulas**, and then click **Calculated Field**.
3. In the **Name** box, click the field you want to delete.
4. Click **Delete**.

## [Delete a calculated item](#)

1. Click the field with the item you want to delete.
2. On the **PivotTable toolbar**, click **PivotTable** or **PivotChart**, point to **Formulas**, and then click **Calculated Item**.
3. In the **Name** box, click the item you want to delete.
4. Click **Delete**.

**Note** When you delete a formula from a PivotChart report or its associated PivotTable report, some chart formatting may be lost.

## [Tip](#)

If you don't want to delete a formula permanently, you can hide the field or item. To hide a field, drag it out of the report, or click the dropdown arrow in the Data

field and then clear its check box; it remains available in the field list. To hide an item, click the dropdown arrow in its field, and then clear the check box for the item.

[Show All](#)

# Use PivotTable data in a formula outside the PivotTable report

1. In the [PivotTable report](#), display the cell that you want to use in your formula.
2. In the formula cell, type the formula up to the point where you want to include data from the report.
3. Click the cell in the report. Microsoft Excel adds a GETPIVOTDATA worksheet [function](#) to your formula that retrieves the data from the report. This function continues to retrieve the correct data if the report layout changes.
4. Finish typing your formula and press ENTER.

**Note** If you remove any of the fields referenced in the GETPIVOTDATA formula from the report, the formula returns #REF!.

[Show All](#)

# Custom calculations for PivotTable and PivotChart data fields

The following functions are available for [custom calculations](#) in [data fields](#).

Function	Result
Difference From	Displays data as the difference from the value of the <b>Base item</b> in the <b>Base field</b> .
% Of	Displays data as a percentage of the value of the <b>Base item</b> in the <b>Base field</b> .
% Difference From	Displays data as the percentage difference from the value of the <b>Base item</b> in the <b>Base field</b> .
Running Total in	Displays the data for successive <a href="#">items</a> in the <b>Base field</b> as a running total.
% Of Row	Displays the data in each row or category as a percentage of the total for the row or category.
% Of Column	Displays all the data in each column or series as a percentage of the total for the column or series.
% Of Total	Displays data as a percentage of the grand total of all the data or data points in the report. Calculates data as follows:
Index	$\frac{(\text{value in cell}) \times (\text{Grand Total of Grand Totals})}{(\text{Grand Row Total}) \times (\text{Grand Column Total})}$

[Show All](#)

# About retrieving PivotTable or PivotChart data one page field item at a time

For large external databases, the [queries](#) for your reports can take a long time to return data, or Microsoft Excel may run out of memory or other resources. To prevent these problems, you can have Excel retrieve only the [source data](#) needed for the currently displayed page of the report, and retrieve new data when you change the page.



## [How page fields let you work with more data](#)

Usually Excel retrieves all the data for a report, including data for pages that aren't currently displayed, when you create or [refresh](#) the report. When you set up a page field to retrieve data only when you display a new page, you retrieve smaller amounts of data on an as-needed basis. Each time you display a different page field [item](#), the subset of the data for the new item is then retrieved.

You set this option for each page field individually. If you're trying to accommodate a very large amount of data in a report, you can set up as many page fields this way as you need.



## [How performance is affected](#)

When a page field is set to query page-by-page, the **All** item summarizing the entire set of data is not available, and the **Show Pages** command is unavailable. Each time you display a different page, you'll have to wait for the data to be retrieved. If your computer becomes disconnected from the external database, you won't be able to display a different page field item until you can reconnect to the source data. However, this setting does allow you to work with much larger amounts of source data than you could otherwise given your system's limits.

If you query for all the pages at once (the default), this initial retrieval may take longer, but you can then change pages with no delays, because all the data you

need is now in memory. You can also display a summary of the entire set of data (the **All** item) and reorganize the report to use the page fields in other areas. This setting gives you the most versatility when the total amount of data to be retrieved is within your system's limits.

#### [What happens if you move a page field](#)

If you drag a page field that is set to query page-by-page to another position, for example if you try to make it a row field, Excel tries to retrieve the data for all the items, and you may run out of system resources.

#### [When the page-by-page option isn't available](#)

Reports based on source data from [OLAP](#) databases automatically query for data on an as-needed basis, and so don't have this option.

The page field must not have any any grouped items; ungroup them to make the option available.

If more than one PivotTable or PivotChart report is based on the same report (you used the **Another PivotTable report or PivotChart report** option in the wizard), page-by-page retrieval isn't available in any of the reports. For a single PivotChart report and its [associated PivotTable report](#), however, the option is available.

If the [ODBC driver](#) for the external database you're querying doesn't support [parameter queries](#), you can't query page-by-page. The ODBC drivers supplied with Microsoft Query all support parameter queries, and third-party driver vendors can tell you whether their drivers have this support.

[Show All](#)

# Refresh data in a PivotTable or PivotChart report

**Note** If the report is based on an [offline cube file](#), refreshing it completely rebuilds the cube file from the [OLAP](#) server and may take as long as initial creation of the cube file.

1. Click the report.
2. On the **PivotTable toolbar**, click **Refresh Data** .
3. If you want Microsoft Excel to refresh the report automatically when you open the workbook, set this option.

[How?](#)

1. On the **PivotTable toolbar**, click **PivotTable** or **PivotChart**, and then click **Table Options** or **Options**.
2. Select the **Refresh on open** check box.

**Security Note** Setting this option can pose as a security risk as arbitrary SQL scripts can be executed upon automatic refreshing of reports.

4. If the report is based on external data, and you want Excel to refresh it at timed intervals, set this option.

[How?](#)

1. On the **PivotTable toolbar**, click **PivotTable** or **PivotChart**, and then click **Table Options** or **Options**.
2. Select the **Refresh every** check box, and then enter the interval you want in the **minutes** box.

**Note** When you refresh a PivotChart report or its [associated PivotTable report](#), some chart formatting may be lost.

[Tip](#)

If your database prompts for a password every time you refresh, you can have

Excel save the password so you won't have to enter it repeatedly. On the **PivotTable** toolbar, click **PivotTable** or **PivotChart**, click **Table Options** or **Options**, and then select the **Save password** check box. This option saves the password as readable text, so if security is a greater concern than convenience, you may not want to use this option.

[Show All](#)

# Retrieve PivotTable or PivotChart page field data for each item or for all items

This setting is not available in reports based on [OLAP source data](#).

1. Double-click the [page field](#).
2. Click **Advanced**.
3. Specify whether you want to query the data for each page separately or all pages at once.
  - If you want to retrieve less data each time, click **Query external data source as you select each page field item** under **Page field options**. This option is useful if you are working with large external databases.
  - If you want to query less frequently, click **Retrieve external data for all page field items**. This option lets you change pages faster.
4. To lock a field set to query page-by-page in the page area, so that it can't be moved to the [row](#), [column](#), or [data area](#), select the **Disable pivoting of this field** check box. This option prevents a field from being dragged to another area causing all the data to be retrieved.

[Show All](#)

# Query data for a PivotTable or PivotChart report in the background or while you wait

This setting is not available in reports based on [OLAP source data](#).

1. Click the report.
2. On the **PivotTable** toolbar, click **PivotTable** or **PivotChart**, and then click **Table Options** or **Options**.
3. Do one of the following:

To wait during queries until retrieval is complete, clear the **Background query** check box.

To query in the background so that you can continue working in Microsoft Excel, select the **Background query** check box.

4. To run the query with the new setting, click **Refresh Data**  on the **PivotTable** toolbar.

To stop a query that's running while you wait, press ESC. To check on progress or stop a background query, double-click the  icon on the status bar to display the **External Data Refresh Status** dialog box, and then click **Stop Refresh**.

**Note** When you record a [macro](#) that includes a query, Microsoft Excel runs the query while you wait. To change the macro to query in the background, use the [Visual Basic Editor](#) and change the statement "BackgroundQuery := False" to "BackgroundQuery := True".

# A bibliography of financial, statistical, and engineering methods

## [See Also](#)

The following books provide detailed information on financial, statistical, and engineering methods.

Abramowitz, Milton, and Irene A. Stegun. *Handbook of Mathematical Functions with Formulas, Graphs, and Mathematical Tables*. 10<sup>th</sup> ed. Washington, D.C.: U.S. Government Printing Office, 1972.

Devore, Jay L. *Probability and Statistics for Engineering and the Sciences*. 4<sup>th</sup> ed. Belmont, Calif.: Wadsworth, 1991.

Fabozzi, Frank J. *The Handbook of Fixed-Income Securities*. 3<sup>rd</sup> ed. Homewood, Ill.: Irwin Professional, 1990.

Hewlett-Packard, *HP-12C Owner's Handbook and Problem-Solving Guide*. N.p.: Hewlett-Packard, 1981.

Lynch, John J., Jr., and Jan H. Mayle. *Standard Securities Calculation Methods, Fixed Income Securities Formulas*. New York: Securities Industry Association, 1994.

McCall, Robert B. *Fundamental Statistics for the Behavioral Sciences*. 6<sup>th</sup> ed. Belmont, Calif.: Wadsworth, 1994.

Monks, Joseph G. *Operations Management: Theory and Problems*. 3<sup>rd</sup> ed. New York: McGraw-Hill, 1987.

Press, W. H., B. P. Flannery, S. A. Teukolsky, and W. T. Vetterling. *Numerical Recipes in C: The Art of Scientific Computing*. 2<sup>nd</sup> ed. New York: Cambridge University Press, 1992.

Sokal, Robert R., and F. James Rohlf. *Biometry: The Principles and Practice of Statistics in Biological Research*. 2<sup>nd</sup> ed. New York: W. H. Freeman, 1995.

Stigum, Marcia, and John Mann. *Money Market Calculations: Yields, Break-Evens, & Arbitrage*. 2<sup>nd</sup> ed. Homewood, Ill.: Irwin Professional, 1989.

[Show All](#)

# Worksheet functions listed by category

## Database

Microsoft Excel includes worksheet functions that analyze data stored in lists or databases. Each of these functions, referred to collectively as the Dfunctions, uses three arguments: database, field, and criteria. These arguments refer to the worksheet ranges that are used by the function.

[DAVERAGE](#) Returns the average of selected database entries

[DCOUNT](#) Counts the cells that contain numbers in a database

[DCOUNTA](#) Counts nonblank cells in a database

[DGET](#) Extracts from a database a single record that matches the specified criteria

[DMAX](#) Returns the maximum value from selected database entries

[DMIN](#) Returns the minimum value from selected database entries

[DPRODUCT](#) Multiplies the values in a particular field of records that match the criteria in a database

[DSTDEV](#) Estimates the standard deviation based on a sample of selected database entries

[DSTDEVP](#) Calculates the standard deviation based on the entire population of selected database entries

[DSUM](#) Adds the numbers in the field column of records in the database that match the criteria

[DVAR](#) Estimates variance based on a sample from selected database entries

[DVARP](#) Calculates variance based on the entire population of selected database entries

[GETPIVOTDATA](#) Returns data stored in a PivotTable



## [Date and Time](#)

[DATE](#) Returns the serial number of a particular date

[DATEVALUE](#) Converts a date in the form of text to a serial number

[DAY](#) Converts a serial number to a day of the month

[DAYS360](#) Calculates the number of days between two dates based on a 360-day year

[EDATE](#) Returns the serial number of the date that is the indicated number of months before or after the start date

[EOMONTH](#) Returns the serial number of the last day of the month before or after a specified number of months

[HOUR](#) Converts a serial number to an hour

[MINUTE](#) Converts a serial number to a minute

[MONTH](#) Converts a serial number to a month

[NETWORKDAYS](#) Returns the number of whole workdays between two dates

[NOW](#) Returns the serial number of the current date and time

[SECOND](#) Converts a serial number to a second

[TIME](#) Returns the serial number of a particular time

[TIMEVALUE](#) Converts a time in the form of text to a serial number

[TODAY](#) Returns the serial number of today's date

[WEEKDAY](#) Converts a serial number to a day of the week

[WEEKNUM](#) Converts a serial number to a number representing where the week falls numerically with a year

[WORKDAY](#) Returns the serial number of the date before or after a specified number of workdays

[YEAR](#) Converts a serial number to a year

[YEARFRAC](#) Returns the year fraction representing the number of whole days between start\_date and end\_date

 [External](#)

These functions are loaded with [add-in](#) programs

[EUROCONVERT](#) Converts a number to euros, converts a number from euros to a euro member currency, or converts a number from one euro member currency to another by using the euro as an intermediary (triangulation)

[SQL.REQUEST](#) Connects with an external data source and runs a query from a worksheet, then returns the result as an array without the need for macro programming

 [Engineering](#)

[BESSELI](#) Returns the modified Bessel function  $I_n(x)$

[BESSELJ](#) Returns the Bessel function  $J_n(x)$

[BESSELK](#) Returns the modified Bessel function  $K_n(x)$

[BESSELY](#) Returns the Bessel function  $Y_n(x)$

[BIN2DEC](#) Converts a binary number to decimal

[BIN2HEX](#) Converts a binary number to hexadecimal

[BIN2OCT](#) Converts a binary number to octal

[COMPLEX](#) Converts real and imaginary coefficients into a complex number

[CONVERT](#) Converts a number from one measurement system to another

[DEC2BIN](#) Converts a decimal number to binary

[DEC2HEX](#) Converts a decimal number to hexadecimal

[DEC2OCT](#) Converts a decimal number to octal

[DELTA](#) Tests whether two values are equal

[ERF](#) Returns the error function

[ERFC](#) Returns the complementary error function

[GESTEP](#) Tests whether a number is greater than a threshold value

[HEX2BIN](#) Converts a hexadecimal number to binary

[HEX2DEC](#) Converts a hexadecimal number to decimal

[HEX2OCT](#) Converts a hexadecimal number to octal

[IMABS](#) Returns the absolute value (modulus) of a complex number

[IMAGINARY](#) Returns the imaginary coefficient of a complex number

[IMARGUMENT](#) Returns the argument theta, an angle expressed in radians

[IMCONJUGATE](#) Returns the complex conjugate of a complex number

[IMCOS](#) Returns the cosine of a complex number

[IMDIV](#) Returns the quotient of two complex numbers

[IMEXP](#) Returns the exponential of a complex number

[IMLN](#) Returns the natural logarithm of a complex number

[IMLOG10](#) Returns the base-10 logarithm of a complex number

[IMLOG2](#) Returns the base-2 logarithm of a complex number

[IMPOWER](#) Returns a complex number raised to an integer power

[IMPRODUCT](#) Returns the product of two complex numbers

[IMREAL](#) Returns the real coefficient of a complex number

[IMSIN](#) Returns the sine of a complex number

[IMSQRT](#) Returns the square root of a complex number

[IMSUB](#) Returns the difference between two complex numbers

[IMSUM](#) Returns the sum of complex numbers

[OCT2BIN](#) Converts an octal number to binary

[OCT2DEC](#) Converts an octal number to decimal

[OCT2HEX](#) Converts an octal number to hexadecimal



## [Financial](#)

[ACCRINT](#) Returns the accrued interest for a security that pays periodic interest

[ACCRINTM](#) Returns the accrued interest for a security that pays interest at maturity

[AMORDEGRC](#) Returns the depreciation for each accounting period by using a depreciation coefficient

[AMORLINC](#) Returns the depreciation for each accounting period

[COUPDAYBS](#) Returns the number of days from the beginning of the coupon period to the settlement date

[COUPDAYS](#) Returns the number of days in the coupon period that contains the settlement date

[COUPDAYSNC](#) Returns the number of days from the settlement date to the next coupon date

[COUPNCD](#) Returns the next coupon date after the settlement date

[COUPNUM](#) Returns the number of coupons payable between the settlement date and maturity date

[COUPPCD](#) Returns the previous coupon date before the settlement date

[CUMIPMT](#) Returns the cumulative interest paid between two periods

[CUMPRINC](#) Returns the cumulative principal paid on a loan between two periods

[DB](#) Returns the depreciation of an asset for a specified period using the fixed-declining balance method

[DDB](#) Returns the depreciation of an asset for a specified period using the double-declining balance method or some other method you specify

[DISC](#) Returns the discount rate for a security

[DOLLARDE](#) Converts a dollar price, expressed as a fraction, into a dollar price, expressed as a decimal number

[DOLLARFR](#) Converts a dollar price, expressed as a decimal number, into a dollar price, expressed as a fraction

[DURATION](#) Returns the annual duration of a security with periodic interest payments

[EFFECT](#) Returns the effective annual interest rate

[FV](#) Returns the future value of an investment

[FVSCHEDULE](#) Returns the future value of an initial principal after applying a series of compound interest rates

[INTRATE](#) Returns the interest rate for a fully invested security

[IPMT](#) Returns the interest payment for an investment for a given period

[IRR](#) Returns the internal rate of return for a series of cash flows

[ISPMT](#) Calculates the interest paid during a specific period of an investment

[MDURATION](#) Returns the Macauley modified duration for a security with an assumed par value of \$100

[MIRR](#) Returns the internal rate of return where positive and negative cash flows are financed at different rates

[NOMINAL](#) Returns the annual nominal interest rate

[NPER](#) Returns the number of periods for an investment

[NPV](#) Returns the net present value of an investment based on a series of periodic cash flows and a discount rate

[ODDFPRICE](#) Returns the price per \$100 face value of a security with an odd first period

[ODDFYIELD](#) Returns the yield of a security with an odd first period

[ODDLPRICE](#) Returns the price per \$100 face value of a security with an odd last period

[ODDLYIELD](#) Returns the yield of a security with an odd last period

[PMT](#) Returns the periodic payment for an annuity

[PPMT](#) Returns the payment on the principal for an investment for a given period

[PRICE](#) Returns the price per \$100 face value of a security that pays periodic interest

[PRICEDISC](#) Returns the price per \$100 face value of a discounted security

[PRICEMAT](#) Returns the price per \$100 face value of a security that pays interest at maturity

[PV](#) Returns the present value of an investment

[RATE](#) Returns the interest rate per period of an annuity

[RECEIVED](#) Returns the amount received at maturity for a fully invested security

[SLN](#) Returns the straight-line depreciation of an asset for one period

[SYD](#) Returns the sum-of-years' digits depreciation of an asset for a specified period

[TBILLEQ](#) Returns the bond-equivalent yield for a Treasury bill

[TBILLPRICE](#) Returns the price per \$100 face value for a Treasury bill

[TBILLYIELD](#) Returns the yield for a Treasury bill

[VDB](#) Returns the depreciation of an asset for a specified or partial period using a declining balance method

[XIRR](#) Returns the internal rate of return for a schedule of cash flows that is not necessarily periodic

[XNPV](#) Returns the net present value for a schedule of cash flows that is not necessarily periodic

[YIELD](#) Returns the yield on a security that pays periodic interest

[YIELDDISC](#) Returns the annual yield for a discounted security; for example, a Treasury bill

[YIELDMAT](#) Returns the annual yield of a security that pays interest at maturity

[Information](#)

[CELL](#) Returns information about the formatting, location, or contents of a cell

[ERROR.TYPE](#) Returns a number corresponding to an error type

[INFO](#) Returns information about the current operating environment

[ISBLANK](#) Returns TRUE if the value is blank

[ISERR](#) Returns TRUE if the value is any error value except #N/A

[ISERROR](#) Returns TRUE if the value is any error value

[ISEVEN](#) Returns TRUE if the number is even

[ISLOGICAL](#) Returns TRUE if the value is a logical value

[ISNA](#) Returns TRUE if the value is the #N/A error value

[ISNONTEXT](#) Returns TRUE if the value is not text

[ISNUMBER](#) Returns TRUE if the value is a number

[ISODD](#) Returns TRUE if the number is odd

[ISREF](#) Returns TRUE if the value is a reference

[ISTEXT](#) Returns TRUE if the value is text

[N](#) Returns a value converted to a number

[NA](#) Returns the error value #N/A

[TYPE](#) Returns a number indicating the data type of a value

[Logical](#)

[AND](#) Returns TRUE if all its arguments are TRUE

[FALSE](#) Returns the logical value FALSE

[IF](#) Specifies a logical test to perform

[NOT](#) Reverses the logic of its argument

[OR](#) Returns TRUE if any argument is TRUE

[TRUE](#) Returns the logical value TRUE

[Lookup and Reference](#)

[ADDRESS](#) Returns a reference as text to a single cell in a worksheet

[AREAS](#) Returns the number of areas in a reference

[CHOOSE](#) Chooses a value from a list of values

[COLUMN](#) Returns the column number of a reference

[COLUMNS](#) Returns the number of columns in a reference

[HLOOKUP](#) Looks in the top row of an array and returns the value of the indicated cell

[HYPERLINK](#) Creates a shortcut or jump that opens a document stored on a network server, an intranet, or the Internet

[INDEX](#) Uses an index to choose a value from a reference or array

[INDIRECT](#) Returns a reference indicated by a text value

[LOOKUP](#) Looks up values in a vector or array

[MATCH](#) Looks up values in a reference or array

[OFFSET](#) Returns a reference offset from a given reference

[ROW](#) Returns the row number of a reference

[ROWS](#) Returns the number of rows in a reference

[RTD](#) Retrieves real-time data from a program that supports [COM automation](#)

[TRANSPOSE](#) Returns the transpose of an array

[VLOOKUP](#) Looks in the first column of an array and moves across the row to return the value of a cell



[Math and Trigonometry](#)

[ABS](#) Returns the absolute value of a number

[ACOS](#) Returns the arccosine of a number

[ACOSH](#) Returns the inverse hyperbolic cosine of a number

[ASIN](#) Returns the arcsine of a number

[ASINH](#) Returns the inverse hyperbolic sine of a number

[ATAN](#) Returns the arctangent of a number

[ATAN2](#) Returns the arctangent from x- and y-coordinates

[ATANH](#) Returns the inverse hyperbolic tangent of a number

[CEILING](#) Rounds a number to the nearest integer or to the nearest multiple of significance

[COMBIN](#) Returns the number of combinations for a given number of objects

[COS](#) Returns the cosine of a number

[COSH](#) Returns the hyperbolic cosine of a number

[DEGREES](#) Converts radians to degrees

[EVEN](#) Rounds a number up to the nearest even integer

[EXP](#) Returns  $e$  raised to the power of a given number

[FACT](#) Returns the factorial of a number

[FACTDOUBLE](#) Returns the double factorial of a number

[FLOOR](#) Rounds a number down, toward zero

[GCD](#) Returns the greatest common divisor

[INT](#) Rounds a number down to the nearest integer

[LCM](#) Returns the least common multiple

[LN](#) Returns the natural logarithm of a number

[LOG](#) Returns the logarithm of a number to a specified base

[LOG10](#) Returns the base-10 logarithm of a number

[MDETERM](#) Returns the matrix determinant of an array

[MINVERSE](#) Returns the matrix inverse of an array

[MMULT](#) Returns the matrix product of two arrays

[MOD](#) Returns the remainder from division

[MROUND](#) Returns a number rounded to the desired multiple

[MULTINOMIAL](#) Returns the multinomial of a set of numbers

[ODD](#) Rounds a number up to the nearest odd integer

[PI](#) Returns the value of pi

[POWER](#) Returns the result of a number raised to a power

[PRODUCT](#) Multiplies its arguments

[QUOTIENT](#) Returns the integer portion of a division

[RADIANS](#) Converts degrees to radians

[RAND](#) Returns a random number between 0 and 1

[RANDBETWEEN](#) Returns a random number between the numbers you specify

[ROMAN](#) Converts an arabic numeral to roman, as text

[ROUND](#) Rounds a number to a specified number of digits

[ROUNDDOWN](#) Rounds a number down, toward zero

[ROUNDUP](#) Rounds a number up, away from zero

[SERIESSUM](#) Returns the sum of a power series based on the formula

[SIGN](#) Returns the sign of a number

[SIN](#) Returns the sine of the given angle

[SINH](#) Returns the hyperbolic sine of a number

[SQRT](#) Returns a positive square root

[SQRTPI](#) Returns the square root of (number \* pi)

[SUBTOTAL](#) Returns a subtotal in a list or database

[SUM](#) Adds its arguments

[SUMIF](#) Adds the cells specified by a given criteria

[SUMPRODUCT](#) Returns the sum of the products of corresponding array components

[SUMSQ](#) Returns the sum of the squares of the arguments

[SUMX2MY2](#) Returns the sum of the difference of squares of corresponding values in two arrays

[SUMX2PY2](#) Returns the sum of the sum of squares of corresponding values in two arrays

[SUMXMY2](#) Returns the sum of squares of differences of corresponding values in two arrays

[TAN](#) Returns the tangent of a number

[TANH](#) Returns the hyperbolic tangent of a number

[TRUNC](#) Truncates a number to an integer

[Statistical](#)

[AVEDEV](#) Returns the average of the absolute deviations of data points from

their mean

[AVERAGE](#) Returns the average of its arguments

[AVERAGEA](#) Returns the average of its arguments, including numbers, text, and logical values

[BETADIST](#) Returns the beta cumulative distribution function

[BETAINV](#) Returns the inverse of the cumulative distribution function for a specified beta distribution

[BINOMDIST](#) Returns the individual term binomial distribution probability

[CHIDIST](#) Returns the one-tailed probability of the chi-squared distribution

[CHIINV](#) Returns the inverse of the one-tailed probability of the chi-squared distribution

[CHITEST](#) Returns the test for independence

[CONFIDENCE](#) Returns the confidence interval for a population mean

[CORREL](#) Returns the correlation coefficient between two data sets

[COUNT](#) Counts how many numbers are in the list of arguments

[COUNTA](#) Counts how many values are in the list of arguments

[COUNTBLANK](#) Counts the number of blank cells within a range

[COUNTIF](#) Counts the number of nonblank cells within a range that meet the given criteria

[COVAR](#) Returns covariance, the average of the products of paired deviations

[CRITBINOM](#) Returns the smallest value for which the cumulative binomial distribution is less than or equal to a criterion value

[DEVSQ](#) Returns the sum of squares of deviations

[EXPONDIST](#) Returns the exponential distribution

[FDIST](#) Returns the F probability distribution

[FINV](#) Returns the inverse of the F probability distribution

[FISHER](#) Returns the Fisher transformation

[FISHERINV](#) Returns the inverse of the Fisher transformation

[FORECAST](#) Returns a value along a linear trend

[FREQUENCY](#) Returns a frequency distribution as a vertical array

[FTEST](#) Returns the result of an F-test

[GAMMADIST](#) Returns the gamma distribution

[GAMMAINV](#) Returns the inverse of the gamma cumulative distribution

[GAMMALN](#) Returns the natural logarithm of the gamma function,  $\Gamma(x)$

[GEOMEAN](#) Returns the geometric mean

[GROWTH](#) Returns values along an exponential trend

[HARMEAN](#) Returns the harmonic mean

[HYPGEOMDIST](#) Returns the hypergeometric distribution

[INTERCEPT](#) Returns the intercept of the linear regression line

[KURT](#) Returns the kurtosis of a data set

[LARGE](#) Returns the k-th largest value in a data set

[LINEST](#) Returns the parameters of a linear trend

[LOGEST](#) Returns the parameters of an exponential trend

[LOGINV](#) Returns the inverse of the lognormal distribution

[LOGNORMDIST](#) Returns the cumulative lognormal distribution

[MAX](#) Returns the maximum value in a list of arguments

[MAXA](#) Returns the maximum value in a list of arguments, including numbers, text, and logical values

[MEDIAN](#) Returns the median of the given numbers

[MIN](#) Returns the minimum value in a list of arguments

[MINA](#) Returns the smallest value in a list of arguments, including numbers, text, and logical values

[MODE](#) Returns the most common value in a data set

[NEGBINOMDIST](#) Returns the negative binomial distribution

[NORMDIST](#) Returns the normal cumulative distribution

[NORMINV](#) Returns the inverse of the normal cumulative distribution

[NORMSDIST](#) Returns the standard normal cumulative distribution

[NORMSINV](#) Returns the inverse of the standard normal cumulative distribution

[PEARSON](#) Returns the Pearson product moment correlation coefficient

[PERCENTILE](#) Returns the k-th percentile of values in a range

[PERCENTRANK](#) Returns the percentage rank of a value in a data set

[PERMUT](#) Returns the number of permutations for a given number of objects

[POISSON](#) Returns the Poisson distribution

[PROB](#) Returns the probability that values in a range are between two limits

[QUARTILE](#) Returns the quartile of a data set

[RANK](#) Returns the rank of a number in a list of numbers

[RSQ](#) Returns the square of the Pearson product moment correlation coefficient

[SKEW](#) Returns the skewness of a distribution

[SLOPE](#) Returns the slope of the linear regression line

[SMALL](#) Returns the k-th smallest value in a data set

[STANDARDIZE](#) Returns a normalized value

[STDEV](#) Estimates standard deviation based on a sample

[STDEVA](#) Estimates standard deviation based on a sample, including numbers, text, and logical values

[STDEV.P](#) Calculates standard deviation based on the entire population

[STDEVPA](#) Calculates standard deviation based on the entire population, including numbers, text, and logical values

[STEYX](#) Returns the standard error of the predicted y-value for each x in the regression

[TDIST](#) Returns the Student's t-distribution

[TINV](#) Returns the inverse of the Student's t-distribution

[TREND](#) Returns values along a linear trend

[TRIMMEAN](#) Returns the mean of the interior of a data set

[TTEST](#) Returns the probability associated with a Student's t-test

[VAR](#) Estimates variance based on a sample

[VARA](#) Estimates variance based on a sample, including numbers, text, and logical values

[VAR.P](#) Calculates variance based on the entire population

[VARPA](#) Calculates variance based on the entire population, including numbers,

text, and logical values

[WEIBULL](#) Returns the Weibull distribution

[ZTEST](#) Returns the one-tailed probability-value of a z-test

[Text and Data](#)

[ASC](#) Changes full-width (double-byte) English letters or katakana within a character string to half-width (single-byte) characters

[BAHTTEXT](#) Converts a number to text, using the ฿ (baht) currency format

[CHAR](#) Returns the character specified by the code number

[CLEAN](#) Removes all nonprintable characters from text

[CODE](#) Returns a numeric code for the first character in a text string

[CONCATENATE](#) Joins several text items into one text item

[DOLLAR](#) Converts a number to text, using the \$ (dollar) currency format

[EXACT](#) Checks to see if two text values are identical

[FIND](#) Finds one text value within another (case-sensitive)

[FIXED](#) Formats a number as text with a fixed number of decimals

[JIS](#) Changes half-width (single-byte) English letters or katakana within a character string to full-width (double-byte) characters

[LEFT](#) Returns the leftmost characters from a text value

[LEN](#) Returns the number of characters in a text string

[LOWER](#) Converts text to lowercase

[MID](#) Returns a specific number of characters from a text string starting at the position you specify

[PHONETIC](#) Extracts the phonetic (furigana) characters from a text string

[PROPER](#) Capitalizes the first letter in each word of a text value

[REPLACE](#) Replaces characters within text

[REPT](#) Repeats text a given number of times

[RIGHT](#) Returns the rightmost characters from a text value

[SEARCH](#) Finds one text value within another (not case-sensitive)

[SUBSTITUTE](#) Substitutes new text for old text in a text string

[T](#) Converts its arguments to text

[TEXT](#) Formats a number and converts it to text

[TRIM](#) Removes spaces from text

[UPPER](#) Converts text to uppercase

[VALUE](#) Converts a text argument to a number

# Database and List Management functions

Microsoft Excel includes worksheet functions that analyze data stored in lists or databases. Each of these functions, referred to collectively as the Dfunctions, uses three arguments: database, field, and criteria. These arguments refer to the worksheet ranges that are used by the function.

[DAVERAGE](#) Returns the average of selected database entries

[DCOUNT](#) Counts the cells that contain numbers in a database

[DCOUNTA](#) Counts nonblank cells in a database

[DGET](#) Extracts from a database a single record that matches the specified criteria

[DMAX](#) Returns the maximum value from selected database entries

[DMIN](#) Returns the minimum value from selected database entries

[DPRODUCT](#) Multiplies the values in a particular field of records that match the criteria in a database

[DSTDEV](#) Estimates the standard deviation based on a sample of selected database entries

[DSTDEVP](#) Calculates the standard deviation based on the entire population of selected database entries

[DSUM](#) Adds the numbers in the field column of records in the database that match the criteria

[DVAR](#) Estimates variance based on a sample from selected database entries

[DVARP](#) Calculates variance based on the entire population of selected database entries

[GETPIVOTDATA](#) Returns data stored in a PivotTable

[Show All](#)

# DAVERAGE

## [See Also](#)

Averages the values in a column of a list or database that match conditions you specify.

## Syntax

**DAVERAGE(database,field,criteria)**

**Database** is the range of cells that makes up the list or database. A database is a list of related data in which rows of related information are records, and columns of data are fields. The first row of the list contains labels for each column.

**Field** indicates which column is used in the function. Field can be given as text with the column label enclosed between double quotation marks, such as "Age" or "Yield," or as a number that represents the position of the column within the list: 1 for the first column, 2 for the second column, and so on.

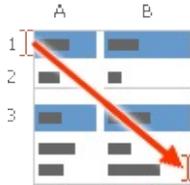
**Criteria** is the range of cells that contains the conditions you specify. You can use any range for the criteria argument, as long as it includes at least one column label and at least one cell below the column label for specifying a condition for the column.

## [Example](#)

The example may be easier to understand if you copy it to a blank worksheet.

**How?**

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>
	<b>Tree</b>	<b>Height</b>	<b>Age</b>	<b>Yield</b>	<b>Profit</b>	<b>Height</b>
Apple		>10				<16
Pear						
	<b>Tree</b>	<b>Height</b>	<b>Age</b>	<b>Yield</b>	<b>Profit</b>	
Apple		18	20	14	105.00	
Pear		12	12	10	96.00	
Cherry		13	14	9	105.00	
Apple		14	15	10	75.00	
Pear		9	8	8	76.80	
Apple		8	9	6	45.00	

**Formula**

**Description (Result)**

This function looks at the records of apple trees

=DCOUNT(A4:E10,"Age",A1:F2)

between a height of 10 and 16 and counts how many of the Age fields in those records contain numbers.

(1)

This function looks at the records of apple trees between a height of 10 and 16 and counts how many of the Profit fields in those records are not blank.

=DCOUNTA(A4:E10,"Profit",A1:F2)

(1)

The maximum profit of apple and pear trees.

=DMAX(A4:E10,"Profit",A1:A3)

(105)

The minimum profit of apple trees over 10 in height. (75)

=DMIN(A4:E10,"Profit",A1:B2)

	=DSUM(A4:E10,"Profit",A1:A2)	The total profit from apple trees. (225)
	=DSUM(A4:E10,"Profit",A1:F2)	The total profit from apple trees with a height between 10 and 16. (75)
1		
2		
3		The product of the yields from apple
4		trees with a height greater than
5	=DPRODUCT(A4:E10,"Yield",A1:B2)	10. (140)
6		
7		
8		The average yield of apple trees
9		over 10 feet in height. (12)
10	=DAVERAGE(A4:E10,"Yield",A1:B2)	
	=DAVERAGE(A4:E10,3,A4:E10)	The average age of all trees in the database. (13)
	=DSTDEV(A4:E10,"Yield",A1:A3)	The estimated standard deviation in the yield of apple and pear trees if the data in the database

is only a sample of the total orchard population.  
(2.97)

=DSTDEVP(A4:E10,"Yield",A1:A3)

The true standard deviation in the yield of apple and pear trees if the data in the database is the entire population.  
(2.65)

=DVAR(A4:E10,"Yield",A1:A3)

The estimated variance in the yield of apple and pear trees if the data in the database is only a sample of the total orchard population.  
(8.8)

=DVARP(A4:E10,"Yield",A1:A3)

The true variance in the yield of apple and pear trees if the data in the database

=DGET(A4:E10,"Yield",A1:A3)

is the entire orchard population. ( 7.04)  
Returns the #NUM! error value because more than one record meets the criteria.

### [Tips](#)

- You can use any range for the criteria argument, as long as it includes at least one column label and at least one cell below the column label for specifying the condition.

For example, if the range G1:G2 contains the column label Income in G1 and the amount 10,000 in G2, you could define the range as MatchIncome and use that name as the criteria argument in the database functions.

- Although the criteria range can be located anywhere on the worksheet, do not place the criteria range below the list. If you add more information to the list by using the **Form** command on the **Data** menu, the new information is added to the first row below the list. If the row below the list is not blank, Microsoft Excel cannot add the new information.
- Make sure the criteria range does not overlap the list.
- To perform an operation on an entire column in a database, enter a blank line below the column labels in the criteria range.

### [Examples of criteria](#)

### [Multiple conditions in a single column](#)

If you have two or more conditions for a single column, type the criteria directly below each other in separate rows. For example, the following criteria range

displays the rows that contain either "Davolio," "Buchanan," or "Suyama" in the Salesperson column.

### **Salesperson**

Davolio

Buchanan

Suyama

[One condition in two or more columns](#)

To find data that meets one condition in two or more columns, enter all the criteria in the same row of the criteria range. For example, the following criteria range displays all rows that contain "Produce" in the Type column, "Davolio" in the Salesperson column, and sales values greater than \$1,000.

### **Type Salesperson Sales**

Produce Davolio >1000

[One condition in one column or another](#)

To find data that meets either a condition in one column or a condition in another column, enter the criteria in different rows of the criteria range. For example, the following criteria range displays all rows that contain either "Produce" in the Type column, "Davolio" in the Salesperson column, or sales values greater than \$1,000.

### **Type Salesperson Sales**

Produce

Davolio

>1000

[One of two sets of conditions for two columns](#)

To find rows that meet one of two sets of conditions, where each set includes conditions for more than one column, type the criteria in separate rows. For example, the following criteria range displays the rows that contain both "Davolio" in the Salesperson column and sales values greater than \$3,000, and

also displays the rows for salesperson Buchanan with sales values greater than \$1,500.

### **Salesperson Sales**

Davolio >3000  
Buchanan >1500

### [More than two sets of conditions for one column](#)

To find rows that meet greater than two sets of conditions, include multiple columns with the same column heading. For example, the following criteria range displays sales that are between 5,000 and 8,000 in addition to sales that are less than 500.

### **Sales Sales**

>5000 <8000  
<500

### [Conditions created as the result of a formula](#)

You can use a calculated value that is the result of a [formula](#) as your criterion. When you use a formula to create a criterion, do not use a column label for a criteria label; either keep the criteria label blank or use a label that is not a column label in the list. For example, the following criteria range displays rows that have a value in column C greater than the average of cells C7:C10.

=C7>AVERAGE(\$C\$7:\$C\$10)

### **Notes**

- The formula you use for a condition must use a [relative reference](#) to refer to the column label (for example, Sales) or the corresponding field in the first record. All other references in the formula must be [absolute references](#), and the formula must evaluate to TRUE or FALSE. In the formula example, "C7" refers to the field (column C) for the first record (row 7) of the list.
- You can use a column label in the formula instead of a relative cell reference or a range name. When Microsoft Excel displays an error value

such as #NAME? or #VALUE! in the cell that contains the criterion, you can ignore this error because it does not affect how the list is filtered.

- When evaluating data, Microsoft Excel does not distinguish between uppercase and lowercase characters.

[Show All](#)

# DCOUNT

## [See Also](#)

Counts the cells that contain numbers in a column of a list or database that match conditions you specify.

The field argument is optional. If field is omitted, DCOUNT counts all records in the database that match the criteria.

## Syntax

**DCOUNT(database,field,criteria)**

Database is the range of cells that makes up the list or database. A database is a list of related data in which rows of related information are records, and columns of data are fields. The first row of the list contains labels for each column.

Field indicates which column is used in the function. Field can be given as text with the column label enclosed between double quotation marks, such as "Age" or "Yield," or as a number that represents the position of the column within the list: 1 for the first column, 2 for the second column, and so on.

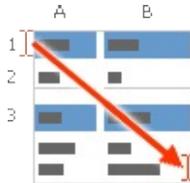
Criteria is the range of cells that contains the conditions you specify. You can use any range for the criteria argument, as long as it includes at least one column label and at least one cell below the column label for specifying a condition for the column.

 [Example](#)

The example may be easier to understand if you copy it to a blank worksheet.

**How?**

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>
	<b>Tree</b>	<b>Height</b>	<b>Age</b>	<b>Yield</b>	<b>Profit</b>	<b>Height</b>
Apple		>10				<16
Pear						
	<b>Tree</b>	<b>Height</b>	<b>Age</b>	<b>Yield</b>	<b>Profit</b>	
Apple		18	20	14	105.00	
Pear		12	12	10	96.00	
Cherry		13	14	9	105.00	
Apple		14	15	10	75.00	
Pear		9	8	8	76.80	
Apple		8	9	6	45.00	
	<b>Formula</b>	<b>Description (Result)</b>				
		This function looks at the				

=DCOUNT(A4:E10,"Age",A1:F2)

records of apple trees between a height of 10 and 16 and counts how many of the Age fields in those records contain numbers.  
(1)

=DCOUNTA(A4:E10,"Profit",A1:F2)

This function looks at the records of apple trees between a height of 10 and 16 and counts how many of the Profit fields in those records are not blank.  
(1)

=DMAX(A4:E10,"Profit",A1:A3)

The maximum profit of apple and pear trees.  
(105)

=DMIN(A4:E10,"Profit",A1:B2)

The minimum profit of apple trees

		over 10 in height. (75)
	=DSUM(A4:E10,"Profit",A1:A2)	The total profit from apple trees. (225)
	=DSUM(A4:E10,"Profit",A1:F2)	The total profit from apple trees with a height between 10 and 16. (75)
1		
2		
3		The product of the yields from apple trees with a height greater than 10. (140)
4		
5	=DPRODUCT(A4:E10,"Yield",A1:B2)	
6		
7		
8		
9		The average yield of apple trees over 10 feet in height. (12)
10	=DAVERAGE(A4:E10,"Yield",A1:B2)	
		The average age of all trees in the database. (13)
	=DAVERAGE(A4:E10,3,A4:E10)	The estimated standard deviation in the yield of apple and

=DSTDEV(A4:E10,"Yield",A1:A3) pear trees if the data in the database is only a sample of the total orchard population. (2.97)

=DSTDEVP(A4:E10,"Yield",A1:A3) pear trees if the data in the database is the entire population. (2.65)

=DVAR(A4:E10,"Yield",A1:A3) pear trees if the data in the database is only a sample of the total orchard population. (8.8)

The true variance in the yield of apple and

=DVARP(A4:E10,"Yield",A1:A3)

pear trees if  
the data in  
the database  
is the entire  
orchard  
population.  
( 7.04)

=DGET(A4:E10,"Yield",A1:A3)

Returns the  
#NUM!  
error value  
because  
more than  
one record  
meets the  
criteria.

## Tips

- You can use any range for the criteria argument, as long as it includes at least one column label and at least one cell below the column label for specifying the condition.

For example, if the range G1:G2 contains the column label Income in G1 and the amount 10,000 in G2, you could define the range as MatchIncome and use that name as the criteria argument in the database functions.

- Although the criteria range can be located anywhere on the worksheet, do not place the criteria range below the list. If you add more information to the list by using the **Form** command on the **Data** menu, the new information is added to the first row below the list. If the row below the list is not blank, Microsoft Excel cannot add the new information.
- Make sure the criteria range does not overlap the list.
- To perform an operation on an entire column in a database, enter a blank line below the column labels in the criteria range.

## Examples of criteria

## Multiple conditions in a single column

If you have two or more conditions for a single column, type the criteria directly below each other in separate rows. For example, the following criteria range displays the rows that contain either "Davolio," "Buchanan," or "Suyama" in the Salesperson column.

### **Salesperson**

Davolio

Buchanan

Suyama

[One condition in two or more columns](#)

To find data that meets one condition in two or more columns, enter all the criteria in the same row of the criteria range. For example, the following criteria range displays all rows that contain "Produce" in the Type column, "Davolio" in the Salesperson column, and sales values greater than \$1,000.

### **Type Salesperson Sales**

Produce Davolio >1000

[One condition in one column or another](#)

To find data that meets either a condition in one column or a condition in another column, enter the criteria in different rows of the criteria range. For example, the following criteria range displays all rows that contain either "Produce" in the Type column, "Davolio" in the Salesperson column, or sales values greater than \$1,000.

### **Type Salesperson Sales**

Produce

Davolio

>1000

[One of two sets of conditions for two columns](#)

To find rows that meet one of two sets of conditions, where each set includes conditions for more than one column, type the criteria in separate rows. For

example, the following criteria range displays the rows that contain both "Davolio" in the Salesperson column and sales values greater than \$3,000, and also displays the rows for salesperson Buchanan with sales values greater than \$1,500.

### **Salesperson Sales**

Davolio >3000  
Buchanan >1500

### [More than two sets of conditions for one column](#)

To find rows that meet greater than two sets of conditions, include multiple columns with the same column heading. For example, the following criteria range displays sales that are between 5,000 and 8,000 in addition to sales that are less than 500.

### **Sales Sales**

>5000 <8000  
<500

### [Conditions created as the result of a formula](#)

You can use a calculated value that is the result of a [formula](#) as your criterion. When you use a formula to create a criterion, do not use a column label for a criteria label; either keep the criteria label blank or use a label that is not a column label in the list. For example, the following criteria range displays rows that have a value in column C greater than the average of cells C7:C10.

=C7>AVERAGE(\$C\$7:\$C\$10)

### **Notes**

- The formula you use for a condition must use a [relative reference](#) to refer to the column label (for example, Sales) or the corresponding field in the first record. All other references in the formula must be [absolute references](#), and the formula must evaluate to TRUE or FALSE. In the formula example, "C7" refers to the field (column C) for the first record (row 7) of the list.

- You can use a column label in the formula instead of a relative cell reference or a range name. When Microsoft Excel displays an error value such as #NAME? or #VALUE! in the cell that contains the criterion, you can ignore this error because it does not affect how the list is filtered.
- When evaluating data, Microsoft Excel does not distinguish between uppercase and lowercase characters.

[Show All](#)

# DCOUNTA

## [See Also](#)

Counts the nonblank cells in a column of a list or database that match conditions you specify.

The field argument is optional. If field is omitted, DCOUNTA counts all records in the database that match the criteria.

## Syntax

**DCOUNTA(database,field,criteria)**

Database is the range of cells that makes up the list or database. A database is a list of related data in which rows of related information are records, and columns of data are fields. The first row of the list contains labels for each column.

Field indicates which column is used in the function. Field can be given as text with the column label enclosed between double quotation marks, such as "Age" or "Yield," or as a number that represents the position of the column within the list: 1 for the first column, 2 for the second column, and so on.

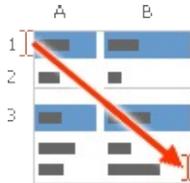
Criteria is the range of cells that contains the conditions you specify. You can use any range for the criteria argument, as long as it includes at least one column label and at least one cell below the column label for specifying a condition for the column.

 [Example](#)

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>
	<b>Tree</b>	<b>Height</b>	<b>Age</b>	<b>Yield</b>	<b>Profit</b>	<b>Height</b>
Apple		>10				<16
Pear						
	<b>Tree</b>	<b>Height</b>	<b>Age</b>	<b>Yield</b>	<b>Profit</b>	
Apple		18	20	14	105.00	
Pear		12	12	10	96.00	
Cherry		13	14	9	105.00	
Apple		14	15	10	75.00	
Pear		9	8	8	76.80	
Apple		8	9	6	45.00	
	<b>Formula</b>	<b>Description (Result)</b>				
		This function looks at the				

=DCOUNT(A4:E10,"Age",A1:F2)

records of apple trees between a height of 10 and 16 and counts how many of the Age fields in those records contain numbers.  
(1)

=DCOUNTA(A4:E10,"Profit",A1:F2)

This function looks at the records of apple trees between a height of 10 and 16 and counts how many of the Profit fields in those records are not blank.  
(1)

=DMAX(A4:E10,"Profit",A1:A3)

The maximum profit of apple and pear trees.  
(105)

=DMIN(A4:E10,"Profit",A1:B2)

The minimum profit of apple trees

		over 10 in height. (75)
	=DSUM(A4:E10,"Profit",A1:A2)	The total profit from apple trees. (225)
	=DSUM(A4:E10,"Profit",A1:F2)	The total profit from apple trees with a height between 10 and 16. (75)
1		
2		
3		The product of the yields from apple trees with a height greater than 10. (140)
4		
5	=DPRODUCT(A4:E10,"Yield",A1:B2)	
6		
7		
8		
9		The average yield of apple trees over 10 feet in height. (12)
10	=DAVERAGE(A4:E10,"Yield",A1:B2)	
		The average age of all trees in the database. (13)
	=DAVERAGE(A4:E10,3,A4:E10)	The estimated standard deviation in the yield of apple and

=DSTDEV(A4:E10,"Yield",A1:A3) pear trees if the data in the database is only a sample of the total orchard population. (2.97)

=DSTDEVP(A4:E10,"Yield",A1:A3) pear trees if the data in the database is the entire population. (2.65)

=DVAR(A4:E10,"Yield",A1:A3) pear trees if the data in the database is only a sample of the total orchard population. (8.8)

The true variance in the yield of apple and

=DVARP(A4:E10,"Yield",A1:A3)

pear trees if  
the data in  
the database  
is the entire  
orchard  
population.  
( 7.04)

=DGET(A4:E10,"Yield",A1:A3)

Returns the  
#NUM!  
error value  
because  
more than  
one record  
meets the  
criteria.

## Tips

- You can use any range for the criteria argument, as long as it includes at least one column label and at least one cell below the column label for specifying the condition.

For example, if the range G1:G2 contains the column label Income in G1 and the amount 10,000 in G2, you could define the range as MatchIncome and use that name as the criteria argument in the database functions.

- Although the criteria range can be located anywhere on the worksheet, do not place the criteria range below the list. If you add more information to the list by using the **Form** command on the **Data** menu, the new information is added to the first row below the list. If the row below the list is not blank, Microsoft Excel cannot add the new information.
- Make sure the criteria range does not overlap the list.
- To perform an operation on an entire column in a database, enter a blank line below the column labels in the criteria range.

## Examples of criteria

## Multiple conditions in a single column

If you have two or more conditions for a single column, type the criteria directly below each other in separate rows. For example, the following criteria range displays the rows that contain either "Davolio," "Buchanan," or "Suyama" in the Salesperson column.

### **Salesperson**

Davolio

Buchanan

Suyama

[One condition in two or more columns](#)

To find data that meets one condition in two or more columns, enter all the criteria in the same row of the criteria range. For example, the following criteria range displays all rows that contain "Produce" in the Type column, "Davolio" in the Salesperson column, and sales values greater than \$1,000.

### **Type Salesperson Sales**

Produce Davolio >1000

[One condition in one column or another](#)

To find data that meets either a condition in one column or a condition in another column, enter the criteria in different rows of the criteria range. For example, the following criteria range displays all rows that contain either "Produce" in the Type column, "Davolio" in the Salesperson column, or sales values greater than \$1,000.

### **Type Salesperson Sales**

Produce

Davolio

>1000

[One of two sets of conditions for two columns](#)

To find rows that meet one of two sets of conditions, where each set includes conditions for more than one column, type the criteria in separate rows. For

example, the following criteria range displays the rows that contain both "Davolio" in the Salesperson column and sales values greater than \$3,000, and also displays the rows for salesperson Buchanan with sales values greater than \$1,500.

### **Salesperson Sales**

Davolio >3000  
Buchanan >1500

### [More than two sets of conditions for one column](#)

To find rows that meet greater than two sets of conditions, include multiple columns with the same column heading. For example, the following criteria range displays sales that are between 5,000 and 8,000 in addition to sales that are less than 500.

### **Sales Sales**

>5000 <8000  
<500

### [Conditions created as the result of a formula](#)

You can use a calculated value that is the result of a [formula](#) as your criterion. When you use a formula to create a criterion, do not use a column label for a criteria label; either keep the criteria label blank or use a label that is not a column label in the list. For example, the following criteria range displays rows that have a value in column C greater than the average of cells C7:C10.

=C7>AVERAGE(\$C\$7:\$C\$10)

### **Notes**

- The formula you use for a condition must use a [relative reference](#) to refer to the column label (for example, Sales) or the corresponding field in the first record. All other references in the formula must be [absolute references](#), and the formula must evaluate to TRUE or FALSE. In the formula example, "C7" refers to the field (column C) for the first record (row 7) of the list.

- You can use a column label in the formula instead of a relative cell reference or a range name. When Microsoft Excel displays an error value such as #NAME? or #VALUE! in the cell that contains the criterion, you can ignore this error because it does not affect how the list is filtered.
- When evaluating data, Microsoft Excel does not distinguish between uppercase and lowercase characters.

[Show All](#)

# DGET

## [See Also](#)

Extracts a single value from a column of a list or database that matches conditions you specify.

## Syntax

### **DGET(database,field,criteria)**

**Database** is the range of cells that makes up the list or database. A database is a list of related data in which rows of related information are records, and columns of data are fields. The first row of the list contains labels for each column.

**Field** indicates which column is used in the function. Field can be given as text with the column label enclosed between double quotation marks, such as "Age" or "Yield," or as a number that represents the position of the column within the list: 1 for the first column, 2 for the second column, and so on.

**Criteria** is the range of cells that contains the conditions you specify. You can use any range for the criteria argument, as long as it includes at least one column label and at least one cell below the column label for specifying a condition for the column.

## Remarks

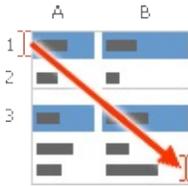
- If no record matches the criteria, DGET returns the #VALUE! error value.
- If more than one record matches the criteria, DGET returns the #NUM! error value.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

## How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>
	<b>Tree</b>	<b>Height</b>	<b>Age</b>	<b>Yield</b>	<b>Profit</b>	<b>Height</b>
Apple		>10				<16
Pear						
	<b>Tree</b>	<b>Height</b>	<b>Age</b>	<b>Yield</b>	<b>Profit</b>	
Apple		18	20	14	105.00	
Pear		12	12	10	96.00	
Cherry		13	14	9	105.00	
Apple		14	15	10	75.00	
Pear		9	8	8	76.80	
Apple		8	9	6	45.00	
	<b>Formula</b>	<b>Description (Result)</b>				

=DCOUNT(A4:E10,"Age",A1:F2)

This function looks at the records of apple trees between a height of 10 and 16 and counts how many of the Age fields in those records contain numbers.

(1)

=DCOUNTA(A4:E10,"Profit",A1:F2)

This function looks at the records of apple trees between a height of 10 and 16 and counts how many of the Profit fields in those records are not blank.

(1)

=DMAX(A4:E10,"Profit",A1:A3)

The maximum profit of apple and pear trees.

(105)

The

	=DMIN(A4:E10,"Profit",A1:B2)	minimum profit of apple trees over 10 in height. (75)
	=DSUM(A4:E10,"Profit",A1:A2)	The total profit from apple trees. (225)
	=DSUM(A4:E10,"Profit",A1:F2)	The total profit from apple trees with a height between 10 and 16. (75)
1		
2		
3		
4		
5		
6	=DPRODUCT(A4:E10,"Yield",A1:B2)	The product of the yields from apple trees with a height greater than 10. (140)
7		
8		
9		
10		
	=DAVERAGE(A4:E10,"Yield",A1:B2)	The average yield of apple trees over 10 feet in height. (12)
	=DAVERAGE(A4:E10,3,A4:E10)	The average age of all trees in the database. (13)
		The estimated standard deviation in

=DSTDEV(A4:E10,"Yield",A1:A3)

the yield of apple and pear trees if the data in the database is only a sample of the total orchard population.  
(2.97)

=DSTDEVP(A4:E10,"Yield",A1:A3)

The true standard deviation in the yield of apple and pear trees if the data in the database is the entire population.  
(2.65)

=DVAR(A4:E10,"Yield",A1:A3)

The estimated variance in the yield of apple and pear trees if the data in the database is only a sample of the total orchard population.  
(8.8)

The true variance in

=DVARP(A4:E10,"Yield",A1:A3)

the yield of apple and pear trees if the data in the database is the entire orchard population.  
( 7.04)

=DGET(A4:E10,"Yield",A1:A3)

Returns the #NUM! error value because more than one record meets the criteria.

### [Tips](#)

- You can use any range for the criteria argument, as long as it includes at least one column label and at least one cell below the column label for specifying the condition.

For example, if the range G1:G2 contains the column label Income in G1 and the amount 10,000 in G2, you could define the range as MatchIncome and use that name as the criteria argument in the database functions.

- Although the criteria range can be located anywhere on the worksheet, do not place the criteria range below the list. If you add more information to the list by using the **Form** command on the **Data** menu, the new information is added to the first row below the list. If the row below the list is not blank, Microsoft Excel cannot add the new information.
- Make sure the criteria range does not overlap the list.
- To perform an operation on an entire column in a database, enter a blank line below the column labels in the criteria range.

### [Examples of criteria](#)

### [Multiple conditions in a single column](#)

If you have two or more conditions for a single column, type the criteria directly below each other in separate rows. For example, the following criteria range displays the rows that contain either "Davolio," "Buchanan," or "Suyama" in the Salesperson column.

#### **Salesperson**

Davolio

Buchanan

Suyama

### [One condition in two or more columns](#)

To find data that meets one condition in two or more columns, enter all the criteria in the same row of the criteria range. For example, the following criteria range displays all rows that contain "Produce" in the Type column, "Davolio" in the Salesperson column, and sales values greater than \$1,000.

#### **Type Salesperson Sales**

Produce Davolio >1000

### [One condition in one column or another](#)

To find data that meets either a condition in one column or a condition in another column, enter the criteria in different rows of the criteria range. For example, the following criteria range displays all rows that contain either "Produce" in the Type column, "Davolio" in the Salesperson column, or sales values greater than \$1,000.

#### **Type Salesperson Sales**

Produce

Davolio

>1000

### [One of two sets of conditions for two columns](#)

To find rows that meet one of two sets of conditions, where each set includes conditions for more than one column, type the criteria in separate rows. For example, the following criteria range displays the rows that contain both "Davolio" in the Salesperson column and sales values greater than \$3,000, and also displays the rows for salesperson Buchanan with sales values greater than \$1,500.

### **Salesperson Sales**

Davolio >3000

Buchanan >1500

[More than two sets of conditions for one column](#)

To find rows that meet greater than two sets of conditions, include multiple columns with the same column heading. For example, the following criteria range displays sales that are between 5,000 and 8,000 in addition to sales that are less than 500.

### **Sales Sales**

>5000 <8000

<500

[Conditions created as the result of a formula](#)

You can use a calculated value that is the result of a [formula](#) as your criterion. When you use a formula to create a criterion, do not use a column label for a criteria label; either keep the criteria label blank or use a label that is not a column label in the list. For example, the following criteria range displays rows that have a value in column C greater than the average of cells C7:C10.

=C7>AVERAGE(\$C\$7:\$C\$10)

### **Notes**

- The formula you use for a condition must use a [relative reference](#) to refer to the column label (for example, Sales) or the corresponding field in the first record. All other references in the formula must be [absolute references](#), and

the formula must evaluate to TRUE or FALSE. In the formula example, "C7" refers to the field (column C) for the first record (row 7) of the list.

- You can use a column label in the formula instead of a relative cell reference or a range name. When Microsoft Excel displays an error value such as #NAME? or #VALUE! in the cell that contains the criterion, you can ignore this error because it does not affect how the list is filtered.
- When evaluating data, Microsoft Excel does not distinguish between uppercase and lowercase characters.

[Show All](#)

# DMAX

## [See Also](#)

Returns the largest number in a column of a list or database that matches conditions you specify.

## Syntax

### **DMAX(database,field,criteria)**

**Database** is the range of cells that makes up the list or database. A database is a list of related data in which rows of related information are records, and columns of data are fields. The first row of the list contains labels for each column.

**Field** indicates which column is used in the function. Field can be given as text with the column label enclosed between double quotation marks, such as "Age" or "Yield," or as a number that represents the position of the column within the list: 1 for the first column, 2 for the second column, and so on.

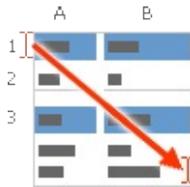
**Criteria** is the range of cells that contains the conditions you specify. You can use any range for the criteria argument, as long as it includes at least one column label and at least one cell below the column label for specifying a condition for the column.

## [Example](#)

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>
	<b>Tree</b>	<b>Height</b>	<b>Age</b>	<b>Yield</b>	<b>Profit</b>	<b>Height</b>
Apple		>10				<16
Pear						
	<b>Tree</b>	<b>Height</b>	<b>Age</b>	<b>Yield</b>	<b>Profit</b>	
Apple		18	20	14	105.00	
Pear		12	12	10	96.00	
Cherry		13	14	9	105.00	
Apple		14	15	10	75.00	
Pear		9	8	8	76.80	
Apple		8	9	6	45.00	
	<b>Formula</b>	<b>Description (Result)</b>				
		This function looks at the records of apple trees				

=DCOUNT(A4:E10,"Age",A1:F2)

between a height of 10 and 16 and counts how many of the Age fields in those records contain numbers.

(1)

This function looks at the records of apple trees between a height of 10 and 16 and counts how many of the Profit fields in those records are not blank.

=DCOUNTA(A4:E10,"Profit",A1:F2)

(1)

The maximum profit of apple and pear trees.

=DMAX(A4:E10,"Profit",A1:A3)

(105)

The minimum profit of apple trees over 10 in height. (75)

=DMIN(A4:E10,"Profit",A1:B2)

	=DSUM(A4:E10,"Profit",A1:A2)	The total profit from apple trees. (225)
	=DSUM(A4:E10,"Profit",A1:F2)	The total profit from apple trees with a height between 10 and 16. (75)
1		
2		
3		The product of the yields from apple
4		trees with a height greater than
5	=DPRODUCT(A4:E10,"Yield",A1:B2)	10. (140)
6		
7		
8		The average yield of
9		apple trees over 10 feet
10	=DAVERAGE(A4:E10,"Yield",A1:B2)	in height. (12)
	=DAVERAGE(A4:E10,3,A4:E10)	The average age of all trees in the database. (13)
		The estimated standard deviation in the yield of apple and pear trees if the data in the database
	=DSTDEV(A4:E10,"Yield",A1:A3)	

is only a sample of the total orchard population.  
(2.97)

=DSTDEVP(A4:E10,"Yield",A1:A3)

The true standard deviation in the yield of apple and pear trees if the data in the database is the entire population.  
(2.65)

=DVAR(A4:E10,"Yield",A1:A3)

The estimated variance in the yield of apple and pear trees if the data in the database is only a sample of the total orchard population.  
(8.8)

=DVARP(A4:E10,"Yield",A1:A3)

The true variance in the yield of apple and pear trees if the data in the database

=DGET(A4:E10,"Yield",A1:A3)

is the entire orchard population. ( 7.04)  
Returns the #NUM! error value because more than one record meets the criteria.

### [Tips](#)

- You can use any range for the criteria argument, as long as it includes at least one column label and at least one cell below the column label for specifying the condition.

For example, if the range G1:G2 contains the column label Income in G1 and the amount 10,000 in G2, you could define the range as MatchIncome and use that name as the criteria argument in the database functions.

- Although the criteria range can be located anywhere on the worksheet, do not place the criteria range below the list. If you add more information to the list by using the **Form** command on the **Data** menu, the new information is added to the first row below the list. If the row below the list is not blank, Microsoft Excel cannot add the new information.
- Make sure the criteria range does not overlap the list.
- To perform an operation on an entire column in a database, enter a blank line below the column labels in the criteria range.

### [Examples of criteria](#)

### [Multiple conditions in a single column](#)

If you have two or more conditions for a single column, type the criteria directly below each other in separate rows. For example, the following criteria range

displays the rows that contain either "Davolio," "Buchanan," or "Suyama" in the Salesperson column.

### **Salesperson**

Davolio

Buchanan

Suyama

[One condition in two or more columns](#)

To find data that meets one condition in two or more columns, enter all the criteria in the same row of the criteria range. For example, the following criteria range displays all rows that contain "Produce" in the Type column, "Davolio" in the Salesperson column, and sales values greater than \$1,000.

#### **Type Salesperson Sales**

Produce Davolio >1000

[One condition in one column or another](#)

To find data that meets either a condition in one column or a condition in another column, enter the criteria in different rows of the criteria range. For example, the following criteria range displays all rows that contain either "Produce" in the Type column, "Davolio" in the Salesperson column, or sales values greater than \$1,000.

#### **Type Salesperson Sales**

Produce

Davolio

>1000

[One of two sets of conditions for two columns](#)

To find rows that meet one of two sets of conditions, where each set includes conditions for more than one column, type the criteria in separate rows. For example, the following criteria range displays the rows that contain both "Davolio" in the Salesperson column and sales values greater than \$3,000, and

also displays the rows for salesperson Buchanan with sales values greater than \$1,500.

### **Salesperson Sales**

Davolio >3000  
Buchanan >1500

### [More than two sets of conditions for one column](#)

To find rows that meet greater than two sets of conditions, include multiple columns with the same column heading. For example, the following criteria range displays sales that are between 5,000 and 8,000 in addition to sales that are less than 500.

### **Sales Sales**

>5000 <8000  
<500

### [Conditions created as the result of a formula](#)

You can use a calculated value that is the result of a [formula](#) as your criterion. When you use a formula to create a criterion, do not use a column label for a criteria label; either keep the criteria label blank or use a label that is not a column label in the list. For example, the following criteria range displays rows that have a value in column C greater than the average of cells C7:C10.

=C7>AVERAGE(\$C\$7:\$C\$10)

### **Notes**

- The formula you use for a condition must use a [relative reference](#) to refer to the column label (for example, Sales) or the corresponding field in the first record. All other references in the formula must be [absolute references](#), and the formula must evaluate to TRUE or FALSE. In the formula example, "C7" refers to the field (column C) for the first record (row 7) of the list.
- You can use a column label in the formula instead of a relative cell reference or a range name. When Microsoft Excel displays an error value

such as #NAME? or #VALUE! in the cell that contains the criterion, you can ignore this error because it does not affect how the list is filtered.

- When evaluating data, Microsoft Excel does not distinguish between uppercase and lowercase characters.

[Show All](#)

# DMIN

## [See Also](#)

Returns the smallest number in a column of a list or database that matches conditions you specify.

## Syntax

**DMIN(database,field,criteria)**

**Database** is the range of cells that makes up the list or database. A database is a list of related data in which rows of related information are records, and columns of data are fields. The first row of the list contains labels for each column.

**Field** indicates which column is used in the function. Field can be given as text with the column label enclosed between double quotation marks, such as "Age" or "Yield," or as a number that represents the position of the column within the list: 1 for the first column, 2 for the second column, and so on.

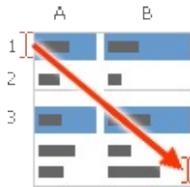
**Criteria** is the range of cells that contains the conditions you specify. You can use any range for the criteria argument, as long as it includes at least one column label and at least one cell below the column label for specifying a condition for the column.

## [Example](#)

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



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3. Press CTRL+C.
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	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>
	<b>Tree</b>	<b>Height</b>	<b>Age</b>	<b>Yield</b>	<b>Profit</b>	<b>Height</b>
Apple		>10				<16
Pear						
	<b>Tree</b>	<b>Height</b>	<b>Age</b>	<b>Yield</b>	<b>Profit</b>	
Apple		18	20	14	105.00	
Pear		12	12	10	96.00	
Cherry		13	14	9	105.00	
Apple		14	15	10	75.00	
Pear		9	8	8	76.80	
Apple		8	9	6	45.00	
	<b>Formula</b>	<b>Description (Result)</b>				
		This function looks at the records of apple trees				

=DCOUNT(A4:E10,"Age",A1:F2)

between a height of 10 and 16 and counts how many of the Age fields in those records contain numbers.

(1)

This function looks at the records of apple trees between a height of 10 and 16 and counts how many of the Profit fields in those records are not blank.

=DCOUNTA(A4:E10,"Profit",A1:F2)

(1)

The maximum profit of apple and pear trees.

=DMAX(A4:E10,"Profit",A1:A3)

(105)

The minimum profit of apple trees over 10 in height. (75)

=DMIN(A4:E10,"Profit",A1:B2)

	=DSUM(A4:E10,"Profit",A1:A2)	The total profit from apple trees. (225)
	=DSUM(A4:E10,"Profit",A1:F2)	The total profit from apple trees with a height between 10 and 16. (75)
1		
2		
3		The product of the yields from apple
4		trees with a height greater than
5	=DPRODUCT(A4:E10,"Yield",A1:B2)	10. (140)
6		
7		
8		The average yield of
9		apple trees over 10 feet
10	=DAVERAGE(A4:E10,"Yield",A1:B2)	in height. (12)
	=DAVERAGE(A4:E10,3,A4:E10)	The average age of all trees in the database. (13)
		The estimated standard deviation in the yield of apple and pear trees if the data in the database
	=DSTDEV(A4:E10,"Yield",A1:A3)	

is only a sample of the total orchard population.  
(2.97)

=DSTDEVP(A4:E10,"Yield",A1:A3)

The true standard deviation in the yield of apple and pear trees if the data in the database is the entire population.  
(2.65)

=DVAR(A4:E10,"Yield",A1:A3)

The estimated variance in the yield of apple and pear trees if the data in the database is only a sample of the total orchard population.  
(8.8)

=DVARP(A4:E10,"Yield",A1:A3)

The true variance in the yield of apple and pear trees if the data in the database

=DGET(A4:E10,"Yield",A1:A3)

is the entire orchard population. ( 7.04)  
Returns the #NUM! error value because more than one record meets the criteria.

### [Tips](#)

- You can use any range for the criteria argument, as long as it includes at least one column label and at least one cell below the column label for specifying the condition.

For example, if the range G1:G2 contains the column label Income in G1 and the amount 10,000 in G2, you could define the range as MatchIncome and use that name as the criteria argument in the database functions.

- Although the criteria range can be located anywhere on the worksheet, do not place the criteria range below the list. If you add more information to the list by using the **Form** command on the **Data** menu, the new information is added to the first row below the list. If the row below the list is not blank, Microsoft Excel cannot add the new information.
- Make sure the criteria range does not overlap the list.
- To perform an operation on an entire column in a database, enter a blank line below the column labels in the criteria range.

### [Examples of criteria](#)

### [Multiple conditions in a single column](#)

If you have two or more conditions for a single column, type the criteria directly below each other in separate rows. For example, the following criteria range

displays the rows that contain either "Davolio," "Buchanan," or "Suyama" in the Salesperson column.

### **Salesperson**

Davolio

Buchanan

Suyama

[One condition in two or more columns](#)

To find data that meets one condition in two or more columns, enter all the criteria in the same row of the criteria range. For example, the following criteria range displays all rows that contain "Produce" in the Type column, "Davolio" in the Salesperson column, and sales values greater than \$1,000.

#### **Type Salesperson Sales**

Produce Davolio >1000

[One condition in one column or another](#)

To find data that meets either a condition in one column or a condition in another column, enter the criteria in different rows of the criteria range. For example, the following criteria range displays all rows that contain either "Produce" in the Type column, "Davolio" in the Salesperson column, or sales values greater than \$1,000.

#### **Type Salesperson Sales**

Produce

Davolio

>1000

[One of two sets of conditions for two columns](#)

To find rows that meet one of two sets of conditions, where each set includes conditions for more than one column, type the criteria in separate rows. For example, the following criteria range displays the rows that contain both "Davolio" in the Salesperson column and sales values greater than \$3,000, and

also displays the rows for salesperson Buchanan with sales values greater than \$1,500.

### **Salesperson Sales**

Davolio >3000  
Buchanan >1500

### [More than two sets of conditions for one column](#)

To find rows that meet greater than two sets of conditions, include multiple columns with the same column heading. For example, the following criteria range displays sales that are between 5,000 and 8,000 in addition to sales that are less than 500.

### **Sales Sales**

>5000 <8000  
<500

### [Conditions created as the result of a formula](#)

You can use a calculated value that is the result of a [formula](#) as your criterion. When you use a formula to create a criterion, do not use a column label for a criteria label; either keep the criteria label blank or use a label that is not a column label in the list. For example, the following criteria range displays rows that have a value in column C greater than the average of cells C7:C10.

=C7>AVERAGE(\$C\$7:\$C\$10)

### **Notes**

- The formula you use for a condition must use a [relative reference](#) to refer to the column label (for example, Sales) or the corresponding field in the first record. All other references in the formula must be [absolute references](#), and the formula must evaluate to TRUE or FALSE. In the formula example, "C7" refers to the field (column C) for the first record (row 7) of the list.
- You can use a column label in the formula instead of a relative cell reference or a range name. When Microsoft Excel displays an error value

such as #NAME? or #VALUE! in the cell that contains the criterion, you can ignore this error because it does not affect how the list is filtered.

- When evaluating data, Microsoft Excel does not distinguish between uppercase and lowercase characters.

[Show All](#)

# DPRODUCT

## [See Also](#)

Multiplies the values in a column of a list or database that match conditions you specify.

## Syntax

**DPRODUCT(database,field,criteria)**

Database is the range of cells that makes up the list or database. A database is a list of related data in which rows of related information are records, and columns of data are fields. The first row of the list contains labels for each column.

Field indicates which column is used in the function. Field can be given as text with the column label enclosed between double quotation marks, such as "Age" or "Yield," or as a number that represents the position of the column within the list: 1 for the first column, 2 for the second column, and so on.

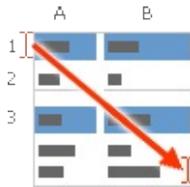
Criteria is the range of cells that contains the conditions you specify. You can use any range for the criteria argument, as long as it includes at least one column label and at least one cell below the column label for specifying a condition for the column.

## [Example](#)

The example may be easier to understand if you copy it to a blank worksheet.

**How?**

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>
	<b>Tree</b>	<b>Height</b>	<b>Age</b>	<b>Yield</b>	<b>Profit</b>	<b>Height</b>
Apple		>10				<16
Pear						
	<b>Tree</b>	<b>Height</b>	<b>Age</b>	<b>Yield</b>	<b>Profit</b>	
Apple		18	20	14	105.00	
Pear		12	12	10	96.00	
Cherry		13	14	9	105.00	
Apple		14	15	10	75.00	
Pear		9	8	8	76.80	
Apple		8	9	6	45.00	

**Formula**

**Description (Result)**

This function looks at the records of apple trees

=DCOUNT(A4:E10,"Age",A1:F2)

between a height of 10 and 16 and counts how many of the Age fields in those records contain numbers.

(1)

This function looks at the records of apple trees between a height of 10 and 16 and counts how many of the Profit fields in those records are not blank.

=DCOUNTA(A4:E10,"Profit",A1:F2)

(1)

The maximum profit of apple and pear trees.

=DMAX(A4:E10,"Profit",A1:A3)

(105)

The minimum profit of apple trees over 10 in height. (75)

=DMIN(A4:E10,"Profit",A1:B2)

	=DSUM(A4:E10,"Profit",A1:A2)	The total profit from apple trees. (225)
	=DSUM(A4:E10,"Profit",A1:F2)	The total profit from apple trees with a height between 10 and 16. (75)
1		
2		
3		The product of the yields from apple
4		trees with a height greater than
5	=DPRODUCT(A4:E10,"Yield",A1:B2)	10. (140)
6		
7		
8		The average yield of
9		apple trees over 10 feet
10	=DAVERAGE(A4:E10,"Yield",A1:B2)	in height. (12)
	=DAVERAGE(A4:E10,3,A4:E10)	The average age of all trees in the database. (13)
		The estimated standard deviation in the yield of apple and pear trees if the data in the database
	=DSTDEV(A4:E10,"Yield",A1:A3)	

is only a sample of the total orchard population.  
(2.97)

=DSTDEVP(A4:E10,"Yield",A1:A3)

The true standard deviation in the yield of apple and pear trees if the data in the database is the entire population.  
(2.65)

=DVAR(A4:E10,"Yield",A1:A3)

The estimated variance in the yield of apple and pear trees if the data in the database is only a sample of the total orchard population.  
(8.8)

=DVARP(A4:E10,"Yield",A1:A3)

The true variance in the yield of apple and pear trees if the data in the database

=DGET(A4:E10,"Yield",A1:A3)

is the entire orchard population. ( 7.04)  
Returns the #NUM! error value because more than one record meets the criteria.

### [Tips](#)

- You can use any range for the criteria argument, as long as it includes at least one column label and at least one cell below the column label for specifying the condition.

For example, if the range G1:G2 contains the column label Income in G1 and the amount 10,000 in G2, you could define the range as MatchIncome and use that name as the criteria argument in the database functions.

- Although the criteria range can be located anywhere on the worksheet, do not place the criteria range below the list. If you add more information to the list by using the **Form** command on the **Data** menu, the new information is added to the first row below the list. If the row below the list is not blank, Microsoft Excel cannot add the new information.
- Make sure the criteria range does not overlap the list.
- To perform an operation on an entire column in a database, enter a blank line below the column labels in the criteria range.

### [Examples of criteria](#)

### [Multiple conditions in a single column](#)

If you have two or more conditions for a single column, type the criteria directly below each other in separate rows. For example, the following criteria range

displays the rows that contain either "Davolio," "Buchanan," or "Suyama" in the Salesperson column.

### **Salesperson**

Davolio

Buchanan

Suyama

[One condition in two or more columns](#)

To find data that meets one condition in two or more columns, enter all the criteria in the same row of the criteria range. For example, the following criteria range displays all rows that contain "Produce" in the Type column, "Davolio" in the Salesperson column, and sales values greater than \$1,000.

### **Type Salesperson Sales**

Produce Davolio >1000

[One condition in one column or another](#)

To find data that meets either a condition in one column or a condition in another column, enter the criteria in different rows of the criteria range. For example, the following criteria range displays all rows that contain either "Produce" in the Type column, "Davolio" in the Salesperson column, or sales values greater than \$1,000.

### **Type Salesperson Sales**

Produce

Davolio

>1000

[One of two sets of conditions for two columns](#)

To find rows that meet one of two sets of conditions, where each set includes conditions for more than one column, type the criteria in separate rows. For example, the following criteria range displays the rows that contain both "Davolio" in the Salesperson column and sales values greater than \$3,000, and

also displays the rows for salesperson Buchanan with sales values greater than \$1,500.

### **Salesperson Sales**

Davolio >3000  
Buchanan >1500

### [More than two sets of conditions for one column](#)

To find rows that meet greater than two sets of conditions, include multiple columns with the same column heading. For example, the following criteria range displays sales that are between 5,000 and 8,000 in addition to sales that are less than 500.

### **Sales Sales**

>5000 <8000  
<500

### [Conditions created as the result of a formula](#)

You can use a calculated value that is the result of a [formula](#) as your criterion. When you use a formula to create a criterion, do not use a column label for a criteria label; either keep the criteria label blank or use a label that is not a column label in the list. For example, the following criteria range displays rows that have a value in column C greater than the average of cells C7:C10.

=C7>AVERAGE(\$C\$7:\$C\$10)

### **Notes**

- The formula you use for a condition must use a [relative reference](#) to refer to the column label (for example, Sales) or the corresponding field in the first record. All other references in the formula must be [absolute references](#), and the formula must evaluate to TRUE or FALSE. In the formula example, "C7" refers to the field (column C) for the first record (row 7) of the list.
- You can use a column label in the formula instead of a relative cell reference or a range name. When Microsoft Excel displays an error value

such as #NAME? or #VALUE! in the cell that contains the criterion, you can ignore this error because it does not affect how the list is filtered.

- When evaluating data, Microsoft Excel does not distinguish between uppercase and lowercase characters.

[Show All](#)

# DSTDEV

## [See Also](#)

Estimates the standard deviation of a population based on a sample by using the numbers in a column of a list or database that match conditions you specify.

## Syntax

**DSTDEV(database,field,criteria)**

**Database** is the range of cells that makes up the list or database. A database is a list of related data in which rows of related information are records, and columns of data are fields. The first row of the list contains labels for each column.

**Field** indicates which column is used in the function. Field can be given as text with the column label enclosed between double quotation marks, such as "Age" or "Yield," or as a number that represents the position of the column within the list: 1 for the first column, 2 for the second column, and so on.

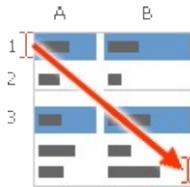
**Criteria** is the range of cells that contains the conditions you specify. You can use any range for the criteria argument, as long as it includes at least one column label and at least one cell below the column label for specifying a condition for the column.

## [Example](#)

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
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Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>
	<b>Tree</b>	<b>Height</b>	<b>Age</b>	<b>Yield</b>	<b>Profit</b>	<b>Height</b>
Apple		>10				<16
Pear						
	<b>Tree</b>	<b>Height</b>	<b>Age</b>	<b>Yield</b>	<b>Profit</b>	
Apple		18	20	14	105.00	
Pear		12	12	10	96.00	
Cherry		13	14	9	105.00	
Apple		14	15	10	75.00	
Pear		9	8	8	76.80	
Apple		8	9	6	45.00	

<b>Formula</b>	<b>Description (Result)</b>
	This function looks at the records of apple trees

=DCOUNT(A4:E10,"Age",A1:F2)

between a height of 10 and 16 and counts how many of the Age fields in those records contain numbers.

(1)

This function looks at the records of apple trees between a height of 10 and 16 and counts how many of the Profit fields in those records are not blank.

=DCOUNTA(A4:E10,"Profit",A1:F2)

(1)

The maximum profit of apple and pear trees.

=DMAX(A4:E10,"Profit",A1:A3)

(105)

The minimum profit of apple trees over 10 in height. (75)

=DMIN(A4:E10,"Profit",A1:B2)

	=DSUM(A4:E10,"Profit",A1:A2)	The total profit from apple trees. (225)
	=DSUM(A4:E10,"Profit",A1:F2)	The total profit from apple trees with a height between 10 and 16. (75)
1		
2		
3		The product of the yields from apple
4		trees with a height greater than
5	=DPRODUCT(A4:E10,"Yield",A1:B2)	10. (140)
6		
7		
8		The average yield of
9		apple trees over 10 feet
10	=DAVERAGE(A4:E10,"Yield",A1:B2)	in height. (12)
	=DAVERAGE(A4:E10,3,A4:E10)	The average age of all trees in the database. (13)
		The estimated standard deviation in the yield of apple and pear trees if the data in the database
	=DSTDEV(A4:E10,"Yield",A1:A3)	

is only a sample of the total orchard population.  
(2.97)

=DSTDEVP(A4:E10,"Yield",A1:A3)

The true standard deviation in the yield of apple and pear trees if the data in the database is the entire population.  
(2.65)

=DVAR(A4:E10,"Yield",A1:A3)

The estimated variance in the yield of apple and pear trees if the data in the database is only a sample of the total orchard population.  
(8.8)

=DVARP(A4:E10,"Yield",A1:A3)

The true variance in the yield of apple and pear trees if the data in the database

=DGET(A4:E10,"Yield",A1:A3)

is the entire orchard population. ( 7.04)  
Returns the #NUM! error value because more than one record meets the criteria.

### [Tips](#)

- You can use any range for the criteria argument, as long as it includes at least one column label and at least one cell below the column label for specifying the condition.

For example, if the range G1:G2 contains the column label Income in G1 and the amount 10,000 in G2, you could define the range as MatchIncome and use that name as the criteria argument in the database functions.

- Although the criteria range can be located anywhere on the worksheet, do not place the criteria range below the list. If you add more information to the list by using the **Form** command on the **Data** menu, the new information is added to the first row below the list. If the row below the list is not blank, Microsoft Excel cannot add the new information.
- Make sure the criteria range does not overlap the list.
- To perform an operation on an entire column in a database, enter a blank line below the column labels in the criteria range.

### [Examples of criteria](#)

### [Multiple conditions in a single column](#)

If you have two or more conditions for a single column, type the criteria directly below each other in separate rows. For example, the following criteria range

displays the rows that contain either "Davolio," "Buchanan," or "Suyama" in the Salesperson column.

### **Salesperson**

Davolio

Buchanan

Suyama

[One condition in two or more columns](#)

To find data that meets one condition in two or more columns, enter all the criteria in the same row of the criteria range. For example, the following criteria range displays all rows that contain "Produce" in the Type column, "Davolio" in the Salesperson column, and sales values greater than \$1,000.

### **Type Salesperson Sales**

Produce Davolio >1000

[One condition in one column or another](#)

To find data that meets either a condition in one column or a condition in another column, enter the criteria in different rows of the criteria range. For example, the following criteria range displays all rows that contain either "Produce" in the Type column, "Davolio" in the Salesperson column, or sales values greater than \$1,000.

### **Type Salesperson Sales**

Produce

Davolio

>1000

[One of two sets of conditions for two columns](#)

To find rows that meet one of two sets of conditions, where each set includes conditions for more than one column, type the criteria in separate rows. For example, the following criteria range displays the rows that contain both "Davolio" in the Salesperson column and sales values greater than \$3,000, and

also displays the rows for salesperson Buchanan with sales values greater than \$1,500.

### **Salesperson Sales**

Davolio >3000  
Buchanan >1500

### [More than two sets of conditions for one column](#)

To find rows that meet greater than two sets of conditions, include multiple columns with the same column heading. For example, the following criteria range displays sales that are between 5,000 and 8,000 in addition to sales that are less than 500.

### **Sales Sales**

>5000 <8000  
<500

### [Conditions created as the result of a formula](#)

You can use a calculated value that is the result of a [formula](#) as your criterion. When you use a formula to create a criterion, do not use a column label for a criteria label; either keep the criteria label blank or use a label that is not a column label in the list. For example, the following criteria range displays rows that have a value in column C greater than the average of cells C7:C10.

=C7>AVERAGE(\$C\$7:\$C\$10)

### **Notes**

- The formula you use for a condition must use a [relative reference](#) to refer to the column label (for example, Sales) or the corresponding field in the first record. All other references in the formula must be [absolute references](#), and the formula must evaluate to TRUE or FALSE. In the formula example, "C7" refers to the field (column C) for the first record (row 7) of the list.
- You can use a column label in the formula instead of a relative cell reference or a range name. When Microsoft Excel displays an error value

such as #NAME? or #VALUE! in the cell that contains the criterion, you can ignore this error because it does not affect how the list is filtered.

- When evaluating data, Microsoft Excel does not distinguish between uppercase and lowercase characters.

[Show All](#)

# DSTDEVP

## [See Also](#)

Calculates the standard deviation of a population based on the entire population, using the numbers in a column of a list or database that match conditions you specify.

## Syntax

### **DSTDEVP(database,field,criteria)**

**Database** is the range of cells that makes up the list or database. A database is a list of related data in which rows of related information are records, and columns of data are fields. The first row of the list contains labels for each column.

**Field** indicates which column is used in the function. Field can be given as text with the column label enclosed between double quotation marks, such as "Age" or "Yield," or as a number that represents the position of the column within the list: 1 for the first column, 2 for the second column, and so on.

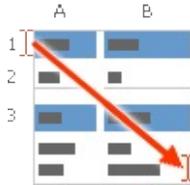
**Criteria** is the range of cells that contains the conditions you specify. You can use any range for the criteria argument, as long as it includes at least one column label and at least one cell below the column label for specifying a condition for the column.

## [Example](#)

The example may be easier to understand if you copy it to a blank worksheet.

**How?**

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



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3. Press CTRL+C.
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	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>
	<b>Tree</b>	<b>Height</b>	<b>Age</b>	<b>Yield</b>	<b>Profit</b>	<b>Height</b>
Apple		>10				<16
Pear						
	<b>Tree</b>	<b>Height</b>	<b>Age</b>	<b>Yield</b>	<b>Profit</b>	
Apple		18	20	14	105.00	
Pear		12	12	10	96.00	
Cherry		13	14	9	105.00	
Apple		14	15	10	75.00	
Pear		9	8	8	76.80	
Apple		8	9	6	45.00	

**Formula**

**Description (Result)**

This function looks at the records of apple trees

=DCOUNT(A4:E10,"Age",A1:F2)

between a height of 10 and 16 and counts how many of the Age fields in those records contain numbers.

(1)

This function looks at the records of apple trees between a height of 10 and 16 and counts how many of the Profit fields in those records are not blank.

=DCOUNTA(A4:E10,"Profit",A1:F2)

(1)

The maximum profit of apple and pear trees.

=DMAX(A4:E10,"Profit",A1:A3)

(105)

The minimum profit of apple trees over 10 in height. (75)

=DMIN(A4:E10,"Profit",A1:B2)

	=DSUM(A4:E10,"Profit",A1:A2)	The total profit from apple trees. (225)
	=DSUM(A4:E10,"Profit",A1:F2)	The total profit from apple trees with a height between 10 and 16. (75)
1		
2		
3		The product of the yields from apple
4		trees with a height greater than
5	=DPRODUCT(A4:E10,"Yield",A1:B2)	10. (140)
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7		
8		The average yield of
9		apple trees over 10 feet
10	=DAVERAGE(A4:E10,"Yield",A1:B2)	in height. (12)
	=DAVERAGE(A4:E10,3,A4:E10)	The average age of all trees in the database. (13)
		The estimated standard deviation in the yield of apple and pear trees if the data in the database
	=DSTDEV(A4:E10,"Yield",A1:A3)	

is only a sample of the total orchard population.  
(2.97)

=DSTDEVP(A4:E10,"Yield",A1:A3)

The true standard deviation in the yield of apple and pear trees if the data in the database is the entire population.  
(2.65)

=DVAR(A4:E10,"Yield",A1:A3)

The estimated variance in the yield of apple and pear trees if the data in the database is only a sample of the total orchard population.  
(8.8)

=DVARP(A4:E10,"Yield",A1:A3)

The true variance in the yield of apple and pear trees if the data in the database

=DGET(A4:E10,"Yield",A1:A3)

is the entire orchard population. ( 7.04)  
Returns the #NUM! error value because more than one record meets the criteria.

### [Tips](#)

- You can use any range for the criteria argument, as long as it includes at least one column label and at least one cell below the column label for specifying the condition.

For example, if the range G1:G2 contains the column label Income in G1 and the amount 10,000 in G2, you could define the range as MatchIncome and use that name as the criteria argument in the database functions.

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- Make sure the criteria range does not overlap the list.
- To perform an operation on an entire column in a database, enter a blank line below the column labels in the criteria range.

### [Examples of criteria](#)

### [Multiple conditions in a single column](#)

If you have two or more conditions for a single column, type the criteria directly below each other in separate rows. For example, the following criteria range

displays the rows that contain either "Davolio," "Buchanan," or "Suyama" in the Salesperson column.

### **Salesperson**

Davolio

Buchanan

Suyama

[One condition in two or more columns](#)

To find data that meets one condition in two or more columns, enter all the criteria in the same row of the criteria range. For example, the following criteria range displays all rows that contain "Produce" in the Type column, "Davolio" in the Salesperson column, and sales values greater than \$1,000.

#### **Type Salesperson Sales**

Produce Davolio >1000

[One condition in one column or another](#)

To find data that meets either a condition in one column or a condition in another column, enter the criteria in different rows of the criteria range. For example, the following criteria range displays all rows that contain either "Produce" in the Type column, "Davolio" in the Salesperson column, or sales values greater than \$1,000.

#### **Type Salesperson Sales**

Produce

Davolio

>1000

[One of two sets of conditions for two columns](#)

To find rows that meet one of two sets of conditions, where each set includes conditions for more than one column, type the criteria in separate rows. For example, the following criteria range displays the rows that contain both "Davolio" in the Salesperson column and sales values greater than \$3,000, and

also displays the rows for salesperson Buchanan with sales values greater than \$1,500.

### **Salesperson Sales**

Davolio >3000  
Buchanan >1500

### [More than two sets of conditions for one column](#)

To find rows that meet greater than two sets of conditions, include multiple columns with the same column heading. For example, the following criteria range displays sales that are between 5,000 and 8,000 in addition to sales that are less than 500.

### **Sales Sales**

>5000 <8000  
<500

### [Conditions created as the result of a formula](#)

You can use a calculated value that is the result of a [formula](#) as your criterion. When you use a formula to create a criterion, do not use a column label for a criteria label; either keep the criteria label blank or use a label that is not a column label in the list. For example, the following criteria range displays rows that have a value in column C greater than the average of cells C7:C10.

=C7>AVERAGE(\$C\$7:\$C\$10)

### **Notes**

- The formula you use for a condition must use a [relative reference](#) to refer to the column label (for example, Sales) or the corresponding field in the first record. All other references in the formula must be [absolute references](#), and the formula must evaluate to TRUE or FALSE. In the formula example, "C7" refers to the field (column C) for the first record (row 7) of the list.
- You can use a column label in the formula instead of a relative cell reference or a range name. When Microsoft Excel displays an error value

such as #NAME? or #VALUE! in the cell that contains the criterion, you can ignore this error because it does not affect how the list is filtered.

- When evaluating data, Microsoft Excel does not distinguish between uppercase and lowercase characters.

[Show All](#)

# DSUM

## [See Also](#)

Adds the numbers in a column of a list or database that match conditions you specify.

## Syntax

### **DSUM(database,field,criteria)**

**Database** is the range of cells that makes up the list or database. A database is a list of related data in which rows of related information are records, and columns of data are fields. The first row of the list contains labels for each column.

**Field** indicates which column is used in the function. Field can be given as text with the column label enclosed between double quotation marks, such as "Age" or "Yield," or as a number that represents the position of the column within the list: 1 for the first column, 2 for the second column, and so on.

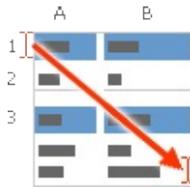
**Criteria** is the range of cells that contains the conditions you specify. You can use any range for the criteria argument, as long as it includes at least one column label and at least one cell below the column label for specifying a condition for the column.

## [Example](#)

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>
	<b>Tree</b>	<b>Height</b>	<b>Age</b>	<b>Yield</b>	<b>Profit</b>	<b>Height</b>
Apple		>10				<16
Pear						
	<b>Tree</b>	<b>Height</b>	<b>Age</b>	<b>Yield</b>	<b>Profit</b>	
Apple		18	20	14	105.00	
Pear		12	12	10	96.00	
Cherry		13	14	9	105.00	
Apple		14	15	10	75.00	
Pear		9	8	8	76.80	
Apple		8	9	6	45.00	

**Formula**

**Description  
(Result)**

This function looks at the records of apple trees

=DCOUNT(A4:E10,"Age",A1:F2)

between a height of 10 and 16 and counts how many of the Age fields in those records contain numbers.

(1)

This function looks at the records of apple trees between a height of 10 and 16 and counts how many of the Profit fields in those records are not blank.

=DCOUNTA(A4:E10,"Profit",A1:F2)

(1)

The maximum profit of apple and pear trees.

=DMAX(A4:E10,"Profit",A1:A3)

(105)

The minimum profit of apple trees over 10 in height. (75)

=DMIN(A4:E10,"Profit",A1:B2)

	=DSUM(A4:E10,"Profit",A1:A2)	The total profit from apple trees. (225)
	=DSUM(A4:E10,"Profit",A1:F2)	The total profit from apple trees with a height between 10 and 16. (75)
1		
2		
3		The product of the yields from apple
4		trees with a height greater than
5	=DPRODUCT(A4:E10,"Yield",A1:B2)	10. (140)
6		
7		
8		The average yield of apple trees
9		over 10 feet in height. (12)
10	=DAVERAGE(A4:E10,"Yield",A1:B2)	
	=DAVERAGE(A4:E10,3,A4:E10)	The average age of all trees in the database. (13)
	=DSTDEV(A4:E10,"Yield",A1:A3)	The estimated standard deviation in the yield of apple and pear trees if the data in the database

is only a sample of the total orchard population.  
(2.97)

=DSTDEVP(A4:E10,"Yield",A1:A3)

The true standard deviation in the yield of apple and pear trees if the data in the database is the entire population.  
(2.65)

=DVAR(A4:E10,"Yield",A1:A3)

The estimated variance in the yield of apple and pear trees if the data in the database is only a sample of the total orchard population.  
(8.8)

=DVARP(A4:E10,"Yield",A1:A3)

The true variance in the yield of apple and pear trees if the data in the database

=DGET(A4:E10,"Yield",A1:A3)

is the entire orchard population. ( 7.04)  
Returns the #NUM! error value because more than one record meets the criteria.

### [Tips](#)

- You can use any range for the criteria argument, as long as it includes at least one column label and at least one cell below the column label for specifying the condition.

For example, if the range G1:G2 contains the column label Income in G1 and the amount 10,000 in G2, you could define the range as MatchIncome and use that name as the criteria argument in the database functions.

- Although the criteria range can be located anywhere on the worksheet, do not place the criteria range below the list. If you add more information to the list by using the **Form** command on the **Data** menu, the new information is added to the first row below the list. If the row below the list is not blank, Microsoft Excel cannot add the new information.
- Make sure the criteria range does not overlap the list.
- To perform an operation on an entire column in a database, enter a blank line below the column labels in the criteria range.

### [Examples of criteria](#)

### [Multiple conditions in a single column](#)

If you have two or more conditions for a single column, type the criteria directly below each other in separate rows. For example, the following criteria range

displays the rows that contain either "Davolio," "Buchanan," or "Suyama" in the Salesperson column.

### **Salesperson**

Davolio

Buchanan

Suyama

[One condition in two or more columns](#)

To find data that meets one condition in two or more columns, enter all the criteria in the same row of the criteria range. For example, the following criteria range displays all rows that contain "Produce" in the Type column, "Davolio" in the Salesperson column, and sales values greater than \$1,000.

### **Type Salesperson Sales**

Produce Davolio >1000

[One condition in one column or another](#)

To find data that meets either a condition in one column or a condition in another column, enter the criteria in different rows of the criteria range. For example, the following criteria range displays all rows that contain either "Produce" in the Type column, "Davolio" in the Salesperson column, or sales values greater than \$1,000.

### **Type Salesperson Sales**

Produce

Davolio

>1000

[One of two sets of conditions for two columns](#)

To find rows that meet one of two sets of conditions, where each set includes conditions for more than one column, type the criteria in separate rows. For example, the following criteria range displays the rows that contain both "Davolio" in the Salesperson column and sales values greater than \$3,000, and

also displays the rows for salesperson Buchanan with sales values greater than \$1,500.

### **Salesperson Sales**

Davolio >3000  
Buchanan >1500

### [More than two sets of conditions for one column](#)

To find rows that meet greater than two sets of conditions, include multiple columns with the same column heading. For example, the following criteria range displays sales that are between 5,000 and 8,000 in addition to sales that are less than 500.

### **Sales Sales**

>5000 <8000  
<500

### [Conditions created as the result of a formula](#)

You can use a calculated value that is the result of a [formula](#) as your criterion. When you use a formula to create a criterion, do not use a column label for a criteria label; either keep the criteria label blank or use a label that is not a column label in the list. For example, the following criteria range displays rows that have a value in column C greater than the average of cells C7:C10.

=C7>AVERAGE(\$C\$7:\$C\$10)

### **Notes**

- The formula you use for a condition must use a [relative reference](#) to refer to the column label (for example, Sales) or the corresponding field in the first record. All other references in the formula must be [absolute references](#), and the formula must evaluate to TRUE or FALSE. In the formula example, "C7" refers to the field (column C) for the first record (row 7) of the list.
- You can use a column label in the formula instead of a relative cell reference or a range name. When Microsoft Excel displays an error value

such as #NAME? or #VALUE! in the cell that contains the criterion, you can ignore this error because it does not affect how the list is filtered.

- When evaluating data, Microsoft Excel does not distinguish between uppercase and lowercase characters.

[Show All](#)

# DVAR

## [See Also](#)

Estimates the variance of a population based on a sample by using the numbers in a column of a list or database that match conditions you specify.

## Syntax

### **DVAR(database,field,criteria)**

**Database** is the range of cells that makes up the list or database. A database is a list of related data in which rows of related information are records, and columns of data are fields. The first row of the list contains labels for each column.

**Field** indicates which column is used in the function. Field can be given as text with the column label enclosed between double quotation marks, such as "Age" or "Yield," or as a number that represents the position of the column within the list: 1 for the first column, 2 for the second column, and so on.

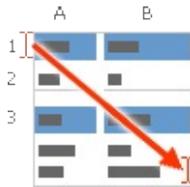
**Criteria** is the range of cells that contains the conditions you specify. You can use any range for the criteria argument, as long as it includes at least one column label and at least one cell below the column label for specifying a condition for the column.

## [Example](#)

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>
	<b>Tree</b>	<b>Height</b>	<b>Age</b>	<b>Yield</b>	<b>Profit</b>	<b>Height</b>
Apple		>10				<16
Pear						
	<b>Tree</b>	<b>Height</b>	<b>Age</b>	<b>Yield</b>	<b>Profit</b>	
Apple		18	20	14	105.00	
Pear		12	12	10	96.00	
Cherry		13	14	9	105.00	
Apple		14	15	10	75.00	
Pear		9	8	8	76.80	
Apple		8	9	6	45.00	

**Formula**

**Description (Result)**

This function looks at the records of apple trees

=DCOUNT(A4:E10,"Age",A1:F2)

between a height of 10 and 16 and counts how many of the Age fields in those records contain numbers.

(1)

This function looks at the records of apple trees between a height of 10 and 16 and counts how many of the Profit fields in those records are not blank.

=DCOUNTA(A4:E10,"Profit",A1:F2)

(1)

The maximum profit of apple and pear trees.

=DMAX(A4:E10,"Profit",A1:A3)

(105)

The minimum profit of apple trees over 10 in height. (75)

=DMIN(A4:E10,"Profit",A1:B2)

	=DSUM(A4:E10,"Profit",A1:A2)	The total profit from apple trees. (225)
	=DSUM(A4:E10,"Profit",A1:F2)	The total profit from apple trees with a height between 10 and 16. (75)
1		
2		
3		The product of the yields from apple
4		trees with a height greater than
5	=DPRODUCT(A4:E10,"Yield",A1:B2)	10. (140)
6		
7		
8		The average yield of
9		apple trees over 10 feet
10	=DAVERAGE(A4:E10,"Yield",A1:B2)	in height. (12)
	=DAVERAGE(A4:E10,3,A4:E10)	The average age of all trees in the database. (13)
		The estimated standard deviation in the yield of apple and pear trees if the data in the database
	=DSTDEV(A4:E10,"Yield",A1:A3)	

is only a sample of the total orchard population.  
(2.97)

=DSTDEVP(A4:E10,"Yield",A1:A3)

The true standard deviation in the yield of apple and pear trees if the data in the database is the entire population.  
(2.65)

=DVAR(A4:E10,"Yield",A1:A3)

The estimated variance in the yield of apple and pear trees if the data in the database is only a sample of the total orchard population.  
(8.8)

=DVARP(A4:E10,"Yield",A1:A3)

The true variance in the yield of apple and pear trees if the data in the database

=DGET(A4:E10,"Yield",A1:A3)

is the entire orchard population. ( 7.04)  
Returns the #NUM! error value because more than one record meets the criteria.

### [Tips](#)

- You can use any range for the criteria argument, as long as it includes at least one column label and at least one cell below the column label for specifying the condition.

For example, if the range G1:G2 contains the column label Income in G1 and the amount 10,000 in G2, you could define the range as MatchIncome and use that name as the criteria argument in the database functions.

- Although the criteria range can be located anywhere on the worksheet, do not place the criteria range below the list. If you add more information to the list by using the **Form** command on the **Data** menu, the new information is added to the first row below the list. If the row below the list is not blank, Microsoft Excel cannot add the new information.
- Make sure the criteria range does not overlap the list.
- To perform an operation on an entire column in a database, enter a blank line below the column labels in the criteria range.

### [Examples of criteria](#)

### [Multiple conditions in a single column](#)

If you have two or more conditions for a single column, type the criteria directly below each other in separate rows. For example, the following criteria range

displays the rows that contain either "Davolio," "Buchanan," or "Suyama" in the Salesperson column.

### **Salesperson**

Davolio

Buchanan

Suyama

[One condition in two or more columns](#)

To find data that meets one condition in two or more columns, enter all the criteria in the same row of the criteria range. For example, the following criteria range displays all rows that contain "Produce" in the Type column, "Davolio" in the Salesperson column, and sales values greater than \$1,000.

### **Type Salesperson Sales**

Produce Davolio >1000

[One condition in one column or another](#)

To find data that meets either a condition in one column or a condition in another column, enter the criteria in different rows of the criteria range. For example, the following criteria range displays all rows that contain either "Produce" in the Type column, "Davolio" in the Salesperson column, or sales values greater than \$1,000.

### **Type Salesperson Sales**

Produce

Davolio

>1000

[One of two sets of conditions for two columns](#)

To find rows that meet one of two sets of conditions, where each set includes conditions for more than one column, type the criteria in separate rows. For example, the following criteria range displays the rows that contain both "Davolio" in the Salesperson column and sales values greater than \$3,000, and

also displays the rows for salesperson Buchanan with sales values greater than \$1,500.

### **Salesperson Sales**

Davolio >3000  
Buchanan >1500

### [More than two sets of conditions for one column](#)

To find rows that meet greater than two sets of conditions, include multiple columns with the same column heading. For example, the following criteria range displays sales that are between 5,000 and 8,000 in addition to sales that are less than 500.

### **Sales Sales**

>5000 <8000  
<500

### [Conditions created as the result of a formula](#)

You can use a calculated value that is the result of a [formula](#) as your criterion. When you use a formula to create a criterion, do not use a column label for a criteria label; either keep the criteria label blank or use a label that is not a column label in the list. For example, the following criteria range displays rows that have a value in column C greater than the average of cells C7:C10.

=C7>AVERAGE(\$C\$7:\$C\$10)

### **Notes**

- The formula you use for a condition must use a [relative reference](#) to refer to the column label (for example, Sales) or the corresponding field in the first record. All other references in the formula must be [absolute references](#), and the formula must evaluate to TRUE or FALSE. In the formula example, "C7" refers to the field (column C) for the first record (row 7) of the list.
- You can use a column label in the formula instead of a relative cell reference or a range name. When Microsoft Excel displays an error value

such as #NAME? or #VALUE! in the cell that contains the criterion, you can ignore this error because it does not affect how the list is filtered.

- When evaluating data, Microsoft Excel does not distinguish between uppercase and lowercase characters.

[Show All](#)

# DVARP

## [See Also](#)

Calculates the variance of a population based on the entire population by using the numbers in a column of a list or database that match conditions you specify.

## Syntax

### **DVARP(database,field,criteria)**

Database is the range of cells that makes up the list or database. A database is a list of related data in which rows of related information are records, and columns of data are fields. The first row of the list contains labels for each column.

Field indicates which column is used in the function. Field can be given as text with the column label enclosed between double quotation marks, such as "Age" or "Yield," or as a number that represents the position of the column within the list: 1 for the first column, 2 for the second column, and so on.

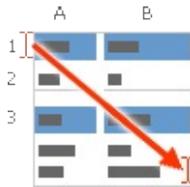
Criteria is the range of cells that contains the conditions you specify. You can use any range for the criteria argument, as long as it includes at least one column label and at least one cell below the column label for specifying a condition for the column.

## [Example](#)

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
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	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>
	<b>Tree</b>	<b>Height</b>	<b>Age</b>	<b>Yield</b>	<b>Profit</b>	<b>Height</b>
Apple		>10				<16
Pear						
	<b>Tree</b>	<b>Height</b>	<b>Age</b>	<b>Yield</b>	<b>Profit</b>	
Apple		18	20	14	105.00	
Pear		12	12	10	96.00	
Cherry		13	14	9	105.00	
Apple		14	15	10	75.00	
Pear		9	8	8	76.80	
Apple		8	9	6	45.00	
	<b>Formula</b>	<b>Description (Result)</b>				
		This function looks at the records of apple trees				

=DCOUNT(A4:E10,"Age",A1:F2)

between a height of 10 and 16 and counts how many of the Age fields in those records contain numbers.

(1)

This function looks at the records of apple trees between a height of 10 and 16 and counts how many of the Profit fields in those records are not blank.

=DCOUNTA(A4:E10,"Profit",A1:F2)

(1)

The maximum profit of apple and pear trees.

=DMAX(A4:E10,"Profit",A1:A3)

(105)

The minimum profit of apple trees over 10 in height. (75)

=DMIN(A4:E10,"Profit",A1:B2)

	=DSUM(A4:E10,"Profit",A1:A2)	The total profit from apple trees. (225)
	=DSUM(A4:E10,"Profit",A1:F2)	The total profit from apple trees with a height between 10 and 16. (75)
1		
2		
3		The product of the yields from apple
4		trees with a height greater than
5	=DPRODUCT(A4:E10,"Yield",A1:B2)	10. (140)
6		
7		
8		The average yield of
9		apple trees over 10 feet
10	=DAVERAGE(A4:E10,"Yield",A1:B2)	in height. (12)
	=DAVERAGE(A4:E10,3,A4:E10)	The average age of all trees in the database. (13)
		The estimated standard deviation in the yield of apple and pear trees if the data in the database
	=DSTDEV(A4:E10,"Yield",A1:A3)	

is only a sample of the total orchard population.  
(2.97)

=DSTDEVP(A4:E10,"Yield",A1:A3)

The true standard deviation in the yield of apple and pear trees if the data in the database is the entire population.  
(2.65)

=DVAR(A4:E10,"Yield",A1:A3)

The estimated variance in the yield of apple and pear trees if the data in the database is only a sample of the total orchard population.  
(8.8)

=DVARP(A4:E10,"Yield",A1:A3)

The true variance in the yield of apple and pear trees if the data in the database

=DGET(A4:E10,"Yield",A1:A3)

is the entire orchard population. ( 7.04)  
Returns the #NUM! error value because more than one record meets the criteria.

### [Tips](#)

- You can use any range for the criteria argument, as long as it includes at least one column label and at least one cell below the column label for specifying the condition.

For example, if the range G1:G2 contains the column label Income in G1 and the amount 10,000 in G2, you could define the range as MatchIncome and use that name as the criteria argument in the database functions.

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- Make sure the criteria range does not overlap the list.
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### [Examples of criteria](#)

### [Multiple conditions in a single column](#)

If you have two or more conditions for a single column, type the criteria directly below each other in separate rows. For example, the following criteria range

displays the rows that contain either "Davolio," "Buchanan," or "Suyama" in the Salesperson column.

### **Salesperson**

Davolio

Buchanan

Suyama

[One condition in two or more columns](#)

To find data that meets one condition in two or more columns, enter all the criteria in the same row of the criteria range. For example, the following criteria range displays all rows that contain "Produce" in the Type column, "Davolio" in the Salesperson column, and sales values greater than \$1,000.

### **Type Salesperson Sales**

Produce Davolio >1000

[One condition in one column or another](#)

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### **Type Salesperson Sales**

Produce

Davolio

>1000

[One of two sets of conditions for two columns](#)

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### **Salesperson Sales**

Davolio >3000  
Buchanan >1500

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To find rows that meet greater than two sets of conditions, include multiple columns with the same column heading. For example, the following criteria range displays sales that are between 5,000 and 8,000 in addition to sales that are less than 500.

### **Sales Sales**

>5000 <8000  
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### [Conditions created as the result of a formula](#)

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=C7>AVERAGE(\$C\$7:\$C\$10)

### **Notes**

- The formula you use for a condition must use a [relative reference](#) to refer to the column label (for example, Sales) or the corresponding field in the first record. All other references in the formula must be [absolute references](#), and the formula must evaluate to TRUE or FALSE. In the formula example, "C7" refers to the field (column C) for the first record (row 7) of the list.
- You can use a column label in the formula instead of a relative cell reference or a range name. When Microsoft Excel displays an error value

such as #NAME? or #VALUE! in the cell that contains the criterion, you can ignore this error because it does not affect how the list is filtered.

- When evaluating data, Microsoft Excel does not distinguish between uppercase and lowercase characters.

# Date and Time functions

[DATE](#) Returns the serial number of a particular date

[DATEVALUE](#) Converts a date in the form of text to a serial number

[DAY](#) Converts a serial number to a day of the month

[DAYS360](#) Calculates the number of days between two dates based on a 360-day year

[EDATE](#) Returns the serial number of the date that is the indicated number of months before or after the start date

[EOMONTH](#) Returns the serial number of the last day of the month before or after a specified number of months

[HOUR](#) Converts a serial number to an hour

[MINUTE](#) Converts a serial number to a minute

[MONTH](#) Converts a serial number to a month

[NETWORKDAYS](#) Returns the number of whole workdays between two dates

[NOW](#) Returns the serial number of the current date and time

[SECOND](#) Converts a serial number to a second

[TIME](#) Returns the serial number of a particular time

[TIMEVALUE](#) Converts a time in the form of text to a serial number

[TODAY](#) Returns the serial number of today's date

[WEEKDAY](#) Converts a serial number to a day of the week

[WEEKNUM](#) Converts a serial number to a number representing where the week

falls numerically with a year

[WORKDAY](#) Returns the serial number of the date before or after a specified number of workdays

[YEAR](#) Converts a serial number to a year

[YEARFRAC](#) Returns the year fraction representing the number of whole days between start\_date and end\_date

[Show All](#)

# DATE

## [See Also](#)

Returns the sequential serial number that represents a particular date. If the cell format was **General** before the function was entered, the result is formatted as a date.

## Syntax

**DATE**(year,month,day)

**Year** The year argument can be one to four digits. Microsoft Excel interprets the year argument according to the date system you are using. By default, Excel for Windows uses the 1900 date system; Excel for the Macintosh uses the 1904 date system.

### [For the 1900 date system](#)

- If year is between 0 (zero) and 1899 (inclusive), Excel adds that value to 1900 to calculate the year. For example, `DATE(108, 1, 2)` returns January 2, 2008 (1900+108).
- If year is between 1900 and 9999 (inclusive), Excel uses that value as the year. For example, `DATE(2008, 1, 2)` returns January 2, 2008.
- If year is less than 0 or is 10000 or greater, Excel returns the #NUM! error value.

### [For the 1904 date system](#)

- If year is between 4 and 1899 (inclusive), Excel adds that value to 1900 to calculate the year. For example, `DATE(108, 1, 2)` returns January 2, 2008 (1900+108).

- If year is between 1904 and 9999 (inclusive), Excel uses that value as the year. For example, DATE(2008, 1, 2) returns January 2, 2008.
- If year is less than 4 or is 10000 or greater or if year is between 1900 and 1903 (inclusive), Excel returns the #NUM! error value.

Month is a number representing the month of the year. If month is greater than 12, month adds that number of months to the first month in the year specified. For example, DATE(2008, 14, 2) returns the serial number representing February 2, 2009.

Day is a number representing the day of the month. If day is greater than the number of days in the month specified, day adds that number of days to the first day in the month. For example, DATE(2008, 1, 35) returns the serial number representing February 4, 2008.

## Remarks

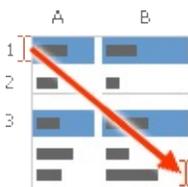
- Excel stores dates as sequential serial numbers so they can be used in calculations. By default, January 1, 1900 is serial number 1, and January 1, 2008 is serial number 39448 because it is 39,448 days after January 1, 1900. Excel for the Macintosh uses a [different date system as its default](#).
- The DATE function is most useful in formulas where year, month, and day are formulas, not constants.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



## Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>	<b>C</b>
	<b>Year</b>	<b>Month</b>	<b>Day</b>
<b>1</b>	2008	1	1
<b>2</b>	<b>Formula</b>	<b>Description (Result)</b>	
	=DATE(A2,B2,C2)	Serial date for the date above, using the 1900 date system (1/1/2008 or 39448)	

**Note** To view the number as a serial number, select the cell and click **Cells** on the **Format** menu. Click the **Number** tab, and then click **General** in the **Category** box.

[Show All](#)

# DATEVALUE

## [See Also](#)

Returns the serial number of the date represented by date\_text. Use DATEVALUE to convert a date represented by text to a serial number.

## Syntax

**DATEVALUE(date\_text)**

Date\_text is text that represents a date in a Microsoft Excel date format. For example, "1/30/2008" or "30-Jan-2008" are text strings within quotation marks that represent dates. Using the default date system in Excel for Windows, date\_text must represent a date from January 1, 1900, to December 31, 9999. Using the default date system in Excel for the Macintosh, date\_text must represent a date from January 1, 1904, to December 31, 9999. DATEVALUE returns the #VALUE! error value if date\_text is out of this range.

If the year portion of date\_text is omitted, DATEVALUE uses the current year from your computer's built-in clock. Time information in date\_text is ignored.

## Remarks

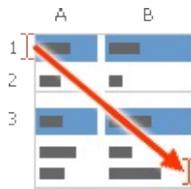
- Excel stores dates as sequential serial numbers so they can be used in calculations. By default, January 1, 1900 is serial number 1, and January 1, 2008 is serial number 39448 because it is 39,448 days after January 1, 1900. Excel for the Macintosh uses a [different date system as its default](#).
- Most functions automatically convert date values to serial numbers.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Formula</b>	<b>Description (Result)</b>
<b>1</b>	=DATEVALUE("8/22/2008")	Serial number of the text date, using the 1900 date system (39682)
<b>2</b>	=DATEVALUE("22-AUG-2008")	Serial number of the text date, using the 1900 date system (39682)
<b>3</b>		
<b>4</b>	=DATEVALUE("2008/02/23")	Serial number of the text date, using the 1900 date system (39501)
<b>5</b>		
	=DATEVALUE("5-JUL")	Serial number of the text date, using the 1900 date system, and assuming the computer's built-in clock is set to 2008 (39634)

**Note** To view the number as a date, select the cell and click **Cells** on the **Format** menu. Click the **Number** tab, and then click **Date** in the **Category** box.

[Show All](#)

# DAY

## [See Also](#)

Returns the day of a date, represented by a serial number. The day is given as an integer ranging from 1 to 31.

## Syntax

**DAY(serial\_number)**

Serial\_number is the date of the day you are trying to find. Dates should be entered by using the DATE function, or as results of other formulas or functions. For example, use DATE(2008,5,23) for the 23rd day of May, 2008. Problems can occur if [dates are entered as text](#).

## Remarks

Microsoft Excel stores dates as sequential serial numbers so they can be used in calculations. By default, January 1, 1900 is serial number 1, and January 1, 2008 is serial number 39448 because it is 39,448 days after January 1, 1900. Microsoft Excel for the Macintosh uses a [different date system as its default](#).

Values returned by the YEAR, MONTH and DAY functions will be Gregorian values regardless of the display format for the supplied date value. For example, if the display format of the supplied date is [Hijri](#), the returned values for the YEAR, MONTH and DAY functions will be values associated with the equivalent Gregorian date.

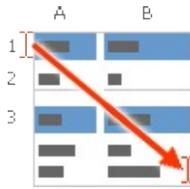
## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.

2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

**A**

**Date**

**1** 15-Apr-2008

**2** **Formula**      **Description (Result)**

=DAY(A2)    Day of the date above (15)

[Show All](#)

# DAYS360

## [See Also](#)

Returns the number of days between two dates based on a 360-day year (twelve 30-day months), which is used in some accounting calculations. Use this function to help compute payments if your accounting system is based on twelve 30-day months.

## Syntax

**DAYS360(start\_date,end\_date,method)**

Start\_date and end\_date are the two dates between which you want to know the number of days. If start\_date occurs after end\_date, DAYS360 returns a negative number. Dates should be entered by using the DATE function, or as results of other formulas or functions. For example, use DATE(2008,5,23) for the 23rd day of May, 2008. Problems can occur if [dates are entered as text](#).

Method is a logical value that specifies whether to use the U.S. or European method in the calculation.

### Method

### Defined

FALSE U.S. (NASD) method. If the starting date is the 31st of a month, it becomes equal to the 30th of the same month. If the ending date is the 31st of a month and the starting date is earlier than the 30th of a month, or the ending date becomes equal to the 1st of the next month; otherwise the ending date becomes equal to the 30th of the same month.

TRUE European method. Starting dates and ending dates that occur on the 31st of a month become equal to the 30th of the same month.

## Remark

Microsoft Excel stores dates as sequential serial numbers so they can be used in calculations. By default, January 1, 1900 is serial number 1, and January 1, 2008 is serial number 39448 because it is 39,448 days after January 1, 1900. Microsoft

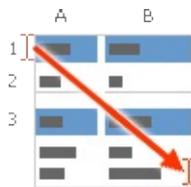
Excel for the Macintosh uses a [different date system as its default](#).

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	B
	<b>Dates</b>	
1	1/30/2008	
2	2/1/2008	
3	<b>Formula</b>	<b>Description (Result)</b>
	=DAYS360(A2,A3)	Number of days between the two dates above, based on a 360-day year (1)

[Show All](#)

# EDATE

## [See Also](#)

Returns the serial number that represents the date that is the indicated number of months before or after a specified date (the `start_date`). Use `EDATE` to calculate maturity dates or due dates that fall on the same day of the month as the date of issue.

If this function is not available, and returns the `#NAME?` error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

### `EDATE(start_date,months)`

`Start_date` is a date that represents the start date. Dates should be entered by using the `DATE` function, or as results of other formulas or functions. For example, use `DATE(2008,5,23)` for the 23rd day of May, 2008. Problems can occur if [dates are entered as text](#).

`Months` is the number of months before or after `start_date`. A positive value for `months` yields a future date; a negative value yields a past date.

## Remarks

- Microsoft Excel stores dates as sequential serial numbers so they can be used in calculations. By default, January 1, 1900 is serial number 1, and

January 1, 2008 is serial number 39448 because it is 39,448 days after January 1, 1900. Microsoft Excel for the Macintosh uses a [different date system as its default](#).

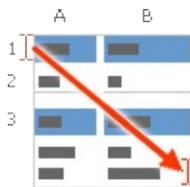
- If start\_date is not a valid date, EDATE returns the #VALUE! error value.
- If months is not an integer, it is truncated.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Date</b>	
	01/15/2008	
	<b>Formula</b>	<b>Description (Result)</b>
<b>1</b>	=EDATE(A2,1)	The date, one month after the date above (February 15, 2008)
<b>2</b>	=EDATE(A2,-1)	The date, one month before the date above (December 15, 2007)
	=EDATE(A2,2)	The date, two months after the date above (March 15,

2008)

**Note** To view the number as a date, select the cell and click **Cells** on the **Format** menu. Click the **Number** tab, and then click **Date** in the **Category** box.

[Show All](#)

# EOMONTH

## [See Also](#)

Returns the serial number for the last day of the month that is the indicated number of months before or after start\_date. Use EOMONTH to calculate maturity dates or due dates that fall on the last day of the month.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

### EOMONTH(start\_date,months)

Start\_date is a date that represents the starting date. Dates should be entered by using the DATE function, or as results of other formulas or functions. For example, use DATE(2008,5,23) for the 23rd day of May, 2008. Problems can occur if [dates are entered as text](#).

Months is the number of months before or after start\_date. A positive value for months yields a future date; a negative value yields a past date.

- If months is not an integer, it is truncated.

## Remarks

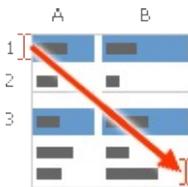
- Microsoft Excel stores dates as sequential serial numbers so they can be used in calculations. By default, January 1, 1900 is serial number 1, and January 1, 2008 is serial number 39448 because it is 39,448 days after January 1, 1900. Microsoft Excel for the Macintosh uses a [different date system as its default](#).
- If start\_date is not a valid date, EOMONTH returns the #NUM! error value.
- If start\_date plus months yields an invalid date, EOMONTH returns the #NUM! error value.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	
	Date	
	01/01/2008	
1	Formula	Description (Result)
2	=EOMONTH(A2,1)	Date of the last day of the month, one month after the date above (February 29, 2008)

=EOMONTH(A2,-3) Date of the last day of the month, three months before the date above (October 31, 2007)

**Note** To view the number as a date, select the cell and click **Cells** on the **Format** menu. Click the **Number** tab, and then click **Date** in the **Category** box.

[Show All](#)

# HOUR

## [See Also](#)

Returns the hour of a time value. The hour is given as an integer, ranging from 0 (12:00 A.M.) to 23 (11:00 P.M.).

## Syntax

**HOUR(serial\_number)**

Serial\_number is the time that contains the hour you want to find. Times may be entered as text strings within quotation marks (for example, "6:45 PM"), as decimal numbers (for example, 0.78125, which represents 6:45 PM), or as results of other formulas or functions (for example, TIMEVALUE("6:45 PM")).

## Remark

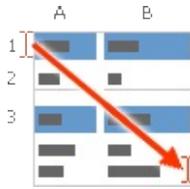
Microsoft Excel for Windows and Excel for the Macintosh use different date systems as their defaults. Time values are a portion of a date value and represented by a decimal number (for example, 12:00 PM is represented as 0.5 because it is half of a day).

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

**A**

**Time**

3:30:30 AM

**1** 3:30:30 PM

**2** 15:30

**3** **Formula**      **Description (Result)**

**4** =HOUR(A2) Hour of first time (3)

=HOUR(A3) Hour of second time (15)

=HOUR(A4) Hour of third time (15)

[Show All](#)

# MINUTE

## [See Also](#)

Returns the minutes of a time value. The minute is given as an integer, ranging from 0 to 59.

## Syntax

**MINUTE(serial\_number)**

`Serial_number` is the time that contains the minute you want to find. Times may be entered as text strings within quotation marks (for example, "6:45 PM"), as decimal numbers (for example, 0.78125, which represents 6:45 PM), or as results of other formulas or functions (for example, TIMEVALUE("6:45 PM")).

## Remarks

Microsoft Excel for Windows and Microsoft Excel for the Macintosh use different date systems as their default. Time values are a portion of a date value and represented by a decimal number (for example, 12:00 PM is represented as 0.5, since it is half of a day).

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

**A**

**Time**

**1** 4:48:00 PM

**2**     **Formula**                    **Description (Result)**

=MINUTE(A2) Minutes of the time above (48)

[Show All](#)

# MONTH

## [See Also](#)

Returns the month of a date represented by a serial number. The month is given as an integer, ranging from 1 (January) to 12 (December).

## Syntax

**MONTH(serial\_number)**

Serial\_number is the date of the month you are trying to find. Dates should be entered by using the DATE function, or as results of other formulas or functions. For example, use DATE(2008,5,23) for the 23rd day of May, 2008. Problems can occur if [dates are entered as text](#).

## Remarks

Microsoft Excel stores dates as sequential serial numbers so they can be used in calculations. By default, January 1, 1900 is serial number 1, and January 1, 2008 is serial number 39448 because it is 39,448 days after January 1, 1900. Microsoft Excel for the Macintosh uses a [different date system as its default](#).

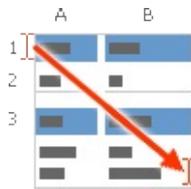
Values returned by the YEAR, MONTH and DAY functions will be Gregorian values regardless of the display format for the supplied date value. For example, if the display format of the supplied date is [Hijri](#), the returned values for the YEAR, MONTH and DAY functions will be values associated with the equivalent Gregorian date.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

**A**

**Date**

**1** 15-Apr-2008

**2** **Formula** **Description (Result)**

=MONTH(A2) Month of the date above (4)

[Show All](#)

# NETWORKDAYS

## [See Also](#)

Returns the number of whole working days between start\_date and end\_date. Working days exclude weekends and any dates identified in holidays. Use NETWORKDAYS to calculate employee benefits that accrue based on the number of days worked during a specific term.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**NETWORKDAYS**(start\_date,end\_date,holidays)

**Important** Dates should be entered by using the DATE function, or as results of other formulas or functions. For example, use DATE(2008,5,23) for the 23rd day of May, 2008. Problems can occur if [dates are entered as text](#).

Start\_date is a date that represents the start date.

End\_date is a date that represents the end date.

Holidays is an optional range of one or more dates to exclude from the working calendar, such as state and federal holidays and floating holidays. The list can be either a range of cells that contains the dates or an [array constant](#) of the serial numbers that represent the dates.

## Remarks

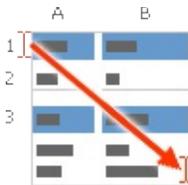
- Microsoft Excel stores dates as sequential serial numbers so they can be used in calculations. By default, January 1, 1900 is serial number 1, and January 1, 2008 is serial number 39448 because it is 39,448 days after January 1, 1900. Microsoft Excel for the Macintosh uses a [different date system as its default](#).
- If any argument is not a valid date, NETWORKDAYS returns the #VALUE! error value.

## Example

The example may be easier to understand if you copy it to a blank worksheet.



1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

<b>A</b>	<b>B</b>
<b>Date</b>	<b>Description</b>
10/01/2008	Start date of project
3/01/2009	End date of project
11/26/2008	Holiday

1	12/4/2008		Holiday
2	1/21/2009		Holiday
3		<b>Formula</b>	<b>Description (Result)</b>
4		=NETWORKDAYS(A2,A3)	Number of workdays between the start and end date above (108)
5			
6		=NETWORKDAYS(A2,A3,A4)	Number of workdays between the start and end date above, excluding the first holiday (107)
		=NETWORKDAYS(A2,A3,A4:A6)	Number of workdays between the start and end date above, excluding every holiday above (105)

**Note** To convert the range of cells used for holidays in the last example into an array constant, select reference A4:A6 in the formula and then press F9.

# NOW

## [See Also](#)

Returns the serial number of the current date and time. If the cell format was **General** before the function was entered, the result is formatted as a date.

## Syntax

NOW()

## Remarks

- Microsoft Excel stores dates as sequential serial numbers so they can be used in calculations. By default, January 1, 1900 is serial number 1, and January 1, 2008 is serial number 39448 because it is 39,448 days after January 1, 1900. Microsoft Excel for the Macintosh uses a [different date system as its default](#).
- Numbers to the right of the decimal point in the serial number represent the time; numbers to the left represent the date. For example, the serial number .5 represents the time 12:00 noon.
- The NOW function changes only when the worksheet is calculated or when a macro that contains the function is run. It is not updated continuously.

[Show All](#)

# SECOND

## [See Also](#)

Returns the seconds of a time value. The second is given as an integer in the range 0 (zero) to 59.

## Syntax

**SECOND(serial\_number)**

Serial\_number is the time that contains the seconds you want to find. Times may be entered as text strings within quotation marks (for example, "6:45 PM"), as decimal numbers (for example, 0.78125, which represents 6:45 PM), or as results of other formulas or functions (for example, TIMEVALUE("6:45 PM")).

## Remark

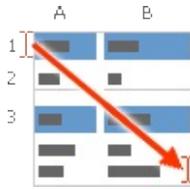
Microsoft Excel for Windows and Microsoft Excel for the Macintosh use different date systems as their default. Time values are a portion of a date value and represented by a decimal number (for example, 12:00 PM is represented as 0.5 because it is half of a day).

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	
	<b>Time</b>	
<b>1</b>	4:48:18 PM	
<b>2</b>	4:48 PM	
	<b>Formula</b>	<b>Description</b>
<b>3</b>	=SECOND(A2)	Seconds in the first time (18)
	=SECOND(A3)	Seconds in the second time (0)

[Show All](#)

# TIME

## [See Also](#)

Returns the decimal number for a particular time. If the cell format was **General** before the function was entered, the result is formatted as a date.

The decimal number returned by TIME is a value ranging from 0 (zero) to 0.99999999, representing the times from 0:00:00 (12:00:00 AM) to 23:59:59 (11:59:59 P.M.).

## Syntax

**TIME(hour,minute,second)**

**Hour** is a number from 0 (zero) to 32767 representing the hour. Any value greater than 23 will be divided by 24 and the remainder will be treated as the hour value. For example,  $\text{TIME}(27,0,0) = \text{TIME}(3,0,0) = .125$  or 3:00 AM.

**Minute** is a number from 0 to 32767 representing the minute. Any value greater than 59 will be converted to hours and minutes. For example,  $\text{TIME}(0,750,0) = \text{TIME}(12,30,0) = .520833$  or 12:30 PM.

**Second** is a number from 0 to 32767 representing the second. Any value greater than 59 will be converted to hours, minutes, and seconds. For example,  $\text{TIME}(0,0,2000) = \text{TIME}(0,33,22) = .023148$  or 12:33:20 AM

## Remark

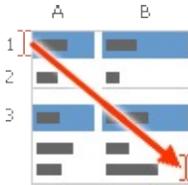
Microsoft Excel for Windows and Microsoft Excel for the Macintosh use different date systems as their default. Time values are a portion of a date value and represented by a decimal number (for example, 12:00 PM is represented as 0.5 because it is half of a day).

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>	<b>C</b>
	<b>Hour</b>	<b>Minute</b>	<b>Second</b>
	12	0	0
<b>1</b>	16	48	10
<b>2</b>	<b>Formula</b>	<b>Description (Result)</b>	
<b>3</b>	=TIME(A2,B2,C2)	Decimal part of a day, for the first time above (0.5)	
	=TIME(A3,B3,C3)	Decimal part of a day, for the second time above (0.700115741)	

**Note** To view the time as a decimal number, select the cell and click **Cells** on the **Format** menu. Click the **Number** tab, and then click **General** or **Number** in the **Category** box.

[Show All](#)

# TIMEVALUE

## [See Also](#)

Returns the decimal number of the time represented by a text string. The decimal number is a value ranging from 0 (zero) to 0.99999999, representing the times from 0:00:00 (12:00:00 AM) to 23:59:59 (11:59:59 P.M.).

## Syntax

**TIMEVALUE**(time\_text)

Time\_text is a text string that represents a time in any one of the Microsoft Excel time formats; for example, "6:45 PM" and "18:45" text strings within quotation marks that represent time.

## Remarks

- Date information in time\_text is ignored.
- Excel for Windows and Excel for the Macintosh use different date systems as their default. Time values are a portion of a date value and represented by a decimal number (for example, 12:00 PM is represented as 0.5 because it is half of a day).

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Formula</b>	<b>Description (Result)</b>
<b>1</b>	=TIMEVALUE("2:24 AM")	Decimal part of a day, for the time (0.1)
<b>2</b>	=TIMEVALUE("22-Aug-2008 6:35 AM")	Decimal part of a day, for the time (0.274305556)

**Note** To view the number as a time, select the cell and click **Cells** on the **Format** menu. Click the **Number** tab, and then click **Time** in the **Category** box.

# TODAY

## [See Also](#)

Returns the serial number of the current date. The serial number is the date-time code used by Microsoft Excel for date and time calculations. If the cell format was **General** before the function was entered, the result is formatted as a date.

## Syntax

**TODAY**( )

## Remark

Excel stores dates as sequential serial numbers so they can be used in calculations. By default, January 1, 1900 is serial number 1, and January 1, 2008 is serial number 39448 because it is 39,448 days after January 1, 1900. Microsoft Excel for the Macintosh uses a [different date system as its default](#).

[Show All](#)

# WEEKDAY

## [See Also](#)

Returns the day of the week corresponding to a date. The day is given as an integer, ranging from 1 (Sunday) to 7 (Saturday), by default.

## Syntax

**WEEKDAY(serial\_number,return\_type)**

Serial\_number is a sequential number that represents the date of the day you are trying to find. Dates should be entered by using the DATE function, or as results of other formulas or functions. For example, use DATE(2008,5,23) for the 23rd day of May, 2008. Problems can occur if [dates are entered as text](#).

Return\_type is a number that determines the type of return value.

Return_type	Number returned
1 or omitted	Numbers 1 (Sunday) through 7 (Saturday). Behaves like previous versions of Microsoft Excel.
2	Numbers 1 (Monday) through 7 (Sunday).
3	Numbers 0 (Monday) through 6 (Sunday).

## Remark

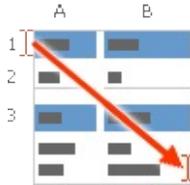
Microsoft Excel stores dates as sequential serial numbers so they can be used in calculations. By default, January 1, 1900 is serial number 1, and January 1, 2008 is serial number 39448 because it is 39,448 days after January 1, 1900. Microsoft Excel for the Macintosh uses a [different date system as its default](#).

## Example

The example may be easier to understand if you copy it to a blank worksheet.

## How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	
	<b>Data</b>	
	2/14/2008	
	<b>Formula</b>	<b>Description (Result)</b>
<b>1</b>	=WEEKDAY(A2)	Day of the week, with numbers 1 (Sunday) through 7 (Saturday) (5)
<b>2</b>	=WEEKDAY(A2,2)	Day of the week, with numbers 1 (Monday) through 7 (Sunday) (4)
	=WEEKDAY(A2,3)	Day of the week, with numbers 0 (Monday) through 6 (Sunday) (3)

**Note** 2/14/2008 is a Thursday.

[Show All](#)

# WEEKNUM

## [See Also](#)

Returns a number that indicates where the week falls numerically within a year.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.



1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**WEEKNUM(serial\_num,return\_type)**

**Serial\_num** is a date within the week. Dates should be entered by using the DATE function, or as results of other formulas or functions. For example, use DATE(2008,5,23) for the 23rd day of May, 2008. Problems can occur if [dates are entered as text](#).

**Return\_type** is a number that determines on which day the week begins. The default is 1.

### **Return\_type**

### **Week Begins**

- |   |   |
|---|---|
| 1 | Week begins on Sunday. Weekdays are numbered 1 through 7. |
| 2 | Week begins on Monday. Weekdays are numbered 1 through 7. |

## Remark

Microsoft Excel stores dates as sequential serial numbers so they can be used in calculations. By default, January 1, 1900 is serial number 1, and January 1, 2008

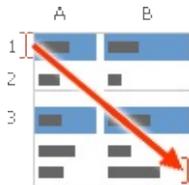
is serial number 39448 because it is 39,448 days after January 1, 1900. Microsoft Excel for the Macintosh uses a [different date system as its default](#).

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	
	March 9, 2008	
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=WEEKNUM(A2,1)	Number of the week in the year, with a week beginning on Sunday (11)
	=WEEKNUM(A2,2)	Number of the week in the year, with a week beginning on Monday (10)

**Note** March 9, 2008 is a Sunday.

[Show All](#)

# WORKDAY

## [See Also](#)

Returns a number that represents a date that is the indicated number of working days before or after a date (the starting date). Working days exclude weekends and any dates identified as holidays. Use WORKDAY to exclude weekends or holidays when you calculate invoice due dates, expected delivery times, or the number of days of work performed.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.



1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**WORKDAY**(start\_date,days,holidays)

**Important** Dates should be entered by using the DATE function, or as results of other formulas or functions. For example, use DATE(2008,5,23) for the 23rd day of May, 2008. Problems can occur if [dates are entered as text](#).

Start\_date is a date that represents the start date.

Days is the number of nonweekend and nonholiday days before or after start\_date. A positive value for days yields a future date; a negative value yields a past date.

Holidays is an optional list of one or more dates to exclude from the working

calendar, such as state and federal holidays and floating holidays. The list can be either a range of cells that contain the dates or an [array constant](#) of the serial numbers that represent the dates.

## Remarks

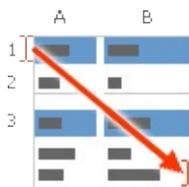
- Microsoft Excel stores dates as sequential serial numbers so they can be used in calculations. By default, January 1, 1900 is serial number 1, and January 1, 2008 is serial number 39448 because it is 39,448 days after January 1, 1900. Microsoft Excel for the Macintosh uses a [different date system as its default](#).
- If any argument is not a valid date, WORKDAY returns the #VALUE! error value.
- If start\_date plus days yields an invalid date, WORKDAY returns the #NUM! error value.
- If days is not an integer, it is truncated.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Date</b>	<b>Description</b>
	10/01/2008	Start date
<b>1</b>	151	Days to completion
<b>2</b>	11/26/2008	Holiday
<b>3</b>	12/4/2008	Holiday
<b>4</b>	1/21/2009	Holiday
<b>5</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>6</b>	=WORKDAY(A2,A3)	Date 151 workdays from the start date (4/30/2009)
	=WORKDAY(A2,A3,A4:A6)	Date 151 workdays from the start date, excluding holidays (5/5/2009)

### Notes

- To view the number as a date, select the cell and click **Cells** on the **Format** menu. Click the **Number** tab, and then click **Date** in the **Category** box.
- To convert the range of cells used for holidays in the last example into a array constant, select A4:A6 and then press F9.

[Show All](#)

# YEAR

## [See Also](#)

Returns the year corresponding to a date.  
The year is returned as an integer in the range 1900-9999.

## Syntax

**YEAR(serial\_number)**

Serial\_number is the date of the year you want to find. Dates should be entered by using the DATE function, or as results of other formulas or functions. For example, use DATE(2008,5,23) for the 23rd day of May, 2008. Problems can occur if [dates are entered as text](#).

## Remarks

Microsoft Excel stores dates as sequential serial numbers so they can be used in calculations. By default, January 1, 1900 is serial number 1, and January 1, 2008 is serial number 39448 because it is 39,448 days after January 1, 1900. Microsoft Excel for the Macintosh uses a [different date system as its default](#).

Values returned by the YEAR, MONTH and DAY functions will be Gregorian values regardless of the display format for the supplied date value. For example, if the display format of the supplied date is [Hijri](#), the returned values for the YEAR, MONTH and DAY functions will be values associated with the equivalent Gregorian date.

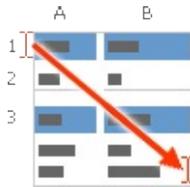
## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.

2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	
	<b>Date</b>	
<b>1</b>	7/5/2008	
<b>2</b>	7/5/10	
	<b>Formula</b>	<b>Description (Result)</b>
<b>3</b>	=YEAR(A2)	Year of the first date (2008)
	=YEAR(A3)	Year of the second date (2010)

[Show All](#)

# YEARFRAC

## [See Also](#)

Calculates the fraction of the year represented by the number of whole days between two dates (the start\_date and the end\_date). Use the YEARFRAC worksheet function to identify the proportion of a whole year's benefits or obligations to assign to a specific term.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**YEARFRAC**(start\_date,end\_date,basis)

**Important** Dates should be entered by using the DATE function, or as results of other formulas or functions. For example, use DATE(2008,5,23) for the 23rd day of May, 2008. Problems can occur if [dates are entered as text](#).

Start\_date is a date that represents the start date.

End\_date is a date that represents the end date.

Basis is the type of day count basis to use.

<b>Basis</b>	<b>Day count basis</b>
0 or omitted	US (NASD) 30/360

- 1 Actual/actual
- 2 Actual/360
- 3 Actual/365
- 4 European 30/360

## Remarks

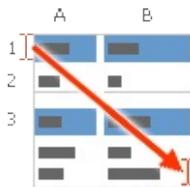
- Microsoft Excel stores dates as sequential serial numbers so they can be used in calculations. By default, January 1, 1900 is serial number 1, and January 1, 2008 is serial number 39448 because it is 39,448 days after January 1, 1900. Microsoft Excel for the Macintosh uses a [different date system as its default](#).
- All arguments are truncated to integers.
- If start\_date or end\_date are not valid dates, YEARFRAC returns the #VALUE! error value.
- If basis < 0 or if basis > 4, YEARFRAC returns the #NUM! error value.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
<b>1</b>	1/1/2007	Start date
<b>2</b>	7/30/2007	End date
<b>3</b>	2	Actual/360 (see above)
<b>4</b>	<b>Formula</b>	<b>Description (Result)</b>
	=YEARFRAC(A2,A3,A4)	Fraction of the year between the two dates (0.583333333)

# Engineering functions

[BESSELI](#) Returns the modified Bessel function  $I_n(x)$

[BESSELJ](#) Returns the Bessel function  $J_n(x)$

[BESSELK](#) Returns the modified Bessel function  $K_n(x)$

[BESSELY](#) Returns the Bessel function  $Y_n(x)$

[BIN2DEC](#) Converts a binary number to decimal

[BIN2HEX](#) Converts a binary number to hexadecimal

[BIN2OCT](#) Converts a binary number to octal

[COMPLEX](#) Converts real and imaginary coefficients into a complex number

[CONVERT](#) Converts a number from one measurement system to another

[DEC2BIN](#) Converts a decimal number to binary

[DEC2HEX](#) Converts a decimal number to hexadecimal

[DEC2OCT](#) Converts a decimal number to octal

[DELTA](#) Tests whether two values are equal

[ERF](#) Returns the error function

[ERFC](#) Returns the complementary error function

[GESTEP](#) Tests whether a number is greater than a threshold value

[HEX2BIN](#) Converts a hexadecimal number to binary

[HEX2DEC](#) Converts a hexadecimal number to decimal

[HEX2OCT](#) Converts a hexadecimal number to octal

[IMABS](#) Returns the absolute value (modulus) of a complex number

[IMAGINARY](#) Returns the imaginary coefficient of a complex number

[IMARGUMENT](#) Returns the argument theta, an angle expressed in radians

[IMCONJUGATE](#) Returns the complex conjugate of a complex number

[IMCOS](#) Returns the cosine of a complex number

[IMDIV](#) Returns the quotient of two complex numbers

[IMEXP](#) Returns the exponential of a complex number

[IMLN](#) Returns the natural logarithm of a complex number

[IMLOG10](#) Returns the base-10 logarithm of a complex number

[IMLOG2](#) Returns the base-2 logarithm of a complex number

[IMPOWER](#) Returns a complex number raised to an integer power

[IMPRODUCT](#) Returns the product of from 2 to 29 complex numbers

[IMREAL](#) Returns the real coefficient of a complex number

[IMSIN](#) Returns the sine of a complex number

[IMSQRT](#) Returns the square root of a complex number

[IMSUB](#) Returns the difference between two complex numbers

[IMSUM](#) Returns the sum of complex numbers

[OCT2BIN](#) Converts an octal number to binary

[OCT2DEC](#) Converts an octal number to decimal

[OCT2HEX](#) Converts an octal number to hexadecimal

[Show All](#)

# BESSELI

## [See Also](#)

Returns the modified Bessel function, which is equivalent to the Bessel function evaluated for purely imaginary arguments.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

### **BESSELI(x,n)**

**X** is the value at which to evaluate the function.

**N** is the order of the Bessel function. If n is not an integer, it is truncated.

## Remarks

- If x is nonnumeric, BESSELI returns the #VALUE! error value.
- If n is nonnumeric, BESSELI returns the #VALUE! error value.
- If n < 0, BESSELI returns the #NUM! error value.
- The n-th order modified Bessel function of the variable x is:

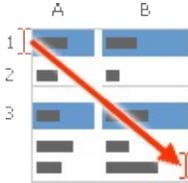
$$I_n(x) = (i)^{-n} J_n(ix)$$

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Formula</b>	<b>Description (Result)</b>
<b>1</b>		
<b>2</b>	=BESSELI(1.5,	Modified Bessel function at 1.5 with an order of 1
	1)	(0.981666)

[Show All](#)

# BESSELJ

## [See Also](#)

Returns the Bessel function.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

### BESSELJ(x,n)

X is the value at which to evaluate the function.

N is the order of the Bessel function. If n is not an integer, it is truncated.

## Remarks

- If x is nonnumeric, BESSELJ returns the #VALUE! error value.
- If n is nonnumeric, BESSELJ returns the #VALUE! error value.
- If n < 0, BESSELJ returns the #NUM! error value.
- The n-th order Bessel function of the variable x is:

$$J_n(x) = \sum_{k=0}^{\infty} \frac{(-1)^k}{k! \Gamma(n+k+1)} \left(\frac{x}{2}\right)^{n+2k}$$

where:

$$\Gamma(n+k+1) = \int_0^{\infty} e^{-x} x^{n+k} dx$$

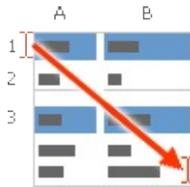
is the Gamma function.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	B
1	<b>Formula</b>	<b>Description (Result)</b>
2	=BESSELJ(1.9, 2)	Bessel function at 1.9 with an order of 2 (0.329926)

[Show All](#)

# BESSELK

## [See Also](#)

Returns the modified Bessel function, which is equivalent to the Bessel functions evaluated for purely imaginary arguments.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

### **BESSELK(x,n)**

**X** is the value at which to evaluate the function.

**N** is the order of the function. If n is not an integer, it is truncated.

## Remarks

- If x is nonnumeric, BESSELK returns the #VALUE! error value.
- If n is nonnumeric, BESSELK returns the #VALUE! error value.
- If n < 0, BESSELK returns the #NUM! error value.
- The n-th order modified Bessel function of the variable x is:

$$K_n(x) = \frac{P}{2} i^{n+1} [J_n(ix) + iY_n(ix)].$$

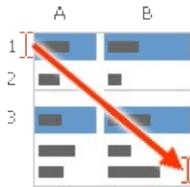
where Jn and Yn are the J and Y Bessel functions, respectively.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=BESSELK(1.5,	Modified Bessel function at 1.5 with an order of 1
<b>1)</b>		(0.277388)

[Show All](#)

# BESSELY

## [See Also](#)

Returns the Bessel function, which is also called the Weber function or the Neumann function.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

### **BESSELY(x,n)**

**X** is the value at which to evaluate the function.

**N** is the order of the function. If n is not an integer, it is truncated.

## Remarks

- If x is nonnumeric, BESSELY returns the #VALUE! error value.
- If n is nonnumeric, BESSELY returns the #VALUE! error value.
- If n < 0, BESSELY returns the #NUM! error value.
- The n-th order Bessel function of the variable x is:

$$Y_n(x) = \lim_{\nu \rightarrow n} \frac{J_\nu(x) \cos(\nu \pi) - J_{-\nu}(x)}{\sin(\nu \pi)}$$

where:

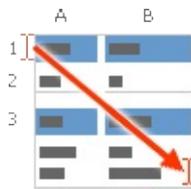
$$\text{ERF}(z) = \frac{2}{\sqrt{\pi}} \int_0^z e^{-t^2} dt$$

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=BESSELY(2.5,	Weber's Bessel function at 2.5 and an order of 1
<b>1)</b>		(0.145918)

[Show All](#)

# BIN2DEC

## [See Also](#)

Converts a binary number to decimal.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

### **BIN2DEC(number)**

Number is the binary number you want to convert. Number cannot contain more than 10 characters (10 bits). The most significant bit of number is the sign bit. The remaining 9 bits are magnitude bits. Negative numbers are represented using two's-complement notation.

## Remark

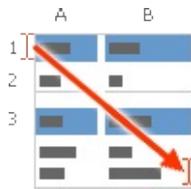
If number is not a valid binary number, or if number contains more than 10 characters (10 bits), BIN2DEC returns the #NUM! error value.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

## [How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=BIN2DEC(1100100)	Converts binary 1100100 to decimal (100)
<b>3</b>	=BIN2DEC(111111111)	Converts binary 111111111 to decimal (-1)

[Show All](#)

# BIN2HEX

## [See Also](#)

Converts a binary number to hexadecimal.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**BIN2HEX**(number,places)

Number is the binary number you want to convert. Number cannot contain more than 10 characters (10 bits). The most significant bit of number is the sign bit. The remaining 9 bits are magnitude bits. Negative numbers are represented using two's-complement notation.

Places is the number of characters to use. If places is omitted, BIN2HEX uses the minimum number of characters necessary. Places is useful for padding the return value with leading 0s (zeros).

## Remarks

- If number is not a valid binary number, or if number contains more than 10 characters (10 bits), BIN2HEX returns the #NUM! error value.
- If number is negative, BIN2HEX ignores places and returns a 10-character hexadecimal number.
- If BIN2HEX requires more than places characters, it returns the #NUM!

error value.

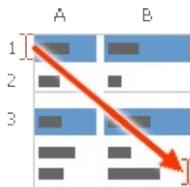
- If places is not an integer, it is truncated.
- If places is nonnumeric, BIN2HEX returns the #VALUE! error value.
- If places is negative, BIN2HEX returns the #NUM! error value.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Formula</b>	<b>Description (Result)</b>
<b>1</b>	=BIN2HEX(11111011,	Converts binary 11111011 to hexadecimal with 4
<b>2</b>	4)	characters (00FB)
<b>3</b>	=BIN2HEX(1110)	Converts binary 1110 to hexadecimal (E)
<b>4</b>	=BIN2HEX(1111111111)	Converts binary 1111111111 to hexadecimal (FFFFFFFF)

[Show All](#)

# BIN2OCT

## [See Also](#)

Converts a binary number to octal.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**BIN2OCT**(number,places)

**Number** is the binary number you want to convert. **Number** cannot contain more than 10 characters (10 bits). The most significant bit of **number** is the sign bit. The remaining 9 bits are magnitude bits. Negative numbers are represented using two's-complement notation.

**Places** is the number of characters to use. If **places** is omitted, **BIN2OCT** uses the minimum number of characters necessary. **Places** is useful for padding the return value with leading 0s (zeros).

## Remarks

- If **number** is not a valid binary number, or if **number** contains more than 10 characters (10 bits), **BIN2OCT** returns the #NUM! error value.
- If **number** is negative, **BIN2OCT** ignores **places** and returns a 10-character octal number.
- If **BIN2OCT** requires more than **places** characters, it returns the #NUM!

error value.

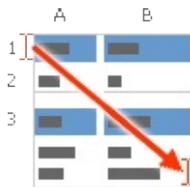
- If places is not an integer, it is truncated.
- If places is nonnumeric, BIN2OCT returns the #VALUE! error value.
- If places is negative, BIN2OCT returns the #NUM! error value.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	B
1	<b>Formula</b>	<b>Description (Result)</b>
2	=BIN2OCT(1001, 3)	Converts binary 1001 to octal with 3 characters (011)
3	=BIN2OCT(1100100)	Converts binary 1100100 to octal (144)
4	=BIN2OCT(111111111)	Converts binary 111111111 to octal (777777777)

[Show All](#)

# COMPLEX

## [See Also](#)

Converts real and imaginary coefficients into a complex number of the form  $x + yi$  or  $x + yj$ .

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**COMPLEX**(real\_num,i\_num,suffix)

Real\_num is the real coefficient of the complex number.

I\_num is the imaginary coefficient of the complex number.

Suffix is the suffix for the imaginary component of the complex number. If omitted, suffix is assumed to be "i".

**Note** All complex number functions accept "i" and "j" for suffix, but neither "I" nor "J". Using uppercase results in the #VALUE! error value. All functions that accept two or more complex numbers require that all suffixes match.

## Remarks

- If real\_num is nonnumeric, COMPLEX returns the #VALUE! error value.

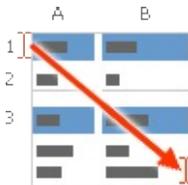
- If i\_num is nonnumeric, COMPLEX returns the #VALUE! error value.
- If suffix is neither "i" nor "j", COMPLEX returns the #VALUE! error value.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	B
	Formula	Description (Result)
1	=COMPLEX(3,4)	Complex number with 3 and 4 as the real and imaginary coefficients (3 + 4i)
2	=COMPLEX(3,4,"j")	Complex number with 3 and 4 as the real and imaginary coefficients, and j as the suffix (3 + 4j)
3		
4	=COMPLEX(0,1)	Complex number with 0 and 1 as the real and imaginary coefficients (i)
5	=COMPLEX(1,0)	Complex number with 1 and 0 as the real and imaginary coefficients (1)

[Show All](#)

# CONVERT

## [See Also](#)

Converts a number from one measurement system to another. For example, CONVERT can translate a table of distances in miles to a table of distances in kilometers.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**CONVERT(number,from\_unit,to\_unit)**

Number is the value in from\_units to convert.

From\_unit is the units for number.

To\_unit is the units for the result. CONVERT accepts the following text values (in quotation marks) for from\_unit and to\_unit.

<b>Weight and mass</b>	<b>From_unit or to_unit</b>
Gram	"g"
Slug	"sg"
Pound mass (avoirdupois)	"lbm"
U (atomic mass unit)	"u"

Ounce mass (avoirdupois) "ozm"

**Distance From\_unit or to\_unit**

Meter "m"  
Statute mile "mi"  
Nautical mile "Nmi"  
Inch "in"  
Foot "ft"  
Yard "yd"  
Angstrom "ang"  
Pica (1/72 in.) "Pica"

**Time From\_unit or to\_unit**

Year "yr"  
Day "day"  
Hour "hr"  
Minute "mn"  
Second "sec"

**Pressure From\_unit or to\_unit**

Pascal "Pa"  
Atmosphere "atm"  
mm of Mercury "mmHg"

**Force From\_unit or to\_unit**

Newton "N"  
Dyne "dyn"  
Pound force "lbf"

**Energy From\_unit or to\_unit**

Joule "J"  
Erg "e"  
Thermodynamic calorie "c"  
IT calorie "cal"

Electron volt	"eV"
Horsepower-hour	"HPh"
Watt-hour	"Wh"
Foot-pound	"flb"
BTU	"BTU"

**Power From\_unit or to\_unit**

Horsepower	"HP"
Watt	"W"

**Magnetism From\_unit or to\_unit**

Tesla	"T"
Gauss	"ga"

**Temperature From\_unit or to\_unit**

Degree Celsius	"C"
Degree Fahrenheit	"F"
Degree Kelvin	"K"

**Liquid measure From\_unit or to\_unit**

Teaspoon	"tsp"
Tablespoon	"tbs"
Fluid ounce	"oz"
Cup	"cup"
U.S. pint	"pt"
U.K. pint	"uk_pt"
Quart	"qt"
Gallon	"gal"
Liter	"l"

The following abbreviated unit prefixes can be prepended to any metric from\_unit or to\_unit.

## Prefix Multiplier Abbreviation

exa	1E+18	"E"
peta	1E+15	"P"
tera	1E+12	"T"
giga	1E+09	"G"
mega	1E+06	"M"
kilo	1E+03	"k"
hecto	1E+02	"h"
deka	1E+01	"e"
deci	1E-01	"d"
centi	1E-02	"c"
milli	1E-03	"m"
micro	1E-06	"u"
nano	1E-09	"n"
pico	1E-12	"p"
femto	1E-15	"f"
atto	1E-18	"a"

## Remarks

- If the input data types are incorrect, CONVERT returns the #VALUE! error value.
- If the unit does not exist, CONVERT returns the #N/A error value.
- If the unit does not support an abbreviated unit prefix, CONVERT returns the #N/A error value.
- If the units are in different groups, CONVERT returns the #N/A error value.
- Unit names and prefixes are case-sensitive.

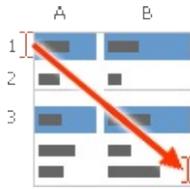
## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.

2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Formula</b>	<b>Description (Result)</b>
	=CONVERT(1.0, "lbm", "kg")	Converts 1 pound mass to kilograms (0.453592)
1		
2	=CONVERT(68, "F", "C")	Converts 68 degrees Fahrenheit to Celsius (20)
3		Data types are not the same so an error is returned (#N/A)
4	=CONVERT(2.5, "ft", "sec")	
5		Converts 100 square feet into square meters (9.290304).
	=CONVERT(CONVERT(100,"ft","m"),"ft","m")	

[Show All](#)

# DEC2BIN

## [See Also](#)

Converts a decimal number to binary.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**DEC2BIN**(number,places)

**Number** is the decimal integer you want to convert. If **number** is negative, **places** is ignored and DEC2BIN returns a 10-character (10-bit) binary number in which the most significant bit is the sign bit. The remaining 9 bits are magnitude bits. Negative numbers are represented using two's-complement notation.

**Places** is the number of characters to use. If **places** is omitted, DEC2BIN uses the minimum number of characters necessary. **Places** is useful for padding the return value with leading 0s (zeros).

## Remarks

- If **number** < -512 or if **number** > 511, DEC2BIN returns the #NUM! error value.
- If **number** is nonnumeric, DEC2BIN returns the #VALUE! error value.
- If DEC2BIN requires more than **places** characters, it returns the #NUM! error value.

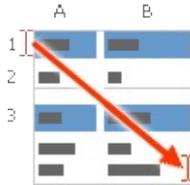
- If places is not an integer, it is truncated.
- If places is nonnumeric, DEC2BIN returns the #VALUE! error value.
- If places is negative, DEC2BIN returns the #NUM! error value.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=DEC2BIN(9, 4)	Converts decimal 9 to binary with 4 characters (1001)
<b>3</b>	=DEC2BIN(-100)	Converts decimal -100 to binary (1110011100)

[Show All](#)

# DEC2HEX

## [See Also](#)

Converts a decimal number to hexadecimal.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**DEC2HEX**(number,places)

**Number** is the decimal integer you want to convert. If **number** is negative, **places** is ignored and DEC2HEX returns a 10-character (40-bit) hexadecimal number in which the most significant bit is the sign bit. The remaining 39 bits are magnitude bits. Negative numbers are represented using two's-complement notation.

**Places** is the number of characters to use. If **places** is omitted, DEC2HEX uses the minimum number of characters necessary. **Places** is useful for padding the return value with leading 0s (zeros).

## Remarks

- If **number** < -549,755,813,888 or if **number** > 549,755,813,887, DEC2HEX returns the #NUM! error value.
- If **number** is nonnumeric, DEC2HEX returns the #VALUE! error value.

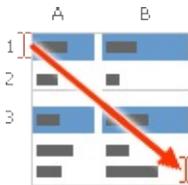
- If DEC2HEX requires more than places characters, it returns the #NUM! error value.
- If places is not an integer, it is truncated.
- If places is nonnumeric, DEC2HEX returns the #VALUE! error value.
- If places is negative, DEC2HEX returns the #NUM! error value.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	B
	<b>Formula</b>	<b>Description (Result)</b>
1		
2	=DEC2HEX(100,	Converts decimal 100 to hexadecimal with 4 characters
3	4)	(0064)
4	=DEC2HEX(-54)	Converts decimal -54 to hexadecimal (FFFFFFFFCA)

[Show All](#)

# DEC2OCT

## [See Also](#)

Converts a decimal number to octal.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**DEC2OCT**(number, places)

Number is the decimal integer you want to convert. If number is negative, places is ignored and DEC2OCT returns a 10-character (30-bit) octal number in which the most significant bit is the sign bit. The remaining 29 bits are magnitude bits. Negative numbers are represented using two's-complement notation.

Places is the number of characters to use. If places is omitted, DEC2OCT uses the minimum number of characters necessary. Places is useful for padding the return value with leading 0s (zeros).

## Remarks

- If number < -536,870,912 or if number > 536,870,911, DEC2OCT returns the #NUM! error value.
- If number is nonnumeric, DEC2OCT returns the #VALUE! error value.
- If DEC2OCT requires more than places characters, it returns the #NUM!

error value.

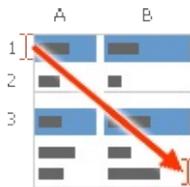
- If places is not an integer, it is truncated.
- If places is nonnumeric, DEC2OCT returns the #VALUE! error value.
- If places is negative, DEC2OCT returns the #NUM! error value.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	B
1	<b>Formula</b>	<b>Description (Result)</b>
2	=DEC2OCT(58, 3)	Converts decimal 58 to octal (072)
3	=DEC2OCT(-100)	Converts decimal to octal (7777777634)

[Show All](#)

# DELTA

## [See Also](#)

Tests whether two values are equal. Returns 1 if  $\text{number1} = \text{number2}$ ; returns 0 otherwise. Use this function to filter a set of values. For example, by summing several DELTA functions you calculate the count of equal pairs. This function is also known as the Kronecker Delta function.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.



1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**DELTA(number1,number2)**

Number1 is the first number.

Number2 is the second number. If omitted, number2 is assumed to be zero.

## Remarks

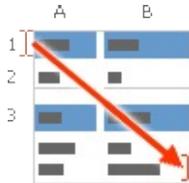
- If number1 is nonnumeric, DELTA returns the #VALUE! error value.
- If number2 is nonnumeric, DELTA returns the #VALUE! error value.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=DELTA(5, 4)	Checks whether 5 equals 4 (0)
<b>3</b>	=DELTA(5, 5)	Checks whether 5 equals 5 (1)
<b>4</b>	=DELTA(0.5, 0)	Checks whether 0.5 equals 0 (0)

[Show All](#)

# ERF

## [See Also](#)

Returns the error function integrated between `lower_limit` and `upper_limit`.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**ERF(lower\_limit,upper\_limit)**

`Lower_limit` is the lower bound for integrating ERF.

`Upper_limit` is the upper bound for integrating ERF. If omitted, ERF integrates between zero and `lower_limit`.

## Remarks

- If `lower_limit` is nonnumeric, ERF returns the #VALUE! error value.
- If `lower_limit` is negative, ERF returns the #NUM! error value.
- If `upper_limit` is nonnumeric, ERF returns the #VALUE! error value.
- If `upper_limit` is negative, ERF returns the #NUM! error value.

$$\text{ERF}(z) = \frac{2}{\sqrt{\pi}} \int_0^z e^{-t^2} dt$$

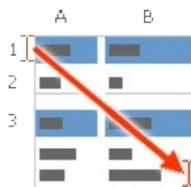
$$\text{ERF}(a, b) = \frac{2}{\sqrt{\pi}} \int_a^b e^{-t^2} dt = \text{ERF}(b) - \text{ERF}(a)$$

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=ERF(0.74500)	Error function integrated between 0 and 0.74500 (0.707929)
<b>3</b>	=ERF(1)	Error function integrated between 0 and 1 (0.842701)

[Show All](#)

# ERFC

## [See Also](#)

Returns the complementary ERF function integrated between x and infinity.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

### ERFC(x)

X is the lower bound for integrating ERF.

## Remarks

- If x is nonnumeric, ERFC returns the #VALUE! error value.
- If x is negative, ERFC returns the #NUM! error value.

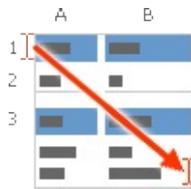
$$\text{ERFC}(x) = \frac{2}{\sqrt{\pi}} \int_x^{\infty} e^{-t^2} dt = 1 - \text{ERF}(x)$$

## Example

The example may be easier to understand if you copy it to a blank worksheet.

## [How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=ERFC(1)	Complementary ERF function of 1 (0.1573)

[Show All](#)

# GESTEP

## [See Also](#)

Returns 1 if number  $\geq$  step; returns 0 (zero) otherwise. Use this function to filter a set of values. For example, by summing several GESTEP functions you calculate the count of values that exceed a threshold.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**GESTEP**(number,step)

Number is the value to test against step.

Step is the threshold value. If you omit a value for step, GESTEP uses zero.

## Remark

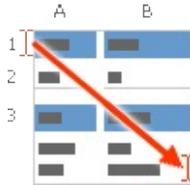
If any argument is nonnumeric, GESTEP returns the #VALUE! error value.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

## How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=GESTEP(5, 4)	Checks whether 5 is greater than or equal to 4 (1)
<b>3</b>	=GESTEP(5, 5)	Checks whether 5 is greater than or equal to 5 (1)
<b>4</b>	=GESTEP(-4, -5)	Checks whether -4 is greater than or equal to -5 (1)
<b>5</b>	=GESTEP(-1, 0)	Checks whether -1 is greater than or equal to 0 (0)

[Show All](#)

# HEX2BIN

## [See Also](#)

Converts a hexadecimal number to binary.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**HEX2BIN**(number,places)

**Number** is the hexadecimal number you want to convert. **Number** cannot contain more than 10 characters. The most significant bit of **number** is the sign bit (40th bit from the right). The remaining 9 bits are magnitude bits. Negative numbers are represented using two's-complement notation.

**Places** is the number of characters to use. If **places** is omitted, **HEX2BIN** uses the minimum number of characters necessary. **Places** is useful for padding the return value with leading 0s (zeros).

## Remarks

- If **number** is negative, **HEX2BIN** ignores **places** and returns a 10-character binary number.
- If **number** is negative, it cannot be less than FFFFFFFE00, and if **number** is positive, it cannot be greater than 1FF.
- If **number** is not a valid hexadecimal number, **HEX2BIN** returns the

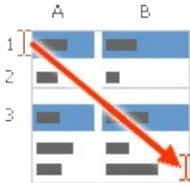
- #NUM! error value.
- If HEX2BIN requires more than places characters, it returns the #NUM! error value.
- If places is not an integer, it is truncated.
- If places is nonnumeric, HEX2BIN returns the #VALUE! error value.
- If places is negative, HEX2BIN returns the #NUM! error value.

**Example**

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Formula</b>	<b>Description (Result)</b>
<b>1</b>	=HEX2BIN("F", 8)	Converts hexadecimal F to binary, with 8 characters (00001111)
<b>2</b>		
<b>3</b>	=HEX2BIN("B7")	Converts hexadecimal B7 to binary (10110111)
<b>4</b>	=HEX2BIN("FFFFFFFF")	Converts hexadecimal FFFFFFFFFF to binary (1111111111)

[Show All](#)

# HEX2DEC

## [See Also](#)

Converts a hexadecimal number to decimal.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

### HEX2DEC(number)

Number is the hexadecimal number you want to convert. Number cannot contain more than 10 characters (40 bits). The most significant bit of number is the sign bit. The remaining 39 bits are magnitude bits. Negative numbers are represented using two's-complement notation.

## Remark

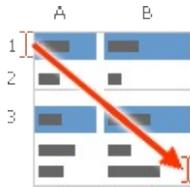
If number is not a valid hexadecimal number, HEX2DEC returns the #NUM! error value.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

## [How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Formula</b>	<b>Description (Result)</b>
<b>1</b>	=HEX2DEC("A5")	Converts hexadecimal A5 to decimal (165)
<b>2</b>	=HEX2DEC("FFFFFFFF5B")	Converts hexadecimal FFFFFFFF5B to
<b>3</b>		decimal (-165)
<b>4</b>	=HEX2DEC("3DA408B9")	Converts hexadecimal 3DA408B9 to decimal (1034160313)

[Show All](#)

# HEX2OCT

## [See Also](#)

Converts a hexadecimal number to octal.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**HEX2OCT**(number,places)

**Number** is the hexadecimal number you want to convert. **Number** cannot contain more than 10 characters. The most significant bit of **number** is the sign bit. The remaining 39 bits are magnitude bits. Negative numbers are represented using two's-complement notation.

**Places** is the number of characters to use. If **places** is omitted, **HEX2OCT** uses the minimum number of characters necessary. **Places** is useful for padding the return value with leading 0s (zeros).

## Remarks

- If **number** is negative, **HEX2OCT** ignores **places** and returns a 10-character octal number.
- If **number** is negative, it cannot be less than FFE000000, and if **number** is positive, it cannot be greater than 1FFFFFFF.
- If **number** is not a valid hexadecimal number, **HEX2OCT** returns the

#NUM! error value.

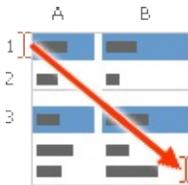
- If HEX2OCT requires more than places characters, it returns the #NUM! error value.
- If places is not an integer, it is truncated.
- If places is nonnumeric, HEX2OCT returns the #VALUE! error value.
- If places is negative, HEX2OCT returns the #NUM! error value.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Formula</b>	<b>Description (Result)</b>
<b>1</b>		
<b>2</b>	=HEX2OCT("F", 3)	Converts hexadecimal F to octal with 3 characters (017)
<b>3</b>	=HEX2OCT("3B4E")	Converts hexadecimal 3B4E to octal (35516)
<b>4</b>	=HEX2OCT("FFFFFFFF00")	Converts hexadecimal FFFFFFFF00 to octal (7777777400)

[Show All](#)

# IMABS

## [See Also](#)

Returns the absolute value (modulus) of a complex number in  $x + yi$  or  $x + yj$  text format.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

### IMABS(inumber)

Inumber is a complex number for which you want the absolute value.

## Remarks

- Use COMPLEX to convert real and imaginary coefficients into a complex number.
- The absolute value of a complex number is:

$$\text{IMABS}(z) = |z| = \sqrt{x^2 + y^2}$$

where:

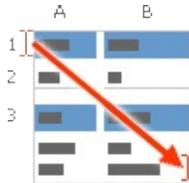
$$z = x + yi$$

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=IMABS("5+12i")	Absolute value of 5+12i (13)

[Show All](#)

# IMAGINARY

## [See Also](#)

Returns the imaginary coefficient of a complex number in  $x + yi$  or  $x + yj$  text format.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

### IMAGINARY(inumber)

Inumber is a complex number for which you want the imaginary coefficient.

## Remarks

- Use COMPLEX to convert real and imaginary coefficients into a complex number.

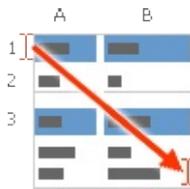
## Example

The example may be easier to understand if you copy it to a blank worksheet.

## [How?](#)

1. Create a blank workbook or worksheet.

2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Formula</b>	<b>Description (Result)</b>
<b>1</b>	=IMAGINARY("3+4i")	Imaginary coefficient of the complex number 3+4i
<b>2</b>		(4)
<b>3</b>	=IMAGINARY("0-j")	Imaginary coefficient of the complex number 0-j
<b>4</b>		(-1)
	=IMAGINARY(4)	Imaginary coefficient 4 (0)

[Show All](#)

# IMARGUMENT

## [See Also](#)

Returns the argument  $\theta$  (theta), an angle expressed in radians, such that:

$$x + yi = |x + yi| \times e^{i\theta} = |x + yi|(\cos \theta + i \sin \theta)$$

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

### IMARGUMENT(**inumber**)

Inumber is a complex number for which you want the argument  $\theta$ .

## Remarks

- Use COMPLEX to convert real and imaginary coefficients into a complex number.
- IMARGUMENT is calculated as follows:

$$\text{IMARGUMENT}(z) = \tan^{-1}\left(\frac{y}{x}\right) = \theta$$

where:

$$\theta \in ]-\pi; \pi] \text{ and}$$

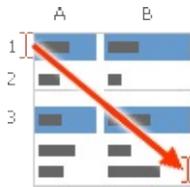
$$z = x + yi$$

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=IMARGUMENT("3+4i")	Theta argument of 3+4i, in radians (0.927295)

[Show All](#)

# IMCONJUGATE

## [See Also](#)

Returns the complex conjugate of a complex number in  $x + yi$  or  $x + yj$  text format.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

### IMCONJUGATE(inumber)

Inumber is a complex number for which you want the conjugate.

## Remarks

- Use COMPLEX to convert real and imaginary coefficients into a complex number.
- The conjugate of a complex number is:

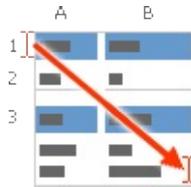
$$\text{IMCONJUGATE}(x + yi) = \bar{z} = (x - yi)$$

## Example

The example may be easier to understand if you copy it to a blank worksheet.

## [How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=IMCONJUGATE("3+4i")	Complex conjugate of 3+4i (3 - 4i)

[Show All](#)

# IMCOS

## [See Also](#)

Returns the cosine of a complex number in  $x + yi$  or  $x + yj$  text format.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

### IMCOS(inumber)

Inumber is a complex number for which you want the cosine.

## Remarks

- Use COMPLEX to convert real and imaginary coefficients into a complex number.
- If inumber is a logical value, IMCOS returns the #VALUE! error value.
- The cosine of a complex number is:

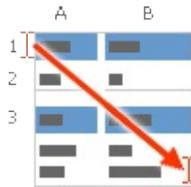
$$\cos(x + yi) = \cos(x) \cosh(y) - \sin(x) \sinh(y)i$$

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=IMCOS("1+i")	Cosine of 1+i (0.83373 - 0.988898i)

[Show All](#)

# IMDIV

## [See Also](#)

Returns the quotient of two complex numbers in  $x + yi$  or  $x + yj$  text format.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**IMDIV(inumber1,inumber2)**

Inumber1 is the complex numerator or dividend.

Inumber2 is the complex denominator or divisor.

## Remarks

- Use COMPLEX to convert real and imaginary coefficients into a complex number.
- The quotient of two complex numbers is:

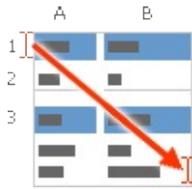
$$\text{IMDIV}(z_1, z_2) = \frac{(a + bi)}{(c + di)} = \frac{(ac + bd) + (bc - ad)i}{c^2 + d^2}$$

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=IMDIV("-238+240i","10+24i")	Quotient of the two complex numbers in the formula (5 + 12i)

[Show All](#)

# IMEXP

## [See Also](#)

Returns the exponential of a complex number in  $x + yi$  or  $x + yj$  text format.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

### IMEXP(inumber)

Inumber is a complex number for which you want the exponential.

## Remarks

- Use COMPLEX to convert real and imaginary coefficients into a complex number.
- The exponential of a complex number is:

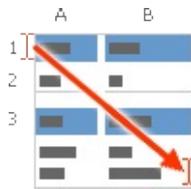
$$\text{IMEXP}(z) = e^{(x+yi)} = e^x e^{yi} = e^x (\cos y + i \sin y)$$

## Example

The example may be easier to understand if you copy it to a blank worksheet.

## [How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=IMEXP("1+i")	Exponential of the complex number 1+i (1.468694 + 2.287355i)

[Show All](#)

# IMLN

## [See Also](#)

Returns the natural logarithm of a complex number in  $x + yi$  or  $x + yj$  text format.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

### IMLN(inumber)

Inumber is a complex number for which you want the natural logarithm.

## Remarks

- Use COMPLEX to convert real and imaginary coefficients into a complex number.
- The natural logarithm of a complex number is:

$$\ln(x + yi) = \ln \sqrt{x^2 + y^2} + i \tan^{-1} \left( \frac{y}{x} \right)$$

where:

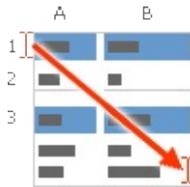
$$\theta \in ]-\pi; \pi]$$

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	B
1	<b>Formula</b>	<b>Description (Result)</b>
2	=IMLN("3+4i")	Natural logarithm of 3+4i (1.609438 + 0.927295i)

[Show All](#)

# IMLOG10

## [See Also](#)

Returns the common logarithm (base 10) of a complex number in  $x + yi$  or  $x + yj$  text format.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

### IMLOG10(inumber)

Inumber is a complex number for which you want the common logarithm.

## Remarks

- Use COMPLEX to convert real and imaginary coefficients into a complex number.
- The common logarithm of a complex number can be calculated from the natural logarithm as follows:

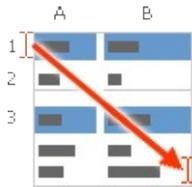
$$\log_{10}(x + yi) = (\log_{10} e) \ln(x + yi)$$

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=IMLOG10("3+4i")	Logarithm (base 10) of 3+4i (0.69897 + 0.402719i)

[Show All](#)

# IMLOG2

## [See Also](#)

Returns the base-2 logarithm of a complex number in  $x + yi$  or  $x + yj$  text format.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

### IMLOG2(inumber)

Inumber is a complex number for which you want the base-2 logarithm.

## Remarks

- Use COMPLEX to convert real and imaginary coefficients into a complex number.
- The base-2 logarithm of a complex number can be calculated from the natural logarithm as follows:

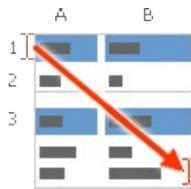
$$\log_2(x + yi) = (\log_2 e) \ln(x + yi)$$

## Example

The example may be easier to understand if you copy it to a blank worksheet.

## [How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=IMLOG2("3+4i")	Base-2 logarithm of 3+4i (2.321928 + 1.337804i)

[Show All](#)

# IMPOWER

## [See Also](#)

Returns a complex number in  $x + yi$  or  $x + yj$  text format raised to a power.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**IMPOWER(inumber,number)**

**Inumber** is a complex number you want to raise to a power.

**Number** is the power to which you want to raise the complex number.

## Remarks

- Use COMPLEX to convert real and imaginary coefficients into a complex number.
- If number is nonnumeric, IMPOWER returns the #VALUE! error value.
- Number can be an integer, fractional, or negative.
- A complex number raised to a power is calculated as follows:

$$(x + yi)^n = r^n e^{in\theta} = r^n \cos n\theta + ir^n \sin n\theta$$

where:

$$r = \sqrt{x^2 + y^2}$$

and:

$$\theta = \tan^{-1}\left(\frac{y}{x}\right)$$

and:

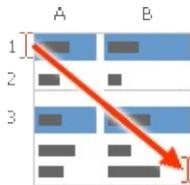
$$\theta \in ]-\pi; \pi]$$

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	B
1	<b>Formula</b>	<b>Description (Result)</b>
2	=IMPOWER("2+3i", 3)	2+3i raised to the power of 3 (-46 + 9i)

[Show All](#)

# IMPRODUCT

## [See Also](#)

Returns the product of 2 to 29 complex numbers in  $x + yi$  or  $x + yj$  text format.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**IMPRODUCT**(**inumber1**,**inumber2**,...)

**inumber1**, **inumber2**,... are 1 to 29 complex numbers to multiply.

## Remarks

- Use **COMPLEX** to convert real and imaginary coefficients into a complex number.
- The product of two complex numbers is:

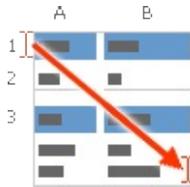
$$(a + bi)(c + di) = (ac - bd) + (ad + bc)i$$

## Example

The example may be easier to understand if you copy it to a blank worksheet.

## [How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Formula</b>	<b>Description (Result)</b>
<b>1</b>	=IMPRODUCT("3+4i","5-	Product of the two complex numbers (27 + 11i)
<b>2</b>	3i")	
<b>3</b>	=IMPRODUCT("1+2i",30)	Product of a complex number and 30 (30 + 60i)

[Show All](#)

# IMREAL

## [See Also](#)

Returns the real coefficient of a complex number in  $x + yi$  or  $x + yj$  text format.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

### IMREAL(inumber)

Inumber is a complex number for which you want the real coefficient.

## Remarks

- Use COMPLEX to convert real and imaginary coefficients into a complex number.

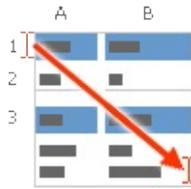
## Example

The example may be easier to understand if you copy it to a blank worksheet.

## [How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column

headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=IMREAL("6-9i")	Real coefficient of 6-9i (6)

[Show All](#)

# IMSIN

## [See Also](#)

Returns the sine of a complex number in x + yi or x + yj text format.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

### IMSIN(inumber)

Inumber is a complex number for which you want the sine.

## Remarks

- Use COMPLEX to convert real and imaginary coefficients into a complex number.
- The sine of a complex number is:

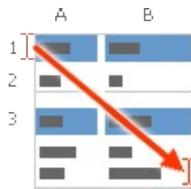
$$\sin(x + yi) = \sin(x) \cosh(y) - \cos(x) \sinh(y)i$$

## Example

The example may be easier to understand if you copy it to a blank worksheet.

## [How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=IMSIN("3+4i")	Sine of 3+4i (3.853738 - 27.016813i)

[Show All](#)

# IMSQRT

## [See Also](#)

Returns the square root of a complex number in  $x + yi$  or  $x + yj$  text format.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

### IMSQRT(**inumber**)

**Inumber** is a complex number for which you want the square root.

## Remarks

- Use COMPLEX to convert real and imaginary coefficients into a complex number.
- The square root of a complex number is:

$$\sqrt{x + yi} = \sqrt{r} \cos\left(\frac{\theta}{2}\right) + i\sqrt{r} \sin\left(\frac{\theta}{2}\right)$$

where:

$$r = \sqrt{x^2 + y^2}$$

and:

$$\theta = \tan^{-1}\left(\frac{y}{x}\right)$$

and:

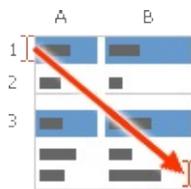
$$\theta \in ]-\pi; \pi]$$

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	B
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=IMSQRT("1+i")	Square root of 1+i (1.098684 + 0.45509i)

[Show All](#)

# IMSUB

## [See Also](#)

Returns the difference of two complex numbers in  $x + yi$  or  $x + yj$  text format.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**IMSUB(inumber1,inumber2)**

Inumber1 is the complex number from which to subtract inumber2.

Inumber2 is the complex number to subtract from inumber1.

## Remarks

- Use COMPLEX to convert real and imaginary coefficients into a complex number.
- The difference of two complex numbers is:

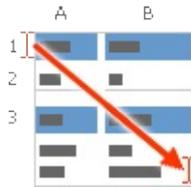
$$(a + bi) - (c + di) = (a - c) + (b - d)i$$

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=IMSUB("13+4i","5+3i")	Difference between the two complex numbers in the formula (8 + i)

[Show All](#)

# IMSUM

## [See Also](#)

Returns the sum of two or more complex numbers in  $x + yi$  or  $x + yj$  text format.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**IMSUM**(**inumber1**,inumber2,...)

Inumber1,inumber2,... are 1 to 29 complex numbers to add.

## Remarks

- Use COMPLEX to convert real and imaginary coefficients into a complex number.
- The sum of two complex numbers is:

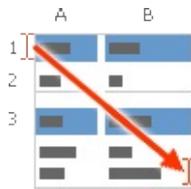
$$(a + bi) + (c + di) = (a + c) + (b + d)i$$

## Example

The example may be easier to understand if you copy it to a blank worksheet.

## [How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Formula</b>	<b>Description (Result)</b>
<b>1</b>		
<b>2</b>	=IMSUM("3+4i","5-3i")	Sum of the two complex numbers in the formula (8+i)

[Show All](#)

# OCT2BIN

## [See Also](#)

Converts an octal number to binary.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**OCT2BIN**(number,places)

Number is the octal number you want to convert. Number may not contain more than 10 characters. The most significant bit of number is the sign bit. The remaining 29 bits are magnitude bits. Negative numbers are represented using two's-complement notation.

Places is the number of characters to use. If places is omitted, OCT2BIN uses the minimum number of characters necessary. Places is useful for padding the return value with leading 0s (zeros).

## Remarks

- If number is negative, OCT2BIN ignores places and returns a 10-character binary number.
- If number is negative, it cannot be less than 7777777000, and if number is positive, it cannot be greater than 777.
- If number is not a valid octal number, OCT2BIN returns the #NUM! error

value.

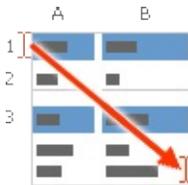
- If OCT2BIN requires more than places characters, it returns the #NUM! error value.
- If places is not an integer, it is truncated.
- If places is nonnumeric, OCT2BIN returns the #VALUE! error value.
- If places is negative, OCT2BIN returns the #NUM! error value.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	B
	Formula	Description (Result)
1	=OCT2BIN(3, 3)	Converts octal 3 to binary with 3 characters (011)
2		
3	=OCT2BIN(7777777000)	Converts octal 7777777000 to binary (1000000000)

[Show All](#)

# OCT2DEC

## [See Also](#)

Converts an octal number to decimal.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

### OCT2DEC(number)

Number is the octal number you want to convert. Number may not contain more than 10 octal characters (30 bits). The most significant bit of number is the sign bit. The remaining 29 bits are magnitude bits. Negative numbers are represented using two's-complement notation.

## Remark

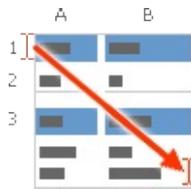
If number is not a valid octal number, OCT2DEC returns the #NUM! error value.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

## [How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=OCT2DEC(54)	Converts octal 54 to decimal (44)
<b>3</b>	=OCT2DEC(7777777533)	Converts octal 7777777533 to decimal (-165)

[Show All](#)

# OCT2HEX

## [See Also](#)

Converts an octal number to hexadecimal.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**OCT2HEX**(number,places)

**Number** is the octal number you want to convert. **Number** may not contain more than 10 octal characters (30 bits). The most significant bit of **number** is the sign bit. The remaining 29 bits are magnitude bits. Negative numbers are represented using two's-complement notation.

**Places** is the number of characters to use. If **places** is omitted, **OCT2HEX** uses the minimum number of characters necessary. **Places** is useful for padding the return value with leading 0s (zeros).

## Remarks

- If **number** is negative, **OCT2HEX** ignores **places** and returns a 10-character hexadecimal number.
- If **number** is not a valid octal number, **OCT2HEX** returns the #NUM! error value.
- If **OCT2HEX** requires more than **places** characters, it returns the #NUM!

error value.

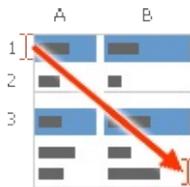
- If places is not an integer, it is truncated.
- If places is nonnumeric, OCT2HEX returns the #VALUE! error value.
- If places is negative, OCT2HEX returns the #NUM! error value.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Formula</b>	<b>Description (Result)</b>
<b>1</b>	=OCT2HEX(100, 4)	Converts octal number 100 to hexadecimal with 4 characters (0040)
<b>2</b>		
<b>3</b>	=OCT2HEX(7777777533)	Converts octal number 7777777533 to hexadecimal (FFFFFFFF5B)

# Financial functions

Some of the content in this topic may not be applicable to some languages.

[ACCRINT](#) Returns the accrued interest for a security that pays periodic interest

[ACCRINTM](#) Returns the accrued interest for a security that pays interest at maturity

[AMORDEGRC](#) Returns the depreciation for each accounting period by using a depreciation coefficient

[AMORLINC](#) Returns the depreciation for each accounting period

[COUPDAYBS](#) Returns the number of days from the beginning of the coupon period to the settlement date

[COUPDAYS](#) Returns the number of days in the coupon period that contains the settlement date

[COUPDAYSNC](#) Returns the number of days from the settlement date to the next coupon date

[COUPNCD](#) Returns the next coupon date after the settlement date

[COUPNUM](#) Returns the number of coupons payable between the settlement date and maturity date

[COUPPCD](#) Returns the previous coupon date before the settlement date

[CUMIPMT](#) Returns the cumulative interest paid between two periods

[CUMPRINC](#) Returns the cumulative principal paid on a loan between two periods

[DB](#) Returns the depreciation of an asset for a specified period using the fixed-declining balance method

[DDB](#) Returns the depreciation of an asset for a specified period using the double-declining balance method or some other method you specify

[DISC](#) Returns the discount rate for a security

[DOLLARDE](#) Converts a dollar price, expressed as a fraction, into a dollar price, expressed as a decimal number

[DOLLARFR](#) Converts a dollar price, expressed as a decimal number, into a dollar price, expressed as a fraction

[DURATION](#) Returns the annual duration of a security with periodic interest payments

[EFFECT](#) Returns the effective annual interest rate

[FV](#) Returns the future value of an investment

[FVSCHEDULE](#) Returns the future value of an initial principal after applying a series of compound interest rates

[INTRATE](#) Returns the interest rate for a fully invested security

[IPMT](#) Returns the interest payment for an investment for a given period

[IRR](#) Returns the internal rate of return for a series of cash flows

[ISPMT](#) Calculates the interest paid during a specific period of an investment

[MDURATION](#) Returns the Macauley modified duration for a security with an assumed par value of \$100

[MIRR](#) Returns the internal rate of return where positive and negative cash flows are financed at different rates

[NOMINAL](#) Returns the annual nominal interest rate

[NPER](#) Returns the number of periods for an investment

[NPV](#) Returns the net present value of an investment based on a series of periodic cash flows and a discount rate

[ODDFPRICE](#) Returns the price per \$100 face value of a security with an odd first period

[ODDFYIELD](#) Returns the yield of a security with an odd first period

[ODDLPRICE](#) Returns the price per \$100 face value of a security with an odd last period

[ODDLYIELD](#) Returns the yield of a security with an odd last period

[PMT](#) Returns the periodic payment for an annuity

[PPMT](#) Returns the payment on the principal for an investment for a given period

[PRICE](#) Returns the price per \$100 face value of a security that pays periodic interest

[PRICEDISC](#) Returns the price per \$100 face value of a discounted security

[PRICEMAT](#) Returns the price per \$100 face value of a security that pays interest at maturity

[PV](#) Returns the present value of an investment

[RATE](#) Returns the interest rate per period of an annuity

[RECEIVED](#) Returns the amount received at maturity for a fully invested security

[SLN](#) Returns the straight-line depreciation of an asset for one period

[SYD](#) Returns the sum-of-years' digits depreciation of an asset for a specified period

[TBILLEQ](#) Returns the bond-equivalent yield for a Treasury bill

[TBILLPRICE](#) Returns the price per \$100 face value for a Treasury bill

[TBILLYIELD](#) Returns the yield for a Treasury bill

[VDB](#) Returns the depreciation of an asset for a specified or partial period using a

declining balance method

[XIRR](#) Returns the internal rate of return for a schedule of cash flows that is not necessarily periodic

[XNPV](#) Returns the net present value for a schedule of cash flows that is not necessarily periodic

[YIELD](#) Returns the yield on a security that pays periodic interest

[YIELDDISC](#) Returns the annual yield for a discounted security; for example, a Treasury bill

[YIELDMAT](#) Returns the annual yield of a security that pays interest at maturity

[Show All](#)

# ACCRINT

## [See Also](#)

Returns the accrued interest for a security that pays periodic interest.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**ACCRINT**(**issue**,**first\_interest**,**settlement**,**rate**,**par**,**frequency**,**basis**)

**Important** Dates should be entered by using the DATE function, or as results of other formulas or functions. For example, use DATE(2008,5,23) for the 23rd day of May, 2008. Problems can occur if [dates are entered as text](#).

**Issue** is the security's issue date.

**First\_interest** is the security's first interest date.

**Settlement** is the security's settlement date. The security settlement date is the date after the issue date when the security is traded to the buyer.

**Rate** is the security's annual coupon rate.

**Par** is the security's par value. If you omit par, ACCRINT uses \$1,000.

**Frequency** is the number of coupon payments per year. For annual payments,

frequency = 1; for semiannual, frequency = 2; for quarterly, frequency = 4.

Basis is the type of day count basis to use.

Basis	Day count basis
0 or omitted	US (NASD) 30/360
1	Actual/actual
2	Actual/360
3	Actual/365
4	European 30/360

### Remarks

- Microsoft Excel stores dates as sequential serial numbers so they can be used in calculations. By default, January 1, 1900 is serial number 1, and January 1, 2008 is serial number 39448 because it is 39,448 days after January 1, 1900. Microsoft Excel for the Macintosh uses a [different date system as its default](#).
- Issue, first\_interest, settlement, frequency, and basis are truncated to integers.
- If issue, first\_interest, or settlement is not a valid date, ACCRINT returns the #VALUE! error value.
- If rate  $\leq 0$  or if par  $\leq 0$ , ACCRINT returns the #NUM! error value.
- If frequency is any number other than 1, 2, or 4, ACCRINT returns the #NUM! error value.
- If basis  $< 0$  or if basis  $> 4$ , ACCRINT returns the #NUM! error value.
- If issue  $\geq$  settlement, ACCRINT returns the #NUM! error value.
- ACCRINT is calculated as follows:

$$ACCRINT = par \times \frac{rate}{frequency} \times \sum_{i=1}^{NC} \frac{A_i}{NL_i}$$

where:

$A_i$  = number of accrued days for the  $i$ th quasi-coupon period within odd period.

$NC$  = number of quasi-coupon periods that fit in odd period. If this number contains a fraction, raise it to the next whole number.

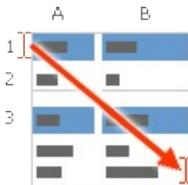
$NLi$  = normal length in days of the  $i$ th quasi-coupon period within odd period.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
	March 1, 2008	Issue date
	August 31, 2008	First interest date
	May 1, 2008	Settlement date
	10.0%	Coupon rate
<b>1</b>	1,000	Par value
<b>2</b>	2	Frequency is
<b>3</b>		semiannual (see above)
<b>4</b>	0	30/360 basis (see
<b>5</b>		above)

6	Formula	Description (Result)
7		Accrued interest for a treasury bond with the terms above
8	=ACCRINT(A2,A3,A4,A5,A6,A7,A8)	(16.66666667)
	=ACCRINT(DATE(2008,3,5),A3,A4,A5,A6,A7,A8)	Accrued interest with the terms above, except the issue date is March 5, 2008. (15.55555556)

[Show All](#)

# ACCRINTM

## [See Also](#)

Returns the accrued interest for a security that pays interest at maturity.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**ACCRINTM(issue,maturity,rate,par,basis)**

**Important** Dates should be entered by using the DATE function, or as results of other formulas or functions. For example, use DATE(2008,5,23) for the 23rd day of May, 2008. Problems can occur if [dates are entered as text](#).

**Issue** is the security's issue date.

**Maturity** is the security's maturity date.

**Rate** is the security's annual coupon rate.

**Par** is the security's par value. If you omit par, ACCRINTM uses \$1,000.

**Basis** is the type of day count basis to use.

<b>Basis</b>	<b>Day count basis</b>
--------------	------------------------

0 or omitted	US (NASD) 30/360
1	Actual/actual
2	Actual/360
3	Actual/365
4	European 30/360

## Remarks

- Microsoft Excel stores dates as sequential serial numbers so they can be used in calculations. By default, January 1, 1900 is serial number 1, and January 1, 2008 is serial number 39448 because it is 39,448 days after January 1, 1900. Microsoft Excel for the Macintosh uses a [different date system as its default](#).
- Issue, settlement, and basis are truncated to integers.
- If issue or settlement is not a valid date, ACCRINTM returns the #VALUE! error value.
- If rate  $\leq 0$  or if par  $\leq 0$ , ACCRINTM returns the #NUM! error value.
- If basis  $< 0$  or if basis  $> 4$ , ACCRINTM returns the #NUM! error value.
- If issue  $\geq$  settlement, ACCRINTM returns the #NUM! error value.
- ACCRINTM is calculated as follows:

$$ACCRINTM = par \times rate \times \frac{A}{D}$$

where:

A = Number of accrued days counted according to a monthly basis. For interest at maturity items, the number of days from the issue date to the maturity date is used.

D = Annual Year Basis.

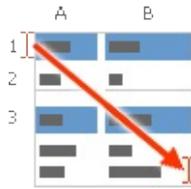
## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
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headers.



Selecting an example from Help

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4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
<b>1</b>	April 1, 2008	Issue date
<b>2</b>	June 15, 2008	Maturity date
<b>3</b>	10.0%	Percent coupon
<b>4</b>	\$1,000	Par value
<b>5</b>	3	Actual/365 basis (see above)
<b>6</b>	<b>Formula</b>	<b>Description (Result)</b>
	=ACCRINTM(A2,A3,A4,A5,A6)	The accrued interest for the terms above (20.54795)

[Show All](#)

# AMORDEGRC

## [See Also](#)

Returns the depreciation for each accounting period. This function is provided for the French accounting system. If an asset is purchased in the middle of the accounting period, the prorated depreciation is taken into account. The function is similar to AMORLINC, except that a depreciation coefficient is applied in the calculation depending on the life of the assets.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**AMORDEGRC**(cost,date\_purchased,first\_period,salvage,period,rate,basis)

**Important** Dates should be entered by using the DATE function, or as results of other formulas or functions. For example, use DATE(2008,5,23) for the 23rd day of May, 2008. Problems can occur if [dates are entered as text](#).

Cost is the cost of the asset.

Date\_purchased is the date of the purchase of the asset.

First\_period is the date of the end of the first period.

Salvage is the salvage value at the end of the life of the asset.

Period is the period.

Rate is the rate of depreciation.

Basis is the year basis to be used.

<b>Basis</b>	<b>Date system</b>
0 or omitted	360 days (NASD method)
1	Actual
3	365 days in a year
4	360 days in a year (European method)

### Remarks

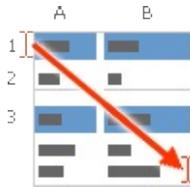
- Microsoft Excel stores dates as sequential serial numbers so they can be used in calculations. By default, January 1, 1900 is serial number 1, and January 1, 2008 is serial number 39448 because it is 39,448 days after January 1, 1900. Microsoft Excel for the Macintosh uses a [different date system as its default](#).
- This function will return the depreciation until the last period of the life of the assets or until the cumulated value of depreciation is greater than the cost of the assets minus the salvage value.
- The depreciation coefficients are:  
**Life of assets (1/rate) Depreciation coefficient**  
Between 3 and 4 years 1.5  
Between 5 and 6 years 2  
More than 6 years 2.5
- The depreciation rate will grow to 50 percent for the period preceding the last period and will grow to 100 percent for the last period.
- If the life of assets is between 0 (zero) and 1, 1 and 2, 2 and 3, or 4 and 5, the #NUM! error value is returned.

### Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
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Selecting an example from Help

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4. In the worksheet, select cell A1, and press CTRL+V.
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	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
<b>1</b>	2400	Cost
<b>2</b>	8/19/2008	Date purchased
<b>3</b>	12/31/2008	End of the first period
<b>4</b>	300	Salvage value
<b>5</b>	1	Period
<b>6</b>	15%	Depreciation rate
<b>7</b>	1	Actual basis (see above)
<b>8</b>	<b>Formula</b>	<b>Description (Result)</b>
	=AMORDEGRC(A2,A3,A4,A5,A6,A7,A8)	First period depreciation (776)

[Show All](#)

# AMORLINC

## [See Also](#)

Returns the depreciation for each accounting period. This function is provided for the French accounting system. If an asset is purchased in the middle of the accounting period, the prorated depreciation is taken into account.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**AMORLINC(cost,date\_purchased,first\_period,salvage,period,rate,basis)**

**Important** Dates should be entered by using the DATE function, or as results of other formulas or functions. For example, use DATE(2008,5,23) for the 23rd day of May, 2008. Problems can occur if [dates are entered as text](#).

Cost is the cost of the asset.

Date\_purchased is the date of the purchase of the asset.

First\_period is the date of the end of the first period.

Salvage is the salvage value at the end of the life of the asset.

Period is the period.

Rate is the rate of depreciation.

Basis is the year basis to be used.

<b>Basis</b>	<b>Date system</b>
0 or omitted	360 days (NASD method)
1	Actual
3	365 days in a year
4	360 days in a year (European method)

### Remark

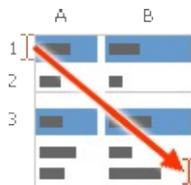
Microsoft Excel stores dates as sequential serial numbers so they can be used in calculations. By default, January 1, 1900 is serial number 1, and January 1, 2008 is serial number 39448 because it is 39,448 days after January 1, 1900. Microsoft Excel for the Macintosh uses a [different date system as its default](#).

### Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to

**Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
<b>1</b>	2400	Cost
<b>2</b>	8/19/2008	Date purchased
<b>3</b>	12/31/2008	End of the first period
<b>4</b>	300	Salvage value
<b>5</b>	1	Period
<b>6</b>	15%	Depreciation rate
<b>7</b>	1	Actual basis (see above)
<b>8</b>	<b>Formula</b>	<b>Description (Result)</b>
	=AMORLINC(A2,A3,A4,A5,A6,A7,A7)	First period depreciation (360)

[Show All](#)

# COUPDAYBS

## [See Also](#)

Returns the number of days from the beginning of the coupon period to the settlement date.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**COUPDAYBS(settlement,maturity,frequency,basis)**

**Important** Dates should be entered by using the DATE function, or as results of other formulas or functions. For example, use DATE(2008,5,23) for the 23rd day of May, 2008. Problems can occur if [dates are entered as text](#).

**Settlement** is the security's settlement date. The security settlement date is the date after the issue date when the security is traded to the buyer.

**Maturity** is the security's maturity date. The maturity date is the date when the security expires.

**Frequency** is the number of coupon payments per year. For annual payments, frequency = 1; for semiannual, frequency = 2; for quarterly, frequency = 4.

**Basis** is the type of day count basis to use.

<b>Basis</b>	<b>Day count basis</b>
0 or omitted	US (NASD) 30/360
1	Actual/actual
2	Actual/360
3	Actual/365
4	European 30/360

## Remarks

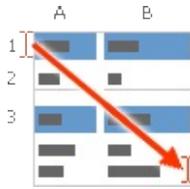
- Microsoft Excel stores dates as sequential serial numbers so they can be used in calculations. By default, January 1, 1900 is serial number 1, and January 1, 2008 is serial number 39448 because it is 39,448 days after January 1, 1900. Microsoft Excel for the Macintosh uses a [different date system as its default](#).
- The settlement date is the date a buyer purchases a coupon, such as a bond. The maturity date is the date when a coupon expires. For example, suppose a 30-year bond is issued on January 1, 2008, and is purchased by a buyer six months later. The issue date would be January 1, 2008, the settlement date would be July 1, 2008, and the maturity date would be January 1, 2038, 30 years after the January 1, 2008, issue date.
- All arguments are truncated to integers.
- If settlement or maturity is not a valid date, COUPDAYBS returns the #VALUE! error value.
- If frequency is any number other than 1, 2, or 4, COUPDAYBS returns the #NUM! error value.
- If basis < 0 or if basis > 4, COUPDAYBS returns the #NUM! error value.
- If settlement ≥ maturity, COUPDAYBS returns the #NUM! error value.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
	January 25, 2007	Settlement date
<b>1</b>	November 15, 2008	Maturity date
<b>2</b>	2	Semiannual coupon (see above)
<b>3</b>	1	Actual/actual basis (see above)
<b>4</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>5</b>	=COUPDAYBS(A2,A3,A4,A5)	The number of days from the beginning of the coupon period to the settlement date, for a bond with the above terms (71)

[Show All](#)

# COUPDAYS

## [See Also](#)

Returns the number of days in the coupon period that contains the settlement date.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**COUPDAYS(settlement,maturity,frequency,basis)**

**Important** Dates should be entered by using the DATE function, or as results of other formulas or functions. For example, use DATE(2008,5,23) for the 23rd day of May, 2008. Problems can occur if [dates are entered as text](#).

**Settlement** is the security's settlement date. The security settlement date is the date after the issue date when the security is traded to the buyer.

**Maturity** is the security's maturity date. The maturity date is the date when the security expires.

**Frequency** is the number of coupon payments per year. For annual payments, frequency = 1; for semiannual, frequency = 2; for quarterly, frequency = 4.

**Basis** is the type of day count basis to use.

<b>Basis</b>	<b>Day count basis</b>
0 or omitted	US (NASD) 30/360
1	Actual/actual
2	Actual/360
3	Actual/365
4	European 30/360

## Remarks

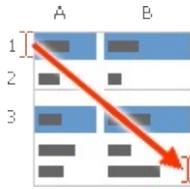
- Microsoft Excel stores dates as sequential serial numbers so they can be used in calculations. By default, January 1, 1900 is serial number 1, and January 1, 2008 is serial number 39448 because it is 39,448 days after January 1, 1900. Microsoft Excel for the Macintosh uses a [different date system as its default](#).
- The settlement date is the date a buyer purchases a coupon, such as a bond. The maturity date is the date when a coupon expires. For example, suppose a 30-year bond is issued on January 1, 2008, and is purchased by a buyer six months later. The issue date would be January 1, 2008, the settlement date would be July 1, 2008, and the maturity date is January 1, 2038, 30 years after the January 1, 2008 issue date.
- All arguments are truncated to integers.
- If settlement or maturity is not a valid date, COUPDAYS returns the #VALUE! error value.
- If frequency is any number other than 1, 2, or 4, COUPDAYS returns the #NUM! error value.
- If basis < 0 or if basis > 4, COUPDAYS returns the #NUM! error value.
- If settlement ≥ maturity, COUPDAYS returns the #NUM! error value.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
	January 25, 2007	Settlement date
<b>1</b>	November 15, 2008	Maturity date
<b>2</b>	2	Semiannual coupon (see above)
<b>3</b>	1	Actual/actual basis (see above)
<b>4</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>5</b>	=COUPDAYS(A2,A3,A4,A5)	The number of days in the coupon period that contains the settlement date, for a bond with the above terms (181)

[Show All](#)

# COUPDAYSNC

## [See Also](#)

Returns the number of days from the settlement date to the next coupon date.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**COUPDAYSNC**(settlement,maturity,frequency,basis)

**Important** Dates should be entered by using the DATE function, or as results of other formulas or functions. For example, use DATE(2008,5,23) for the 23rd day of May, 2008. Problems can occur if [dates are entered as text](#).

**Settlement** is the security's settlement date. The security settlement date is the date after the issue date when the security is traded to the buyer.

**Maturity** is the security's maturity date. The maturity date is the date when the security expires.

**Frequency** is the number of coupon payments per year. For annual payments, frequency = 1; for semiannual, frequency = 2; for quarterly, frequency = 4.

**Basis** is the type of day count basis to use.

<b>Basis</b>	<b>Day count basis</b>
0 or omitted	US (NASD) 30/360
1	Actual/actual
2	Actual/360
3	Actual/365
4	European 30/360

## Remarks

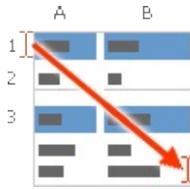
- Microsoft Excel stores dates as sequential serial numbers so they can be used in calculations. By default, January 1, 1900 is serial number 1, and January 1, 2008 is serial number 39448 because it is 39,448 days after January 1, 1900. Microsoft Excel for the Macintosh uses a [different date system as its default](#).
- The settlement date is the date a buyer purchases a coupon, such as a bond. The maturity date is the date when a coupon expires. For example, suppose a 30-year bond is issued on January 1, 2008, and is purchased by a buyer six months later. The issue date would be January 1, 2008, the settlement date would be July 1, 2008, and the maturity date would be January 1, 2038, which is 30 years after the January 1, 2008, issue date.
- All arguments are truncated to integers.
- If settlement or maturity is not a valid date, COUPDAYSNCR returns the #VALUE! error value.
- If frequency is any number other than 1, 2, or 4, COUPDAYSNCR returns the #NUM! error value.
- If basis < 0 or if basis > 4, COUPDAYSNCR returns the #NUM! error value.
- If settlement ≥ maturity, COUPDAYSNCR returns the #NUM! error value.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
	January 25, 2007	Settlement date
<b>1</b>	November 15, 2008	Maturity date
<b>2</b>	2	Semiannual coupon (see above)
<b>3</b>	1	Actual/actual basis (see above)
<b>4</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>5</b>	=COUPDAYSNC(A2,A3,A4,A5)	The number of days from the settlement date to the next coupon date, for a bond with the above terms (110)

[Show All](#)

# COUPNCD

## [See Also](#)

Returns a number that represents the next coupon date after the settlement date.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**COUPNCD(settlement,maturity,frequency,basis)**

**Important** Dates should be entered by using the DATE function, or as results of other formulas or functions. For example, use DATE(2008,5,23) for the 23rd day of May, 2008. Problems can occur if [dates are entered as text](#).

**Settlement** is the security's settlement date. The security settlement date is the date after the issue date when the security is traded to the buyer.

**Maturity** is the security's maturity date. The maturity date is the date when the security expires.

**Frequency** is the number of coupon payments per year. For annual payments, frequency = 1; for semiannual, frequency = 2; for quarterly, frequency = 4.

**Basis** is the type of day count basis to use.

<b>Basis</b>	<b>Day count basis</b>
0 or omitted	US (NASD) 30/360
1	Actual/actual
2	Actual/360
3	Actual/365
4	European 30/360

## Remarks

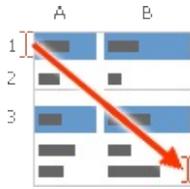
- Microsoft Excel stores dates as sequential serial numbers so they can be used in calculations. By default, January 1, 1900 is serial number 1, and January 1, 2008 is serial number 39448 because it is 39,448 days after January 1, 1900. Microsoft Excel for the Macintosh uses a [different date system as its default](#).
- The settlement date is the date a buyer purchases a coupon, such as a bond. The maturity date is the date when a coupon expires. For example, suppose a 30-year bond is issued on January 1, 2008, and is purchased by a buyer six months later. The issue date would be January 1, 2008, the settlement date would be July 1, 2008, and the maturity date would be January 1, 2038, which is 30 years after the January 1, 2008, issue date.
- All arguments are truncated to integers.
- If settlement or maturity is not a valid date, COUPNCD returns the #VALUE! error value.
- If frequency is any number other than 1, 2, or 4, COUPNCD returns the #NUM! error value.
- If basis < 0 or if basis > 4, COUPNCD returns the #NUM! error value.
- If settlement ≥ maturity, COUPNCD returns the #NUM! error value.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
	January 25, 2007	Settlement date
<b>1</b>	November 15, 2008	Maturity date
<b>2</b>	2	Semiannual coupon (see above)
<b>3</b>	1	Actual/actual basis (see above)
<b>4</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>5</b>	=COUPNCD(A2,A3,A4,A5)	The next coupon date after the settlement date, for a bond with the above terms (May 15, 2007)

**Note** To view the number as a date, select the cell and click **Cells** on the **Format** menu. Click the **Number** tab, and then click **Date** in the **Category** box.

[Show All](#)

# COUPNUM

## [See Also](#)

Returns the number of coupons payable between the settlement date and maturity date, rounded up to the nearest whole coupon.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**COUPNUM**(settlement,maturity,frequency,basis)

**Important** Dates should be entered by using the DATE function, or as results of other formulas or functions. For example, use DATE(2008,5,23) for the 23rd day of May, 2008. Problems can occur if [dates are entered as text](#).

**Settlement** is the security's settlement date. The security settlement date is the date after the issue date when the security is traded to the buyer.

**Maturity** is the security's maturity date. The maturity date is the date when the security expires.

**Frequency** is the number of coupon payments per year. For annual payments, frequency = 1; for semiannual, frequency = 2; for quarterly, frequency = 4.

**Basis** is the type of day count basis to use.

<b>Basis</b>	<b>Day count basis</b>
0 or omitted	US (NASD) 30/360
1	Actual/actual
2	Actual/360
3	Actual/365
4	European 30/360

## Remarks

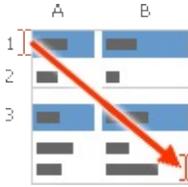
- Microsoft Excel stores dates as sequential serial numbers so they can be used in calculations. By default, January 1, 1900 is serial number 1, and January 1, 2008 is serial number 39448 because it is 39,448 days after January 1, 1900. Microsoft Excel for the Macintosh uses a [different date system as its default](#).
- The settlement date is the date a buyer purchases a coupon, such as a bond. The maturity date is the date when a coupon expires. For example, suppose a 30-year bond is issued on January 1, 2008, and is purchased by a buyer six months later. The issue date would be January 1, 2008, the settlement date would be July 1, 2008, and the maturity date would be January 1, 2038, which is 30 years after the January 1, 2008, issue date.
- All arguments are truncated to integers.
- If settlement or maturity is not a valid date, COUPNUM returns the #VALUE! error value.
- If frequency is any number other than 1, 2, or 4, COUPNUM returns the #NUM! error value.
- If basis < 0 or if basis > 4, COUPNUM returns the #NUM! error value.
- If settlement ≥ maturity, COUPNUM returns the #NUM! error value.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
<b>1</b>	January 25, 2007	Settlement date
<b>2</b>	November 15, 2008	Maturity date
<b>3</b>	2	Semiannual coupon (see above)
<b>4</b>	1	Actual/actual basis (see above)
<b>5</b>	<b>Formula</b>	<b>Description (Result)</b>
	=COUPNUM(A2,A3,A4,A5)	The number of coupon payments for a bond with the above terms (4)

[Show All](#)

# COUPPCD

## [See Also](#)

Returns a number that represents the previous coupon date before the settlement date.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**COUPPCD**(settlement,maturity,frequency,basis)

**Important** Dates should be entered by using the DATE function, or as results of other formulas or functions. For example, use DATE(2008,5,23) for the 23rd day of May, 2008. Problems can occur if [dates are entered as text](#).

**Settlement** is the security's settlement date. The security settlement date is the date after the issue date when the security is traded to the buyer.

**Maturity** is the security's maturity date. The maturity date is the date when the security expires.

**Frequency** is the number of coupon payments per year. For annual payments, frequency = 1; for semiannual, frequency = 2; for quarterly, frequency = 4.

**Basis** is the type of day count basis to use.

<b>Basis</b>	<b>Day count basis</b>
0 or omitted	US (NASD) 30/360
1	Actual/actual
2	Actual/360
3	Actual/365
4	European 30/360

## Remarks

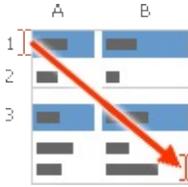
- Microsoft Excel stores dates as sequential serial numbers so they can be used in calculations. By default, January 1, 1900 is serial number 1, and January 1, 2008 is serial number 39448 because it is 39,448 days after January 1, 1900. Microsoft Excel for the Macintosh uses a [different date system as its default](#).
- The settlement date is the date a buyer purchases a coupon, such as a bond. The maturity date is the date when a coupon expires. For example, suppose a 30-year bond is issued on January 1, 2008, and is purchased by a buyer six months later. The issue date would be January 1, 2008, the settlement date would be July 1, 2008, and the maturity date would be January 1, 2038, which is 30 years after the January 1, 2008, issue date.
- All arguments are truncated to integers.
- If settlement or maturity is not a valid date, COUPPCD returns the #VALUE! error value.
- If frequency is any number other than 1, 2, or 4, COUPPCD returns the #NUM! error value.
- If basis < 0 or if basis > 4, COUPPCD returns the #NUM! error value.
- If settlement ≥ maturity, COUPPCD returns the #NUM! error value.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
	January 25, 2007	Settlement date
<b>1</b>	November 15, 2008	Maturity date
<b>2</b>	2	Semiannual coupon (see above)
<b>3</b>	1	Actual/actual basis (see above)
<b>4</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>5</b>	=COUPPCD(A2,A3,A4,A5)	The previous coupon date before the settlement date, for a bond with the above terms (November 15, 2006)

**Note** To view the number as a date, select the cell and click **Cells** on the **Format** menu. Click the **Number** tab, and then click **Date** in the **Category** box.

[Show All](#)

# CUMIPMT

## [See Also](#)

Returns the cumulative interest paid on a loan between start\_period and end\_period.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**CUMIPMT(rate,nper,pv,start\_period,end\_period,type)**

Rate is the interest rate.

Nper is the total number of payment periods.

Pv is the present value.

Start\_period is the first period in the calculation. Payment periods are numbered beginning with 1.

End\_period is the last period in the calculation.

Type is the timing of the payment.

Type	Timing
0 (zero)	Payment at the end of the period

## 1 Payment at the beginning of the period

### Remarks

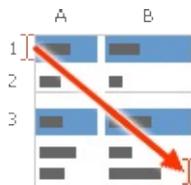
- Make sure that you are consistent about the units you use for specifying rate and nper. If you make monthly payments on a four-year loan at an annual interest rate of 10 percent, use 10%/12 for rate and 4\*12 for nper. If you make annual payments on the same loan, use 10% for rate and 4 for nper.
- Nper, start\_period, end\_period, and type are truncated to integers.
- If  $\text{rate} \leq 0$ ,  $\text{nper} \leq 0$ , or  $\text{pv} \leq 0$ , CUMIPMT returns the #NUM! error value.
- If  $\text{start\_period} < 1$ ,  $\text{end\_period} < 1$ , or  $\text{start\_period} > \text{end\_period}$ , CUMIPMT returns the #NUM! error value.
- If type is any number other than 0 or 1, CUMIPMT returns the #NUM! error value.

### Example

The example may be easier to understand if you copy it to a blank worksheet.



1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

**A**  
**Data**

**B**  
**Description**

	9%	Annual interest rate
	30	Years of the loan
1	125,000	Present value
2		
	<b>Formula</b>	<b>Description (Result)</b>
3		Total interest paid in the second
4	=CUMIPMT(A2/12,A3*12,A4,13,24,0)	year of payments, periods 13 through 24 (-11135.23)
	=CUMIPMT(A2/12,A3*12,A4,1,1,0)	Interest paid in a single payment in the first month (-937.50)

**Note** The interest rate is divided by 12 to get a monthly rate. The years the money is paid out is multiplied by 12 to get the number of payments.

[Show All](#)

# CUMPRINC

## [See Also](#)

Returns the cumulative principal paid on a loan between start\_period and end\_period.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**CUMPRINC(rate,nper,pv,start\_period,end\_period,type)**

Rate is the interest rate.

Nper is the total number of payment periods.

Pv is the present value.

Start\_period is the first period in the calculation. Payment periods are numbered beginning with 1.

End\_period is the last period in the calculation.

Type is the timing of the payment.

Type	Timing
0 (zero)	Payment at the end of the period

## 1 Payment at the beginning of the period

### Remarks

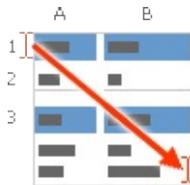
- Make sure that you are consistent about the units you use for specifying rate and nper. If you make monthly payments on a four-year loan at an annual interest rate of 12 percent, use 12%/12 for rate and 4\*12 for nper. If you make annual payments on the same loan, use 12% for rate and 4 for nper.
- Nper, start\_period, end\_period, and type are truncated to integers.
- If  $\text{rate} \leq 0$ ,  $\text{nper} \leq 0$ , or  $\text{pv} \leq 0$ , CUMPRINC returns the #NUM! error value.
- If  $\text{start\_period} < 1$ ,  $\text{end\_period} < 1$ , or  $\text{start\_period} > \text{end\_period}$ , CUMPRINC returns the #NUM! error value.
- If type is any number other than 0 or 1, CUMPRINC returns the #NUM! error value.

### Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

**A**  
**Data**

**B**  
**Description**

	9.00%	Interest rate per annum
	30	Term in years
1	125,000	Present value
2	<b>Formula</b>	<b>Description (Result)</b>
3		The total principal paid in the
4	=CUMPRINC(A2/12,A3*12,A4,13,24,0)	second year of payments, periods 13 through 24 (-934.1071)
	=CUMPRINC(A2/12,A3*12,A4,1,1,0)	The principal paid in a single payment in the first month (-68.27827)

**Note** The interest rate is divided by 12 to get a monthly rate. The years the money is paid out is multiplied by 12 to get the number of payments.

[Show All](#)

# DB

## [See Also](#)

Returns the depreciation of an asset for a specified period using the fixed-declining balance method.

## Syntax

**DB(cost,salvage,life,period,month)**

Cost is the initial cost of the asset.

Salvage is the value at the end of the depreciation (sometimes called the salvage value of the asset).

Life is the number of periods over which the asset is being depreciated (sometimes called the useful life of the asset).

Period is the period for which you want to calculate the depreciation. Period must use the same units as life.

Month is the number of months in the first year. If month is omitted, it is assumed to be 12.

## Remarks

- The fixed-declining balance method computes depreciation at a fixed rate. DB uses the following formulas to calculate depreciation for a period:

$$(\text{cost} - \text{total depreciation from prior periods}) * \text{rate}$$

where:

$$\text{rate} = 1 - ((\text{salvage} / \text{cost}) ^ (1 / \text{life})), \text{ rounded to three decimal places}$$

- Depreciation for the first and last periods is a special case. For the first

period, DB uses this formula:

$$\text{cost} * \text{rate} * \text{month} / 12$$

- For the last period, DB uses this formula:

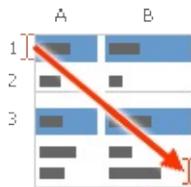
$$((\text{cost} - \text{total depreciation from prior periods}) * \text{rate} * (12 - \text{month})) / 12$$

### Example 1

The example may be easier to understand if you copy it to a blank worksheet.



1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
	1,000,000	Initial cost
	100,000	Salvage value
	6	Lifetime in years
	<b>Formula</b>	<b>Description (Result)</b>
<b>1</b>		Depreciation in first year, with only 7 months

2 =DB(A2,A3,A4,1,7) calculated (186,083.33)

3 =DB(A2,A3,A4,2,7) Depreciation in second year (259,639.42)

4 =DB(A2,A3,A4,3,7) Depreciation in third year (176,814.44)

=DB(A2,A3,A4,4,7) Depreciation in fourth year (120,410.64)

=DB(A2,A3,A4,5,7) Depreciation in fifth year (81,999.64)

=DB(A2,A3,A4,6,7) Depreciation in sixth year (55,841.76)

=DB(A2,A3,A4,7,7) Depreciation in seventh year, with only 5 months  
calculated (15,845.10)

[Show All](#)

# DDB

## [See Also](#)

Returns the depreciation of an asset for a specified period using the double-declining balance method or some other method you specify.

## Syntax

**DDB(cost,salvage,life,period,factor)**

Cost is the initial cost of the asset.

Salvage is the value at the end of the depreciation (sometimes called the salvage value of the asset).

Life is the number of periods over which the asset is being depreciated (sometimes called the useful life of the asset).

Period is the period for which you want to calculate the depreciation. Period must use the same units as life.

Factor is the rate at which the balance declines. If factor is omitted, it is assumed to be 2 (the double-declining balance method).

**Important** All five arguments must be positive numbers.

## Remarks

- The double-declining balance method computes depreciation at an accelerated rate. Depreciation is highest in the first period and decreases in successive periods. DDB uses the following formula to calculate depreciation for a period:

$((\text{cost-salvage}) - \text{total depreciation from prior periods}) * (\text{factor}/\text{life})$

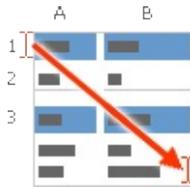
- Change factor if you do not want to use the double-declining balance method.
- Use the VDB function if you want to switch to the straight-line depreciation method when depreciation is greater than the declining balance calculation.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
	2400	Initial cost
	300	Salvage value
	10	Lifetime in years
	<b>Formula</b>	<b>Description (Result)</b>
<b>1</b>		
<b>2</b>	=DDB(A2,A3,A4*365,1)	First day's depreciation. Microsoft Excel automatically assumes that factor is 2. (1.32)
<b>3</b>	=DDB(A2,A3,A4*12,1,2)	First month's depreciation (40.00)
<b>4</b>	=DDB(A2,A3,A4,1,2)	First year's depreciation (480.00)

=DDB(A2,A3,A4,2,1.5)	Second year's depreciation using a factor of 1.5 instead of the double-declining balance method (306.00)
=DDB(A2,A3,A4,10)	Tenth year's depreciation. Microsoft Excel automatically assumes that factor is 2 (22.12)

**Note** The results are rounded to two decimal places.

[Show All](#)

# DISC

## [See Also](#)

Returns the discount rate for a security.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**DISC(settlement,maturity,pr,redemption,basis)**

**Important** Dates should be entered by using the DATE function, or as results of other formulas or functions. For example, use DATE(2008,5,23) for the 23rd day of May, 2008. Problems can occur if [dates are entered as text](#).

**Settlement** is the security's settlement date. The security settlement date is the date after the issue date when the security is traded to the buyer.

**Maturity** is the security's maturity date. The maturity date is the date when the security expires.

**Pr** is the security's price per \$100 face value.

**Redemption** is the security's redemption value per \$100 face value.

**Basis** is the type of day count basis to use.

	<b>Basis</b>	<b>Day count basis</b>
0 or omitted	US (NASD)	30/360
1		Actual/actual
2		Actual/360
3		Actual/365
4		European 30/360

## Remarks

- Microsoft Excel stores dates as sequential serial numbers so they can be used in calculations. By default, January 1, 1900 is serial number 1, and January 1, 2008 is serial number 39448 because it is 39,448 days after January 1, 1900. Microsoft Excel for the Macintosh uses a [different date system as its default](#).
- The settlement date is the date a buyer purchases a coupon, such as a bond. The maturity date is the date when a coupon expires. For example, suppose a 30-year bond is issued on January 1, 2008, and is purchased by a buyer six months later. The issue date would be January 1, 2008, the settlement date would be July 1, 2008, and the maturity date would be January 1, 2038, 30 years after the January 1, 2008, issue date.
- Settlement, maturity, and basis are truncated to integers.
- If settlement or maturity is not a valid serial date number, DISC returns the #VALUE! error value.
- If  $pr \leq 0$  or if redemption  $\leq 0$ , DISC returns the #NUM! error value.
- If basis  $< 0$  or if basis  $> 4$ , DISC returns the #NUM! error value.
- If settlement  $\geq$  maturity, DISC returns the #NUM! error value.
- DISC is calculated as follows:

$$DISC = \frac{\text{redemption} - \text{par}}{\text{par}} \times \frac{B}{DSM}$$

where:

B = number of days in a year, depending on the year basis.

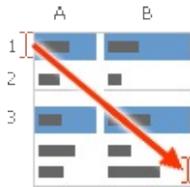
DSM = number of days between settlement and maturity.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

**How?**

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
<b>1</b>	January 25, 2007	Settlement date
<b>2</b>	June 15, 2007	Maturity date
<b>3</b>	97.975	Price
<b>4</b>	100	Redemption value
<b>5</b>	1	Actual/360 basis (see above)
<b>6</b>	<b>Formula</b>	<b>Description (Result)</b>
	=DISC(A2,A3,A4,A5,A6)	The bond discount rate, for a bond with the above terms (0.052420213 or 5.24%)

**Note** To view the number as a percent, select the cell and click **Cells** on the **Format** menu. Click the **Number** tab, and then click **Percentage** in the **Category** box.

[Show All](#)

# DOLLARDE

## [See Also](#)

Converts a dollar price expressed as a fraction into a dollar price expressed as a decimal number. Use DOLLARDE to convert fractional dollar numbers, such as securities prices, to decimal numbers.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**DOLLARDE(fractional\_dollar,fraction)**

Fractional\_dollar is a number expressed as a fraction.

Fraction is the integer to use in the denominator of the fraction.

## Remarks

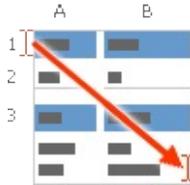
- If fraction is not an integer, it is truncated.
- If fraction is less than 0, DOLLARDE returns the #NUM! error value.
- If fraction is 0, DOLLARDE returns the #DIV/0! error value.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

## How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Formula</b>	<b>Description (Result)</b>
<b>1</b>	=DOLLARDE(1.02,16)	Converts 1.02, read as 1 and 2/16, to a decimal number (1.125)
<b>2</b>		
<b>3</b>	=DOLLARDE(1.1,32)	Converts 1.1, read as 1 and 10/32, to a decimal number (1.3125)

[Show All](#)

# DOLLARFR

## [See Also](#)

Converts a dollar price expressed as a decimal number into a dollar price expressed as a fraction. Use DOLLARFR to convert decimal numbers to fractional dollar numbers, such as securities prices.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**DOLLARFR(decimal\_dollar,fraction)**

Decimal\_dollar is a decimal number.

Fraction is the integer to use in the denominator of a fraction.

## Remarks

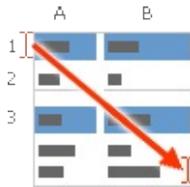
- If fraction is not an integer, it is truncated.
- If fraction is less than 0, DOLLARFR returns the #NUM! error value.
- If fraction is 0, DOLLARFR returns the #DIV/0! error value.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

## How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Formula</b>	<b>Description (Result)</b>
<b>1</b>	=DOLLARFR(1.125,16)	Converts the decimal number 1.125 to a number read as 1 and 2/16 (1.02)
<b>2</b>		
<b>3</b>	=DOLLARFR(1.125,32)	Converts the decimal number 1.125 to a number read as 1 and 1/8 (1.04)

[Show All](#)

# DURATION

## [See Also](#)

Returns the Macauley duration for an assumed par value of \$100. Duration is defined as the weighted average of the present value of the cash flows and is used as a measure of a bond price's response to changes in yield.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**DURATION**(settlement,maturity,coupon,yld,frequency,basis)

**Important** Dates should be entered by using the DATE function, or as results of other formulas or functions. For example, use DATE(2008,5,23) for the 23rd day of May, 2008. Problems can occur if [dates are entered as text](#).

**Settlement** is the security's settlement date. The security settlement date is the date after the issue date when the security is traded to the buyer.

**Maturity** is the security's maturity date. The maturity date is the date when the security expires.

**Coupon** is the security's annual coupon rate.

Yld is the security's annual yield.

Frequency is the number of coupon payments per year. For annual payments, frequency = 1; for semiannual, frequency = 2; for quarterly, frequency = 4.

Basis is the type of day count basis to use.

<b>Basis</b>	<b>Day count basis</b>
0 or omitted	US (NASD) 30/360
1	Actual/actual
2	Actual/360
3	Actual/365
4	European 30/360

### Remarks

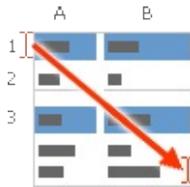
- Microsoft Excel stores dates as sequential serial numbers so they can be used in calculations. By default, January 1, 1900 is serial number 1, and January 1, 2008 is serial number 39448 because it is 39,448 days after January 1, 1900. Microsoft Excel for the Macintosh uses a [different date system as its default](#).
- The settlement date is the date a buyer purchases a coupon, such as a bond. The maturity date is the date when a coupon expires. For example, suppose a 30-year bond is issued on January 1, 2008, and is purchased by a buyer six months later. The issue date would be January 1, 2008, the settlement date would be July 1, 2008, and the maturity date would be January 1, 2038, which is 30 years after the January 1, 2008, issue date.
- Settlement, maturity, frequency, and basis are truncated to integers.
- If settlement or maturity is not a valid date, DURATION returns the #VALUE! error value.
- If coupon < 0 or if yld < 0, DURATION returns the #NUM! error value.
- If frequency is any number other than 1, 2, or 4, DURATION returns the #NUM! error value.
- If basis < 0 or if basis > 4, DURATION returns the #NUM! error value.
- If settlement ≥ maturity, DURATION returns the #NUM! error value.

### Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
<b>1</b>	January 1, 2008	Settlement date
<b>2</b>	January 1, 2016	Maturity date
<b>3</b>	8%	Percent coupon
<b>4</b>	9.0%	Percent yield
<b>5</b>	2	Frequency is semiannual (see above)
<b>6</b>	1	Actual/actual basis (see above)
<b>7</b>	<b>Formula</b>	<b>Description (Result)</b>
	=DURATION(A2,A3,A4,A5,A6,A7)	The duration, for the bond with the terms above (5.993775)

[Show All](#)

# EFFECT

## [See Also](#)

Returns the effective annual interest rate, given the nominal annual interest rate and the number of compounding periods per year.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**EFFECT(nominal\_rate,npery)**

Nominal\_rate is the nominal interest rate.

Npery is the number of compounding periods per year.

## Remarks

- Npery is truncated to an integer.
- If either argument is nonnumeric, EFFECT returns the #VALUE! error value.
- If nominal\_rate  $\leq 0$  or if npery  $< 1$ , EFFECT returns the #NUM! error value.
- EFFECT is calculated as follows:

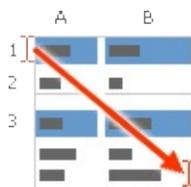
$$EFFECT = \left( 1 + \frac{Nominal\_rate}{Npery} \right)^{Npery} - 1$$

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
<b>1</b>	5.25%	Nominal interest rate
<b>2</b>	4	Number of compounding periods per year
<b>3</b>	<b>Formula</b>	<b>Description (Result)</b>
	=EFFECT(A2,A3)	Effective interest rate with the terms above (0.053543 or 5.3543 percent)

[Show All](#)

# FV

## [See Also](#)

Returns the future value of an investment based on periodic, constant payments and a constant interest rate.

## Syntax

**FV(rate,nper,pmt,pv,type)**

For a more complete description of the arguments in FV and for more information on annuity functions, see PV.

**Rate** is the interest rate per period.

**Nper** is the total number of payment periods in an annuity.

**Pmt** is the payment made each period; it cannot change over the life of the annuity. Typically, pmt contains principal and interest but no other fees or taxes. If pmt is omitted, you must include the pv argument.

**Pv** is the present value, or the lump-sum amount that a series of future payments is worth right now. If pv is omitted, it is assumed to be 0 (zero), and you must include the pmt argument.

**Type** is the number 0 or 1 and indicates when payments are due. If type is omitted, it is assumed to be 0.

<b>Set type equal to</b>	<b>If payments are due</b>
0	At the end of the period
1	At the beginning of the period

## Remarks

- Make sure that you are consistent about the units you use for specifying rate and nper. If you make monthly payments on a four-year loan at 12 percent

annual interest, use 12%/12 for rate and 4\*12 for nper. If you make annual payments on the same loan, use 12% for rate and 4 for nper.

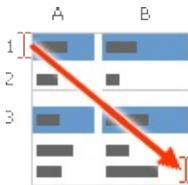
- For all the arguments, cash you pay out, such as deposits to savings, is represented by negative numbers; cash you receive, such as dividend checks, is represented by positive numbers.

### Example 1

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
	6%	Annual interest rate
<b>1</b>	10	Number of payments
<b>2</b>	-200	Amount of the payment
<b>3</b>	-500	Present value
<b>4</b>	1	Payment is due at the beginning of the period (see above)
<b>5</b>		
<b>6</b>	<b>Formula</b>	<b>Description (Result)</b>

=FV(A2/12, A3, A4, A5, A6)      Future value of an investment with the above terms (2581.40)

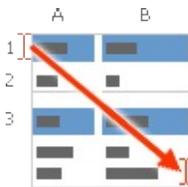
**Note** The annual interest rate is divided by 12 because it is compounded monthly.

### Example 2

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
<b>1</b>	12%	Annual interest rate
<b>2</b>	12	Number of payments
<b>3</b>	-1000	Amount of the payment
<b>4</b>	<b>Formula</b>	<b>Description (Result)</b>
	=FV(A2/12, A3, A4)	Future value of an investment with the above terms (12,682.50)

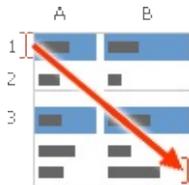
**Note** The annual interest rate is divided by 12 because it is compounded monthly.

### Example 3

The example may be easier to understand if you copy it to a blank worksheet.

 [How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
	11%	Annual interest rate
<b>1</b>	35	Number of payments
<b>2</b>	-2000	Amount of the payment
<b>3</b>	1	Payment is due at the beginning of the year (see above)
<b>4</b>		
<b>5</b>	<b>Formula</b>	<b>Description (Result)</b>
	=FV(A2/12, A3, A4,, A5)	Future value of an investment with the above terms (82,846.25)

**Note** The annual interest rate is divided by 12 because it is compounded

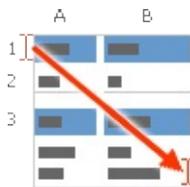
monthly.

### Example 4

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
	6%	Annual interest rate
<b>1</b>	12	Number of payments
<b>2</b>	-100	Amount of the payment
<b>3</b>	-1000	Present value
<b>4</b>	1	Payment is due at the beginning of the year (see above)
<b>5</b>		
<b>6</b>	<b>Formula</b>	<b>Description (Result)</b>
	=FV(A2/12, A3, A4, A5, A6)	Future value of an investment with the above terms (2301.40)

**Note** The annual interest rate is divided by 12 because it is compounded monthly.

[Show All](#)

# FVSCCHEDULE

## [See Also](#)

Returns the future value of an initial principal after applying a series of compound interest rates. Use FVSCCHEDULE to calculate the future value of an investment with a variable or adjustable rate.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## How?

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**FVSCCHEDULE**(principal,schedule)

Principal is the present value.

Schedule is an array of interest rates to apply.

## Remark

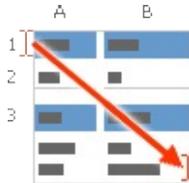
The values in schedule can be numbers or blank cells; any other value produces the #VALUE! error value for FVSCCHEDULE. Blank cells are taken as zeros (no interest).

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Formula</b>	<b>Description (Result)</b>
<b>1</b>	=FVSCCHEDULE(1,	Future value of 1 with compound interest rates of
<b>2</b>	{0.09,0.11,0.1})	0.09,0.11,0.1 (1.33089)

[Show All](#)

# INTRATE

## [See Also](#)

Returns the interest rate for a fully invested security.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**INTRATE**(**settlement**,**maturity**,**investment**,**redemption**,basis)

**Important** Dates should be entered by using the DATE function, or as results of other formulas or functions. For example, use DATE(2008,5,23) for the 23rd day of May, 2008. Problems can occur if [dates are entered as text](#).

**Settlement** is the security's settlement date. The security settlement date is the date after the issue date when the security is traded to the buyer.

**Maturity** is the security's maturity date. The maturity date is the date when the security expires.

**Investment** is the amount invested in the security.

**Redemption** is the amount to be received at maturity.

**Basis** is the type of day count basis to use.

<b>Basis</b>	<b>Day count basis</b>
0 or omitted	US (NASD) 30/360
1	Actual/actual
2	Actual/360
3	Actual/365
4	European 30/360

## Remarks

- Microsoft Excel stores dates as sequential serial numbers so they can be used in calculations. By default, January 1, 1900 is serial number 1, and January 1, 2008 is serial number 39448 because it is 39,448 days after January 1, 1900. Microsoft Excel for the Macintosh uses a [different date system as its default](#).
- The settlement date is the date a buyer purchases a coupon, such as a bond. The maturity date is the date when a coupon expires. For example, suppose a 30-year bond is issued on January 1, 2008, and is purchased by a buyer six months later. The issue date would be January 1, 2008, the settlement date would be July 1, 2008, and the maturity date would be January 1, 2038, which is 30 years after the January 1, 2008, issue date.
- Settlement, maturity, and basis are truncated to integers.
- If settlement or maturity is not a valid date, INTRATE returns the #VALUE! error value.
- If investment  $\leq 0$  or if redemption  $\leq 0$ , INTRATE returns the #NUM! error value.
- If basis  $< 0$  or if basis  $> 4$ , INTRATE returns the #NUM! error value.
- If settlement  $\geq$  maturity, INTRATE returns the #NUM! error value.
- INTRATE is calculated as follows:

$$INTRATE = \frac{\text{redemption} - \text{investment}}{\text{investment}} \times \frac{B}{DIM}$$

where:

B = number of days in a year, depending on the year basis.

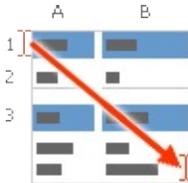
DIM = number of days from settlement to maturity.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

 [How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
<b>1</b>	February 15, 2008	Settlement date
<b>2</b>	May 15, 2008	Maturity date
<b>3</b>	1,000,000	Investment
<b>4</b>	1,014,420	Redemption value
<b>5</b>	2	Actual/360 basis (see above)
<b>6</b>	<b>Formula</b>	<b>Description (Result)</b>
	=INTRATE(A2,A3,A4,A5,A6)	Discount rate, for the terms of the bond above (0.05768 or 5.77%)

**Note** To view the number as a percentage, select the cell and click **Cells** on the **Format** menu. Click the **Number** tab, and then click **Percentage** in the **Category** box.

[Show All](#)

# IPMT

## [See Also](#)

Returns the interest payment for a given period for an investment based on periodic, constant payments and a constant interest rate. For a more complete description of the arguments in IPMT and for more information about annuity functions, see [PV](#).

## Syntax

**IPMT(rate,per,nper,pv,fv,type)**

Rate is the interest rate per period.

Per is the period for which you want to find the interest and must be in the range 1 to nper.

Nper is the total number of payment periods in an annuity.

Pv is the present value, or the lump-sum amount that a series of future payments is worth right now.

Fv is the future value, or a cash balance you want to attain after the last payment is made. If fv is omitted, it is assumed to be 0 (the future value of a loan, for example, is 0).

Type is the number 0 or 1 and indicates when payments are due. If type is omitted, it is assumed to be 0.

<b>Set type equal to</b>	<b>If payments are due</b>
0	At the end of the period
1	At the beginning of the period

## Remarks

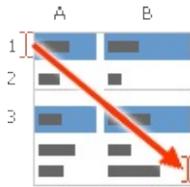
- Make sure that you are consistent about the units you use for specifying rate and nper. If you make monthly payments on a four-year loan at 12 percent annual interest, use 12%/12 for rate and 4\*12 for nper. If you make annual payments on the same loan, use 12% for rate and 4 for nper.
- For all the arguments, cash you pay out, such as deposits to savings, is represented by negative numbers; cash you receive, such as dividend checks, is represented by positive numbers.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

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2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

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4. In the worksheet, select cell A1, and press CTRL+V.
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	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
	10%	Annual interest
<b>1</b>	1	Period for which you want to find the interest
<b>2</b>	3	Years of loan
<b>3</b>	8000	Present value of loan
	<b>Formula</b>	<b>Description (Result)</b>

4	=IPMT(A2/12,	Interest due in the first month for a loan with the terms
5	A3*3, A4, A5)	above (-22.41)
	=IPMT(A2, 3,	Interest due in the last year for a loan with the terms
	A4, A5)	above, where payments are made yearly (-292.45)

**Note** The interest rate is divided by 12 to get a monthly rate. The years the money is paid out is multiplied by 12 to get the number of payments.

[Show All](#)

# IRR

## [See Also](#)

Returns the internal rate of return for a series of cash flows represented by the numbers in values. These cash flows do not have to be even, as they would be for an annuity. However, the cash flows must occur at regular intervals, such as monthly or annually. The internal rate of return is the interest rate received for an investment consisting of payments (negative values) and income (positive values) that occur at regular periods.

## Syntax

**IRR(values,guess)**

Values is an array or a reference to cells that contain numbers for which you want to calculate the internal rate of return.

- Values must contain at least one positive value and one negative value to calculate the internal rate of return.
- IRR uses the order of values to interpret the order of cash flows. Be sure to enter your payment and income values in the sequence you want.
- If an array or reference argument contains text, logical values, or empty cells, those values are ignored.

Guess is a number that you guess is close to the result of IRR.

- Microsoft Excel uses an iterative technique for calculating IRR. Starting with guess, IRR cycles through the calculation until the result is accurate within 0.00001 percent. If IRR can't find a result that works after 20 tries, the #NUM! error value is returned.
- In most cases you do not need to provide guess for the IRR calculation. If guess is omitted, it is assumed to be 0.1 (10 percent).
- If IRR gives the #NUM! error value, or if the result is not close to what you expected, try again with a different value for guess.

## Remarks

IRR is closely related to NPV, the net present value function. The rate of return calculated by IRR is the interest rate corresponding to a 0 (zero) net present value. The following formula demonstrates how NPV and IRR are related:

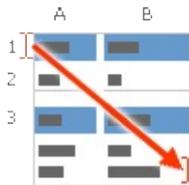
$\text{NPV}(\text{IRR}(\text{B1:B6}), \text{B1:B6})$  equals  $3.60\text{E-}08$  [Within the accuracy of the IRR calculation, the value  $3.60\text{E-}08$  is effectively 0 (zero).]

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
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Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
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	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
	-70,000	Initial cost of a business
	12,000	Net income for the first year
<b>1</b>	15,000	Net income for the second year
<b>2</b>	18,000	Net income for the third year

3	21,000	Net income for the fourth year
4	26,000	Net income for the fifth year
5	<b>Formula</b>	<b>Description (Result)</b>
6	=IRR(A2:A6)	Investment's internal rate of return after four years (-2%)
7	=IRR(A2:A7)	Internal rate of return after five years (9%)
	=IRR(A2:A4,-10%)	To calculate the internal rate of return after two years, you need to include a guess (-44%)

[Show All](#)

# ISPMT

## [See Also](#)

Calculates the interest paid during a specific period of an investment. This function is provided for compatibility with Lotus 1-2-3.

## Syntax

**ISPMT(rate,per,nper,pv)**

Rate is the interest rate for the investment.

Per is the period for which you want to find the interest, and must be between 1 and nper.

Nper is the total number of payment periods for the investment.

Pv is the present value of the investment. For a loan, pv is the loan amount.

## Remarks

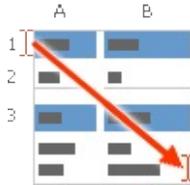
- Make sure that you are consistent about the units you use for specifying rate and nper. If you make monthly payments on a four-year loan at an annual interest rate of 12 percent, use 12%/12 for rate and 4\*12 for nper. If you make annual payments on the same loan, use 12% for rate and 4 for nper.
- For all the arguments, the cash you pay out, such as deposits to savings or other withdrawals, is represented by negative numbers; the cash you receive, such as dividend checks and other deposits, is represented by positive numbers.
- For additional information about financial functions, see the PV function.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

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3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
	10%	Annual interest rate
<b>1</b>	1	Period
<b>2</b>	3	Number of years in the investment
<b>3</b>	8000000	Amount of loan
<b>4</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>5</b>	=ISPMT(A2/12,A3,A4*12,A5)	Interest paid for the first monthly payment of a loan with the above terms (-64814.8)
	=ISPMT(A2,1,A4,A5)	Interest paid in the first year of a loan with the above terms (-533333)

**Note** The interest rate is divided by 12 to get a monthly rate. The number of years the money is paid out is multiplied by 12 to get the number of payments.

[Show All](#)

# MDURATION

## [See Also](#)

Returns the modified Macauley duration for a security with an assumed par value of \$100.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**MDURATION**(settlement,maturity,coupon,yld,frequency,basis)

**Important** Dates should be entered by using the DATE function, or as results of other formulas or functions. For example, use DATE(2008,5,23) for the 23rd day of May, 2008. Problems can occur if [dates are entered as text](#).

**Settlement** is the security's settlement date. The security settlement date is the date after the issue date when the security is traded to the buyer.

**Maturity** is the security's maturity date. The maturity date is the date when the security expires.

**Coupon** is the security's annual coupon rate.

**Yld** is the security's annual yield.

Frequency is the number of coupon payments per year. For annual payments, frequency = 1; for semiannual, frequency = 2; for quarterly, frequency = 4.

Basis is the type of day count basis to use.

Basis	Day count basis
0 or omitted	US (NASD) 30/360
1	Actual/actual
2	Actual/360
3	Actual/365
4	European 30/360

### Remarks

- Microsoft Excel stores dates as sequential serial numbers so they can be used in calculations. By default, January 1, 1900 is serial number 1, and January 1, 2008 is serial number 39448 because it is 39,448 days after January 1, 1900. Microsoft Excel for the Macintosh uses a [different date system as its default](#).
- The settlement date is the date a buyer purchases a coupon, such as a bond. The maturity date is the date when a coupon expires. For example, suppose a 30-year bond is issued on January 1, 2008, and is purchased by a buyer six months later. The issue date would be January 1, 2008, the settlement date would be July 1, 2008, and the maturity date is January 1, 2038, which is 30 years after the January 1, 2008, issue date.
- Settlement, maturity, frequency, and basis are truncated to integers.
- If settlement or maturity is not a valid date, MDURATION returns the #VALUE! error value.
- If yld < 0 or if coupon < 0, MDURATION returns the #NUM! error value.
- If frequency is any number other than 1, 2, or 4, MDURATION returns the #NUM! error value.
- If basis < 0 or if basis > 4, MDURATION returns the #NUM! error value.
- If settlement ≥ maturity, MDURATION returns the #NUM! error value.
- Modified duration is defined as follows:

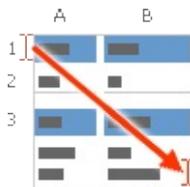
$$\text{MDURATION} = \frac{\text{DURATION}}{1 + \left( \frac{\text{Market yield}}{\text{Coupon payments per year}} \right)}$$

### Example

The example may be easier to understand if you copy it to a blank worksheet.

**How?**

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

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4. In the worksheet, select cell A1, and press CTRL+V.
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	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
<b>1</b>	January 1, 2008	Settlement date
<b>2</b>	January 1, 2016	Maturity date
<b>3</b>	8%	Percent coupon
<b>4</b>	9.0%	Percent yield
<b>5</b>	2	Frequency is semiannual (see above)
<b>6</b>	1	Actual/actual basis (see above)
<b>7</b>	<b>Formula</b>	<b>Description (Result)</b>
	=MDURATION(A2,A3,A4,A5,A6,A7)	The modified duration, for the bond with the terms above (5.73567)

[Show All](#)

# MIRR

## [See Also](#)

Returns the modified internal rate of return for a series of periodic cash flows. MIRR considers both the cost of the investment and the interest received on reinvestment of cash.

## Syntax

**MIRR(values,finance\_rate,reinvest\_rate)**

Values is an array or a reference to cells that contain numbers. These numbers represent a series of payments (negative values) and income (positive values) occurring at regular periods.

- Values must contain at least one positive value and one negative value to calculate the modified internal rate of return. Otherwise, MIRR returns the #DIV/0! error value.
- If an array or reference argument contains text, logical values, or empty cells, those values are ignored; however, cells with the value zero are included.

Finance\_rate is the interest rate you pay on the money used in the cash flows.

Reinvest\_rate is the interest rate you receive on the cash flows as you reinvest them.

## Remarks

- MIRR uses the order of values to interpret the order of cash flows. Be sure to enter your payment and income values in the sequence you want and with the correct signs (positive values for cash received, negative values for cash paid).
- If n is the number of cash flows in values, frate is the finance\_rate, and rrate

is the `reinvest_rate`, then the formula for MIRR is:

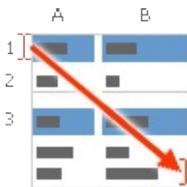
$$\left( \frac{-\text{NPV}(\text{rrate}, \text{values}[\text{positive}]) * (1 + \text{rrate})^n}{\text{NPV}(\text{frate}, \text{values}[\text{negative}]) * (1 + \text{frate})} \right)^{\frac{1}{n-1}} - 1$$

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
	-\$120,000	Initial cost
	39,000	Return first year
<b>1</b>	30,000	Return second year
<b>2</b>	21,000	Return third year
<b>3</b>	37,000	Return fourth year
<b>4</b>	46,000	Return fifth year
<b>5</b>	10.00%	Annual interest rate for the 120,000 loan

6	12.00%	Annual interest rate for the reinvested profits
7	<b>Formula</b>	<b>Description (Result)</b>
8	=MIRR(A2:A7,	Investment's modified rate of return after five years
9	A8, A9)	(13%)
	=MIRR(A2:A5,	Modified rate of return after three years (-5%)
	A8, A9)	
	=MIRR(A2:A7,	Five-year modified rate of return based on a
	A8, 14%)	reinvest_rate of 14 percent (13%)

[Show All](#)

# NOMINAL

## [See Also](#)

Returns the nominal annual interest rate, given the effective rate and the number of compounding periods per year.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**NOMINAL(effect\_rate,npery)**

Effect\_rate is the effective interest rate.

Npery is the number of compounding periods per year.

## Remarks

- Npery is truncated to an integer.
- If either argument is nonnumeric, NOMINAL returns the #VALUE! error value.
- If effect\_rate  $\leq 0$  or if npery  $< 1$ , NOMINAL returns the #NUM! error value.
- NOMINAL is related to EFFECT as shown in the following equation:

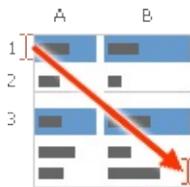
$$EFFECT = \left( 1 + \frac{Nominal\_rate}{Npery} \right)^{Npery} - 1$$

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
<b>1</b>	5.3543%	Effective interest rate
<b>2</b>	4	Number of compounding periods per year
<b>3</b>	<b>Formula</b>	<b>Description (Result)</b>
	=NOMINAL(A2,A3)	Nominal interest rate with the terms above (0.0525 or 5.25 percent)

[Show All](#)

# NPER

## [See Also](#)

Returns the number of periods for an investment based on periodic, constant payments and a constant interest rate.

## Syntax

**NPER**(rate, pmt, pv, fv, type)

For a more complete description of the arguments in NPER and for more information about annuity functions, see PV.

**Rate** is the interest rate per period.

**Pmt** is the payment made each period; it cannot change over the life of the annuity. Typically, pmt contains principal and interest but no other fees or taxes.

**Pv** is the present value, or the lump-sum amount that a series of future payments is worth right now.

**Fv** is the future value, or a cash balance you want to attain after the last payment is made. If fv is omitted, it is assumed to be 0 (the future value of a loan, for example, is 0).

**Type** is the number 0 or 1 and indicates when payments are due.

<b>Set type equal to</b>	<b>If payments are due</b>
--------------------------	----------------------------

0 or omitted	At the end of the period
--------------	--------------------------

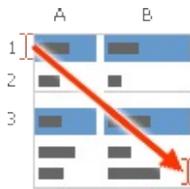
1	At the beginning of the period
---	--------------------------------

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
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	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
	12%	Annual interest rate
	-100	Payment made each period
<b>1</b>	-1000	Present value
<b>2</b>	10000	Future value
<b>3</b>	1	Payment is due at the beginning of the period (see above)
<b>4</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>5</b>	=NPER(A2/12, A3, A4, A5, 1)	Periods for the investment with the above terms (60)
<b>6</b>	=NPER(A2/12, A3, A4, A5)	Periods for the investment with the above terms, except payments are made at the beginning of the period (60)
	=NPER(A2/12, A3, A4)	Periods for the investment with the above terms, except with a future value of 0 (-9.578)

[Show All](#)

# NPV

## [See Also](#)

Calculates the net present value of an investment by using a discount rate and a series of future payments (negative values) and income (positive values).

## Syntax

**NPV(rate,value1,value2, ...)**

Rate is the rate of discount over the length of one period.

Value1, value2, ... are 1 to 29 arguments representing the payments and income.

- Value1, value2, ... must be equally spaced in time and occur at the end of each period.
- NPV uses the order of value1, value2, ... to interpret the order of cash flows. Be sure to enter your payment and income values in the correct sequence.
- Arguments that are numbers, empty cells, logical values, or text representations of numbers are counted; arguments that are error values or text that cannot be translated into numbers are ignored.
- If an argument is an array or reference, only numbers in that array or reference are counted. Empty cells, logical values, text, or error values in the array or reference are ignored.

## Remarks

- The NPV investment begins one period before the date of the value1 cash flow and ends with the last cash flow in the list. The NPV calculation is based on future cash flows. If your first cash flow occurs at the beginning of the first period, the first value must be added to the NPV result, not included in the values arguments. For more information, see the examples

below.

- If n is the number of cash flows in the list of values, the formula for NPV is:

$$NPV = \sum_{j=1}^n \frac{values_j}{(1+rate)^j}$$

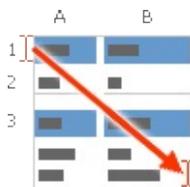
- NPV is similar to the PV function (present value). The primary difference between PV and NPV is that PV allows cash flows to begin either at the end or at the beginning of the period. Unlike the variable NPV cash flow values, PV cash flows must be constant throughout the investment. For information about annuities and financial functions, see PV.
- NPV is also related to the IRR function (internal rate of return). IRR is the rate for which NPV equals zero: NPV(IRR(...), ...) = 0.

### Example 1

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

**A**

**B**

	Data	Description
1	10%	Annual discount rate
2	-10,000	Initial cost of investment one year from today
3	3,000	Return from first year
4	4,200	Return from second year
5	6,800	Return from third year
6	<b>Formula</b>	<b>Description (Result)</b>
	=NPV(A2, A3, A4, A5, A6)	Net present value of this investment (1,188.44)

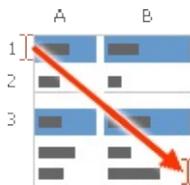
In the preceding example, you include the initial \$10,000 cost as one of the values, because the payment occurs at the end of the first period.

### Example 2

The example may be easier to understand if you copy it to a blank worksheet.



1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

**A**  
**Data**

**B**  
**Description**

8%	Annual discount rate. This might represent the rate of inflation or the interest rate of a competing investment.
<b>1</b> -40,000	Initial cost of investment
<b>2</b> 8,000	Return from first year
<b>3</b> 9,200	Return from second year
<b>4</b> 10,000	Return from third year
<b>5</b> 12,000	Return from fourth year
<b>6</b> 14,500	Return from fifth year
<b>7</b> <b>Formula</b>	<b>Description (Result)</b>
<b>8</b> =NPV(A2, A4:A8)+A3	Net present value of this investment (1,922.06)
=NPV(A2, A4:A8, -9000)+A3	Net present value of this investment, with a loss in the sixth year of 9000 (-3,749.47)

In the preceding example, you don't include the initial \$40,000 cost as one of the values, because the payment occurs at the beginning of the first period.

[Show All](#)

# ODDFPRICE

## [See Also](#)

Returns the price per \$100 face value of a security having an odd (short or long) first period.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**ODDFPRICE**(settlement,maturity,issue,first\_coupon,rate,yld,redemption,fr

**Important** Dates should be entered by using the DATE function, or as results of other formulas or functions. For example, use DATE(2008,5,23) for the 23rd day of May, 2008. Problems can occur if [dates are entered as text](#).

**Settlement** is the security's settlement date. The security settlement date is the date after the issue date when the security is traded to the buyer.

**Maturity** is the security's maturity date. The maturity date is the date when the security expires.

**Issue** is the security's issue date.

**First\_coupon** is the security's first coupon date.

Rate is the security's interest rate.

Yld is the security's annual yield.

Redemption is the security's redemption value per \$100 face value.

Frequency is the number of coupon payments per year. For annual payments, frequency = 1; for semiannual, frequency = 2; for quarterly, frequency = 4.

Basis is the type of day count basis to use.

<b>Basis</b>	<b>Day count basis</b>
0 or omitted	US (NASD) 30/360
1	Actual/actual
2	Actual/360
3	Actual/365
4	European 30/360

## **Remarks**

- Microsoft Excel stores dates as sequential serial numbers so they can be used in calculations. By default, January 1, 1900 is serial number 1, and January 1, 2008 is serial number 39448 because it is 39,448 days after January 1, 1900. Microsoft Excel for the Macintosh uses a [different date system as its default](#).
- The settlement date is the date a buyer purchases a coupon, such as a bond. The maturity date is the date when a coupon expires. For example, suppose a 30-year bond is issued on January 1, 2008, and is purchased by a buyer six months later. The issue date would be January 1, 2008, the settlement date would be July 1, 2008, and the maturity date would be January 1, 2038, which is 30 years after the January 1, 2008, issue date.
- Settlement, maturity, issue, first\_coupon, and basis are truncated to integers.
- If settlement, maturity, issue, or first\_coupon is not a valid date, ODDFPRICE returns the #VALUE! error value.
- If rate < 0 or if yld < 0, ODDFPRICE returns the #NUM! error value.
- If basis < 0 or if basis > 4, ODDFPRICE returns the #NUM! error value.
- The following date condition must be satisfied; otherwise, ODDFPRICE returns the #NUM! error value:

maturity > first\_coupon > settlement > issue

- ODDFPRICE is calculated as follows:

Odd short first coupon:

$$\begin{aligned}
 ODDFPRICE = & \left[ \frac{\text{redemption}}{\left(1 + \frac{\text{yld}}{\text{frequency}}\right)^{\left(N + \frac{ISC}{E}\right)}} \right] + \left[ \frac{100 \times \frac{\text{rate}}{\text{frequency}} \times \frac{DFC}{E}}{\left(1 + \frac{\text{yld}}{\text{frequency}}\right)^{\frac{ISC}{E}}} \right] \\
 & + \left[ \sum_{k=2}^N \frac{100 \times \frac{\text{rate}}{\text{frequency}}}{\left(1 + \frac{\text{yld}}{\text{frequency}}\right)^{\left(k + \frac{ISC}{E}\right)}} \right] \\
 & - \left[ 100 \times \frac{\text{rate}}{\text{frequency}} \times \frac{A}{E} \right]
 \end{aligned}$$

where:

A = number of days from the beginning of the coupon period to the settlement date (accrued days).

DSC = number of days from the settlement to the next coupon date.

DFC = number of days from the beginning of the odd first coupon to the first coupon date.

E = number of days in the coupon period.

N = number of coupons payable between the settlement date and the redemption date. (If this number contains a fraction, it is raised to the next whole number.)

Odd long first coupon:

$$\begin{aligned}
ODDFPRICE = & \left[ \frac{\text{redemption}}{\left(1 + \frac{\text{yld}}{\text{frequency}}\right)^{\left(M + N_3 + \frac{DSC}{E}\right)}} \right] \\
& + \left[ \frac{100 \times \frac{\text{rate}}{\text{frequency}} \times \left[ \sum_{i=1}^{NC} \frac{DC_i}{NL_i} \right]}{\left(1 + \frac{\text{yld}}{\text{frequency}}\right)^{\left(M_3 + \frac{DSC}{E}\right)}} \right] \\
& + \left[ \sum_{k=1}^N \frac{100 \times \frac{\text{rate}}{\text{frequency}}}{\left(1 + \frac{\text{yld}}{\text{frequency}}\right)^{\left(k \times M_3 + \frac{DSC}{E}\right)}} \right] \\
& - \left[ 100 \times \frac{\text{rate}}{\text{frequency}} \times \sum_{i=1}^{NC} \frac{A_i}{NL_i} \right]
\end{aligned}$$

where:

$A_i$  = number of days from the beginning of the  $i$ th, or last, quasi-coupon period within odd period.

$DC_i$  = number of days from dated date (or issue date) to first quasi-coupon ( $i = 1$ ) or number of days in quasi-coupon ( $i = 2, \dots, i = NC$ ).

$DSC$  = number of days from settlement to next coupon date.

$E$  = number of days in coupon period.

$N$  = number of coupons payable between the first real coupon date and redemption date. (If this number contains a fraction, it is raised to the next whole number.)

$NC$  = number of quasi-coupon periods that fit in odd period. (If this number contains a fraction, it is raised to the next whole number.)

$NL_i$  = normal length in days of the full  $i$ th, or last, quasi-coupon period within odd period.

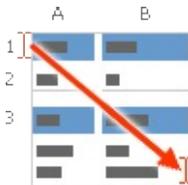
$Nq$  = number of whole quasi-coupon periods between settlement date and first coupon.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description (Result)</b>
	November 11, 2008	Settlement date
	March 1, 2021	Maturity date
	October 15, 2008	Issue date
<b>1</b>	March 1, 2009	First coupon date
<b>2</b>	7.85%	Percent coupon
<b>3</b>	6.25%	Percent yield
<b>4</b>	100	Redemptive value
<b>5</b>	2	Frequency is
<b>6</b>		semiannual (see above)

7 1

8

9

10

**Formula**

=ODDFPRICE(A2,A3,A4,A5,A6,A7,A8,A9,A10)

Actual/actual basis (see above)

**Description (Result)**

The price per \$100 face value of a security having an odd (short or long) first period, for the bond with the above terms (113.5977)

[Show All](#)

# ODDFYIELD

## [See Also](#)

Returns the yield of a security that has an odd (short or long) first period.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**ODDFYIELD(settlement,maturity,issue,first\_coupon,rate,pr,redemption,fre**

**Important** Dates should be entered by using the DATE function, or as results of other formulas or functions. For example, use DATE(2008,5,23) for the 23rd day of May, 2008. Problems can occur if [dates are entered as text](#).

**Settlement** is the security's settlement date. The security settlement date is the date after the issue date when the security is traded to the buyer.

**Maturity** is the security's maturity date. The maturity date is the date when the security expires.

**Issue** is the security's issue date.

**First\_coupon** is the security's first coupon date.

**Rate** is the security's interest rate.

Pr is the security's price.

Redemption is the security's redemption value per \$100 face value.

Frequency is the number of coupon payments per year. For annual payments, frequency = 1; for semiannual, frequency = 2; for quarterly, frequency = 4.

Basis is the type of day count basis to use.

<b>Basis</b>	<b>Day count basis</b>
0 or omitted	US (NASD) 30/360
1	Actual/actual
2	Actual/360
3	Actual/365
4	European 30/360

### Remarks

- Microsoft Excel stores dates as sequential serial numbers so they can be used in calculations. By default, January 1, 1900 is serial number 1, and January 1, 2008 is serial number 39448 because it is 39,448 days after January 1, 1900. Microsoft Excel for the Macintosh uses a [different date system as its default](#).
- The settlement date is the date a buyer purchases a coupon, such as a bond. The maturity date is the date when a coupon expires. For example, suppose a 30-year bond is issued on January 1, 2008, and is purchased by a buyer six months later. The issue date would be January 1, 2008, the settlement date would be July 1, 2008, and the maturity date would be January 1, 2038, which is 30 years after the January 1, 2008, issue date.
- Settlement, maturity, issue, first\_coupon, and basis are truncated to integers.
- If settlement, maturity, issue, or first\_coupon is not a valid date, ODDFYIELD returns the #VALUE! error value.
- If rate < 0 or if pr ≤ 0, ODDFYIELD returns the #NUM! error value.
- If basis < 0 or if basis > 4, ODDFYIELD returns the #NUM! error value.
- The following date condition must be satisfied; otherwise, ODDFYIELD returns the #NUM! error value:

$$\text{maturity} > \text{first\_coupon} > \text{settlement} > \text{issue}$$

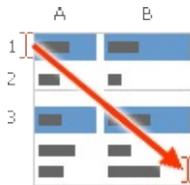
- Excel uses an iterative technique to calculate ODDFYIELD. This function uses the Newton method based on the formula used for the function ODDFPRICE. The yield is changed through 100 iterations until the estimated price with the given yield is close to the price. See ODDFPRICE for the formula that ODDFYIELD uses.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	B
	Data	Description (Result)
	November 11, 2008	Settlement date
	March 1, 2021	Maturity date
	October 15, 2008	Issue date
1	March 1, 2009	First coupon date
2	5.75%	Percent coupon
3	84.50	Price
4	100	Redemptive value

5 2  
6  
7 0  
8  
9  
10

**Formula**

=ODDFYIELD(A2,A3,A4,A5,A6,A7,A8,A9,A10)

Frequency is  
semiannual (see above)  
30/360 basis (see  
above)

**Description (Result)**

The yield of a security  
that has an odd (short or  
long) first period, for  
the bond with the terms  
above (0.077245542 or  
7.72%)

**Note** To view the number as a percentage, select the cell and click **Cells** on the **Format** menu. Click the **Number** tab, and then click **Percentage** in the **Category** box.

[Show All](#)

# ODDLPRICE

## [See Also](#)

Returns the price per \$100 face value of a security having an odd (short or long) last coupon period.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.



1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**ODDLPRICE**(settlement,maturity,last\_interest,rate,yld,redemption,frequen

**Important** Dates should be entered by using the DATE function, or as results of other formulas or functions. For example, use DATE(2008,5,23) for the 23rd day of May, 2008. Problems can occur if [dates are entered as text](#).

**Settlement** is the security's settlement date. The security settlement date is the date after the issue date when the security is traded to the buyer.

**Maturity** is the security's maturity date. The maturity date is the date when the security expires.

**Last\_interest** is the security's last coupon date.

**Rate** is the security's interest rate.

Yld is the security's annual yield.

Redemption is the security's redemption value per \$100 face value.

Frequency is the number of coupon payments per year. For annual payments, frequency = 1; for semiannual, frequency = 2; for quarterly, frequency = 4.

Basis is the type of day count basis to use.

<b>Basis</b>	<b>Day count basis</b>
0 or omitted	US (NASD) 30/360
1	Actual/actual
2	Actual/360
3	Actual/365
4	European 30/360

### Remarks

- Microsoft Excel stores dates as sequential serial numbers so they can be used in calculations. By default, January 1, 1900 is serial number 1, and January 1, 2008 is serial number 39448 because it is 39,448 days after January 1, 1900. Microsoft Excel for the Macintosh uses a [different date system as its default](#).
- The settlement date is the date a buyer purchases a coupon, such as a bond. The maturity date is the date when a coupon expires. For example, suppose a 30-year bond is issued on January 1, 2008, and is purchased by a buyer six months later. The issue date would be January 1, 2008, the settlement date would be July 1, 2008, and the maturity date would be January 1, 2038, which is 30 years after the January 1, 2008, issue date.
- Settlement, maturity, last\_interest, and basis are truncated to integers.
- If settlement, maturity, or last\_interest is not a valid date, ODDLPRICE returns the #VALUE! error value.
- If rate < 0 or if yld < 0, ODDLPRICE returns the #NUM! error value.
- If basis < 0 or if basis > 4, ODDLPRICE returns the #NUM! error value.
- The following date condition must be satisfied; otherwise, ODDLPRICE returns the #NUM! error value:

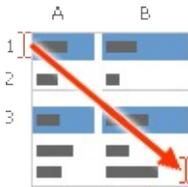
maturity > settlement > last\_interest

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description (Result)</b>
	February 7, 2008	Settlement date
	June 15, 2008	Maturity date
<b>1</b>	October 15, 2007	Last interest date
<b>2</b>	3.75%	Percent coupon
<b>3</b>	4.05%	Percent yield
<b>4</b>	\$100	Redemptive value
<b>5</b>	2	Frequency is semiannual (see above)
<b>6</b>	0	30/360 basis (see above)
<b>7</b>		
<b>8</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>9</b>		The price per \$100 of a security having an odd (short

=ODDLPRICE(A2,A3,A4,A5,A6,A7,A8,A9) or long) last coupon period,  
for a bond with the above  
terms (99.87829)

[Show All](#)

# ODDLYIELD

## [See Also](#)

Returns the yield of a security that has an odd (short or long) last period.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**ODDLYIELD(settlement,maturity,last\_interest,rate,pr,redemption,freque**

**Important** Dates should be entered by using the DATE function, or as results of other formulas or functions. For example, use DATE(2008,5,23) for the 23rd day of May, 2008. Problems can occur if [dates are entered as text](#).

**Settlement** is the security's settlement date. The security settlement date is the date after the issue date when the security is traded to the buyer.

**Maturity** is the security's maturity date. The maturity date is the date when the security expires.

**Last\_interest** is the security's last coupon date.

**Rate** is the security's interest rate.

**Pr** is the security's price.

Redemption is the security's redemption value per \$100 face value.

Frequency is the number of coupon payments per year. For annual payments, frequency = 1; for semiannual, frequency = 2; for quarterly, frequency = 4.

Basis is the type of day count basis to use.

<b>Basis</b>	<b>Day count basis</b>
0 or omitted	US (NASD) 30/360
1	Actual/actual
2	Actual/360
3	Actual/365
4	European 30/360

### Remarks

- Microsoft Excel stores dates as sequential serial numbers so they can be used in calculations. By default, January 1, 1900 is serial number 1, and January 1, 2008 is serial number 39448 because it is 39,448 days after January 1, 1900. Microsoft Excel for the Macintosh uses a [different date system as its default](#).
- The settlement date is the date a buyer purchases a coupon, such as a bond. The maturity date is the date when a coupon expires. For example, suppose a 30-year bond is issued on January 1, 2008, and is purchased by a buyer six months later. The issue date would be January 1, 2008, the settlement date would be July 1, 2008, and the maturity date would be January 1, 2038, which is 30 years after the January 1, 2008, issue date.
- Settlement, maturity, last\_interest, and basis are truncated to integers.
- If settlement, maturity, or last\_interest is not a valid date, ODDLYIELD returns the #VALUE! error value.
- If rate < 0 or if pr ≤ 0, ODDLYIELD returns the #NUM! error value.
- If basis < 0 or if basis > 4, ODDLYIELD returns the #NUM! error value.
- The following date condition must be satisfied; otherwise, ODDLYIELD returns the #NUM! error value:

maturity > settlement > last\_interest

- ODDLYIELD is calculated as follows:

$$\text{ODDLYIELD} = \frac{\left( \text{redemption} + \left( \sum_{j=1}^{NC} \frac{DC_j}{NL_j} \right) \times \frac{100 \times \text{rate}}{\text{frequency}} \right) - \left( \text{par} + \left( \sum_{j=1}^{NC} \frac{A_j}{NL_j} \right) \times \frac{100 \times \text{rate}}{\text{frequency}} \right)}{\text{par} + \left( \sum_{j=1}^{NC} \frac{A_j}{NL_j} \right) \times \frac{100 \times \text{rate}}{\text{frequency}}}$$

$$\times \frac{\text{frequency}}{\left( \sum_{j=1}^{NC} \frac{DSC_j}{NL_j} \right)}$$

where:

$A_i$  = number of accrued days for the  $i$ th, or last, quasi-coupon period within odd period counting forward from last interest date before redemption.

$DC_i$  = number of days counted in the  $i$ th, or last, quasi-coupon period as delimited by the length of the actual coupon period.

$NC$  = number of quasi-coupon periods that fit in odd period; if this number contains a fraction it will be raised to the next whole number.

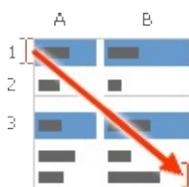
$NL_i$  = normal length in days of the  $i$ th, or last, quasi-coupon period within odd coupon period.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
	April 20, 2008	Settlement date
	June 15, 2008	Maturity date
<b>1</b>	December 24, 2007	Last interest date
<b>2</b>	3.75%	Percent coupon
<b>3</b>	\$99.875	Price
<b>4</b>	\$100	Redemption value
<b>5</b>		Frequency is semiannual (see above)
<b>6</b>	2	
<b>7</b>	0	30/360 basis (see above)
<b>8</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>9</b>	=ODDLYIELD(A2,A3,A4,A5,A6,A7,A8,A9)	The yield of a security that has an odd (short or long) last period, for the bond with the terms above (0.045192)

[Show All](#)

# PMT

## [See Also](#)

Calculates the payment for a loan based on constant payments and a constant interest rate.

## Syntax

**PMT(rate,nper,pv,fv,type)**

For a more complete description of the arguments in PMT, see the PV function.

Rate is the interest rate for the loan.

Nper is the total number of payments for the loan.

Pv is the present value, or the total amount that a series of future payments is worth now; also known as the principal.

Fv is the future value, or a cash balance you want to attain after the last payment is made. If fv is omitted, it is assumed to be 0 (zero), that is, the future value of a loan is 0.

Type is the number 0 (zero) or 1 and indicates when payments are due.

<b>Set type equal to</b>	<b>If payments are due</b>
--------------------------	----------------------------

0 or omitted	At the end of the period
--------------	--------------------------

1	At the beginning of the period
---	--------------------------------

## Remarks

- The payment returned by PMT includes principal and interest but no taxes, reserve payments, or fees sometimes associated with loans.
- Make sure that you are consistent about the units you use for specifying rate and nper. If you make monthly payments on a four-year loan at an annual interest rate of 12 percent, use 12%/12 for rate and 4\*12 for nper. If you

make annual payments on the same loan, use 12 percent for rate and 4 for nper.

 **Tip**

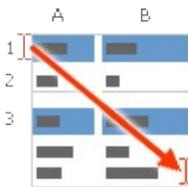
To find the total amount paid over the duration of the loan, multiply the returned PMT value by nper.

**Example 1**

The example may be easier to understand if you copy it to a blank worksheet.

 **How?**

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
	8%	Annual interest rate
<b>1</b>	10	Number of months of payments
<b>2</b>	10000	Amount of loan
<b>3</b>	<b>Formula</b>	<b>Description (Result)</b>
	=PMT(A2/12,	

4 A3, A4) Monthly payment for a loan with the above terms (-1,037.03)

=PMT(A2/12, Monthly payment for a loan with the above terms, except  
A3, A4, 0, 1) payments are due at the beginning of the period (-1,030.16)

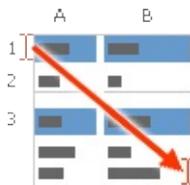
## Example 2

You can use PMT to determine payments to annuities other than loans.

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

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4. In the worksheet, select cell A1, and press CTRL+V.
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	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
<b>1</b>	6%	Annual interest rate
<b>2</b>	18	Years you plan on saving
<b>3</b>	50,000	Amount you want to have save in 18 years
<b>4</b>	<b>Formula</b>	<b>Description (Result)</b>
	=PMT(A2/12, A3*12, 0, A4)	Amount to save each month to have 50,000 at the end of 18 years (-129.08)

**Note** The interest rate is divided by 12 to get a monthly rate. The number of years the money is paid out is multiplied by 12 to get the number of payments.

[Show All](#)

# PPMT

## [See Also](#)

Returns the payment on the principal for a given period for an investment based on periodic, constant payments and a constant interest rate.

## Syntax

**PPMT(rate,per,nper,pv,fv,type)**

For a more complete description of the arguments in PPMT, see PV.

**Rate** is the interest rate per period.

**Per** specifies the period and must be in the range 1 to nper.

**Nper** is the total number of payment periods in an annuity.

**Pv** is the present value—the total amount that a series of future payments is worth now.

**Fv** is the future value, or a cash balance you want to attain after the last payment is made. If fv is omitted, it is assumed to be 0 (zero), that is, the future value of a loan is 0.

**Type** is the number 0 or 1 and indicates when payments are due.

**Set type equal to**      **If payments are due**

0 or omitted      At the end of the period

1 At the beginning of the period

## Remark

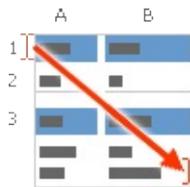
Make sure that you are consistent about the units you use for specifying rate and nper. If you make monthly payments on a four-year loan at 12 percent annual interest, use 12%/12 for rate and 4\*12 for nper. If you make annual payments on the same loan, use 12% for rate and 4 for nper.

## Example 1

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

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4. In the worksheet, select cell A1, and press CTRL+V.
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	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description (Result)</b>
1	10%	Annual interest rate
2	2	Number of years in the loan
3	2000	Amount of loan
	<b>Formula</b>	<b>Description (Result)</b>
4	=PPMT(A2/12, 1, A3*12,	Payment on principle for the first month of loan

A4)

(-75.62)

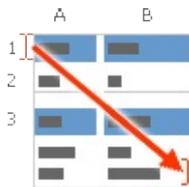
**Note** The interest rate is divided by 12 to get a monthly rate. The number of years the money is paid out is multiplied by 12 to get the number of payments.

## Example 2

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



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	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description (Result)</b>
<b>1</b>	8%	Annual interest rate
<b>2</b>	10	Number of years in the loan
<b>3</b>	200,000	Amount of loan
<b>4</b>	<b>Formula</b>	<b>Description (Result)</b>
	=PPMT(A2, A3, 10, A4)	Principal payment for the last year of the loan with the above terms (-27,598.05)

[Show All](#)

# PRICE

## [See Also](#)

Returns the price per \$100 face value of a security that pays periodic interest.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**PRICE**(**settlement,maturity,rate,yld,redemption,frequency,basis**)

**Important** Dates should be entered by using the DATE function, or as results of other formulas or functions. For example, use DATE(2008,5,23) for the 23rd day of May, 2008. Problems can occur if [dates are entered as text](#).

**Settlement** is the security's settlement date. The security settlement date is the date after the issue date when the security is traded to the buyer.

**Maturity** is the security's maturity date. The maturity date is the date when the security expires.

**Rate** is the security's annual coupon rate.

**Yld** is the security's annual yield.

**Redemption** is the security's redemption value per \$100 face value.

Frequency is the number of coupon payments per year. For annual payments, frequency = 1; for semiannual, frequency = 2; for quarterly, frequency = 4.

Basis is the type of day count basis to use.

<b>Basis</b>	<b>Day count basis</b>
0 or omitted	US (NASD) 30/360
1	Actual/actual
2	Actual/360
3	Actual/365
4	European 30/360

### **Remarks**

- Microsoft Excel stores dates as sequential serial numbers so they can be used in calculations. By default, January 1, 1900 is serial number 1, and January 1, 2008 is serial number 39448 because it is 39,448 days after January 1, 1900. Microsoft Excel for the Macintosh uses a [different date system as its default](#).
- The settlement date is the date a buyer purchases a coupon, such as a bond. The maturity date is the date when a coupon expires. For example, suppose a 30-year bond is issued on January 1, 2008, and is purchased by a buyer six months later. The issue date would be January 1, 2008, the settlement date would be July 1, 2008, and the maturity date would be January 1, 2038, which is 30 years after the January 1, 2008, issue date.
- Settlement, maturity, frequency, and basis are truncated to integers.
- If settlement or maturity is not a valid date, PRICE returns the #VALUE! error value.
- If  $yld < 0$  or if  $rate < 0$ , PRICE returns the #NUM! error value.
- If  $redemption \leq 0$ , PRICE returns the #NUM! error value.
- If frequency is any number other than 1, 2, or 4, PRICE returns the #NUM! error value.
- If  $basis < 0$  or if  $basis > 4$ , PRICE returns the #NUM! error value.
- If  $settlement \geq maturity$ , PRICE returns the #NUM! error value.
- PRICE is calculated as follows:

$$PRICE = \left[ \frac{redemption}{\left(1 + \frac{yld}{frequency}\right)^{\left(N-1 + \frac{DSC}{E}\right)}} \right] + \left[ \sum_{k=1}^N \frac{100 \times \frac{rate}{frequency}}{\left(1 + \frac{yld}{frequency}\right)^{\left(k-1 + \frac{DSC}{E}\right)}} \right] - \left( 100 \times \frac{rate}{frequency} \times \frac{A}{E} \right)$$

where:

DSC = number of days from settlement to next coupon date.

E = number of days in coupon period in which the settlement date falls.

N = number of coupons payable between settlement date and redemption date.

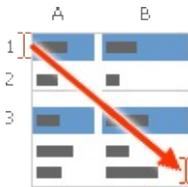
A = number of days from beginning of coupon period to settlement date.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to

**Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
<b>1</b>	February 15, 2008	Settlement date
<b>2</b>	November 15, 2017	Maturity date
<b>3</b>	5.75%	Percent semiannual coupon
<b>4</b>	6.50%	Percent yield
<b>5</b>	\$100	Redemption value
<b>6</b>	2	Frequency is semiannual (see above)
<b>7</b>	0	30/360 basis (see above)
<b>8</b>	<b>Formula</b>	<b>Description (Result)</b>
	=PRICE(A2,A3,A4,A5,A6,A7,A8)	The bond price, for the bond with the terms above (94.63436)

[Show All](#)

# PRICEDISC

## [See Also](#)

Returns the price per \$100 face value of a discounted security.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**PRICEDISC**(settlement,maturity,discount,redemption,basis)

**Important** Dates should be entered by using the DATE function, or as results of other formulas or functions. For example, use DATE(2008,5,23) for the 23rd day of May, 2008. Problems can occur if [dates are entered as text](#).

**Settlement** is the security's settlement date. The security settlement date is the date after the issue date when the security is traded to the buyer.

**Maturity** is the security's maturity date. The maturity date is the date when the security expires.

**Discount** is the security's discount rate.

**Redemption** is the security's redemption value per \$100 face value.

**Basis** is the type of day count basis to use.

<b>Basis</b>	<b>Day count basis</b>
0 or omitted	US (NASD) 30/360
1	Actual/actual
2	Actual/360
3	Actual/365
4	European 30/360

## Remarks

- Microsoft Excel stores dates as sequential serial numbers so they can be used in calculations. By default, January 1, 1900 is serial number 1, and January 1, 2008 is serial number 39448 because it is 39,448 days after January 1, 1900. Microsoft Excel for the Macintosh uses a [different date system as its default](#).
- The settlement date is the date a buyer purchases a coupon, such as a bond. The maturity date is the date when a coupon expires. For example, suppose a 30-year bond is issued on January 1, 2008, and is purchased by a buyer six months later. The issue date would be January 1, 2008, the settlement date would be July 1, 2008, and the maturity date would be January 1, 2038, which is 30 years after the January 1, 2008, issue date.
- Settlement, maturity, and basis are truncated to integers.
- If settlement or maturity is not a valid date, PRICEDISC returns the #VALUE! error value.
- If discount  $\leq 0$  or if redemption  $\leq 0$ , PRICEDISC returns the #NUM! error value.
- If basis  $< 0$  or if basis  $> 4$ , PRICEDISC returns the #NUM! error value.
- If settlement  $\geq$  maturity, PRICEDISC returns the #NUM! error value.
- PRICEDISC is calculated as follows:

$$PRICEDISC = redemption - discount \times redemption \times \frac{DSM}{B}$$

where:

B = number of days in year, depending on year basis.

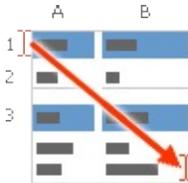
DSM = number of days from settlement to maturity.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

**How?**

1. Create a blank workbook or worksheet.
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Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
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	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
<b>1</b>	February 16, 2008	Settlement date
<b>2</b>	March 1, 2008	Maturity date
<b>3</b>	5.25%	Percent discount rate
<b>4</b>	\$100	Redemption value
<b>5</b>	2	Actual/360 basis (see above)
<b>6</b>	<b>Formula</b>	<b>Description (Result)</b>
	=PRICEDISC(A2,A3,A4,A5,A6)	The bond price, for the bond with the terms above (99.79583)

[Show All](#)

# PRICEMAT

## [See Also](#)

Returns the price per \$100 face value of a security that pays interest at maturity.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**PRICEMAT(settlement,maturity,issue,rate,yld,basis)**

**Important** Dates should be entered by using the DATE function, or as results of other formulas or functions. For example, use DATE(2008,5,23) for the 23rd day of May, 2008. Problems can occur if [dates are entered as text](#).

**Settlement** is the security's settlement date. The security settlement date is the date after the issue date when the security is traded to the buyer.

**Maturity** is the security's maturity date. The maturity date is the date when the security expires.

**Issue** is the security's issue date, expressed as a serial date number.

**Rate** is the security's interest rate at date of issue.

**Yld** is the security's annual yield.

Basis is the type of day count basis to use.

Basis	Day count basis
0 (zero) or omitted	US (NASD) 30/360
1	Actual/actual
2	Actual/360
3	Actual/365
4	European 30/360

### Remarks

- Microsoft Excel stores dates as sequential serial numbers so they can be used in calculations. By default, January 1, 1900 is serial number 1, and January 1, 2008 is serial number 39448 because it is 39,448 days after January 1, 1900. Microsoft Excel for the Macintosh uses a [different date system as its default](#).
- The settlement date is the date a buyer purchases a coupon, such as a bond. The maturity date is the date when a coupon expires. For example, suppose a 30-year bond is issued on January 1, 2008, and is purchased by a buyer six months later. The issue date would be January 1, 2008, the settlement date would be July 1, 2008, and the maturity date would be January 1, 2038, which is 30 years after the January 1, 2008, issue date.
- Settlement, maturity, issue, and basis are truncated to integers.
- If settlement, maturity, or issue is not a valid date, PRICEMAT returns the #VALUE! error value.
- If rate < 0 or if yld < 0, PRICEMAT returns the #NUM! error value.
- If basis < 0 or if basis > 4, PRICEMAT returns the #NUM! error value.
- If settlement ≥ maturity, PRICEMAT returns the #NUM! error value.
- PRICEMAT is calculated as follows:

$$PRICEMAT = \frac{100 + \left(\frac{DIM}{B} \times rate \times 100\right)}{1 + \left(\frac{DSM}{B} \times yld\right)} - \left(\frac{A}{B} \times rate \times 100\right)$$

where:

B = number of days in year, depending on year basis.

DSM = number of days from settlement to maturity.

DIM = number of days from issue to maturity.

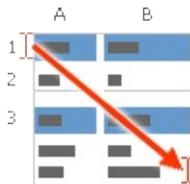
A = number of days from issue to settlement.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

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Selecting an example from Help

3. Press CTRL+C.
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	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
<b>1</b>	February 15, 2008	Settlement date
<b>2</b>	April 13, 2008	Maturity date
<b>3</b>	November 11, 2007	Issue date
<b>4</b>	6.1%	Percent semiannual coupon
<b>5</b>	6.1%	Percent yield
<b>6</b>	0	30/360 basis (see above)
<b>7</b>	<b>Formula</b>	<b>Description (Result)</b>
	=PRICEMAT(A2,A3,A4,A5,A6,A7)	The price, for the bond with the terms above (99.98449888)

[Show All](#)

# PV

## [See Also](#)

Returns the present value of an investment. The present value is the total amount that a series of future payments is worth now. For example, when you borrow money, the loan amount is the present value to the lender.

## Syntax

**PV(rate,nper,pmt,fv,type)**

**Rate** is the interest rate per period. For example, if you obtain an automobile loan at a 10 percent annual interest rate and make monthly payments, your interest rate per month is 10%/12, or 0.83%. You would enter 10%/12, or 0.83%, or 0.0083, into the formula as the rate.

**Nper** is the total number of payment periods in an annuity. For example, if you get a four-year car loan and make monthly payments, your loan has 4\*12 (or 48) periods. You would enter 48 into the formula for nper.

**Pmt** is the payment made each period and cannot change over the life of the annuity. Typically, pmt includes principal and interest but no other fees or taxes. For example, the monthly payments on a \$10,000, four-year car loan at 12 percent are \$263.33. You would enter -263.33 into the formula as the pmt. If pmt is omitted, you must include the fv argument.

**Fv** is the future value, or a cash balance you want to attain after the last payment is made. If fv is omitted, it is assumed to be 0 (the future value of a loan, for example, is 0). For example, if you want to save \$50,000 to pay for a special project in 18 years, then \$50,000 is the future value. You could then make a conservative guess at an interest rate and determine how much you must save each month. If fv is omitted, you must include the pmt argument.

Type is the number 0 or 1 and indicates when payments are due.

**Set type equal to      If payments are due**

0 or omitted      At the end of the period

1      At the beginning of the period

**Remarks**

- Make sure that you are consistent about the units you use for specifying rate and nper. If you make monthly payments on a four-year loan at 12 percent annual interest, use 12%/12 for rate and 4\*12 for nper. If you make annual payments on the same loan, use 12% for rate and 4 for nper.

- The following functions apply to annuities:

CUMIPMT      PPMT

CUMPRINC      PV

FV      RATE

FVSCCHEDULE XIRR

IPMT      XNPV

PMT

An annuity is a series of constant cash payments made over a continuous period. For example, a car loan or a mortgage is an annuity. For more information, see the description for each annuity function.

- In annuity functions, cash you pay out, such as a deposit to savings, is represented by a negative number; cash you receive, such as a dividend check, is represented by a positive number. For example, a \$1,000 deposit to the bank would be represented by the argument -1000 if you are the depositor and by the argument 1000 if you are the bank.
- Microsoft Excel solves for one financial argument in terms of the others. If rate is not 0, then:

$$pv * (1 + rate)^{nper} + pmt(1 + rate * type)^* \left( \frac{(1 + rate)^{nper} - 1}{rate} \right) + fv = 0$$

If rate is 0, then:

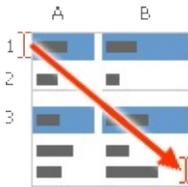
$$(pmt * nper) + pv + fv = 0$$

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

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	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
<b>1</b>	500	Money paid out of an insurance annuity at the end of every month
<b>2</b>	8%	Interest rate earned on the money paid out
<b>3</b>	20	Years the money will be paid out
<b>4</b>	<b>Formula</b>	<b>Description (Result)</b>
	=PV(A3/12, 12*A4, A2, , 0)	Present value of an annuity with the terms above (-59,777.15).

The result is negative because it represents money that you would pay, an outgoing cash flow. If you are asked to pay (60,000) for the annuity, you would determine this would not be a good investment because the present value of the annuity (59,777.15) is less than what you are asked to pay.

**Note** The interest rate is divided by 12 to get a monthly rate. The years the money is paid out is multiplied by 12 to get the number of payments.

[Show All](#)

# RATE

## [See Also](#)

Returns the interest rate per period of an annuity. RATE is calculated by iteration and can have zero or more solutions. If the successive results of RATE do not converge to within 0.0000001 after 20 iterations, RATE returns the #NUM! error value.

## Syntax

**RATE(nper,pmt,pv,fv,type,guess)**

For a complete description of the arguments nper, pmt, pv, fv, and type, see PV.

Nper is the total number of payment periods in an annuity.

Pmt is the payment made each period and cannot change over the life of the annuity. Typically, pmt includes principal and interest but no other fees or taxes. If pmt is omitted, you must include the fv argument.

Pv is the present value—the total amount that a series of future payments is worth now.

Fv is the future value, or a cash balance you want to attain after the last payment is made. If fv is omitted, it is assumed to be 0 (the future value of a loan, for example, is 0).

Type is the number 0 or 1 and indicates when payments are due.

<b>Set type equal to</b>	<b>If payments are due</b>
--------------------------	----------------------------

0 or omitted	At the end of the period
--------------	--------------------------

1	At the beginning of the period
---	--------------------------------

Guess is your guess for what the rate will be.

- If you omit guess, it is assumed to be 10 percent.
- If RATE does not converge, try different values for guess. RATE usually converges if guess is between 0 and 1.

## Remark

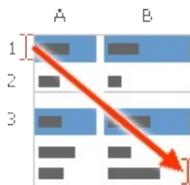
Make sure that you are consistent about the units you use for specifying guess and nper. If you make monthly payments on a four-year loan at 12 percent annual interest, use 12%/12 for guess and 4\*12 for nper. If you make annual payments on the same loan, use 12% for guess and 4 for nper.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
4		Years of the loan
1	-200	Monthly payment
	8000	Amount of the loan

2	Formula	Description (Result)
3	=RATE(A2*12, A3,	Monthly rate of the loan with the above terms (1%)
4	A4)	
	=RATE(A2*12, A3,	Annual rate of the loan with the above terms
	A4)*12	

**Note** The number of years of the loan is multiplied by 12 to get the number of months.

[Show All](#)

# RECEIVED

## [See Also](#)

Returns the amount received at maturity for a fully invested security.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**RECEIVED**(settlement,maturity,investment,discount,basis)

**Important** Dates should be entered by using the DATE function, or as results of other formulas or functions. For example, use DATE(2008,5,23) for the 23rd day of May, 2008. Problems can occur if [dates are entered as text](#).

**Settlement** is the security's settlement date. The security settlement date is the date after the issue date when the security is traded to the buyer.

**Maturity** is the security's maturity date. The maturity date is the date when the security expires.

**Investment** is the amount invested in the security.

**Discount** is the security's discount rate.

**Basis** is the type of day count basis to use.

<b>Basis</b>	<b>Day count basis</b>
0 or omitted	US (NASD) 30/360
1	Actual/actual
2	Actual/360
3	Actual/365
4	European 30/360

## Remarks

- Microsoft Excel stores dates as sequential serial numbers so they can be used in calculations. By default, January 1, 1900 is serial number 1, and January 1, 2008 is serial number 39448 because it is 39,448 days after January 1, 1900. Microsoft Excel for the Macintosh uses a [different date system as its default](#).
- The settlement date is the date a buyer purchases a coupon, such as a bond. The maturity date is the date when a coupon expires. For example, suppose a 30-year bond is issued on January 1, 2008, and is purchased by a buyer six months later. The issue date would be January 1, 2008, the settlement date would be July 1, 2008, and the maturity date would be January 1, 2038, which is 30 years after the January 1, 2008, issue date.
- Settlement, maturity, and basis are truncated to integers.
- If settlement or maturity is not a valid date, RECEIVED returns the #VALUE! error value.
- If investment  $\leq 0$  or if discount  $\leq 0$ , RECEIVED returns the #NUM! error value.
- If basis  $< 0$  or if basis  $> 4$ , RECEIVED returns the #NUM! error value.
- If settlement  $\geq$  maturity, RECEIVED returns the #NUM! error value.
- RECEIVED is calculated as follows:

$$RECEIVED = \frac{\textit{investment}}{1 - (\textit{discount} \times \frac{DIM}{B})}$$

where:

B = number of days in a year, depending on the year basis.

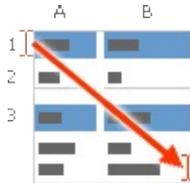
DIM = number of days from issue to maturity.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

**How?**

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
	February 15, 2008	Settlement (issue) date
<b>1</b>	May 15, 2008	Maturity date
<b>2</b>	1,000,000	Investment
<b>3</b>	5.75%	Percent discount rate
<b>4</b>	2	Actual/360 basis (see above)
<b>5</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>6</b>	=RECEIVED(A2,A3,A4,A5,A6)	The total amount to be received at maturity, for the bond with the terms above (1014584.654)

[Show All](#)

# SLN

## [See Also](#)

Returns the straight-line depreciation of an asset for one period.

## Syntax

**SLN(cost,salvage,life)**

Cost is the initial cost of the asset.

Salvage is the value at the end of the depreciation (sometimes called the salvage value of the asset).

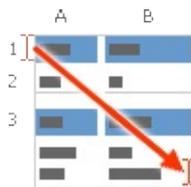
Life is the number of periods over which the asset is depreciated (sometimes called the useful life of the asset).

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.

4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>		<b>B</b>
	<b>Data</b>		<b>Description</b>
<b>1</b>	30,000		Cost
<b>2</b>	7,500		Salvage value
<b>3</b>	10		Years of useful life
<b>4</b>	<b>Formula</b>		<b>Description (Result)</b>
	=SLN(A2, A3, A4)		The depreciation allowance for each year (2,250)

[Show All](#)

# SYD

## [See Also](#)

Returns the sum-of-years' digits depreciation of an asset for a specified period.

## Syntax

**SYD(cost,salvage,life,per)**

Cost is the initial cost of the asset.

Salvage is the value at the end of the depreciation (sometimes called the salvage value of the asset).

Life is the number of periods over which the asset is depreciated (sometimes called the useful life of the asset).

Per is the period and must use the same units as life.

## Remark

- SYD is calculated as follows:

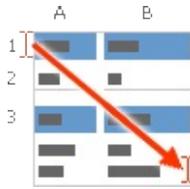
$$SYD = \frac{(cost - salvage) * (life - per + 1) * 2}{(life)(life + 1)}$$

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
	30,000	Initial cost
<b>1</b>	7,500	Salvage value
<b>2</b>	10	Lifespan in years
<b>3</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>4</b>	=SYD(A2,A3,A4,1)	Yearly depreciation allowance for the first year (4,090.91)
	=SYD(A2,A3,A4,10)	Yearly depreciation allowance for the tenth year (409.09)

[Show All](#)

# TBILLEQ

## [See Also](#)

Returns the bond-equivalent yield for a Treasury bill.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**TBILLEQ(settlement,maturity,discount)**

**Important** Dates should be entered by using the DATE function, or as results of other formulas or functions. For example, use DATE(2008,5,23) for the 23rd day of May, 2008. Problems can occur if [dates are entered as text](#).

**Settlement** is the Treasury bill's settlement date. The security settlement date is the date after the issue date when the Treasury bill is traded to the buyer.

**Maturity** is the Treasury bill's maturity date. The maturity date is the date when the Treasury bill expires.

**Discount** is the Treasury bill's discount rate.

## Remarks

- Microsoft Excel stores dates as sequential serial numbers so they can be

used in calculations. By default, January 1, 1900 is serial number 1, and January 1, 2008 is serial number 39448 because it is 39,448 days after January 1, 1900. Microsoft Excel for the Macintosh uses a [different date system as its default](#).

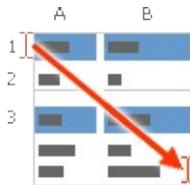
- Settlement and maturity are truncated to integers.
- If settlement or maturity is not a valid date, TBILLEQ returns the #VALUE! error value.
- If discount  $\leq 0$ , TBILLEQ returns the #NUM! error value.
- If settlement > maturity, or if maturity is more than one year after settlement, TBILLEQ returns the #NUM! error value.
- TBILLEQ is calculated as  $TBILLEQ = (365 \times \text{rate}) / (360 - (\text{rate} \times \text{DSM}))$ , where DSM is the number of days between settlement and maturity computed according to the 360 days per year basis.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

**A**  
**Data**

**B**  
**Description**

	March 31, 2008	Settlement date
1	June 1, 2008	Maturity date
2	9.14%	Percent discount rate
3	<b>Formula</b>	<b>Description (Result)</b>
4	=TBILLEQ(A2,A3,A4)	The bond equivalent yield, for the Treasury bill with the terms above (0.094151 or 9.42%)

**Note** To view the number as a percent, select the cell and click **Cells** on the **Format** menu. Click the **Number** tab, and then click **Percentage** in the **Category** box.

[Show All](#)

# TBILLPRICE

## [See Also](#)

Returns the price per \$100 face value for a Treasury bill.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**TBILLPRICE**(settlement,maturity,discount)

**Important** Dates should be entered by using the DATE function, or as results of other formulas or functions. For example, use DATE(2008,5,23) for the 23rd day of May, 2008. Problems can occur if [dates are entered as text](#).

**Settlement** is the Treasury bill's settlement date. The security settlement date is the date after the issue date when the Treasury bill is traded to the buyer.

**Maturity** is the Treasury bill's maturity date. The maturity date is the date when the Treasury bill expires.

**Discount** is the Treasury bill's discount rate.

## Remarks

- Microsoft Excel stores dates as sequential serial numbers so they can be

used in calculations. By default, January 1, 1900 is serial number 1, and January 1, 2008 is serial number 39448 because it is 39,448 days after January 1, 1900. Microsoft Excel for the Macintosh uses a [different date system as its default](#).

- Settlement and maturity are truncated to integers.
- If settlement or maturity is not a valid date, TBILLPRICE returns the #VALUE! error value.
- If discount  $\leq 0$ , TBILLPRICE returns the #NUM! error value.
- If settlement  $>$  maturity, or if maturity is more than one year after settlement, TBILLPRICE returns the #NUM! error value.
- TBILLPRICE is calculated as follows:

$$TBILLPRICE = 100 \times \left(1 - \frac{\text{discount} \times DSM}{360}\right)$$

where:

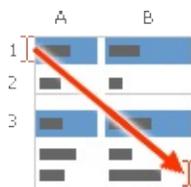
DSM = number of days from settlement to maturity, excluding any maturity date that is more than one calendar year after the settlement date.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return

the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
<b>1</b>	March 31, 2008	Settlement date
<b>2</b>	June 1, 2008	Maturity date
<b>3</b>	9%	Percent discount rate
<b>4</b>	<b>Formula</b>	<b>Description (Result)</b>
	=TBILLPRICE(A2,A3,A4)	The price, for the Treasury bill with the terms above (98.45)

[Show All](#)

# TBILLYIELD

## [See Also](#)

Returns the yield for a Treasury bill.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**TBILLYIELD(settlement,maturity,pr)**

**Important** Dates should be entered by using the DATE function, or as results of other formulas or functions. For example, use DATE(2008,5,23) for the 23rd day of May, 2008. Problems can occur if [dates are entered as text](#).

**Settlement** is the Treasury bill's settlement date. The security settlement date is the date after the issue date when the Treasury bill is traded to the buyer.

**Maturity** is the Treasury bill's maturity date. The maturity date is the date when the Treasury bill expires.

**Pr** is the Treasury bill's price per \$100 face value.

## Remarks

- Microsoft Excel stores dates as sequential serial numbers so they can be used in calculations. By default, January 1, 1900 is serial number 1, and

January 1, 2008 is serial number 39448 because it is 39,448 days after January 1, 1900. Microsoft Excel for the Macintosh uses a [different date system as its default](#).

- Settlement and maturity are truncated to integers.
- If settlement or maturity is not a valid date, TBILLYIELD returns the #VALUE! error value.
- If  $pr \leq 0$ , TBILLYIELD returns the #NUM! error value.
- If settlement  $\geq$  maturity, or if maturity is more than one year after settlement, TBILLYIELD returns the #NUM! error value.
- TBILLYIELD is calculated as follows:

$$TBILLYIELD = \frac{100 - par}{par} \times \frac{360}{DSM}$$

where:

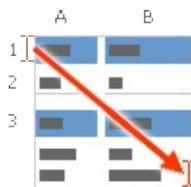
DSM = number of days from settlement to maturity, excluding any maturity date that is more than one calendar year after the settlement date.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to

**Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
<b>1</b>	March 31, 2008	Settlement date
<b>2</b>	June 1, 2008	Maturity date
<b>3</b>	98.45	Price per \$100 face value
<b>4</b>	<b>Formula</b>	<b>Description (Result)</b>
	=TBILLYIELD(A2,A3,A4)	The yield, for the treasury bill with the terms above (0.091417 or 9.1417 percent)

[Show All](#)

# VDB

## [See Also](#)

Returns the depreciation of an asset for any period you specify, including partial periods, using the double-declining balance method or some other method you specify. VDB stands for variable declining balance.

## Syntax

**VDB(cost,salvage,life,start\_period,end\_period,factor,no\_switch)**

**Cost** is the initial cost of the asset.

**Salvage** is the value at the end of the depreciation (sometimes called the salvage value of the asset).

**Life** is the number of periods over which the asset is depreciated (sometimes called the useful life of the asset).

**Start\_period** is the starting period for which you want to calculate the depreciation. **Start\_period** must use the same units as **life**.

**End\_period** is the ending period for which you want to calculate the depreciation. **End\_period** must use the same units as **life**.

**Factor** is the rate at which the balance declines. If **factor** is omitted, it is assumed to be 2 (the double-declining balance method). Change **factor** if you do not want to use the double-declining balance method. For a description of the double-declining balance method, see **DDB**.

**No\_switch** is a logical value specifying whether to switch to straight-line depreciation when depreciation is greater than the declining balance calculation.

- If **no\_switch** is TRUE, Microsoft Excel does not switch to straight-line

depreciation even when the depreciation is greater than the declining balance calculation.

- If no\_switch is FALSE or omitted, Excel switches to straight-line depreciation when depreciation is greater than the declining balance calculation.

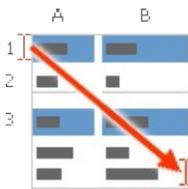
All arguments except no\_switch must be positive numbers.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

<b>A</b>	<b>B</b>
<b>Data</b>	<b>Description</b>
2400	Initial cost
300	Salvage value
10	Lifetime in years
<b>Formula</b>	<b>Description (Result)</b>
=VDB(A2,	

A3, First day's depreciation. Excel automatically assumes that factor  
A4\*365, 0, is 2 (1.32)

1) =VDB(A2, A3, A4\*12, 0, 1) First month's depreciation (40.00)

2) =VDB(A2, A3, A4, 0, 1) First year's depreciation (480.00)

3) =VDB(A2, A3, A4\*12, 6, 18) Depreciation between the sixth month and the eighteenth month (396.31)

4) =VDB(A2, A3, A4\*12, 6, 18, 1.5) Depreciation between the sixth month and the eighteenth month using a factor of 1.5 instead of the double-declining balance method (311.81)

=VDB(A2, A3, A4, 0, 0.875, 1.5) Depreciation for the first fiscal year that you own the asset, assuming that tax laws limit you to 150-percent depreciation of the declining balance. Asset is purchased in the middle of the first quarter of the fiscal year. (315.00)

**Note** The results are rounded to two decimal places.

[Show All](#)

# XIRR

## [See Also](#)

Returns the internal rate of return for a schedule of cash flows that is not necessarily periodic. To calculate the internal rate of return for a series of periodic cash flows, use the IRR function.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**XIRR(values,dates,guess)**

**Values** is a series of cash flows that corresponds to a schedule of payments in dates. The first payment is optional and corresponds to a cost or payment that occurs at the beginning of the investment. If the first value is a cost or payment, it must be a negative value. All succeeding payments are discounted based on a 365-day year. The series of values must contain at least one positive and one negative value.

**Dates** is a schedule of payment dates that corresponds to the cash flow payments. The first payment date indicates the beginning of the schedule of payments. All other dates must be later than this date, but they may occur in any order. Dates should be entered by using the DATE function, or as results of other formulas or functions. For example, use DATE(2008,5,23) for the 23rd day of May, 2008. Problems can occur if [dates are entered as text](#).

Guess is a number that you guess is close to the result of XIRR.

## Remarks

- Microsoft Excel stores dates as sequential serial numbers so they can be used in calculations. By default, January 1, 1900 is serial number 1, and January 1, 2008 is serial number 39448 because it is 39,448 days after January 1, 1900. Microsoft Excel for the Macintosh uses a [different date system as its default](#).
- Numbers in dates are truncated to integers.
- XIRR expects at least one positive cash flow and one negative cash flow; otherwise, XIRR returns the #NUM! error value.
- If any number in dates is not a valid date, XIRR returns the #VALUE! error value.
- If any number in dates precedes the starting date, XIRR returns the #NUM! error value.
- If values and dates contain a different number of values, XIRR returns the #NUM! error value.
- In most cases you do not need to provide guess for the XIRR calculation. If omitted, guess is assumed to be 0.1 (10 percent).
- XIRR is closely related to XNPV, the net present value function. The rate of return calculated by XIRR is the interest rate corresponding to XNPV = 0.
- Excel uses an iterative technique for calculating XIRR. Using a changing rate (starting with guess), XIRR cycles through the calculation until the result is accurate within 0.000001 percent. If XIRR can't find a result that works after 100 tries, the #NUM! error value is returned. The rate is changed until:

$$0 = \sum_{i=1}^N \frac{P_i}{(1 + \text{rate})^{\frac{d_i - d_1}{365}}}$$

where:

$d_i$  = the  $i$ th, or last, payment date.

$d_1$  = the 0th payment date.

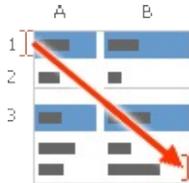
$P_i$  = the  $i$ th, or last, payment.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Values</b>	<b>Dates</b>
<b>1</b>	-10,000	January 1, 2008
<b>2</b>	2,750	March 1, 2008
<b>3</b>	4,250	October 30, 2008
<b>4</b>	3,250	February 15, 2009
<b>5</b>	2,750	April 1, 2009
<b>6</b>	<b>Formula</b>	<b>Description (Result)</b>
	=XIRR(A2:A6,B2:B6,0.1)	The internal rate of return (0.373362535 or 37.34%)

**Note** To view the number as a percentage, select the cell and click **Cells** on the **Format** menu. Click the **Number** tab, and then click **Percentage** in the **Category** box.

[Show All](#)

# XNPV

## [See Also](#)

Returns the net present value for a schedule of cash flows that is not necessarily periodic. To calculate the net present value for a series of cash flows that is periodic, use the NPV function.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**XNPV(rate,values,dates)**

**Rate** is the discount rate to apply to the cash flows.

**Values** is a series of cash flows that corresponds to a schedule of payments in dates. The first payment is optional and corresponds to a cost or payment that occurs at the beginning of the investment. If the first value is a cost or payment, it must be a negative value. All succeeding payments are discounted based on a 365-day year. The series of values must contain at least one positive value and one negative value.

**Dates** is a schedule of payment dates that corresponds to the cash flow payments. The first payment date indicates the beginning of the schedule of payments. All other dates must be later than this date, but they may occur in any order.

## Remarks

- Microsoft Excel stores dates as sequential serial numbers so they can be used in calculations. By default, January 1, 1900 is serial number 1, and January 1, 2008 is serial number 39448 because it is 39,448 days after January 1, 1900. Microsoft Excel for the Macintosh uses a [different date system as its default](#).
- Numbers in dates are truncated to integers.
- If any argument is nonnumeric, XNPV returns the #VALUE! error value.
- If any number in dates is not a valid date, XNPV returns the #VALUE! error value.
- If any number in dates precedes the starting date, XNPV returns the #NUM! error value.
- If values and dates contain a different number of values, XNPV returns the #NUM! error value.
- XNPV is calculated as follows:

$$XNPV = \sum_{i=1}^N \frac{P_i}{(1 + rate)^{\frac{(d_i - d_1)}{365}}}$$

where:

$d_i$  = the  $i$ th, or last, payment date.

$d_1$  = the 0th payment date.

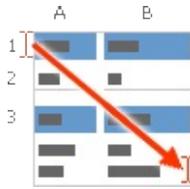
$P_i$  = the  $i$ th, or last, payment.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Values</b>	<b>Dates</b>
	-10,000	January 1, 2008
<b>1</b>	2,750	March 1, 2008
<b>2</b>	4,250	October 30, 2008
<b>3</b>	3,250	February 15, 2009
<b>4</b>	2,750	April 1, 2009
<b>5</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>6</b>	=XNPV(.09,A2:A6,B2:B6)	The net present value for an investment with the above cost and returns. The cash flows are discounted at 9 percent. (2086.6476 or 2086.65)

[Show All](#)

# YIELD

## [See Also](#)

Returns the yield on a security that pays periodic interest. Use YIELD to calculate bond yield.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**YIELD(settlement,maturity,rate,pr,redemption,frequency,basis)**

**Important** Dates should be entered by using the DATE function, or as results of other formulas or functions. For example, use DATE(2008,5,23) for the 23rd day of May, 2008. Problems can occur if [dates are entered as text](#).

**Settlement** is the security's settlement date. The security settlement date is the date after the issue date when the security is traded to the buyer.

**Maturity** is the security's maturity date. The maturity date is the date when the security expires.

**Rate** is the security's annual coupon rate.

**Pr** is the security's price per \$100 face value.

Redemption is the security's redemption value per \$100 face value.

Frequency is the number of coupon payments per year. For annual payments, frequency = 1; for semiannual, frequency = 2; for quarterly, frequency = 4.

Basis is the type of day count basis to use.

<b>Basis</b>	<b>Day count basis</b>
0 or omitted	US (NASD) 30/360
1	Actual/actual
2	Actual/360
3	Actual/365
4	European 30/360

### Remarks

- Microsoft Excel stores dates as sequential serial numbers so they can be used in calculations. By default, January 1, 1900 is serial number 1, and January 1, 2008 is serial number 39448 because it is 39,448 days after January 1, 1900. Microsoft Excel for the Macintosh uses a [different date system as its default](#).
- The settlement date is the date a buyer purchases a coupon, such as a bond. The maturity date is the date when a coupon expires. For example, suppose a 30-year bond is issued on January 1, 2008, and is purchased by a buyer six months later. The issue date would be January 1, 2008, the settlement date would be July 1, 2008, and the maturity date would be January 1, 2038, which is 30 years after the January 1, 2008, issue date.
- Settlement, maturity, frequency, and basis are truncated to integers.
- If settlement or maturity is not a valid date, YIELD returns the #VALUE! error value.
- If rate < 0, YIELD returns the #NUM! error value.
- If pr ≤ 0 or if redemption ≤ 0, YIELD returns the #NUM! error value.
- If frequency is any number other than 1, 2, or 4, YIELD returns the #NUM! error value.
- If basis < 0 or if basis > 4, YIELD returns the #NUM! error value.
- If settlement ≥ maturity, YIELD returns the #NUM! error value.
- If there is one coupon period or less until redemption, YIELD is calculated as follows:

$$YIELD = \frac{\left(\frac{redemption}{100} + \frac{rate}{frequency}\right) - \left(\frac{par}{100} + \left(\frac{A}{E} \times \frac{rate}{frequency}\right)\right)}{\frac{par}{100} + \left(\frac{A}{E} \times \frac{rate}{frequency}\right)} \times \frac{frequency \times E}{DSR}$$

where:

A = number of days from the beginning of the coupon period to the settlement date (accrued days).

DSR = number of days from the settlement date to the redemption date.

E = number of days in the coupon period.

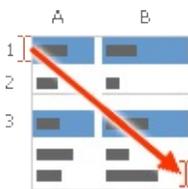
- If there is more than one coupon period until redemption, YIELD is calculated through a hundred iterations. The resolution uses the Newton method, based on the formula used for the function PRICE. The yield is changed until the estimated price given the yield is close to price.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
<b>1</b>	February 15, 2008	Settlement date
<b>2</b>	November 15, 2016	Maturity date
<b>3</b>	5.75%	Percent coupon
<b>4</b>	95.04287	Price
<b>5</b>	\$100	Redemption value
<b>6</b>	2	Frequency is semiannual (see above)
<b>7</b>	0	30/360 basis (see above)
<b>8</b>	<b>Formula</b>	<b>Description (Result)</b>
	=YIELD(A2,A3,A4,A5,A6,A7,A8)	The yield, for the bond with the terms above (0.065 or 6.5%)

**Note** To view the number as a percentage, select the cell and click **Cells** on the **Format** menu. Click the **Number** tab, and then click **Percentage** in the **Category** box.

[Show All](#)

# YIELDDISC

## [See Also](#)

Returns the annual yield for a discounted security.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**YIELDDISC(settlement,maturity,pr,redemption,basis)**

**Important** Dates should be entered by using the DATE function, or as results of other formulas or functions. For example, use DATE(2008,5,23) for the 23rd day of May, 2008. Problems can occur if [dates are entered as text](#).

**Settlement** is the security's settlement date. The security settlement date is the date after the issue date when the security is traded to the buyer.

**Maturity** is the security's maturity date. The maturity date is the date when the security expires.

**Pr** is the security's price per \$100 face value.

**Redemption** is the security's redemption value per \$100 face value.

**Basis** is the type of day count basis to use.

<b>Basis</b>	<b>Day count basis</b>
0 or omitted	US (NASD) 30/360
1	Actual/actual
2	Actual/360
3	Actual/365
4	European 30/360

## Remarks

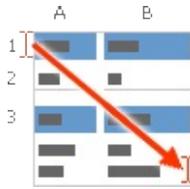
- Microsoft Excel stores dates as sequential serial numbers so they can be used in calculations. By default, January 1, 1900 is serial number 1, and January 1, 2008 is serial number 39448 because it is 39,448 days after January 1, 1900. Microsoft Excel for the Macintosh uses a [different date system as its default](#).
- The settlement date is the date a buyer purchases a coupon, such as a bond. The maturity date is the date when a coupon expires. For example, suppose a 30-year bond is issued on January 1, 2008, and is purchased by a buyer six months later. The issue date would be January 1, 2008, the settlement date would be July 1, 2008, and the maturity date would be January 1, 2038, which is 30 years after the January 1, 2008, issue date.
- Settlement, maturity, and basis are truncated to integers.
- If settlement or maturity is not a valid date, YIELDDISC returns the #VALUE! error value.
- If  $pr \leq 0$  or if redemption  $\leq 0$ , YIELDDISC returns the #NUM! error value.
- If basis  $< 0$  or if basis  $> 4$ , YIELDDISC returns the #NUM! error value.
- If settlement  $\geq$  maturity, YIELDDISC returns the #NUM! error value.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

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Selecting an example from Help

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4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
<b>1</b>	February 16, 2008	Settlement date
<b>2</b>	March 1, 2008	Maturity date
<b>3</b>	99.795	Price
<b>4</b>	\$100	Redemption value
<b>5</b>	2	Actual/360 basis
<b>6</b>	<b>Formula</b>	<b>Description (Result)</b>
	=YIELDDISC(A2,A3,A4,A5,A6)	The yield, for the bond with the terms above (0.052823 or 5.28%)

**Note** To view the number as a percentage, select the cell and click **Cells** on the **Format** menu. Click the **Number** tab, and then click **Percentage** in the **Category** box.

[Show All](#)

# YIELDMAT

## [See Also](#)

Returns the annual yield of a security that pays interest at maturity.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**YIELDMAT(settlement,maturity,issue,rate,pr,basis)**

**Important** Dates should be entered by using the DATE function, or as results of other formulas or functions. For example, use DATE(2008,5,23) for the 23rd day of May, 2008. Problems can occur if [dates are entered as text](#).

**Settlement** is the security's settlement date. The security settlement date is the date after the issue date when the security is traded to the buyer.

**Maturity** is the security's maturity date. The maturity date is the date when the security expires.

**Issue** is the security's issue date, expressed as a serial date number.

**Rate** is the security's interest rate at date of issue.

**Pr** is the security's price per \$100 face value.

Basis is the type of day count basis to use.

<b>Basis</b>	<b>Day count basis</b>
0 or omitted	US (NASD) 30/360
1	Actual/actual
2	Actual/360
3	Actual/365
4	European 30/360

### Remarks

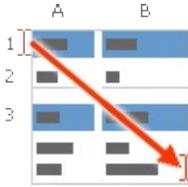
- Microsoft Excel stores dates as sequential serial numbers so they can be used in calculations. By default, January 1, 1900 is serial number 1, and January 1, 2008 is serial number 39448 because it is 39,448 days after January 1, 1900. Microsoft Excel for the Macintosh uses a [different date system as its default](#).
- The settlement date is the date a buyer purchases a coupon, such as a bond. The maturity date is the date when a coupon expires. For example, suppose a 30-year bond is issued on January 1, 2008, and is purchased by a buyer six months later. The issue date would be January 1, 2008, the settlement date would be July 1, 2008, and the maturity date would be January 1, 2038, which is 30 years after the January 1, 2008, issue date.
- Settlement, maturity, issue, and basis are truncated to integers.
- If settlement, maturity, or issue is not a valid date, YIELDMAT returns the #VALUE! error value.
- If rate < 0 or if pr ≤ 0, YIELDMAT returns the #NUM! error value.
- If basis < 0 or if basis > 4, YIELDMAT returns the #NUM! error value.
- If settlement ≥ maturity, YIELDMAT returns the #NUM! error value.

### Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



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3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
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	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
<b>1</b>	March 15, 2008	Settlement date
<b>2</b>	November 3, 2008	Maturity date
<b>3</b>	November 8, 2007	Issue date
<b>4</b>	6.25%	Percent semiannual coupon
<b>5</b>	100.0123	Price
<b>6</b>	0	30/360 basis (see above)
<b>7</b>	<b>Formula</b>	<b>Description (Result)</b>
	=YIELDMAT(A2,A3,A4,A5,A6,A7)	The yield, for the bond with the terms above (0.060954 or 6.09%)

**Note** To view the number as a percentage, select the cell and click **Cells** on the **Format** menu. Click the **Number** tab, and then click **Percentage** in the **Category** box.

# Information functions

[CELL](#) Returns information about the formatting, location, or contents of a cell

[ERROR.TYPE](#) Returns a number corresponding to an error type

[INFO](#) Returns information about the current operating environment

[ISBLANK](#) Returns TRUE if the value is blank

[ISERR](#) Returns TRUE if the value is any error value except #N/A

[ISERROR](#) Returns TRUE if the value is any error value

[ISEVEN](#) Returns TRUE if the number is even

[ISLOGICAL](#) Returns TRUE if the value is a logical value

[ISNA](#) Returns TRUE if the value is the #N/A error value

[ISNONTTEXT](#) Returns TRUE if the value is not text

[ISNUMBER](#) Returns TRUE if the value is a number

[ISODD](#) Returns TRUE if the number is odd

[ISREF](#) Returns TRUE if the value is a reference

[ISTEXT](#) Returns TRUE if the value is text

[N](#) Returns a value converted to a number

[NA](#) Returns the error value #N/A

[TYPE](#) Returns a number indicating the data type of a value

[Show All](#)

# CELL

## [See Also](#)

Returns information about the formatting, location, or contents of the upper-left cell in a reference.

## Syntax

**CELL**(**info\_type**,reference)

**Info\_type** is a text value that specifies what type of cell information you want. The following list shows the possible values of **info\_type** and the corresponding results.

<b>Info_type</b>	<b>Returns</b>
"address"	Reference of the first cell in reference, as text.
"col"	Column number of the cell in reference.
"color"	1 if the cell is formatted in color for negative values; otherwise returns 0 (zero).
"contents"	Value of the upper-left cell in reference; not a formula.
"filename"	Filename (including full path) of the file that contains reference, as text. Returns empty text ("") if the worksheet that contains reference has not yet been saved.
"format"	Text value corresponding to the number format of the cell. The text values for the various formats are shown in the following table. Returns "-" at the end of the text value if the cell is formatted in color for negative values. Returns "(" at the end of the text value if the cell is formatted with parentheses for positive or all values.
"parentheses"	1 if the cell is formatted with parentheses for positive or all values; otherwise returns 0. Text value corresponding to the "label prefix" of the cell. Returns single quotation mark (') if the cell contains left-aligned text,

"prefix"	double quotation mark (") if the cell contains right-aligned text, caret (^) if the cell contains centered text, backslash (\) if the cell contains fill-aligned text, and empty text ("") if the cell contains anything else.
"protect"	0 if the cell is not locked, and 1 if the cell is locked.
"row"	Row number of the cell in reference.
"type"	Text value corresponding to the type of data in the cell. Returns "b" for blank if the cell is empty, "l" for label if the cell contains a text constant, and "v" for value if the cell contains anything else.
"width"	Column width of the cell rounded off to an integer. Each unit of column width is equal to the width of one character in the default font size.

Reference is the cell that you want information about. If omitted, information specified in info\_type is returned for the last cell that was changed. The following list describes the text values CELL returns when info\_type is "format", and reference is a cell formatted with a built-in number format.

<b>If the Microsoft Excel format is</b>	<b>CELL returns</b>
General	"G"
0	"F0"
#,##0	",0"
0.00	"F2"
#,##0.00	",2"
\$\$,##0_);(\$\$,##0)	"C0"
\$\$,##0_);[Red](\$\$,##0)	"C0-"
\$\$,##0.00_);(\$\$,##0.00)	"C2"
\$\$,##0.00_);[Red](\$\$,##0.00)	"C2-"
0%	"P0"
0.00%	"P2"
0.00E+00	"S2"
# ??/? or # ???/??	"G"
m/d/yy or m/d/yy h:mm or mm/dd/yy	"D4"
d-mmm-yy or dd-mmm-yy	"D1"
d-mmm or dd-mmm	"D2"

mmm-yy	"D3"
mm/dd	"D5"
h:mm AM/PM	"D7"
h:mm:ss AM/PM	"D6"
h:mm	"D9"
h:mm:ss	"D8"

If the info\_type argument in the CELL formula is "format", and if the cell is formatted later with a custom format, then you must recalculate the worksheet to update the CELL formula.

### Remark

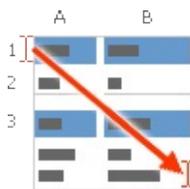
The CELL function is provided for compatibility with other spreadsheet programs.

### Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

**A**  
**Data**

5-Mar

**1** TOTAL

<b>2</b>	<b>Formula</b>	<b>Description (Result)</b>
----------	----------------	-----------------------------

<b>3</b>	=CELL("row",A20)	The row number of cell A20 (20)
----------	------------------	---------------------------------

	=CELL("format", A2)	The format code of the first string (D2, see above)
--	---------------------	---

	=CELL("contents", A3)	The content of cell A3 (TOTAL)
--	-----------------------	--------------------------------

[Show All](#)

# COUNTBLANK

## [See Also](#)

Counts empty cells in a specified range of cells.

## Syntax

### COUNTBLANK(range)

Range is the range from which you want to count the blank cells.

## Remark

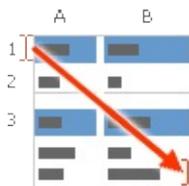
Cells with formulas that return "" (empty text) are also counted. Cells with zero values are not counted.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.

- To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Data</b>
<b>1</b>		
<b>2</b>	6	=IF(B4<30,"",B4)
<b>3</b>		27
<b>4</b>	4	34
<b>5</b>	<b>Formula</b>	<b>Description (Result)</b>
	=COUNTBLANK(A2:B5)	Counts empty cells in the range above. The formula returns empty text. (4)

[Show All](#)

# ERROR.TYPE

## [See Also](#)

Returns a number corresponding to one of the error values in Microsoft Excel or returns the #N/A error if no error exists. You can use ERROR.TYPE in an IF function to test for an error value and return a text string, such as a message, instead of the error value.

## Syntax

**ERROR.TYPE**(error\_val)

Error\_val is the error value whose identifying number you want to find. Although error\_val can be the actual error value, it will usually be a reference to a cell containing a formula that you want to test.

### If error\_val is ERROR.TYPE returns

#NULL!	1
#DIV/0!	2
#VALUE!	3
#REF!	4
#NAME?	5
#NUM!	6
#N/A	7
Anything else	#N/A

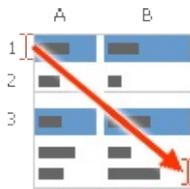
## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.

2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

### A Data

#NULL!

=1/0

### Formula

=ERROR.TYPE(A2)

1

2

3

=IF(ERROR.TYPE(A3)  
<3,CHOOSE(ERROR.TYPE(A3),"Ranges  
do not intersect","The divisor is zero"))

### Description (Result)

Number of the #NULL! error (1)

Checks cell A3 to see whether the cell contains either the #NULL! error value or the #DIV/0! error value. If it does, then the number for the error value is used in the CHOOSE worksheet function to display one of two messages; otherwise, the #N/A error value is returned. (The divisor is zero.)

[Show All](#)

# INFO

## [See Also](#)

**Security** Use this feature with caution. Sensitive or confidential information could be revealed to other users.

Returns information about the current operating environment.

## Syntax

### INFO(**type\_text**)

**Type\_text** is text that specifies what type of information you want returned.

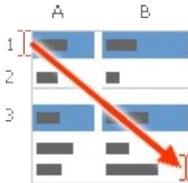
<b>Type_text</b>	<b>Returns</b>
"directory"	Path of the current directory or folder.
"memavail"	Amount of memory available, in bytes.
"memused"	Amount of memory being used for data.
"numfile"	Number of active worksheets in the open workbooks.
"origin"	Absolute A1-style reference, as text, prepended with "\$A:" for Lotus 1-2-3 release 3.x compatibility. Returns the cell reference of the top and leftmost cell visible in the window, based on the current scrolling position.
"osversion"	Current operating system version, as text.
"recalc"	Current recalculation mode; returns "Automatic" or "Manual".
"release"	Version of Microsoft Excel, as text.
"system"	Name of the operating environment: Macintosh = "mac" Windows = "pcdos"
"totmem"	Total memory available, including memory already in use, in bytes.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

## How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Formula</b>	<b>Description (Result)</b>
<b>1</b>	=INFO("numfile")	Number of active worksheets (varies)
<b>2</b>	=INFO("recalc")	Recalculation mode for the workbook (Automatic or Manual)

[Show All](#)

# IS Functions

## [See Also](#)

This section describes the nine worksheet functions used for testing the type of a value or reference.

Each of these functions, referred to collectively as the IS functions, checks the type of value and returns TRUE or FALSE depending on the outcome. For example, the ISBLANK function returns the logical value TRUE if value is a reference to an empty cell; otherwise it returns FALSE.

## Syntax

**ISBLANK(value)**

**ISERR(value)**

**ISERROR(value)**

**ISLOGICAL(value)**

**ISNA(value)**

**ISNONTEXT(value)**

**ISNUMBER(value)**

**ISREF(value)**

**ISTEXT(value)**

Value is the value you want tested. Value can be a blank (empty cell), error, logical, text, number, or reference value, or a name referring to any of these, that you want to test.

<b>Function</b>	<b>Returns TRUE if</b>
ISBLANK	Value refers to an empty cell.
ISERR	Value refers to any error value except #N/A.
ISERROR	Value refers to any error value (#N/A, #VALUE!, #REF!, #DIV/0!, #NUM!, #NAME?, or #NULL!).
ISLOGICAL	Value refers to a logical value.

ISNA	Value refers to the #N/A (value not available) error value.
ISNONTEXT	Value refers to any item that is not text. (Note that this function returns TRUE if value refers to a blank cell.)
ISNUMBER	Value refers to a number.
ISREF	Value refers to a reference.
ISTEXT	Value refers to text.

## Remarks

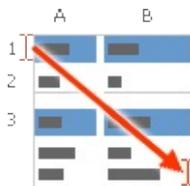
- The value arguments of the IS functions are not converted. For example, in most other functions where a number is required, the text value "19" is converted to the number 19. However, in the formula ISNUMBER("19"), "19" is not converted from a text value, and the ISNUMBER function returns FALSE.
- The IS functions are useful in formulas for testing the outcome of a calculation. When combined with the IF function, they provide a method for locating errors in formulas (see the following examples).

## Example 1

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return

the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

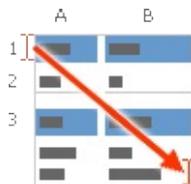
	A	B
	Formula	Description (Result)
1		
2	=ISLOGICAL(TRUE)	Checks whether TRUE is a logical value (TRUE)
3	=ISLOGICAL("TRUE")	Checks whether "TRUE" is a logical value (FALSE)
4	=ISNUMBER(4)	Checks whether 4 is a number (TRUE)

### Example 2

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

A

**Data**

Gold

Region1

#REF!

1 330.92

2 #N/A

3 **Formula**

**Description (Result)**

4 =ISBLANK(A2) Checks whether cell C2 is blank (FALSE)

5 =ISERROR(A4) Checks whether #REF! is an error (TRUE)

6 =ISNA(A4) Checks whether #REF! is the #N/A error (FALSE)

=ISNA(A6) Checks whether #N/A is the #N/A error (TRUE)

=ISERR(A6) Checks whether #N/A is an error (FALSE)

=ISNUMBER(A5) Checks whether 330.92 is a number (TRUE)

=ISTEXT(A3) Checks whether Region1 is text (TRUE)

[Show All](#)

# ISEVEN

## [See Also](#)

Returns TRUE if number is even, or FALSE if number is odd.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**ISEVEN(number)**

Number is the value to test. If number is not an integer, it is truncated.

## Remark

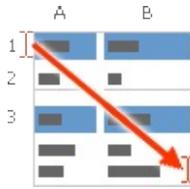
If number is nonnumeric, ISEVEN returns the #VALUE! error value.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

## [How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=ISEVEN(-1)	Checks whether -1 is even (FALSE)
<b>3</b>	=ISEVEN(2.5)	Checks whether 2.5 is even (TRUE)
<b>4</b>	=ISEVEN(5)	Checks whether 5 is even (FALSE)

[Show All](#)

# ISODD

## [See Also](#)

Returns TRUE if number is odd, or FALSE if number is even.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

### ISODD(number)

Number is the value to test. If number is not an integer, it is truncated.

## Remark

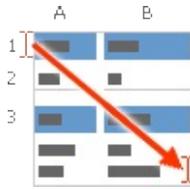
If number is nonnumeric, ISODD returns the #VALUE! error value.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

## [How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=ISODD(-1)	Checks whether -1 is odd (TRUE)
<b>3</b>	=ISODD(2.5)	Checks whether 2.5 is odd (FALSE)
<b>4</b>	=ISODD(5)	Checks whether 5 is odd (TRUE)

[Show All](#)

# N

## [See Also](#)

Returns a value converted to a number.

## Syntax

### N(value)

Value is the value you want converted. N converts values listed in the following table.

	<b>If value is or refers to</b>	<b>N returns</b>
	A number	That number
	A date, in one of the built-in date formats available in Microsoft Excel	The serial number of that date
	TRUE	1
	FALSE	0
	An error value, such as #DIV/0!	The error value
	Anything else	0

## Remarks

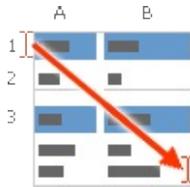
- It is not generally necessary to use the N function in a formula, because Excel automatically converts values as necessary. This function is provided for compatibility with other spreadsheet programs.
- Excel stores dates as sequential serial numbers so they can be used in calculations. By default, January 1, 1900 is serial number 1, and January 1, 2008 is serial number 39448 because it is 39,448 days after January 1, 1900. Excel for the Macintosh uses a [different date system as its default](#).

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

**A**

**Data**

7

Even

TRUE

1 4/17/2008

2 **Formula**

**Description (Result)**

3 =N(A2) Because A2 contains a number, it is returned (7)

4 =N(A3) Because A3 contains text, 0 is returned (0, see above)

5 =N(A4) Because A4 is the logical value TRUE, 1 is returned (1, see above)

=N(A5) Because A5 is a date, the serial number is returned (varies with the date system used)

=N("7") Because "7" is text, 0 is returned (0, see above)

# NA

## [See Also](#)

Returns the error value #N/A. #N/A is the error value that means "no value is available." Use NA to mark empty cells. By entering #N/A in cells where you are missing information, you can avoid the problem of unintentionally including empty cells in your calculations. (When a formula refers to a cell containing #N/A, the formula returns the #N/A error value.)

## Syntax

NA( )

## Remarks

- You must include the empty parentheses with the function name. Otherwise, Microsoft Excel will not recognize it as a function.
- You can also type the value #N/A directly into a cell. The NA function is provided for compatibility with other spreadsheet programs.

[Show All](#)

# TYPE

## [See Also](#)

Returns the type of value. Use TYPE when the behavior of another function depends on the type of value in a particular cell.

## Syntax

### TYPE(value)

Value can be any Microsoft Excel value, such as a number, text, logical value, and so on.

<b>If value is</b>	<b>TYPE returns</b>
Number	1
Text	2
Logical value	4
Error value	16
<a href="#">Array</a>	64

## Remarks

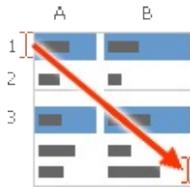
- TYPE is most useful when you are using functions that can accept different types of data, such as ARGUMENT and INPUT. Use TYPE to find out what type of data is returned by a function or formula.
- You cannot use TYPE to determine whether a cell contains a formula. TYPE only determines the type of the resulting, or displayed, value. If value is a cell reference to a cell that contains a formula, TYPE returns the type of the formula's resulting value.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

## How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

### A

#### Data

Smith

	<b>Formula</b>	<b>Description (Result)</b>
1	=TYPE(A2)	Checks the type of the value above (2)
2	=TYPE("Mr.&A2)	Checks the type of "Mr. Smith" (2)
	=TYPE(2+A2)	Checks the type of the formula, which returns the error #VALUE! (16)
	=TYPE({1,2;3,4})	Checks the type of an array constant (64)

# Logical functions

[AND](#) Returns TRUE if all its arguments are TRUE

[FALSE](#) Returns the logical value FALSE

[IF](#) Specifies a logical test to perform

[NOT](#) Reverses the logic of its argument

[OR](#) Returns TRUE if any argument is TRUE

[TRUE](#) Returns the logical value TRUE

[Show All](#)

# AND

## [See Also](#)

Returns TRUE if all its arguments are TRUE; returns FALSE if one or more argument is FALSE.

## Syntax

**AND(logical1,logical2, ...)**

Logical1, logical2, ... are 1 to 30 conditions you want to test that can be either TRUE or FALSE.

## Remarks

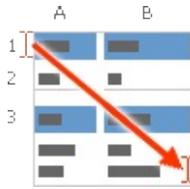
- The arguments must evaluate to logical values such as TRUE or FALSE, or the arguments must be [arrays](#) or references that contain logical values.
- If an array or reference argument contains text or empty cells, those values are ignored.
- If the specified range contains no logical values, AND returns the #VALUE! error value.

## Example 1

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

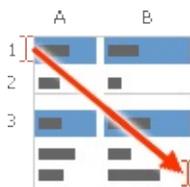
	A	B
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
2	=AND(TRUE, TRUE)	All arguments are TRUE (TRUE)
3	=AND(TRUE, FALSE)	One argument is FALSE (FALSE)
4	=AND(2+2=4, 2+3=5)	All arguments evaluate to TRUE (TRUE)

## Example 2

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.

- To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

**A**

**Data**

50

104

**Formula**

**Description (Result)**

<b>1</b>	=AND(1<A2, A2<100)	Because 50 is between 1 and 100 (TRUE)
<b>2</b>	=IF(AND(1<A3,	Displays the second number above, if it is between 1 and 100, otherwise displays a message (The value is out of range.)
<b>3</b>	A3<100), A3, "The value is out of range.")	
	=IF(AND(1<A2, A2<100), A2, "The value is out of range.")	Displays the first number above, if it is between 1 and 100, otherwise displays a message (50)

# FALSE

## [See Also](#)

Returns the logical value FALSE.

## **Syntax**

**FALSE( )**

## **Remark**

You can also type the word FALSE directly onto the worksheet or into the formula, and Microsoft Excel interprets it as the logical value FALSE.

[Show All](#)

# IF

## [See Also](#)

Returns one value if a condition you specify evaluates to TRUE and another value if it evaluates to FALSE.

Use IF to conduct conditional tests on values and formulas.

## Syntax

**IF(logical\_test,value\_if\_true,value\_if\_false)**

**Logical\_test** is any value or expression that can be evaluated to TRUE or FALSE. For example, A10=100 is a logical expression; if the value in cell A10 is equal to 100, the expression evaluates to TRUE. Otherwise, the expression evaluates to FALSE. This argument can use any [comparison calculation operator](#).

**Value\_if\_true** is the value that is returned if **logical\_test** is TRUE. For example, if this argument is the text string "Within budget" and the **logical\_test** argument evaluates to TRUE, then the IF function displays the text "Within budget". If **logical\_test** is TRUE and **value\_if\_true** is blank, this argument returns 0 (zero). To display the word TRUE, use the logical value TRUE for this argument. **Value\_if\_true** can be another formula.

**Value\_if\_false** is the value that is returned if **logical\_test** is FALSE. For example, if this argument is the text string "Over budget" and the **logical\_test** argument evaluates to FALSE, then the IF function displays the text "Over budget". If **logical\_test** is FALSE and **value\_if\_false** is omitted, (that is, after **value\_if\_true**, there is no comma), then the logical value FALSE is returned. If **logical\_test** is FALSE and **value\_if\_false** is blank (that is, after **value\_if\_true**, there is a comma followed by the closing parenthesis), then the value 0 (zero) is returned. **Value\_if\_false** can be another formula.

## Remarks

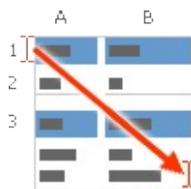
- Up to seven IF functions can be nested as value\_if\_true and value\_if\_false arguments to construct more elaborate tests. See the last of the following examples.
- When the value\_if\_true and value\_if\_false arguments are evaluated, IF returns the value returned by those statements.
- If any of the arguments to IF are [arrays](#), every element of the array is evaluated when the IF statement is carried out.
- Microsoft Excel provides additional functions that can be used to analyze your data based on a condition. For example, to count the number of occurrences of a string of text or a number within a range of cells, use the COUNTIF worksheet function. To calculate a sum based on a string of text or a number within a range, use the SUMIF worksheet function. Learn [about calculating a value based on a condition](#).

## Example 1

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

**A**  
**Data**

50

**Formula**

**Description (Result)**

1  
2 =IF(A2<=100,"Within budget","Over budget")

If the number above is less than or equal to 100, then the formula displays "Within budget". Otherwise, the function displays "Over budget" (Within budget)

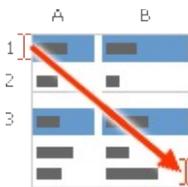
=IF(A2=100,SUM(B5:B15),"") B5:B15 is calculated. Otherwise, empty text ("") is returned ()

**Example 2**

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

A	B
Actual Expenses	Predicted Expenses
1500	900

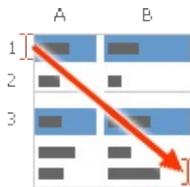
	500	900
1	500	925
2	<b>Formula</b>	<b>Description (Result)</b>
3	=IF(A2>B2,"Over	Checks whether the first row is over budget
4	Budget","OK")	(Over Budget)
	=IF(A3>B3,"Over	Checks whether the second row is over budget
	Budget","OK")	(OK)

### Example 3

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	
	Score	
	45	
	90	
1	78	
2	<b>Formula</b>	<b>Description (Result)</b>

<b>3</b> =IF(A2>89,"A",IF(A2>79,"B", IF(A2>69,"C",IF(A2>59,"D","F"))))	Assigns a letter grade to the first score (F)
<b>4</b> =IF(A3>89,"A",IF(A3>79,"B", IF(A3>69,"C",IF(A3>59,"D","F"))))	Assigns a letter grade to the second score (A)
=IF(A4>89,"A",IF(A4>79,"B", IF(A4>69,"C",IF(A4>59,"D","F"))))	Assigns a letter grade to the third score (C)

In the preceding example, the second IF statement is also the value\_if\_false argument to the first IF statement. Similarly, the third IF statement is the value\_if\_false argument to the second IF statement. For example, if the first logical\_test (Average>89) is TRUE, "A" is returned. If the first logical\_test is FALSE, the second IF statement is evaluated, and so on.

The letter grades are assigned to numbers using the following key.

<b>If Score is</b>	<b>Then return</b>
Greater than 89	A
From 80 to 89	B
From 70 to 79	C
From 60 to 69	D
Less than 60	F

[Show All](#)

# NOT

## [See Also](#)

Reverses the value of its argument. Use NOT when you want to make sure a value is not equal to one particular value.

## Syntax

### NOT(logical)

Logical is a value or expression that can be evaluated to TRUE or FALSE.

## Remark

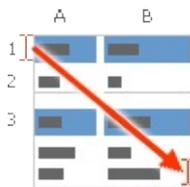
If logical is FALSE, NOT returns TRUE; if logical is TRUE, NOT returns FALSE.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.

4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

A	B
1 <b>Formula</b>	<b>Description (Result)</b>
2 =NOT(FALSE)	Reverses FALSE (TRUE)
3 =NOT(1+1=2)	Reverses an equation that evaluates to TRUE (FALSE)

[Show All](#)

# OR

## [See Also](#)

Returns TRUE if any argument is TRUE; returns FALSE if all arguments are FALSE.

## Syntax

**OR(logical1,logical2,...)**

Logical1,logical2,... are 1 to 30 conditions you want to test that can be either TRUE or FALSE.

## Remarks

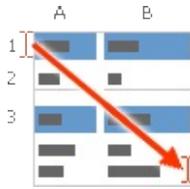
- The arguments must evaluate to logical values such as TRUE or FALSE, or in [arrays](#) or references that contain logical values.
- If an array or reference argument contains text or empty cells, those values are ignored.
- If the specified range contains no logical values, OR returns the #VALUE! error value.
- You can use an OR array formula to see if a value occurs in an array. To enter an array formula, press CTRL+SHIFT+ENTER.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=OR(TRUE)	One argument is TRUE (TRUE)
<b>3</b>	=OR(1+1=1,2+2=5)	All arguments evaluate to FALSE (FALSE)
<b>4</b>	=OR(TRUE,FALSE,TRUE)	At least one argument is TRUE (TRUE)

# TRUE

## [See Also](#)

Returns the logical value TRUE.

## **Syntax**

**TRUE( )**

## **Remark**

You can enter the value TRUE directly into cells and formulas without using this function. The TRUE function is provided primarily for compatibility with other spreadsheet programs.

[Show All](#)

# Lookup and Reference functions

[ADDRESS](#) Returns a reference as text to a single cell in a worksheet

[AREAS](#) Returns the number of areas in a reference

[CHOOSE](#) Chooses a value from a list of values

[COLUMN](#) Returns the column number of a reference

[COLUMNS](#) Returns the number of columns in a reference

[HLOOKUP](#) Looks in the top row of an array and returns the value of the indicated cell

[HYPERLINK](#) Creates a shortcut or jump that opens a document stored on a network server, an intranet, or the Internet

[INDEX](#) Uses an index to choose a value from a reference or array

[INDIRECT](#) Returns a reference indicated by a text value

[LOOKUP](#) Looks up values in a vector or array

[MATCH](#) Looks up values in a reference or array

[OFFSET](#) Returns a reference offset from a given reference

[ROW](#) Returns the row number of a reference

[ROWS](#) Returns the number of rows in a reference

[RTD](#) Retrieves real-time data from a program that supports [COM automation](#)

[TRANSPOSE](#) Returns the transpose of an array

[VLOOKUP](#) Looks in the first column of an array and moves across the row to return the value of a cell

[Show All](#)

# ADDRESS

## [See Also](#)

Creates a cell address as text, given specified row and column numbers.

## Syntax

**ADDRESS**(row\_num,column\_num,abs\_num,a1,sheet\_text)

Row\_num is the row number to use in the cell reference.

Column\_num is the column number to use in the cell reference.

Abs\_num specifies the type of reference to return.

### **Abs\_num Returns this type of reference**

- |              |                               |
|--------------|-------------------------------|
| 1 or omitted | Absolute                      |
| 2            | Absolute row; relative column |
| 3            | Relative row; absolute column |
| 4            | Relative                      |

A1 is a logical value that specifies the A1 or R1C1 reference style. If a1 is TRUE or omitted, ADDRESS returns an A1-style reference; if FALSE, ADDRESS returns an R1C1-style reference.

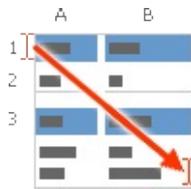
Sheet\_text is text specifying the name of the worksheet to be used as the external reference. If sheet\_text is omitted, no sheet name is used.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Formula</b>	<b>Description (Result)</b>
	=ADDRESS(2,3)	Absolute reference (\$C\$2)
<b>1</b>	=ADDRESS(2,3,2)	Absolute row; relative column (C\$2)
<b>2</b>		
<b>3</b>	=ADDRESS(2,3,2,FALSE)	Absolute row; relative column in R1C1 reference style (R2C[3])
<b>4</b>		
<b>5</b>	=ADDRESS(2,3,1,FALSE,"[Book1]Sheet1")	Absolute reference to another workbook and worksheet ([Book1]Sheet1!R2C3)
<b>6</b>	=ADDRESS(2,3,1,FALSE,"EXCEL SHEET")	Absolute reference to another worksheet ('EXCEL SHEET'!R2C3)

[Show All](#)

# AREAS

## [See Also](#)

Returns the number of areas in a reference. An area is a range of contiguous cells or a single cell.

## Syntax

### **AREAS(reference)**

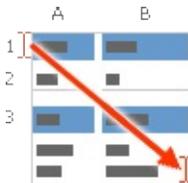
Reference is a reference to a cell or range of cells and can refer to multiple areas. If you want to specify several references as a single argument, then you must include extra sets of parentheses so that Microsoft Excel will not interpret the comma as a field separator. See the following example.

## Example

The example may be easier to understand if you copy it to a blank worksheet.



1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return

the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=AREAS(B2:D4)	Number of areas in the range (1)
<b>3</b>	=AREAS((B2:D4,E5,F6:I9))	Number of areas in the range (3)
<b>4</b>	=AREAS(B2:D4 B2)	Number of areas in the range (1)

[Show All](#)

# CHOOSE

## [See Also](#)

Uses `index_num` to return a value from the list of value arguments. Use CHOOSE to select one of up to 29 values based on the index number. For example, if `value1` through `value7` are the days of the week, CHOOSE returns one of the days when a number between 1 and 7 is used as `index_num`.

## Syntax

**CHOOSE(`index_num`,`value1`,`value2`,...)**

`Index_num` specifies which value argument is selected. `Index_num` must be a number between 1 and 29, or a formula or reference to a cell containing a number between 1 and 29.

- If `index_num` is 1, CHOOSE returns `value1`; if it is 2, CHOOSE returns `value2`; and so on.
- If `index_num` is less than 1 or greater than the number of the last value in the list, CHOOSE returns the #VALUE! error value.
- If `index_num` is a fraction, it is truncated to the lowest integer before being used.

`Value1,value2,...` are 1 to 29 value arguments from which CHOOSE selects a value or an action to perform based on `index_num`. The arguments can be numbers, cell references, defined names, formulas, functions, or text.

## Remarks

- If `index_num` is an [array](#), every value is evaluated when CHOOSE is evaluated.
- The value arguments to CHOOSE can be range references as well as single

values.

For example, the formula:

```
=SUM(CHOOSE(2,A1:A10,B1:B10,C1:C10))
```

evaluates to:

```
=SUM(B1:B10)
```

which then returns a value based on the values in the range B1:B10.

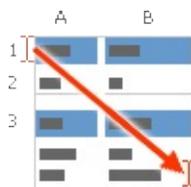
The CHOOSE function is evaluated first, returning the reference B1:B10. The SUM function is then evaluated using B1:B10, the result of the CHOOSE function, as its argument.

### Example 1

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

**A**

**B**

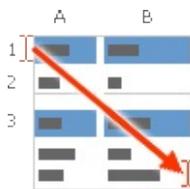
	Data		Data
1	1st		Nails
2	2nd		Screws
3	3rd		Nuts
4	Finished		Bolts
5	Formula		Description (Result)
	=CHOOSE(2,A2,A3,A4,A5)		Value from the second argument A3 (2nd)
	=CHOOSE(4,B2,B3,B4,B5)		Value from the fourth argument B5 (Bolts)

## Example 2

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A
	Data
1	23
2	45
3	12

4 10

5	<b>Formula</b>	<b>Description (Result)</b>
	=SUM(A2:CHOOSE(2,A3,A4,A5))	Sums the range A2:A4 (80)

[Show All](#)

# COLUMN

## [See Also](#)

Returns the column number of the given reference.

## Syntax

**COLUMN**(reference)

Reference is the cell or range of cells for which you want the column number.

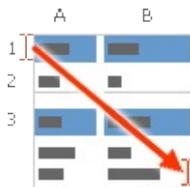
- If reference is omitted, it is assumed to be the reference of the cell in which the COLUMN function appears.
- If reference is a range of cells, and if COLUMN is entered as a horizontal [array](#), COLUMN returns the column numbers of reference as a horizontal array.
- Reference cannot refer to multiple areas.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



## Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=COLUMN()	Column in which the formula appears (1)
<b>3</b>	=COLUMN(A10)	Column of the reference (1)

[Show All](#)

# COLUMNS

## [See Also](#)

Returns the number of columns in an [array](#) or reference.

## Syntax

**COLUMNS(array)**

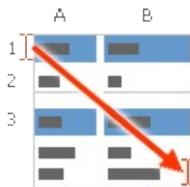
Array is an array or [array formula](#), or a reference to a range of cells for which you want the number of columns.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=COLUMNS(C1:E4)	Number of columns in the reference (3)
<b>3</b>	=COLUMNS({1,2,3;4,5,6})	Number of columns in the array constant (3)

[Show All](#)

# HLOOKUP

## [See Also](#)

Searches for a value in the top row of a table or an [array](#) of values, and then returns a value in the same column from a row you specify in the table or array. Use HLOOKUP when your comparison values are located in a row across the top of a table of data, and you want to look down a specified number of rows. Use VLOOKUP when your comparison values are located in a column to the left of the data you want to find.

The H in HLOOKUP stands for "Horizontal."

## Syntax

**HLOOKUP(lookup\_value,table\_array,row\_index\_num,range\_lookup)**

**Lookup\_value** is the value to be found in the first row of the table. **Lookup\_value** can be a value, a reference, or a text string.

**Table\_array** is a table of information in which data is looked up. Use a reference to a range or a range name.

- The values in the first row of **table\_array** can be text, numbers, or logical values.
- If **range\_lookup** is TRUE, the values in the first row of **table\_array** must be placed in ascending order: ...-2, -1, 0, 1, 2,... , A-Z, FALSE, TRUE; otherwise, HLOOKUP may not give the correct value. If **range\_lookup** is FALSE, **table\_array** does not need to be sorted.
- Uppercase and lowercase text are equivalent.
- You can put values in ascending order, left to right, by selecting the values and then clicking **Sort** on the **Data** menu. Click **Options**, click **Sort left to right**, and then click **OK**. Under **Sort by**, click the row in the list, and then

click **Ascending**.

Row\_index\_num is the row number in table\_array from which the matching value will be returned. A row\_index\_num of 1 returns the first row value in table\_array, a row\_index\_num of 2 returns the second row value in table\_array, and so on. If row\_index\_num is less than 1, HLOOKUP returns the #VALUE! error value; if row\_index\_num is greater than the number of rows on table\_array, HLOOKUP returns the #REF! error value.

Range\_lookup is a logical value that specifies whether you want HLOOKUP to find an exact match or an approximate match. If TRUE or omitted, an approximate match is returned. In other words, if an exact match is not found, the next largest value that is less than lookup\_value is returned. If FALSE, HLOOKUP will find an exact match. If one is not found, the error value #N/A is returned.

## Remarks

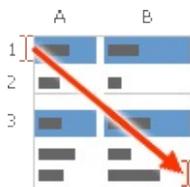
- If HLOOKUP can't find lookup\_value, and range\_lookup is TRUE, it uses the largest value that is less than lookup\_value.
- If lookup\_value is smaller than the smallest value in the first row of table\_array, HLOOKUP returns the #N/A error value.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>	<b>C</b>
	<b>Axles</b>	<b>Bearings</b>	<b>Bolts</b>
4		4	9
5		7	10
6		8	11
	<b>Formula</b>	<b>Description (Result)</b>	
	=HLOOKUP("Axles",A1:C4,2,TRUE)	Looks up Axles in row 1, and returns the value from row 2 that's in the same column. (4)	
<b>1</b>	=HLOOKUP("Bearings",A1:C4,3,FALSE)	Looks up Bearings in row 1, and returns the value from row 3 that's in the same column. (7)	
<b>2</b>			
<b>3</b>		Looks up B in row 1, and returns the value from row 3 that's in the same column. Because B is not an exact match, the next largest value that is less than B is used: Axles. (5)	
<b>4</b>	=HLOOKUP("B",A1:C4,3,TRUE)		
	=HLOOKUP("Bolts",A1:C4,4)	Looks up Bolts in row 1, and returns the value from row 4 that's in the same column. (11)	
	=HLOOKUP(3, {1,2,3;"a","b","c";"d","e","f"},2,TRUE)	Looks up 3 in the first row of the array constant, and returns the value from row 2 in same column. (c)	

[Show All](#)

# HYPERLINK

## [See Also](#)

Creates a shortcut or jump that opens a document stored on a network server, an [intranet](#), or the Internet. When you click the cell that contains the HYPERLINK function, Microsoft Excel opens the file stored at link\_location.

## Syntax

**HYPERLINK(link\_location,friendly\_name)**

Link\_location is the path and file name to the document to be opened as text. Link\_location can refer to a place in a document— such as a specific cell or named range in an Excel worksheet or workbook, or to a bookmark in a Microsoft Word document. The path can be to a file stored on a hard disk drive, or the path can be a universal naming convention (UNC) path on a server (in Microsoft Excel for Windows) or a Uniform Resource Locator ([URL](#)) path on the Internet or an intranet.

- Link\_location can be a text string enclosed in quotation marks or a cell that contains the link as a text string.
- If the jump specified in link\_location does not exist or cannot be navigated, an error appears when you click the cell.

Friendly\_name is the jump text or numeric value that is displayed in the cell. Friendly\_name is displayed in blue and is underlined. If friendly\_name is omitted, the cell displays the link\_location as the jump text.

- Friendly\_name can be a value, a text string, a name, or a cell that contains the jump text or value.
- If friendly\_name returns an error value (for example, #VALUE!), the cell displays the error instead of the jump text.

## Remark

To select a cell that has a hyperlink in it without jumping to the hyperlink destination, click the cell and hold the mouse button until the cursor becomes a cross , then release the mouse button.

## Examples

The following example opens a worksheet named Budget Report.xls that is stored on the Internet at the location named `example.microsoft.com/report` and displays the text "Click for report":

```
=HYPERLINK("http://example.microsoft.com/report/budget report.xls",
"Click for report")
```

The following example creates a hyperlink to cell F10 on the worksheet named Annual in the workbook Budget Report.xls, which is stored on the Internet at the location named `example.microsoft.com/report`. The cell on the worksheet that contains the hyperlink displays the contents of cell D1 as the jump text:

```
=HYPERLINK("[http://example.microsoft.com/report/budget
report.xls]Annual!F10", D1)
```

The following example creates a hyperlink to the range named DeptTotal on the worksheet named First Quarter in the workbook Budget Report.xls, which is stored on the Internet at the location named `example.microsoft.com/report`. The cell on the worksheet that contains the hyperlink displays the text "Click to see First Quarter Department Total":

```
=HYPERLINK("[http://example.microsoft.com/report/budget
report.xls]First Quarter!DeptTotal", "Click to see First Quarter
Department Total")
```

To create a hyperlink to a specific location in a Microsoft Word document, you must use a bookmark to define the location you want to jump to in the document. The following example creates a hyperlink to the bookmark named QrtlyProfits

in the document named Annual Report.doc located at example.microsoft.com:

```
=HYPERLINK("[http://example.microsoft.com/Annual  
Report.doc]QrtlyProfits", "Quarterly Profit Report")
```

In Excel for Windows, the following example displays the contents of cell D5 as the jump text in the cell and opens the file named 1stqtr.xls, which is stored on the server named FINANCE in the Statements share. This example uses a UNC path:

```
=HYPERLINK("\\FINANCE\Statements\1stqtr.xls", D5)
```

The following example opens the file 1stqtr.xls in Excel for Windows that is stored in a directory named Finance on drive D, and displays the numeric value stored in cell H10:

```
=HYPERLINK("D:\FINANCE\1stqtr.xls", H10)
```

In Excel for Windows, the following example creates a hyperlink to the area named Totals in another (external) workbook, Mybook.xls:

```
=HYPERLINK("[C:\My Documents\Mybook.xls]Totals")
```

In Microsoft Excel for the Macintosh, the following example displays "Click here" in the cell and opens the file named First Quarter that is stored in a folder named Budget Reports on the hard drive named Macintosh HD:

```
=HYPERLINK("Macintosh HD:Budget Reports:First Quarter", "Click  
here")
```

You can create hyperlinks within a worksheet to jump from one cell to another cell. For example, if the active worksheet is the sheet named June in the workbook named Budget, the following formula creates a hyperlink to cell E56. The link text itself is the value in cell E56.

```
=HYPERLINK("[Budget]June!E56", E56)
```

To jump to a different sheet in the same workbook, change the name of the sheet in the link. In the previous example, to create a link to cell E56 on the September sheet, change the word "June" to "September."

[Show All](#)

# INDEX

## [See Also](#)

Returns a value or the reference to a value from within a table or range. There are two forms of the INDEX() function: [array](#) and reference. The array form always returns a value or an array of values; the reference form always returns a reference.

INDEX(**array**,row\_num,column\_num) returns the value of a specified cell or array of cells within array.

INDEX(**reference**,row\_num,column\_num,area\_num) returns a reference to specified cells within reference.

## [Syntax 1 \(array\)](#)

## [Syntax 2 \(reference\)](#)

[Show All](#)

# INDIRECT

## [See Also](#)

Returns the reference specified by a text string. References are immediately evaluated to display their contents. Use INDIRECT when you want to change the reference to a cell within a formula without changing the formula itself.

## Syntax

**INDIRECT(ref\_text,a1)**

**Ref\_text** is a reference to a cell that contains an A1-style reference, an R1C1-style reference, a name defined as a reference, or a reference to a cell as a text string. If **ref\_text** is not a valid cell reference, INDIRECT returns the #REF! error value.

- If **ref\_text** refers to another workbook (an external reference), the other workbook must be open. If the source workbook is not open, INDIRECT returns the #REF! error value.

**A1** is a logical value that specifies what type of reference is contained in the cell **ref\_text**.

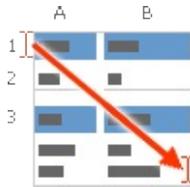
- If **a1** is TRUE or omitted, **ref\_text** is interpreted as an A1-style reference.
- If **a1** is FALSE, **ref\_text** is interpreted as an R1C1-style reference.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Data</b>
	B2	1.333
	B3	45
<b>1</b>	George	10
<b>2</b>	5	62
<b>3</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>4</b>	=INDIRECT(\$A\$2)	Value of the reference in cell A2 (1.333)
<b>5</b>	=INDIRECT(\$A\$3)	Value of the reference in cell A3 (45)
	=INDIRECT(\$A\$4)	If the cell B4 has the defined name "George," the value of the defined name is returned (10)
	=INDIRECT("B"&\$A\$5)	Value of a reference in cell A5 (62)

When you create a formula that refers to a cell, the reference to the cell will be updated if: (1) the cell is moved by using the **Cut** command to delete the cell or (2) the cell is moved because rows or columns are inserted or deleted. If you always want the formula to refer to the same cell regardless of whether the row above the cell is deleted or the cell is moved, use the INDIRECT worksheet function. For example, if you always want to refer to cell A10, use the following syntax:

=INDIRECT("A10")

[Show All](#)

# LOOKUP

## [See Also](#)

Returns a value either from a one-row or one-column range or from an [array](#). The LOOKUP function has two syntax forms: vector and array. The vector form of LOOKUP looks in a one-row or one-column range (known as a vector) for a value and returns a value from the same position in a second one-row or one-column range. The array form of LOOKUP looks in the first row or column of an array for the specified value and returns a value from the same position in the last row or column of the array.

## [Syntax 1 \(vector\)](#)

## [Syntax 2 \(array\)](#)

[Show All](#)

# MATCH

## [See Also](#)

Returns the relative position of an item in an [array](#) that matches a specified value in a specified order. Use MATCH instead of one of the LOOKUP functions when you need the position of an item in a range instead of the item itself.

## Syntax

**MATCH(lookup\_value,lookup\_array,match\_type)**

Lookup\_value is the value you use to find the value you want in a table.

- Lookup\_value is the value you want to match in lookup\_array. For example, when you look up someone's number in a telephone book, you are using the person's name as the lookup value, but the telephone number is the value you want.
- Lookup\_value can be a value (number, text, or logical value) or a cell reference to a number, text, or logical value.

Lookup\_array is a contiguous range of cells containing possible lookup values. Lookup\_array must be an array or an array reference.

Match\_type is the number -1, 0, or 1. Match\_type specifies how Microsoft Excel matches lookup\_value with values in lookup\_array.

- If match\_type is 1, MATCH finds the largest value that is less than or equal to lookup\_value. Lookup\_array must be placed in ascending order: ...-2, -1, 0, 1, 2, ..., A-Z, FALSE, TRUE.
- If match\_type is 0, MATCH finds the first value that is exactly equal to lookup\_value. Lookup\_array can be in any order.

- If match\_type is -1, MATCH finds the smallest value that is greater than or equal to lookup\_value. Lookup\_array must be placed in descending order: TRUE, FALSE, Z-A, ...2, 1, 0, -1, -2, ..., and so on.
- If match\_type is omitted, it is assumed to be 1.

## Remarks

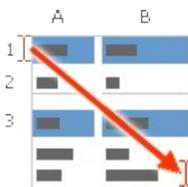
- MATCH returns the position of the matched value within lookup\_array, not the value itself. For example, MATCH("b",{ "a","b","c"},0) returns 2, the relative position of "b" within the array {"a","b","c"}.
- MATCH does not distinguish between uppercase and lowercase letters when matching text values.
- If MATCH is unsuccessful in finding a match, it returns the #N/A error value.
- If match\_type is 0 and lookup\_value is text, lookup\_value can contain the wildcard characters asterisk (\*) and question mark (?). An asterisk matches any sequence of characters; a question mark matches any single character.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to

**Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Product</b>	<b>Count</b>
	Bananas	25
	Oranges	38
<b>1</b>	Apples	40
<b>2</b>	Pears	41
<b>3</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>4</b>		Because there is not an exact match, the position of
<b>5</b>	=MATCH(39,B2:B5,1)	the next lowest value (38) in the range B2:B5 is returned. (2)
	=MATCH(41,B2:B5,0)	The position of 41 in the range B2:B5. (4)
	=MATCH(40,B2:B5,-1)	Returns an error because the range B2:B5 is not in descending order. (#N/A)

[Show All](#)

# OFFSET

## [See Also](#)

Returns a reference to a range that is a specified number of rows and columns from a cell or range of cells. The reference that is returned can be a single cell or a range of cells. You can specify the number of rows and the number of columns to be returned.

## Syntax

**OFFSET(reference,rows,cols,height,width)**

**Reference** is the reference from which you want to base the offset. Reference must refer to a cell or range of adjacent cells; otherwise, OFFSET returns the #VALUE! error value.

**Rows** is the number of rows, up or down, that you want the upper-left cell to refer to. Using 5 as the rows argument specifies that the upper-left cell in the reference is five rows below reference. Rows can be positive (which means below the starting reference) or negative (which means above the starting reference).

**Cols** is the number of columns, to the left or right, that you want the upper-left cell of the result to refer to. Using 5 as the cols argument specifies that the upper-left cell in the reference is five columns to the right of reference. Cols can be positive (which means to the right of the starting reference) or negative (which means to the left of the starting reference).

**Height** is the height, in number of rows, that you want the returned reference to be. Height must be a positive number.

**Width** is the width, in number of columns, that you want the returned reference to be. Width must be a positive number.

## Remarks

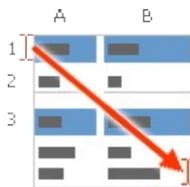
- If rows and cols offset reference over the edge of the worksheet, OFFSET returns the #REF! error value.
- If height or width is omitted, it is assumed to be the same height or width as reference.
- OFFSET doesn't actually move any cells or change the selection; it just returns a reference. OFFSET can be used with any function expecting a reference argument. For example, the formula SUM(OFFSET(C2,1,2,3,1)) calculates the total value of a 3-row by 1-column range that is 1 row below and 2 columns to the right of cell C2.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

**A**  
**Formula**

**B**  
**Description (Result)**

- |          |   |  |
|----------|---|--|
| <b>1</b> | <code>=OFFSET(C3,2,3,1,1)</code>          | Displays the value in cell F5 (0)          |
| <b>2</b> | <code>=SUM(OFFSET(C3:E5,-1,0,3,3))</code> | Sums the range C2:E4 (0)                   |
| <b>3</b> | <code>=OFFSET(C3:E5,0,-3,3,3)</code>      | Returns an error, because the reference is |
| <b>4</b> |   | not on the worksheet (#REF!)               |

[Show All](#)

# ROW

## [See Also](#)

Returns the row number of a reference.

## Syntax

**ROW**(reference)

Reference is the cell or range of cells for which you want the row number.

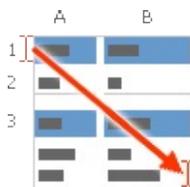
- If reference is omitted, it is assumed to be the reference of the cell in which the ROW function appears.
- If reference is a range of cells, and if ROW is entered as a vertical [array](#), ROW returns the row numbers of reference as a vertical array.
- Reference cannot refer to multiple areas.

## Example 1

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.

- In the worksheet, select cell A1, and press CTRL+V.
- To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

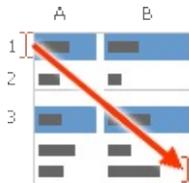
A	B
<b>1 Formula</b>	<b>Description (Result)</b>
2 =ROW()	Row in which the formula appears (2)
3 =ROW(C10)	Row of the reference (10)

## Example 2

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

- Create a blank workbook or worksheet.
- Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

- Press CTRL+C.
- In the worksheet, select cell A1, and press CTRL+V.
- To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

A	B
<b>1 Formula</b>	<b>Description (Result)</b>
2 =ROW(C4:D6)	First row in the reference (4)
3	Second row in the reference (5)

4

Third row in the reference (6)

**Note** The formula in the example must be entered as an [array formula](#). After copying the example to a blank worksheet, select the range A2:A4 starting with the formula cell. Press F2, and then press CTRL+SHIFT+ENTER. If the formula is not entered as an array formula, the single result is 4.

[Show All](#)

# ROWS

## [See Also](#)

Returns the number of rows in a reference or [array](#).

## Syntax

### ROWS(array)

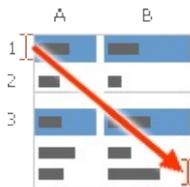
Array is an array, an [array formula](#), or a reference to a range of cells for which you want the number of rows.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=ROWS(C1:E4)	Number of rows in the reference (4)
<b>3</b>	=ROWS({1,2,3;4,5,6})	Number of rows in the array constant (2)

[Show All](#)

# RTD

## [See Also](#)

Retrieves real-time data from a program that supports [COM automation](#).

## Syntax

**=RTD(ProgID,server,topic1,[topic2],...)**

**ProgID** the name of the ProgID of a registered COM automation [add-in](#) that has been installed on the local computer. Enclose the name in quotation marks.

**server** name of the server where the add-in should be run. If there is no server, and the program is run locally, leave the argument blank. Otherwise, enter quotation marks ("" ) around the server name. When using RTD within [Visual Basic for Applications \(VBA\)](#), double quotation marks or the VBA **NullString** property are required for the server, even if the server is running locally.

**topic1, topic2,...** 1 to 28 parameters that together represent a unique piece of real-time data.

## Remarks

- The RTD COM automation add-in must be created and registered on a local computer. If you haven't installed a real-time data server, you will get an error message in a cell when you try to use the RTD function.
- When the server has been programmed to continually update results, unlike other functions, RTD formulas will change when Microsoft Excel is in automatic calculation mode.

## Example

Formula	Description (Result)
=RTD("MyComAddIn.Progid", "LOREM_IPSUM", "Price")	Data

[Show All](#)

# TRANSPOSE

## [See Also](#)

Returns a vertical range of cells as a horizontal range, or vice versa.

TRANSPOSE must be entered as an [array formula](#) in a range that has the same number of rows and columns, respectively, as an [array](#) has columns and rows. Use TRANSPOSE to shift the vertical and horizontal orientation of an array on a worksheet.

## Syntax

### TRANSPOSE(array)

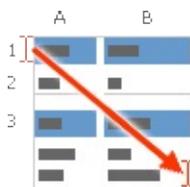
Array is an array or range of cells on a worksheet that you want to transpose. The transpose of an array is created by using the first row of the array as the first column of the new array, the second row of the array as the second column of the new array, and so on.

## Example 1

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	B	C
	Data	Data	Data
1		2	3
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>	
2	=TRANSPOSE(\$A\$2:\$C\$2)	Value from first column (1)	
		Value from second column (2)	
		Value from third column (3)	

**Note** The formula in the example must be entered as an array formula. After copying the example to a blank worksheet, select the range A5:A7 starting with the formula cell. Press F2, and then press CTRL+SHIFT+ENTER. If the formula is not entered as an array formula, the single result is 1.

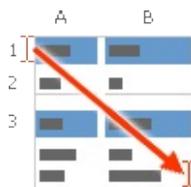
## Example 2

Some functions, such as LINEST, return horizontal arrays. LINEST returns a horizontal array of the slope and Y-intercept for a line. The following formula returns a vertical array of the slope and Y-intercept from LINEST.

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



## Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Known y</b>	<b>Known x</b>
<b>1</b>	1	0
<b>2</b>	9	4
<b>3</b>	5	2
<b>4</b>	7	3
	<b>Formula</b>	<b>Description (Result)</b>
<b>5</b>	=TRANSPOSE(LINEST(A2:A5,B2:B5,,FALSE))	Slope (2) Y-intercept (1)

**Note** The formula in the example must be entered as an array formula. After copying the example to a blank worksheet, select the range A7:A8 starting with the formula cell. Press F2, and then press CTRL+SHIFT+ENTER. If the formula is not entered as an array formula, the single result is 2.

[Show All](#)

# VLOOKUP

## [See Also](#)

Searches for a value in the leftmost column of a table, and then returns a value in the same row from a column you specify in the table. Use VLOOKUP instead of HLOOKUP when your comparison values are located in a column to the left of the data you want to find.

The V in VLOOKUP stands for "Vertical."

## Syntax

**VLOOKUP(lookup\_value,table\_array,col\_index\_num,range\_lookup)**

Lookup\_value is the value to be found in the first column of the [array](#). Lookup\_value can be a value, a reference, or a text string.

Table\_array is the table of information in which data is looked up. Use a reference to a range or a range name, such as Database or List.

- If range\_lookup is TRUE, the values in the first column of table\_array must be placed in ascending order: ..., -2, -1, 0, 1, 2, ..., A-Z, FALSE, TRUE; otherwise VLOOKUP may not give the correct value. If range\_lookup is FALSE, table\_array does not need to be sorted.
- You can put the values in ascending order by choosing the **Sort** command from the **Data** menu and selecting **Ascending**.
- The values in the first column of table\_array can be text, numbers, or logical values.
- Uppercase and lowercase text are equivalent.

Col\_index\_num is the column number in table\_array from which the matching

value must be returned. A col\_index\_num of 1 returns the value in the first column in table\_array; a col\_index\_num of 2 returns the value in the second column in table\_array, and so on. If col\_index\_num is less than 1, VLOOKUP returns the #VALUE! error value; if col\_index\_num is greater than the number of columns in table\_array, VLOOKUP returns the #REF! error value.

Range\_lookup is a logical value that specifies whether you want VLOOKUP to find an exact match or an approximate match. If TRUE or omitted, an approximate match is returned. In other words, if an exact match is not found, the next largest value that is less than lookup\_value is returned. If FALSE, VLOOKUP will find an exact match. If one is not found, the error value #N/A is returned.

## Remarks

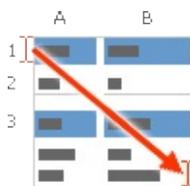
- If VLOOKUP can't find lookup\_value, and range\_lookup is TRUE, it uses the largest value that is less than or equal to lookup\_value.
- If lookup\_value is smaller than the smallest value in the first column of table\_array, VLOOKUP returns the #N/A error value.
- If VLOOKUP can't find lookup\_value, and range\_lookup is FALSE, VLOOKUP returns the #N/A value.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.

4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

The example uses values for air at 1 atm pressure.

	<b>A</b>	<b>B</b>	<b>C</b>
	<b>Density</b>	<b>Viscosity</b>	<b>Temperature</b>
	0.457	3.55	500
	0.525	3.25	400
	0.616	2.93	300
	0.675	2.75	250
	0.746	2.57	200
	0.835	2.38	150
	0.946	2.17	100
	1.09	1.95	50
	1.29	1.71	0
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>	
<b>2</b>		Looks up 1 in column A, and returns the value from column B in the same row (2.17)	
<b>3</b>	=VLOOKUP(1,A2:C10,2)		
<b>4</b>		Looks up 1 in column A, and returns the value from column C in the same row (100)	
<b>6</b>	=VLOOKUP(1,A2:C10,3,TRUE)		
<b>7</b>		Looks up 0.746 in column A. Because there is no exact match in column A, an error is returned (#N/A)	
<b>9</b>	=VLOOKUP(.7,A2:C10,3,FALSE)		
<b>10</b>	=VLOOKUP(0.1,A2:C10,2,TRUE)	Looks up 0.1 in column A. Because 0.1 is less than the smallest value in column A, an error is	

=VLOOKUP(2,A2:C10,2,TRUE)

returned (#N/A)

Looks up 2 in column A,  
and returns the value  
from column B in the  
same row (1.71)

# Math and Trigonometry functions

[ABS](#) Returns the absolute value of a number

[ACOS](#) Returns the arccosine of a number

[ACOSH](#) Returns the inverse hyperbolic cosine of a number

[ASIN](#) Returns the arcsine of a number

[ASINH](#) Returns the inverse hyperbolic sine of a number

[ATAN](#) Returns the arctangent of a number

[ATAN2](#) Returns the arctangent from x- and y-coordinates

[ATANH](#) Returns the inverse hyperbolic tangent of a number

[CEILING](#) Rounds a number to the nearest integer or to the nearest multiple of significance

[COMBIN](#) Returns the number of combinations for a given number of objects

[COS](#) Returns the cosine of a number

[COSH](#) Returns the hyperbolic cosine of a number

[DEGREES](#) Converts radians to degrees

[EVEN](#) Rounds a number up to the nearest even integer

[EXP](#) Returns  $e$  raised to the power of a given number

[FACT](#) Returns the factorial of a number

[FACTDOUBLE](#) Returns the double factorial of a number

[FLOOR](#) Rounds a number down, toward zero

[GCD](#) Returns the greatest common divisor

[INT](#) Rounds a number down to the nearest integer

[LCM](#) Returns the least common multiple

[LN](#) Returns the natural logarithm of a number

[LOG](#) Returns the logarithm of a number to a specified base

[LOG10](#) Returns the base-10 logarithm of a number

[MDETERM](#) Returns the matrix determinant of an array

[MINVERSE](#) Returns the matrix inverse of an array

[MMULT](#) Returns the matrix product of two arrays

[MOD](#) Returns the remainder from division

[MROUND](#) Returns a number rounded to the desired multiple

[MULTINOMIAL](#) Returns the multinomial of a set of numbers

[ODD](#) Rounds a number up to the nearest odd integer

[PI](#) Returns the value of pi

[POWER](#) Returns the result of a number raised to a power

[PRODUCT](#) Multiplies its arguments

[QUOTIENT](#) Returns the integer portion of a division

[RADIANS](#) Converts degrees to radians

[RAND](#) Returns a random number between 0 and 1

[RANDBETWEEN](#) Returns a random number between the numbers you specify

[ROMAN](#) Converts an arabic numeral to roman, as text

[ROUND](#) Rounds a number to a specified number of digits

[ROUNDDOWN](#) Rounds a number down, toward zero

[ROUNDUP](#) Rounds a number up, away from zero

[SERIESSUM](#) Returns the sum of a power series based on the formula

[SIGN](#) Returns the sign of a number

[SIN](#) Returns the sine of the given angle

[SINH](#) Returns the hyperbolic sine of a number

[SQRT](#) Returns a positive square root

[SQRTPI](#) Returns the square root of (number \* pi)

[SUBTOTAL](#) Returns a subtotal in a list or database

[SUM](#) Adds its arguments

[SUMIF](#) Adds the cells specified by a given criteria

[SUMPRODUCT](#) Returns the sum of the products of corresponding array components

[SUMSQ](#) Returns the sum of the squares of the arguments

[SUMX2MY2](#) Returns the sum of the difference of squares of corresponding values in two arrays

[SUMX2PY2](#) Returns the sum of the sum of squares of corresponding values in two arrays

[SUMXMY2](#) Returns the sum of squares of differences of corresponding values in two arrays

[TAN](#) Returns the tangent of a number

[TANH](#) Returns the hyperbolic tangent of a number

TRUNC Truncates a number to an integer

[Show All](#)

# ABS

## [See Also](#)

Returns the absolute value of a number.  
The absolute value of a number is the number without its sign.

## Syntax

**ABS(number)**

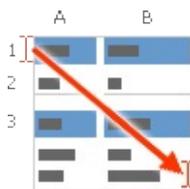
Number is the real number of which you want the absolute value.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

**A**

**Data**

1	-4		
	<b>Formula</b>	<b>Description (Result)</b>	
2	=ABS(2)	Absolute value of 2 (2)	
	=ABS(-2)	Absolute value of -2 (2)	
	=ABS(A2)	Absolute value of -4 (4)	

[Show All](#)

# ACOS

## [See Also](#)

Returns the arccosine, or inverse cosine, of a number. The arccosine is the angle whose cosine is *number*. The returned angle is given in radians in the range 0 (zero) to pi.

## Syntax

**ACOS(number)**

Number is the cosine of the angle you want and must be from -1 to 1.

## Remark

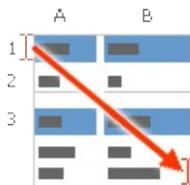
If you want to convert the result from radians to degrees, multiply it by 180/PI() or use the DEGREES function.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=ACOS(-0.5)	Arccosine of -0.5 in radians, 2*pi/3 (2.094395)
<b>3</b>	=ACOS(-0.5)*180/PI()	Arccosine of -0.5 in degrees (120)
<b>4</b>	=DEGREES(ACOS(-0.5))	Arccosine of -0.5 in degrees (120)

[Show All](#)

# ACOSH

## [See Also](#)

Returns the inverse hyperbolic cosine of a number. Number must be greater than or equal to 1. The inverse hyperbolic cosine is the value whose hyperbolic cosine is *number*, so  $ACOSH(COSH(number))$  equals *number*.

## Syntax

**ACOSH(number)**

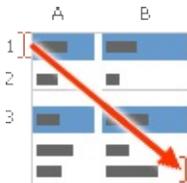
Number is any real number equal to or greater than 1.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return

the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

<b>A</b>	<b>B</b>
<b>1 Formula</b>	<b>Description (Result)</b>
<b>2</b> =ACOSH(1)	Inverse hyperbolic cosine of 1 (0)
<b>3</b> =ACOSH(10)	Inverse hyperbolic cosine of 10 (2.993223)

[Show All](#)

# ASIN

## [See Also](#)

Returns the arcsine, or inverse sine, of a number. The arcsine is the angle whose sine is *number*. The returned angle is given in radians in the range  $-\pi/2$  to  $\pi/2$ .

## Syntax

**ASIN(number)**

Number is the sine of the angle you want and must be from -1 to 1.

## Remark

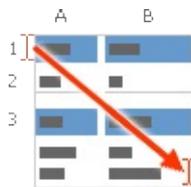
To express the arcsine in degrees, multiply the result by  $180/\text{PI}()$  or use the DEGREES function.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=ASIN(-0.5)	Arcsine of -0.5 in radians, -pi/6 (-0.5236)
<b>3</b>	=ASIN(-0.5)*180/PI()	Arcsine of -0.5 in degrees (-30)
<b>4</b>	=DEGREES(ASIN(-0.5))	Arcsine of -0.5 in degrees (-30)

[Show All](#)

# ASINH

## [See Also](#)

Returns the inverse hyperbolic sine of a number. The inverse hyperbolic sine is the value whose hyperbolic sine is *number*, so ASINH(SINH(number)) equals *number*.

## Syntax

**ASINH(number)**

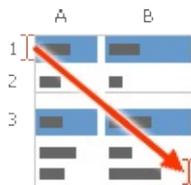
Number is any real number.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

<b>A</b>	<b>B</b>
<b>1 Formula</b>	<b>Description (Result)</b>
<b>2</b> =ASINH(-2.5)	Inverse hyperbolic sine of -2.5 (-1.64723)
<b>3</b> =ASINH(10)	Inverse hyperbolic sine of 10 (2.998223)

[Show All](#)

# ATAN

## [See Also](#)

Returns the arctangent, or inverse tangent, of a number. The arctangent is the angle whose tangent is *number*. The returned angle is given in radians in the range  $-\pi/2$  to  $\pi/2$ .

## Syntax

**ATAN (number)**

Number is the tangent of the angle you want.

## Remark

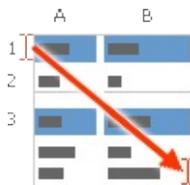
To express the arctangent in degrees, multiply the result by  $180/\text{PI}()$  or use the DEGREES function.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=ATAN(1)	Arctangent of 1 in radians, pi/4 (0.785398)
<b>3</b>	=ATAN(1)*180/PI()	Arctangent of 1 in degrees (45)
<b>4</b>	=DEGREES(ATAN(1))	Arctangent of 1 in degrees (45)

[Show All](#)

# ATAN2

## [See Also](#)

Returns the arctangent, or inverse tangent, of the specified x- and y-coordinates. The arctangent is the angle from the x-axis to a line containing the origin (0, 0) and a point with coordinates (x\_num, y\_num). The angle is given in radians between -pi and pi, excluding -pi.

## Syntax

**ATAN2(x\_num,y\_num)**

X\_num is the x-coordinate of the point.

Y\_num is the y-coordinate of the point.

## Remarks

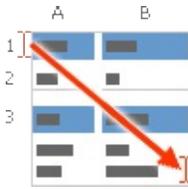
- A positive result represents a counterclockwise angle from the x-axis; a negative result represents a clockwise angle.
- ATAN2(a,b) equals ATAN(b/a), except that a can equal 0 in ATAN2.
- If both x\_num and y\_num are 0, ATAN2 returns the #DIV/0! error value.
- To express the arctangent in degrees, multiply the result by 180/PI( ) or use the DEGREES function.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Formula</b>	<b>Description (Result)</b>
<b>1</b>	=ATAN2(1, 1)	Arctangent of the point 1,1 in radians, pi/4 (0.785398)
<b>2</b>	=ATAN2(-1, -1)	Arctangent of the point -1,-1 in radians, -3*pi/4 (-2.35619)
<b>3</b>		
<b>4</b>	=ATAN2(-1, -1)*180/PI()	Arctangent of the point 1,1 in degrees (-135)
<b>5</b>	=DEGREES(ATAN2(-1, -1))	Arctangent of the point 1,1 in degrees (-135)

[Show All](#)

# ATANH

## [See Also](#)

Returns the inverse hyperbolic tangent of a number. Number must be between -1 and 1 (excluding -1 and 1). The inverse hyperbolic tangent is the value whose hyperbolic tangent is *number*, so  $\text{ATANH}(\text{TANH}(\text{number}))$  equals *number*.

## Syntax

**ATANH(number)**

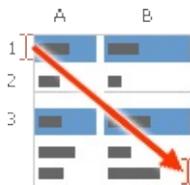
Number is any real number between 1 and -1.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return

the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Formula</b>	<b>Description (Result)</b>
<b>1</b>		
<b>2</b>	=ATANH(0.76159416)	Inverse hyperbolic tangent of 0.76159416 (1, approximately)
<b>3</b>	=ATANH(-0.1)	Inverse hyperbolic tangent of -0.1 (-0.10034)

[Show All](#)

# CEILING

## [See Also](#)

Returns number rounded up, away from zero, to the nearest multiple of significance. For example, if you want to avoid using pennies in your prices and your product is priced at \$4.42, use the formula =CEILING(4.42,0.05) to round prices up to the nearest nickel.

## Syntax

**CEILING(number,significance)**

Number is the value you want to round.

Significance is the multiple to which you want to round.

## Remarks

- If either argument is nonnumeric, CEILING returns the #VALUE! error value.
- Regardless of the sign of number, a value is rounded up when adjusted away from zero. If number is an exact multiple of significance, no rounding occurs.
- If number and significance have different signs, CEILING returns the #NUM! error value.

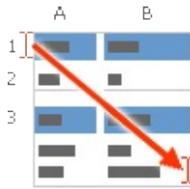
## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column

headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Formula</b>	<b>Description (Result)</b>
<b>1</b>	=CEILING(2.5, 1)	Rounds 2.5 up to nearest multiple of 1 (3)
<b>2</b>	=CEILING(-2.5, -2)	Rounds -2.5 up to nearest multiple of -2 (-4)
<b>3</b>	=CEILING(-2.5, 2)	Returns an error, because -2.5 and 2 have different signs (#NUM!)
<b>4</b>	=CEILING(1.5,	
<b>5</b>	0.1)	Rounds 1.5 up to the nearest multiple of 0.1 (1.5)
<b>6</b>	=CEILING(0.234,	
	0.01)	Rounds 0.234 up to the nearest multiple of 0.01 (0.24)

[Show All](#)

# COMBIN

## [See Also](#)

Returns the number of combinations for a given number of items. Use COMBIN to determine the total possible number of groups for a given number of items.

## Syntax

**COMBIN(number,number\_chosen)**

Number is the number of items.

Number chosen is the number of items in each combination.

## Remarks

- Numeric arguments are truncated to integers.
- If either argument is nonnumeric, COMBIN returns the #VALUE! error value.
- If number < 0, number\_chosen < 0, or number < number\_chosen, COMBIN returns the #NUM! error value.
- A combination is any set or subset of items, regardless of their internal order. Combinations are distinct from permutations, for which the internal order is significant.
- The number of combinations is as follows, where number = n and number\_chosen = k:

$$\binom{n}{k} = \frac{P_{k,n}}{k!} = \frac{n!}{k!(n-k)!}$$

where:

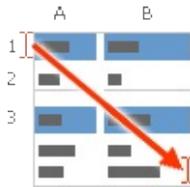
$$P_{k,n} = \frac{n!}{(n-k)!}$$

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	B
1	<b>Formula</b>	<b>Description (Result)</b>
2	=COMBIN(8,2)	Possible two-person teams that can be formed from 8 candidates (28)

[Show All](#)

# COS

## [See Also](#)

Returns the cosine of the given angle.

## Syntax

### **COS(number)**

Number is the angle in radians for which you want the cosine.

## Remark

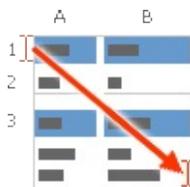
If the angle is in degrees, multiply it by  $\text{PI}()/180$  or use the COS function to convert it to radians.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return

the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=COS(1.047)	Cosine of 1.047 radians (0.500171)
<b>3</b>	=COS(60*PI()/180)	Cosine of 60 degrees (0.5)
<b>4</b>	=COS(RADIANS(60))	Cosine of 60 degrees (0.5)

[Show All](#)

# COSH

## [See Also](#)

Returns the hyperbolic cosine of a number.

## Syntax

### COSH(number)

Number is any real number for which you want to find the hyperbolic cosine.

## Remark

The formula for the hyperbolic cosine is:

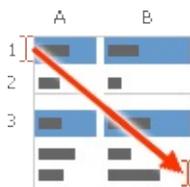
$$\text{COSH}(z) = \frac{e^z + e^{-z}}{2}$$

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.

5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Formula</b>	<b>Description (Result)</b>
<b>1</b>		
<b>2</b>	=COSH(4)	Hyperbolic cosine of 4 (27.30823)
<b>3</b>	=COSH(EXP(1))	Hyperbolic cosine of the base of the natural logarithm (7.610125)

[Show All](#)

# COUNTIF

## [See Also](#)

Counts the number of cells within a range that meet the given criteria.

## Syntax

**COUNTIF(range,criteria)**

Range is the range of cells from which you want to count cells.

Criteria is the criteria in the form of a number, expression, or text that defines which cells will be counted. For example, criteria can be expressed as 32, "32", ">32", "apples".

## Remark

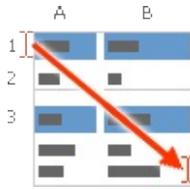
Microsoft Excel provides additional functions that can be used to analyze your data based on a condition. For example, to calculate a sum based on a string of text or a number within a range, use the SUMIF worksheet function. To have a formula return one of two values based on a condition, such as a sales bonus based on a specified sales amount, use the IF worksheet function.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>		<b>B</b>
	<b>Data</b>		<b>Data</b>
	apples		32
<b>1</b>	oranges		54
<b>2</b>	peaches		75
<b>3</b>	apples		86
<b>4</b>	<b>Formula</b>		<b>Description (Result)</b>
<b>5</b>	=COUNTIF(A2:A5,"apples")		Number of cells with apples in the first column above (2)
	=COUNTIF(B2:B5,">55")		Number of cells with a value greater than 55 in the second column above (2)

[Show All](#)

# DEGREES

[See Also](#)

Converts radians into degrees.

## Syntax

### DEGREES(angle)

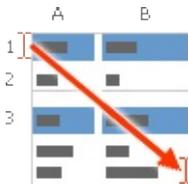
Angle is the angle in radians that you want to convert.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	B
1	Formula	Description (Result)

**2 =DEGREES(PI()) Degrees of pi radians (180)**

[Show All](#)

# EVEN

## [See Also](#)

Returns number rounded up to the nearest even integer. You can use this function for processing items that come in twos. For example, a packing crate accepts rows of one or two items. The crate is full when the number of items, rounded up to the nearest two, matches the crate's capacity.

## Syntax

### **EVEN(number)**

Number is the value to round.

## Remarks

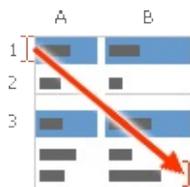
- If number is nonnumeric, EVEN returns the #VALUE! error value.
- Regardless of the sign of number, a value is rounded up when adjusted away from zero. If number is an even integer, no rounding occurs.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



## Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

<b>A</b>	<b>B</b>
<b>1 Formula</b>	<b>Description (Result)</b>
<b>2</b> =EVEN(1.5)	Rounds 1.5 up to the nearest even integer (2)
<b>3</b> =EVEN(3)	Rounds 3 up to the nearest even integer (4)
<b>4</b> =EVEN(2)	Rounds 2 up to the nearest even integer (2)
<b>5</b> =EVEN(-1)	Rounds -1 up to the nearest even integer (-2)

[Show All](#)

# EXP

## [See Also](#)

Returns e raised to the power of number.  
The constant e equals 2.71828182845904,  
the base of the natural logarithm.

## Syntax

### EXP(number)

Number is the exponent applied to the base e.

## Remarks

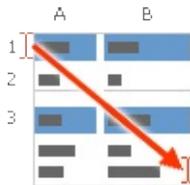
- To calculate powers of other bases, use the exponentiation operator (^).
- EXP is the inverse of LN, the natural logarithm of number.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.

4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

<b>A</b>	<b>B</b>
<b>1 Formula</b>	<b>Description (Result)</b>
<b>2</b> =EXP(1)	Approximate value of e (2.718282)
<b>3</b> =EXP(2)	Base of the natural logarithm e raised to the power of 2 (7.389056)

[Show All](#)

# FACT

## [See Also](#)

Returns the factorial of a number. The factorial of a number is equal to  $1*2*3*...*$  number.

## Syntax

**FACT(number)**

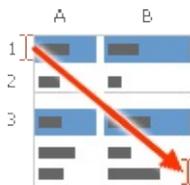
Number is the nonnegative number you want the factorial of. If number is not an integer, it is truncated.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

<b>A</b>	<b>B</b>
<b>1 Formula</b>	<b>Description (Result)</b>
<b>2</b> =FACT(5)	Factorial of 5, or 1*2*3*4*5 (120)
<b>3</b> =FACT(1.9)	Factorial of the integer of 1.9 (1)
<b>4</b> =FACT(0)	Factorial of 0 (1)
<b>5</b> =FACT(-1)	Negative numbers cause an error value (#NUM!)
<b>6</b> =FACT(1)	Factorial of 1 (1)

[Show All](#)

# FACTDOUBLE

## [See Also](#)

Returns the double factorial of a number.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**FACTDOUBLE(number)**

Number is the value for which to return the double factorial. If number is not an integer, it is truncated.

## Remarks

- If number is nonnumeric, FACTDOUBLE returns the #VALUE! error value.
- If number is negative, FACTDOUBLE returns the #NUM! error value.
- If number is even:

$$n!! = n(n-2)(n-4)\dots(4)(2)$$

- If number is odd:

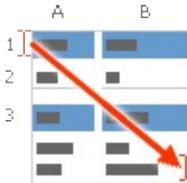
$$n!! = n(n-2)(n-4)\dots(3)(1)$$

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=FACTDOUBLE(6)	Double factorial of 6 (48)
<b>3</b>	=FACTDOUBLE(7)	Double factorial of 7 (105)

[Show All](#)

# FLOOR

## [See Also](#)

Rounds number down, toward zero, to the nearest multiple of significance.

## Syntax

**FLOOR(number,significance)**

Number is the numeric value you want to round.

Significance is the multiple to which you want to round.

## Remarks

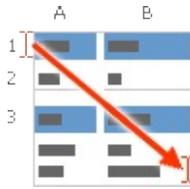
- If either argument is nonnumeric, FLOOR returns the #VALUE! error value.
- If number and significance have different signs, FLOOR returns the #NUM! error value.
- Regardless of the sign of number, a value is rounded down when adjusted away from zero. If number is an exact multiple of significance, no rounding occurs.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

A	B
Formula	Description (Result)
1 =FLOOR(2.5, 1)	Rounds 2.5 down to nearest multiple of 1 (2)
2 =FLOOR(-2.5, -2)	Rounds -2.5 down to nearest multiple of -2 (-2)
3 =FLOOR(-2.5, 2)	Returns an error, because -2.5 and 2 have different signs (#NUM!)
4 =FLOOR(-2.5, 2)	
5 =FLOOR(1.5, 0.1)	Rounds 1.5 down to the nearest multiple of 0.1 (1.5)
6 =FLOOR(0.234, 0.01)	Rounds 0.234 down to the nearest multiple of 0.01 (0.23)

[Show All](#)

# GCD

## [See Also](#)

Returns the greatest common divisor of two or more integers. The greatest common divisor is the largest integer that divides both number1 and number2 without a remainder.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**GCD**(number1,number2, ...)

Number1, number2, ... are 1 to 29 values. If any value is not an integer, it is truncated.

## Remarks

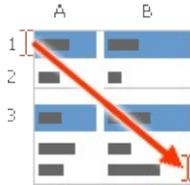
- If any argument is nonnumeric, GCD returns the #VALUE! error value.
- If any argument is less than zero, GCD returns the #NUM! error value.
- One divides any value evenly.
- A prime number has only itself and one as even divisors.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

## How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=GCD(5, 2)	Greatest common divisor of 5 and 2 (1)
<b>3</b>	=GCD(24, 36)	Greatest common divisor of 24 and 36 (12)
<b>4</b>	=GCD(7, 1)	Greatest common divisor of 7 and 1 (1)
<b>5</b>	=GCD(5, 0)	Greatest common divisor of 5 and 0 (5)

[Show All](#)

# INT

## [See Also](#)

Rounds a number down to the nearest integer.

## Syntax

**INT(number)**

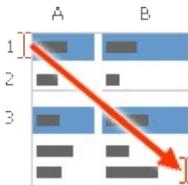
Number is the real number you want to round down to an integer.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

A

## Data

19.5

<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=INT(8.9)	Rounds 8.9 down (8)
	=INT(-8.9)	Rounds -8.9 down (-9)
	=A2- INT(A2)	Returns the decimal part of a positive real number in cell A2 (0.5)

[Show All](#)

# LCM

## [See Also](#)

Returns the least common multiple of integers. The least common multiple is the smallest positive integer that is a multiple of all integer arguments number1, number2, and so on. Use LCM to add fractions with different denominators.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**LCM**(number1,number2, ...)

Number1, number2,... are 1 to 29 values for which you want the least common multiple. If value is not an integer, it is truncated.

## Remarks

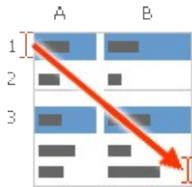
- If any argument is nonnumeric, LCM returns the #VALUE! error value.
- If any argument is less than zero, LCM returns the #NUM! error value.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=LCM(5, 2)	Least common multiple of 5 and 2 (10)
<b>3</b>	=LCM(24, 36)	Least common multiple of 24 and 36 (72)

[Show All](#)

# LN

## [See Also](#)

Returns the natural logarithm of a number.  
Natural logarithms are based on the constant  $e$  (2.71828182845904).

## Syntax

**LN(number)**

Number is the positive real number for which you want the natural logarithm.

## Remark

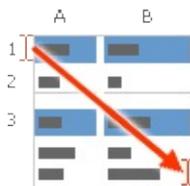
LN is the inverse of the EXP function.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.

5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

<b>A</b>	<b>B</b>
<b>1</b> <b>Formula</b>	<b>Description (Result)</b>
<b>2</b> =LN(86)	Natural logarithm of 86 (4.454347)
<b>3</b> =LN(2.7182818)	Natural logarithm of the value of the constant e (1)
<b>4</b> =LN(EXP(3))	Natural logarithm of e raised to the power of 3 (3)

[Show All](#)

# LOG

## [See Also](#)

Returns the logarithm of a number to the base you specify.

## Syntax

**LOG(number,base)**

Number is the positive real number for which you want the logarithm.

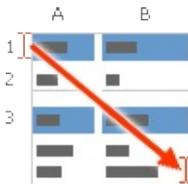
Base is the base of the logarithm. If base is omitted, it is assumed to be 10.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

## [How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=LOG(10)	Logarithm of 10 (1)
<b>3</b>	=LOG(8, 2)	Logarithm of 8 with base 2 (3)
<b>4</b>	=LOG(86, 2.7182818)	Logarithm of 86 with base e (4.454347)

[Show All](#)

# LOG10

## [See Also](#)

Returns the base-10 logarithm of a number.

## Syntax

### LOG10(number)

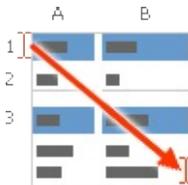
Number is the positive real number for which you want the base-10 logarithm.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

**A**

**B**

<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=LOG10(86)	Base-10 logarithm of 86 (1.934498451)
<b>3</b>	=LOG10(10)	Base-10 logarithm of 10 (1)
<b>4</b>	=LOG10(1E5)	Base-10 logarithm of 1E5 (5)
<b>5</b>	=LOG10(10^5)	Base-10 logarithm of 10^5 (5)

[Show All](#)

# MDETERM

## [See Also](#)

Returns the matrix determinant of an array.

## Syntax

**MDETERM(array)**

Array is a numeric array with an equal number of rows and columns.

## Remarks

- Array can be given as a cell range, for example, A1:C3; as an array constant, such as {1,2,3;4,5,6;7,8,9}; or as a name to either of these.
- If any cells in array are empty or contain text, MDETERM returns the #VALUE! error value.
- MDETERM also returns #VALUE! if array does not have an equal number of rows and columns.
- The matrix determinant is a number derived from the values in array. For a three-row, three-column array, A1:C3, the determinant is defined as:

MDETERM(A1:C3) equals  
 $A1*(B2*C3-B3*C2) + A2*(B3*C1-B1*C3) + A3*(B1*C2-B2*C1)$

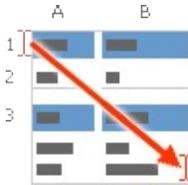
- Matrix determinants are generally used for solving systems of mathematical equations that involve several variables.
- MDETERM is calculated with an accuracy of approximately 16 digits, which may lead to a small numeric error when the calculation is not complete. For example, the determinant of a singular matrix may differ from zero by 1E-16.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
	<b>Data</b>	<b>Data</b>	<b>Data</b>	<b>Data</b>
1		3	8	5
1		3	6	1
1		1	1	0
7		3	10	2
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>		
<b>2</b>	=MDETERM(A2:D5)	Determinant of the matrix above (88)		
<b>3</b>				
<b>4</b>	=MDETERM({3,6,1;1,1,0;3,10,2})	Determinant of the matrix as an array constant (1)		
<b>5</b>	=MDETERM({3,6;1,1})	Determinant of the matrix in the array constant (-3)		
	=MDETERM({1,3,8,5;1,3,6,1})	Returns an error because the array does not have an equal number of rows and columns		

(#VALUE!)

[Show All](#)

# MINVERSE

## [See Also](#)

Returns the inverse matrix for the matrix stored in an array.

## Syntax

**MINVERSE(array)**

Array is a numeric array with an equal number of rows and columns.

## Remarks

- Array can be given as a cell range, such as A1:C3; as an array constant, such as {1,2,3;4,5,6;7,8,9}; or as a name for either of these.
- If any cells in array are empty or contain text, MINVERSE returns the #VALUE! error value.
- MINVERSE also returns the #VALUE! error value if array does not have an equal number of rows and columns.
- Formulas that return arrays must be entered as array formulas.
- Inverse matrices, like determinants, are generally used for solving systems of mathematical equations involving several variables. The product of a matrix and its inverse is the identity matrix—the square array in which the diagonal values equal 1, and all other values equal 0.
- As an example of how a two-row, two-column matrix is calculated, suppose that the range A1:B2 contains the letters a, b, c, and d that represent any four numbers. The following table shows the inverse of the matrix A1:B2.

	<b>Column A</b>	<b>Column B</b>
Row 1	$d/(a*d-b*c)$	$b/(b*c-a*d)$
Row 2	$c/(b*c-a*d)$	$a/(a*d-b*c)$

- MINVERSE is calculated with an accuracy of approximately 16 digits,

which may lead to a small numeric error when the cancellation is not complete.

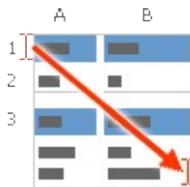
- Some square matrices cannot be inverted and will return the #NUM! error value with MINVERSE. The determinant for a noninvertible matrix is 0.

### Example 1

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Data</b>
<b>1</b>	4	-1
<b>2</b>	2	0
<b>3</b>	<b>Formula</b>	<b>Formula</b>
	=MINVERSE(A2:B3)	

**Note** The formula in the example must be entered as an array formula. After copying the example to a blank worksheet, select the range A5:B6 starting with the formula cell. Press F2, and then press CTRL+SHIFT+ENTER. If the formula

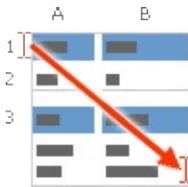
is not entered as an array formula, the single result is 0.

## Example 2

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>	<b>C</b>
	<b>Data</b>	<b>Data</b>	<b>Data</b>
<b>1</b>	1	2	1
<b>2</b>	3	4	-1
<b>3</b>	0	2	0
<b>4</b>	<b>Formula</b>	<b>Formula</b>	<b>Formula</b>
	=MINVERSE(A2:C4)		

**Note** The formula in the example must be entered as an array formula. After copying the example to a blank worksheet, select the range A6:C8 starting with the formula cell. Press F2, and then press CTRL+SHIFT+ENTER. If the formula is not entered as an array formula, the single result is 0.25.



Tip

Use the INDEX function to access individual elements from the inverse matrix.

[Show All](#)

# MMULT

## [See Also](#)

Returns the matrix product of two arrays.  
The result is an array with the same number of rows as array1 and the same number of columns as array2.

## Syntax

**MMULT(array1,array2)**

Array1, array2 are the arrays you want to multiply.

## Remarks

- The number of columns in array1 must be the same as the number of rows in array2, and both arrays must contain only numbers.
- Array1 and array2 can be given as cell ranges, array constants, or references.
- If any cells are empty or contain text, or if the number of columns in array1 is different from the number of rows in array2, MMULT returns the #VALUE! error value.
- The matrix product array a of two arrays b and c is:

$$a_{ij} = \sum_{k=1}^n b_{ik}c_{kj}$$

where i is the row number, and j is the column number.

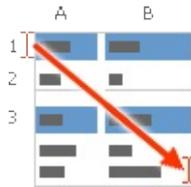
- Formulas that return arrays must be entered as array formulas.

## Example 1

The example may be easier to understand if you copy it to a blank worksheet.

## How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Array 1</b>	<b>Array 1</b>
<b>1</b>	1	3
<b>2</b>	7	2
<b>3</b>	<b>Array 2</b>	<b>Array 2</b>
<b>4</b>	2	0
<b>5</b>	0	2
<b>6</b>	<b>Formula</b>	<b>Formula</b>
	=MMULT(A2:B3,A5:B6)	

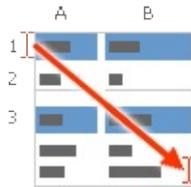
**Note** The formula in the example must be entered as an array formula. After copying the example to a blank worksheet, select the range A8:B9 starting with the formula cell. Press F2, and then press CTRL+SHIFT+ENTER. If the formula is not entered as an array formula, the single result is 2.

### Example 2

The example may be easier to understand if you copy it to a blank worksheet.

## How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Array 1</b>	<b>Array 1</b>
<b>1</b>	3	0
<b>2</b>	2	0
<b>3</b>	<b>Array 2</b>	<b>Array 2</b>
<b>4</b>	2	0
<b>5</b>	0	2
<b>6</b>	<b>Formula</b>	<b>Formula</b>
	=MMULT(A2:B3,A5:B6)	

**Note** The formula in the example must be entered as an array formula. After copying the example to a blank worksheet, select the range A8:B9 starting with the formula cell. Press F2, and then press CTRL+SHIFT+ENTER. If the formula is not entered as an array formula, the single result is 6.

[Show All](#)

# MOD

## [See Also](#)

Returns the remainder after number is divided by divisor. The result has the same sign as divisor.

## Syntax

**MOD(number,divisor)**

Number is the number for which you want to find the remainder.

Divisor is the number by which you want to divide number.

## Remarks

- If divisor is 0, MOD returns the #DIV/0! error value.
- The MOD function can be expressed in terms of the INT function:

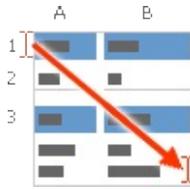
$$\text{MOD}(n, d) = n - d * \text{INT}(n/d)$$

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

A	B
1 <b>Formula</b>	<b>Description (Result)</b>
2 =MOD(3, 2)	Remainder of 3/2 (1)
3 =MOD(-3, 2)	Remainder of -3/2. The sign is the same as divisor (1)
4 =MOD(3, -2)	Remainder of 3/-2. The sign is the same as divisor (-1)
5 =MOD(-3, -2)	Remainder of -3/-2. The sign is the same as divisor (-1)

[Show All](#)

# MROUND

## [See Also](#)

Returns a number rounded to the desired multiple.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**MROUND(number,multiple)**

Number is the value to round.

Multiple is the multiple to which you want to round number.

## Remark

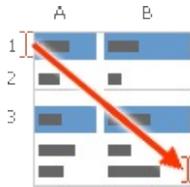
MROUND rounds up, away from zero, if the remainder of dividing number by multiple is greater than or equal to half the value of multiple.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

## [How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Formula</b>	<b>Description (Result)</b>
<b>1</b>	=MROUND(10, 3)	Rounds 10 to a nearest multiple of 3 (9)
<b>2</b>	=MROUND(-10, -3)	Rounds 10 to a nearest multiple of 3 (-9)
<b>3</b>	=MROUND(1.3, 0.2)	Rounds 1.3 to a nearest multiple of 0.2 (1.4)
<b>4</b>	=MROUND(5, -2)	Returns an error, because -2 and 5 have different signs (#NUM!)
<b>5</b>		

[Show All](#)

# MULTINOMIAL

## [See Also](#)

Returns the ratio of the factorial of a sum of values to the product of factorials.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**MULTINOMIAL**(number1,number2, ...)

Number1,number2, ... are 1 to 29 values for which you want the multinomial.

## Remarks

- If any argument is nonnumeric, MULTINOMIAL returns the #VALUE! error value.
- If any argument is less than one, MULTINOMIAL returns the #NUM! error value.
- The multinomial is:

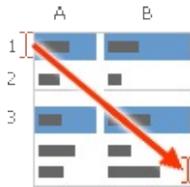
$$\text{MULTINOMIAL}(a,b,c) = \frac{(a+b+c)!}{a!b!c!}$$

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=MULTINOMIAL(2, 3, 4)	Ratio of the factorial of a sum of 2, 3 and 4 to the product of factorials (1260)

[Show All](#)

# ODD

## [See Also](#)

Returns number rounded up to the nearest odd integer.

## Syntax

**ODD(number)**

Number is the value to round.

## Remarks

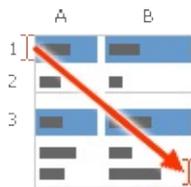
- If number is nonnumeric, ODD returns the #VALUE! error value.
- Regardless of the sign of number, a value is rounded up when adjusted away from zero. If number is an odd integer, no rounding occurs.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.

4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

<b>A</b>	<b>B</b>
<b>1 Formula</b>	<b>Description (Result)</b>
<b>2</b> =ODD(1.5)	Rounds 1.5 up to the nearest odd integer (3)
<b>3</b> =ODD(3)	Rounds 3 up to the nearest odd integer (3)
<b>4</b> =ODD(2)	Rounds 2 up to the nearest odd integer (3)
<b>5</b> =ODD(-1)	Rounds -1 up to the nearest odd integer (-1)
<b>6</b> =ODD(-2)	Rounds -2 up to the nearest odd integer (-3)

[Show All](#)

# PI

## [See Also](#)

Returns the number 3.14159265358979, the mathematical constant pi, accurate to 15 digits.

## Syntax

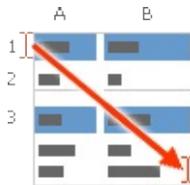
PI( )

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

**A**  
**Radius**

3

<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=PI()	Pi (3.14159265358979)
	=PI()/2	Pi/2 (1.570796327)
	=PI()*(A2^2)	Area of a circle, with the radius above (28.27433388)

[Show All](#)

# POWER

## [See Also](#)

Returns the result of a number raised to a power.

## Syntax

**POWER(number,power)**

Number is the base number. It can be any real number.

Power is the exponent to which the base number is raised.

## Remark

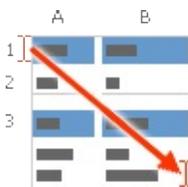
The "^" operator can be used instead of POWER to indicate to what power the base number is to be raised, such as in  $5^2$ .

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.

4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=POWER(5,2)	5 squared (25)
<b>3</b>	=POWER(98.6,3.2)	98.6 raised to the power of 3.2 (2401077)
<b>4</b>	=POWER(4,5/4)	4 raised to the power of 5/4 (5.656854)

[Show All](#)

# PRODUCT

## [See Also](#)

Multiplies all the numbers given as arguments and returns the product.

## Syntax

**PRODUCT**(number1,number2,...)

Number1, number2, ... are 1 to 30 numbers that you want to multiply.

## Remarks

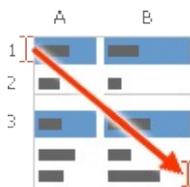
- Arguments that are numbers, logical values, or text representations of numbers are counted; arguments that are error values or text that cannot be translated into numbers cause errors.
- If an argument is an array or reference, only numbers in the array or reference are counted. Empty cells, logical values, text, or error values in the array or reference are ignored.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



## Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

A		
Data		
1	5	
2	15	
3	30	
4	Formula	Description (Result)
	=PRODUCT(A2:A4)	Multiplies the numbers above (2250)
	=PRODUCT(A2:A4, 2)	Multiplies the numbers above and 2 (4500)

[Show All](#)

# QUOTIENT

## [See Also](#)

Returns the integer portion of a division.  
Use this function when you want to discard the remainder of a division.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

[How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

**QUOTIENT(numerator,denominator)**

Numerator is the dividend.

Denominator is the divisor.

## Remark

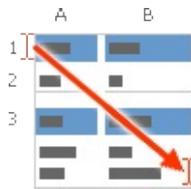
If either argument is nonnumeric, QUOTIENT returns the #VALUE! error value.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=QUOTIENT(5, 2)	Integer portion of 5/2 (2)
<b>3</b>	=QUOTIENT(4.5, 3.1)	Integer portion of 4.5/3.1 (1)
<b>4</b>	=QUOTIENT(-10, 3)	Integer portion of -10/3 (-3)

[Show All](#)

# RADIANS

[See Also](#)

Converts degrees to radians.

## Syntax

### RADIANS(angle)

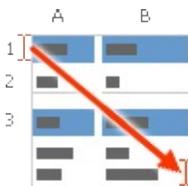
Angle is an angle in degrees that you want to convert.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	B
1	<b>Formula</b>	<b>Description (Result)</b>

**2** =RADIANS(270) 270 degrees as radians (4.712389 or  $3\pi/2$  radians)

[Show All](#)

# RAND

## [See Also](#)

Returns an evenly distributed random number greater than or equal to 0 and less than 1. A new random number is returned every time the worksheet is calculated.

## Syntax

**RAND()**

## Remarks

- To generate a random real number between a and b, use:

$\text{RAND()}*(b-a)+a$

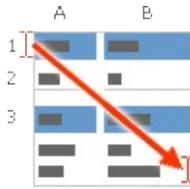
- If you want to use RAND to generate a random number but don't want the numbers to change every time the cell is calculated, you can enter =RAND() in the formula bar, and then press F9 to change the formula to a random number.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=RAND()	A random number between 0 and 1 (varies)
<b>3</b>	=RAND()*100	A random number equal to 0 but less than 100 (varies)

[Show All](#)

# RANDBETWEEN

## [See Also](#)

Returns a random number between the numbers you specify. A new random number is returned every time the worksheet is calculated.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

### **RANDBETWEEN(bottom,top)**

**Bottom** is the smallest integer RANDBETWEEN will return.

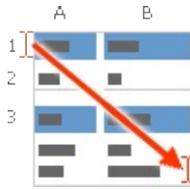
**Top** is the largest integer RANDBETWEEN will return.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

## [How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=RANDBETWEEN(1,100)	Random number between 1 and 100 (varies)
<b>3</b>	=RANDBETWEEN(-1,1)	Random number between -1 and 1 (varies)

[Show All](#)

# ROMAN

## [See Also](#)

Converts an arabic numeral to roman, as text.

## Syntax

**ROMAN**(number,form)

Number is the Arabic numeral you want converted.

Form is a number specifying the type of roman numeral you want. The roman numeral style ranges from Classic to Simplified, becoming more concise as the value of form increases. See the example following `ROMAN(499,0)` below.

Form	Type
0 or omitted	Classic.
1	More concise. See example below.
2	More concise. See example below.
3	More concise. See example below.
4	Simplified.
TRUE	Classic.
FALSE	Simplified.

## Remarks

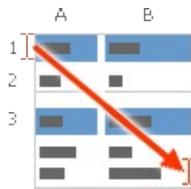
- If number is negative, the #VALUE! error value is returned.
- If number is greater than 3999, the #VALUE! error value is returned.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=ROMAN(499,0)	Classic roman numeral style for 499 (CDXCIX)
<b>3</b>	=ROMAN(499,1)	More concise version for 499 (LDVLIIV)
<b>4</b>	=ROMAN(499,2)	More concise version for 499 (XDIX)
<b>5</b>	=ROMAN(499,3)	More concise version for 499 (VDIV)
<b>6</b>	=ROMAN(499,4)	More concise version for 499 (ID)
<b>7</b>	=ROMAN(2013,0)	Classic roman numeral style for 2013 (MMXIII)

[Show All](#)

# ROUND

## [See Also](#)

Rounds a number to a specified number of digits.

## Syntax

**ROUND(number,num\_digits)**

Number is the number you want to round.

Num\_digits specifies the number of digits to which you want to round number.

## Remarks

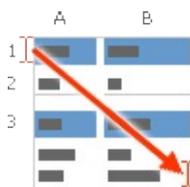
- If num\_digits is greater than 0 (zero), then number is rounded to the specified number of decimal places.
- If num\_digits is 0, then number is rounded to the nearest integer.
- If num\_digits is less than 0, then number is rounded to the left of the decimal point.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



## Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Formula</b>	<b>Description (Result)</b>
<b>1</b>	=ROUND(2.15, 1)	Rounds 2.15 to one decimal place (2.2)
<b>2</b>	=ROUND(2.149, 1)	Rounds 2.149 to one decimal place (2.1)
<b>4</b>	=ROUND(-1.475, 2)	Rounds -1.475 to two decimal places (-1.48)
<b>5</b>	=ROUND(21.5, -1)	Rounds 21.5 to one decimal place to the left of the decimal point (20)

[Show All](#)

# ROUNDDOWN

## [See Also](#)

Rounds a number down, toward zero.

## Syntax

**ROUNDDOWN(number,num\_digits)**

Number is any real number that you want rounded down.

Num\_digits is the number of digits to which you want to round number.

## Remarks

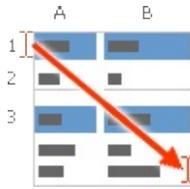
- ROUNDDOWN behaves like ROUND, except that it always rounds a number down.
- If num\_digits is greater than 0 (zero), then number is rounded down to the specified number of decimal places.
- If num\_digits is 0, then number is rounded down to the nearest integer.
- If num\_digits is less than 0, then number is rounded down to the left of the decimal point.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Formula</b>	<b>Description (Result)</b>
<b>1</b>	=ROUNDDOWN(3.2, 0)	Rounds 3.2 down to zero decimal places (3)
<b>2</b>	=ROUNDDOWN(76.9,0)	Rounds 76.9 down to zero decimal places (76)
<b>3</b>		
<b>4</b>	=ROUNDDOWN(3.14159, 3)	Rounds 3.14159 down to three decimal places (3.141)
<b>5</b>		
<b>6</b>	=ROUNDDOWN(-3.14159, 1)	Rounds -3.14159 down to one decimal place (-3.1)
	=ROUNDDOWN(31415.92654, -2)	Rounds 31415.92654 down to 2 decimal places to the left of the decimal (31400)

[Show All](#)

# ROUNDUP

## [See Also](#)

Rounds a number up, away from 0 (zero).

## Syntax

**ROUNDUP(number,num\_digits)**

Number is any real number that you want rounded up.

Num\_digits is the number of digits to which you want to round number.

## Remarks

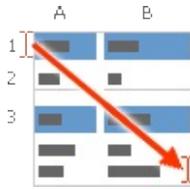
- ROUNDUP behaves like ROUND, except that it always rounds a number up.
- If num\_digits is greater than 0 (zero), then number is rounded up to the specified number of decimal places.
- If num\_digits is 0, then number is rounded up to the nearest integer.
- If num\_digits is less than 0, then number is rounded up to the left of the decimal point.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Formula</b>	<b>Description (Result)</b>
<b>1</b>	=ROUNDUP(3.2,0)	Rounds 3.2 up to zero decimal places (4)
<b>2</b>	=ROUNDUP(76.9,0)	Rounds 76.9 up to zero decimal places (77)
<b>3</b>	=ROUNDUP(3.14159, 3)	Rounds 3.14159 up to three decimal places
<b>4</b>		(3.142)
<b>5</b>	=ROUNDUP(-3.14159, 1)	Rounds -3.14159 up to one decimal place (-3.2)
<b>6</b>	=ROUNDUP(31415.92654, -2)	Rounds 31415.92654 up to 2 decimal places to the left of the decimal (31500)

[Show All](#)

# SERIESSUM

## [See Also](#)

Returns the sum of a power series based on the formula:

$$\text{SERIES}(x, n, m, a) = a_1x^n + a_2x^{(n+m)} + a_3x^{(n+2m)} \\ + \dots + a_jx^{(n+(j-1)m)}$$

Many functions can be approximated by a power series expansion.

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.



1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

### **SERIESSUM(x,n,m,coefficients)**

**X** is the input value to the power series.

**N** is the initial power to which you want to raise x.

**M** is the step by which to increase n for each term in the series.

**Coefficients** is a set of coefficients by which each successive power of x is multiplied. The number of values in coefficients determines the number of terms in the power series. For example, if there are three values in coefficients, then there will be three terms in the power series.

## Remark

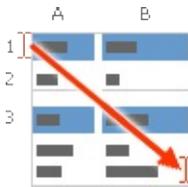
If any argument is nonnumeric, SERIESSUM returns the #VALUE! error value.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

<b>A</b>		
<b>Coefficients</b>		
<b>1</b>	=PI()/4	
<b>2</b>	1	
<b>3</b>	=-1/FACT(2)	
<b>4</b>	=1/FACT(4)	
<b>5</b>	=-1/FACT(6)	
<b>6</b>	<b>Formula</b>	<b>Description (Result)</b>
	=SERIESSUM(A2,0,2,A3:A6)	Approximation to the cosine of Pi/4 radians, or 45 degrees (0.707103)

[Show All](#)

# SIGN

## [See Also](#)

Determines the sign of a number. Returns 1 if the number is positive, zero (0) if the number is 0, and -1 if the number is negative.

## Syntax

**SIGN(number)**

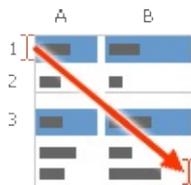
Number is any real number.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

<b>A</b>	<b>B</b>	
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=SIGN(10)	Sign of a positive number (1)
<b>3</b>	=SIGN(4-4)	Sign of zero (0)
<b>4</b>	=SIGN(-0.00001)	Sign of a negative number (-1)

[Show All](#)

# SIN

## [See Also](#)

Returns the sine of the given angle.

## Syntax

### SIN(number)

Number is the angle in radians for which you want the sine.

## Remark

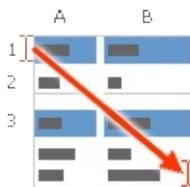
If your argument is in degrees, multiply it by  $\text{PI}()/180$  or use the RADIANS function to convert it to radians.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return

the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=SIN(PI())	Sine of pi radians (0, approximately)
<b>3</b>	=SIN(PI()/2)	Sine of pi/2 radians (1)
<b>4</b>	=SIN(30*PI()/180)	Sine of 30 degrees (0.5)
<b>5</b>	=SIN(RADIANS(30))	Sine of 30 degrees (0.5)

[Show All](#)

# SINH

## [See Also](#)

Returns the hyperbolic sine of a number.

## Syntax

**SINH(number)**

Number is any real number.

## Remark

The formula for the hyperbolic sine is:

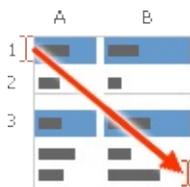
$$\text{SINH}(z) = \frac{e^z - e^{-z}}{2}$$

## Example 1

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.

- To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

A	B
<b>1 Formula</b>	<b>Description (Result)</b>
2 =SINH(1)	Hyperbolic sine of 1 (1.175201194)
3 =SINH(-1)	Hyperbolic sine of -1 (-1.175201194)

### Example 2

You can use the hyperbolic sine function to approximate a cumulative probability distribution. Suppose a laboratory test value varies between 0 and 10 seconds. An empirical analysis of the collected history of experiments shows that the probability of obtaining a result,  $x$ , of less than  $t$  seconds is approximated by the following equation:

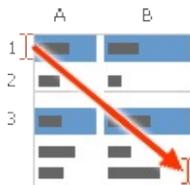
$$P(x < t) = 2.868 * \text{SINH}(0.0342 * t), \text{ where } 0 < t < 10$$

To calculate the probability of obtaining a result of less than 1.03 seconds, substitute 1.03 for  $t$ .

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

- Create a blank workbook or worksheet.
- Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

- Press CTRL+C.
- In the worksheet, select cell A1, and press CTRL+V.

5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=2.868*SINH(0.0342*1.03)	Probability of obtaining a result of less than 1.03 seconds (0.101049063)

You can expect this result to occur about 101 times for every 1000 experiments.

[Show All](#)

# SQRT

## [See Also](#)

Returns a positive square root.

## Syntax

**SQRT(number)**

Number is the number for which you want the square root.

## Remark

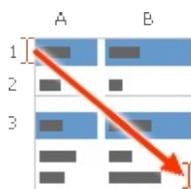
If number is negative, SQRT returns the #NUM! error value.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to

**Formula Auditing**, and then click **Formula Auditing Mode**.

**A**

**Data**

-16

	<b>Formula</b>	<b>Description (Result)</b>
<b>1</b>	=SQRT(16)	Square root of 16 (4)
<b>2</b>	=SQRT(A2)	Square root of the number above. Because the number is negative, an error is returned (#NUM!)
	=SQRT(ABS(A2))	Square root of the absolute value of the number above (4)

[Show All](#)

# SQRTPI

## [See Also](#)

Returns the square root of (number \* pi).

If this function is not available, and returns the #NAME? error, install and load the Analysis ToolPak add-in.

## [How?](#)

1. On the **Tools** menu, click **Add-Ins**.
2. In the **Add-Ins available** list, select the **Analysis ToolPak** box, and then click **OK**.
3. If necessary, follow the instructions in the setup program.

## Syntax

### SQRTPI(number)

Number is the number by which pi is multiplied.

## Remark

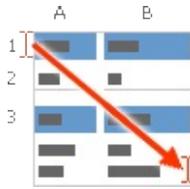
If number < 0, SQRTPI returns the #NUM! error value.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

## [How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=SQRTPI(1)	Square root of pi (1.772454)
<b>3</b>	=SQRTPI(2)	Square root of 2 * pi (2.506628)

[Show All](#)

# SUBTOTAL

## [See Also](#)

Returns a subtotal in a list or database. It is generally easier to create a list with subtotals using the **Subtotals** command (**Data** menu). Once the subtotal list is created, you can modify it by editing the SUBTOTAL function.

## Syntax

**SUBTOTAL(function\_num, ref1, ref2, ...)**

Function\_num is the number 1 to 11 (includes hidden values) or 101 to 111 (ignores hidden values) that specifies which function to use in calculating subtotals within a list.

<b>Function_num (includes hidden values)</b>	<b>Function_num (ignores hidden values)</b>	<b>Function</b>
1	101	AVERAGE
2	102	COUNT
3	103	COUNTA
4	104	MAX
5	105	MIN
6	106	PRODUCT
7	107	STDEV
8	108	STDEVP
9	109	SUM
10	110	VAR
11	111	VARP

Ref1, ref2, are 1 to 29 ranges or references for which you want the subtotal.

## Remarks

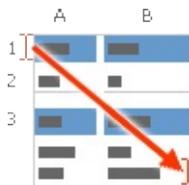
- If there are other subtotals within ref1, ref2,... (or nested subtotals), these nested subtotals are ignored to avoid double counting.
- For the function\_num constants from 1 to 11, the SUBTOTAL function includes the values of rows hidden by the **Hide** command under the **Row** submenu of the **Format** menu). Use these constants when you want to subtotal hidden and nonhidden numbers in a list. For the function\_Num constants from 101 to 111, the SUBTOTAL function ignores values of rows hidden by the **Hide** command under the **Row** submenu of the **Format** menu). Use these constants when you want to subtotal only nonhidden numbers in a list.
- The SUBTOTAL function ignores any rows that are not included in the result of a filter, no matter which function\_num value you use.
- The SUBTOTAL function is designed for columns of data, or vertical ranges. It is not designed for rows of data, or horizontal ranges. For example, when you subtotal a horizontal range using a function\_num of 101 or greater, such as SUBTOTAL(109,B2:G2), hiding a column does not affect the subtotal. But, hiding a row in a subtotal of a vertical range does affect the subtotal.
- If any of the references are 3-D references, SUBTOTAL returns the #VALUE! error value.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

<b>A</b>	
<b>Data</b>	
	120
<b>1</b>	10
<b>2</b>	150
<b>3</b>	23
<b>4</b>	<b>Formula</b>
<b>5</b>	<b>Description (Result)</b>
	=SUBTOTAL(9,A2:A5) Subtotal of the column above using the SUM function (303)
	=SUBTOTAL(1,A2:A5) Subtotal of the column above using the AVERAGE function (75.75)

[Show All](#)

# SUM

## [See Also](#)

Adds all the numbers in a range of cells.

## Syntax

**SUM**(number1,number2, ...)

Number1, number2, ... are 1 to 30 arguments for which you want the total value or sum.

## Remarks

- Numbers, logical values, and text representations of numbers that you type directly into the list of arguments are counted. See the first and second examples following.
- If an argument is an array or reference, only numbers in that array or reference are counted. Empty cells, logical values, text, or error values in the array or reference are ignored. See the third example following.
- Arguments that are error values or text that cannot be translated into numbers cause errors.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



[Show All](#)

# SUMIF

## [See Also](#)

Adds the cells specified by a given criteria.

## Syntax

**SUMIF**(range,criteria,sum\_range)

Range is the range of cells you want evaluated.

Criteria is the criteria in the form of a number, expression, or text that defines which cells will be added. For example, criteria can be expressed as 32, "32", ">32", "apples".

Sum\_range are the actual cells to sum.

## Remarks

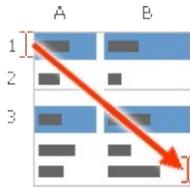
- The cells in sum\_range are summed only if their corresponding cells in range match the criteria.
- If sum\_range is omitted, the cells in range are summed.
- Microsoft Excel provides additional functions that can be used to analyze your data based on a condition. For example, to count the number of occurrences of a string of text or a number within a range of cells, use the COUNTIF function. To have a formula return one of two values based on a condition, such as a sales bonus based on a specified sales amount, use the IF function.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Property Value</b>	<b>Commission</b>
<b>1</b>	100,000	7,000
<b>2</b>	200,000	14,000
<b>3</b>	300,000	21,000
<b>4</b>	400,000	28,000
<b>5</b>	<b>Formula</b>	<b>Description (Result)</b>
	=SUMIF(A2:A5,">160000",B2:B5)	Sum of the commissions for property values over 160000 (63,000)

[Show All](#)

# SUMPRODUCT

## [See Also](#)

Multiplies corresponding components in the given arrays, and returns the sum of those products.

## Syntax

**SUMPRODUCT**(array1,array2,array3, ...)

Array1, array2, array3, ... are 2 to 30 arrays whose components you want to multiply and then add.

## Remarks

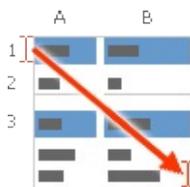
- The array arguments must have the same dimensions. If they do not, SUMPRODUCT returns the #VALUE! error value.
- SUMPRODUCT treats array entries that are not numeric as if they were zeros.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



## Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	B	C	D
	<b>Array 1</b>	<b>Array 1</b>	<b>Array 2</b>	<b>Array 2</b>
3		4	2	7
1 8		6	6	7
2 1		9	5	3
3	<b>Formula</b>	<b>Description (Result)</b>		
4		Multiplies all the components of		
	=SUMPRODUCT(A2:B4, C2:D4)	the two arrays and then adds the products— that is, $3*2 + 4*7 + 8*6 + 6*7 + 1*5 + 9*3$ . (156)		

### Remark

The preceding example returns the same result as the formula SUM(A2:B4\*C2:D4) entered as an array. Using arrays provides a more general solution for doing operations similar to SUMPRODUCT. For example, you can calculate the sum of the squares of the elements in A2:B4 by using the formula =SUM(A2:B4^2) and pressing CTRL+SHIFT+ENTER.

[Show All](#)

# SUMSQ

## [See Also](#)

Returns the sum of the squares of the arguments.

## Syntax

**SUMSQ**(number1,number2, ...)

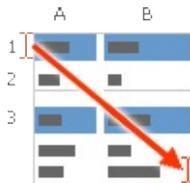
Number1, number2, ... are 1 to 30 arguments for which you want the sum of the squares. You can also use a single array or a reference to an array instead of arguments separated by commas.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=SUMSQ(3, 4)	Sum of the squares of 3 and 4 (25)

[Show All](#)

# SUMX2MY2

## [See Also](#)

Returns the sum of the difference of squares of corresponding values in two arrays.

## Syntax

**SUMX2MY2(array\_x,array\_y)**

Array\_x is the first array or range of values.

Array\_y is the second array or range of values.

## Remarks

- The arguments should be either numbers or names, arrays, or references that contain numbers.
- If an array or reference argument contains text, logical values, or empty cells, those values are ignored; however, cells with the value zero are included.
- If array\_x and array\_y have a different number of values, SUMX2MY2 returns the #N/A error value.
- The equation for the sum of the difference of squares is:

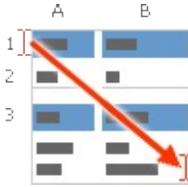
$$\text{SUMX2MY2} = \sum (x^2 - y^2)$$

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>		<b>B</b>
	<b>First array</b>		<b>Second array</b>
<b>1</b>	3		5
<b>2</b>	9		11
<b>3</b>	1		7
<b>4</b>	8		5
<b>5</b>	7		4
<b>6</b>	5		4
<b>7</b>	<b>Formula</b>		<b>Description (Result)</b>
<b>8</b>	=SUMX2MY2(A2:A8,B2:B8)		Sum of the difference of squares of the two arrays above (-55)
	=SUMX2MY2({2, 3, 9, 1, 8, 7, 5}, {6, 5, 11, 7, 5, 4, 4})		Sum of the difference of squares of the two arrays constants (-55)

[Show All](#)

# SUMX2PY2

## [See Also](#)

Returns the sum of the sum of squares of corresponding values in two arrays. The sum of the sum of squares is a common term in many statistical calculations.

## Syntax

**SUMX2PY2(array\_x,array\_y)**

Array\_x is the first array or range of values.

Array\_y is the second array or range of values.

## Remarks

- The arguments should be either numbers or names, arrays, or references that contain numbers.
- If an array or reference argument contains text, logical values, or empty cells, those values are ignored; however, cells with the value zero are included.
- If array\_x and array\_y have a different number of values, SUMX2PY2 returns the #N/A error value.
- The equation for the sum of the sum of squares is:

$$\text{SUMX2PY2} = \sum (x^2 + y^2)$$

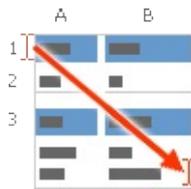
## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column

headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>		<b>B</b>
	<b>First array</b>		<b>Second array</b>
	2		6
<b>1</b>	3		5
<b>2</b>	9		11
<b>3</b>	1		7
<b>4</b>	8		5
<b>5</b>	7		4
<b>6</b>	5		4
<b>7</b>	<b>Formula</b>		<b>Description (Result)</b>
<b>8</b>	=SUMX2PY2(A2:A8,B2:B8)		Sum of the sum of squares of the two arrays above (521)
	=SUMX2PY2({2, 3, 9, 1, 8, 7, 5}, {6, 5, 11, 7, 5, 4, 4})		Sum of the sum of squares of the two arrays constants (521)

[Show All](#)

# SUMXMY2

## [See Also](#)

Returns the sum of squares of differences of corresponding values in two arrays.

## Syntax

**SUMXMY2(array\_x,array\_y)**

Array\_x is the first array or range of values.

Array\_y is the second array or range of values.

## Remarks

- The arguments should be either numbers or names, arrays, or references that contain numbers.
- If an array or reference argument contains text, logical values, or empty cells, those values are ignored; however, cells with the value zero are included.
- If array\_x and array\_y have a different number of values, SUMXMY2 returns the #N/A error value.
- The equation for the sum of squared differences is:

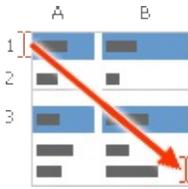
$$\text{SUMXMY2} = \sum (x - y)^2$$

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>		<b>B</b>
	<b>First array</b>		<b>Second array</b>
	2		6
<b>1</b>	3		5
<b>2</b>	9		11
<b>3</b>	1		7
<b>4</b>	8		5
<b>5</b>	7		4
<b>6</b>	5		4
<b>7</b>	<b>Formula</b>		<b>Description (Result)</b>
<b>8</b>	=SUMXMY2(A2:A8,B2:B8)		Sum of squares of differences of the two arrays above (79)
	=SUMXMY2({2, 3, 9, 1, 8, 7, 5}, {6, 5, 11, 7, 5, 4, 4})		Sum of squares of differences of the two arrays constants (79)

[Show All](#)

# TAN

## [See Also](#)

Returns the tangent of the given angle.

## Syntax

**TAN(number)**

Number is the angle in radians for which you want the tangent.

## Remark

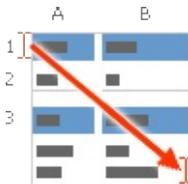
If your argument is in degrees, multiply it by  $\text{PI}()/180$  or use the RADIANS function to convert it to radians.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return

the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=TAN(0.785)	Tangent of 0.785 radians (0.99920)
<b>3</b>	=TAN(45*PI()/180)	Tangent of 45 degrees (1)
<b>4</b>	=TAN(RADIANS(45))	Tangent of 45 degrees (1)

[Show All](#)

# TANH

## [See Also](#)

Returns the hyperbolic tangent of a number.

## Syntax

**TANH(number)**

Number is any real number

## Remark

The formula for the hyperbolic tangent is:

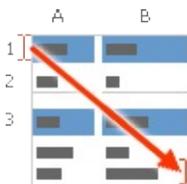
$$\text{TANH}(z) = \frac{\text{SINH}(z)}{\text{COSH}(z)}$$

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.

4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=TANH(-2)	Hyperbolic tangent of -2 (-0.96403)
<b>3</b>	=TANH(0)	Hyperbolic tangent of 0 (0)
<b>4</b>	=TANH(0.5)	Hyperbolic tangent of 0.5 (0.462117)

[Show All](#)

# TRUNC

## [See Also](#)

Truncates a number to an integer by removing the fractional part of the number.

## Syntax

**TRUNC**(number,num\_digits)

Number is the number you want to truncate.

Num\_digits is a number specifying the precision of the truncation. The default value for num\_digits is 0 (zero).

## Remark

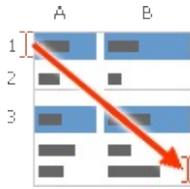
TRUNC and INT are similar in that both return integers. TRUNC removes the fractional part of the number. INT rounds numbers down to the nearest integer based on the value of the fractional part of the number. INT and TRUNC are different only when using negative numbers: TRUNC(-4.3) returns -4, but INT(-4.3) returns -5 because -5 is the lower number.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=TRUNC(8.9)	Integer part of 8.9 (8)
<b>3</b>	=TRUNC(-8.9)	Integer part of -8.9 (-8)
<b>4</b>	=TRUNC(PI())	Integer part of pi (3)

[Show All](#)

# External functions

These functions are loaded with [add-in](#) programs

[EUROCONVERT](#) Converts a number to euros, converts a number from euros to a euro member currency, or converts a number from one euro member currency to another by using the euro as an intermediary (triangulation)

[SQL.REQUEST](#) Connects with an external data source and runs a query from a worksheet, then returns the result as an array without the need for macro programming

[Show All](#)

# CALL

## [See Also](#)

**Caution** Incorrectly editing the registry may severely damage your operating system, requiring you to reinstall it. Microsoft cannot guarantee that problems resulting from editing the registry incorrectly can be resolved. Before editing the registry, back up any valuable data. For the most recent information about using and protecting your computer's registry, see Microsoft Windows Help.

Calls a procedure in a dynamic link library or code resource. There are two syntax forms of this function. Use syntax 1 only with a previously registered code resource, which uses arguments from the REGISTER function. Use syntax 2a or 2b to simultaneously register and call a code resource.

**Important** This function is provided for advanced users only. If you use the CALL function incorrectly, you may cause errors that will require you to restart your computer. This function is only available from an Excel macro sheet.

## **Syntax 1**

Used with REGISTER

**CALL(register\_id,argument1,...)**

## **Syntax 2a**

Used alone (in Microsoft Excel for Windows)

**CALL(module\_text,procedure,type\_text,argument1,...)**

## Syntax 2b

Used alone (in Microsoft Excel for the Macintosh)

**CALL(file\_text,resource,type\_text,argument1,...)**

Register\_id is the value returned by a previously executed REGISTER or REGISTER.ID function.

Argument1, ... are the arguments to be passed to the procedure.

Module\_text is quoted text specifying the name of the dynamic link library (DLL) that contains the procedure in Microsoft Excel for Windows.

File\_text is the name of the file that contains the code resource in Microsoft Excel for the Macintosh.

Procedure is text specifying the name of the function in the DLL in Microsoft Excel for Windows. You can also use the ordinal value of the function from the EXPORTS statement in the module-definition file (.DEF). The ordinal value must not be in the form of text.

Resource is the name of the code resource in Microsoft Excel for the Macintosh. You can also use the resource ID number. The resource ID number must not be in the form of text.

Type\_text is text specifying the data type of the return value and the data types of all arguments to the DLL or code resource. The first letter of type\_text specifies the return value. The codes you use for type\_text are described in detail in [Using the CALL and REGISTER Functions](#). For stand-alone DLLs or code resources (XLLs), you can omit this argument.

## Example

### Syntax 1 (32-Bit Microsoft Excel)

IN 32-bit Microsoft Excel for Windows, the following macro formula registers the GetTickCount function from 32-bit Microsoft Windows. GetTickCount returns the number of milliseconds that have elapsed since Microsoft Windows was started.

```
REGISTER("Kernel32", "GetTickCount", "J")
```

Assuming that this REGISTER function is in cell A5, after your macro registers GetTickCount, you can use the CALL function to return the number of milliseconds that have elapsed:

```
CALL(A5)
```

### **Syntax 1 (16-Bit Microsoft Excel)**

In 16-bit Microsoft Excel for Windows, the following macro formula registers the GetTickCount function from 16-bit Microsoft Windows. GetTickCount returns the number of milliseconds that have elapsed since Microsoft Windows was started.

```
REGISTER("User", "GetTickCount", "J")
```

Assuming that this REGISTER function is in cell A5, after your macro registers GetTickCount, you can use the CALL function to return the number of milliseconds that have elapsed:

```
CALL(A5)
```

### **Example**

#### **Syntax 2a (32-Bit Microsoft Excel)**

On a worksheet, you can use the following CALL formula (syntax 2a) to call the GetTickCount function:

```
CALL("Kernel32", "GetTickCount", "J!")
```

The ! in the type\_text argument forces Microsoft Excel to recalculate the CALL function every time the worksheet recalculates. This updates the elapsed time whenever the worksheet recalculates.

#### **Syntax 2a (16-Bit Microsoft Excel)**

On a worksheet, you can use the following CALL formula (syntax 2a) to call the GetTickCount function:

```
CALL("User", "GetTickCount", "J!")
```

The ! in the type\_text argument forces Microsoft Excel to recalculate the CALL function every time the worksheet recalculates. This updates the elapsed time whenever the worksheet recalculates.



Tip

You can use optional arguments to the REGISTER function to assign a custom name to a function. This name will appear in the **Insert Function** dialog box, and you can call the function by using its custom name in a formula. For more information, see REGISTER.

# EUROCONVERT

## [See Also](#)

Some of the content in this topic may not be applicable to some languages.

Converts a number to euros, converts a number from euros to a euro member currency, or converts a number from one euro member currency to another by using the euro as an intermediary (triangulation). The currencies available for conversion are those of European Union (EU) members that have adopted the euro. The function uses fixed conversion rates that are established by the EU.

## Syntax

**EUROCONVERT**(**number**,**source**,**target**,full\_precision,triangulation\_precision)

**Number** is the currency value you want to convert, or a reference to a cell containing the value.

**Source** is a three-letter string, or reference to a cell containing the string, corresponding to the ISO code for the source currency. The following currency codes are available in the EUROCONVERT function:

<b>Country/Region</b>	<b>Basic unit of currency</b>	<b>ISO code</b>
Belgium	franc	BEF
Luxembourg	franc	LUF
Germany	deutsche mark	DEM
Spain	peseta	ESP
France	franc	FRF
Ireland	pound	IEP
Italy	lira	ITL
Netherlands	guilder	NLG

Austria	schilling	ATS
Portugal	escudo	PTE
Finland	markka	FIM
Greece	drachma	GRD
Euro member states	euro	EUR

Target is a three-letter string, or cell reference, corresponding to the ISO code of the currency to which you want to convert the number. See the previous Source table for the ISO codes.

Full\_precision is a logical value (TRUE or FALSE), or an expression that evaluates to a value of TRUE or FALSE, that specifies how to display the result.

Use	If you want Excel to
FALSE	Display the result with the currency-specific rounding rules, see the table that follows. Excel uses the calculation precision value to calculate the result and the display precision value to display the result. FALSE is the default if the full_precision argument is omitted.
TRUE	Display the result with all significant digits resulting from the calculation.

The following table shows the currency specific rounding rules, that is, how many decimal places Excel uses to calculate a currency's conversion and display the result.

ISO code	Calculation precision	Display precision
BEF	0	0
LUF	0	0
DEM	2	2
ESP	0	0
FRF	2	2
IEP	2	2
ITL	0	0
NLG	2	2
ATS	2	2
PTE	0	2

FIM	2	2
GRD	0	2
EUR	2	2

Triangulation\_precision is an integer equal to or greater than 3 that specifies the number of significant digits to be used for the intermediate euro value when converting between two euro member currencies. If you omit this argument, Excel does not round the intermediate euro value. If you include this argument when converting from a euro member currency to the euro, Excel calculates the intermediate euro value that could then be converted to a euro member currency.

## Remarks

- Excel truncates any trailing zeros in the return value.
- If the source ISO code is the same as the target ISO code, Excel returns the original value of the number.
- Invalid parameters return #VALUE.
- This function does not apply a number format.
- This function cannot be used in array formulas.

## Examples

These examples assume conversion rates of 1 euro = 6.55957 French francs and 1.95583 deutsche marks. The EUROCONVERT function uses the current rates established by the EU. Microsoft will update the function if the rates change. To get full information about the rules and the rates currently in effect, see the European Commission publications about the euro.

The examples show the resulting value stored in the cell, not the formatted value.

EUROCONVERT(1.20, "DEM", "EUR") equals 0.61 euro. Because neither full\_precision nor triangulation\_precision are specified, the result uses the calculation precision for the euro, which is 2 decimal places.

EUROCONVERT(1, "FRF", "EUR", TRUE, 3) equals 0.152 euro. When converting to euros, if full\_precision is TRUE, the result has the precision specified by triangulation\_precision.

EUROCONVERT(1, "FRF", "EUR", FALSE, 3) equals 0.15 euro. When converting to euros, if full\_precision is FALSE, the result uses the calculation precision for the euro, which is 2 decimal places.

EUROCONVERT(1, "FRF", "DEM", TRUE, 3) equals 0.29728616 DM. Because triangulation\_precision is 3, the intermediate euro value is rounded to three places. Because full\_precision is TRUE, the resulting deutsche mark value is stored with all significant digits.

EUROCONVERT(1, "FRF", "DEM", FALSE, 3) equals 0.30 DM. Because triangulation\_precision is 3, the intermediate euro value is rounded to three places. Because full\_precision is FALSE, the resulting deutsche mark value is rounded to the calculation precision for the deutsche mark, which is 2 decimal places.

# GETPIVOTDATA

## [See Also](#)

Returns data stored in a PivotTable report. You can use GETPIVOTDATA to retrieve summary data from a PivotTable report, provided the summary data is visible in the report.

**Note** You can quickly enter a simple GETPIVOTDATA formula by typing = in the cell you want to return the value to and then clicking the cell in the PivotTable report that contains the data you want to return.

## Syntax

**GETPIVOTDATA(data\_field,pivot\_table,field1,item1,field2,item2,...)**

**Data\_field** is the name, enclosed in quotation marks, for the data field that contains the data you want to retrieve.

**Pivot\_table** is a reference to any cell, range of cells, or named range of cells in a PivotTable report. This information is used to determine which PivotTable report contains the data you want to retrieve.

**Field1, Item1, Field2, Item2** are one to 14 pairs of field names and item names that describe the data you want to retrieve. The pairs can be in any order. Field names and names for items other than dates and numbers are enclosed in quotation marks. For OLAP PivotTable reports, items can contain the source name of the dimension as well as the source name of the item. A field and item pair for an OLAP PivotTable might look like this:

"[Product]", "[Product].[All Products].[Foods].[Baked Goods]"

## Remarks

- Calculated fields or items and custom calculations are included in GETPIVOTDATA calculations.
- If pivot\_table is a range that includes two or more PivotTable reports, data will be retrieved from whichever report was created most recently in the range.
- If the field and item arguments describe a single cell, the value of that cell is returned regardless of whether it is a string, number, error, and so on.
- If an item contains a date, the value must be expressed as a serial number or populated by using the DATE function so that the value will be retained if the spreadsheet is opened in a different locale. For example, an item referring to the date March 5, 1999 could be entered as 36224 or DATE(1999,3,5). Times can be entered as decimal values or by using the TIME function.
- If pivot\_table is not a range in which a PivotTable report is found, GETPIVOTDATA returns #REF!.
- If the arguments do not describe a visible field, or if they include a page field that is not displayed, GETPIVOTDATA returns #REF!.

## Examples

The range that contains the PivotTable report is:

	A	B	C	D	E
2	Region	North			
3					
4	Sum of Sales		Product		
5	Month	Salesperson	Beverages	Produce	Grand Total
6	March	Buchanan	\$ 3,522	\$ 10,201	\$ 13,723
7		Davolio	\$ 8,725	\$ 7,889	\$ 16,614
8	March Total		\$ 12,247	\$ 18,090	\$ 30,337
9	April	Buchanan	\$ 5,594	\$ 7,265	\$ 12,859
10		Davolio	\$ 5,461	\$ 668	\$ 6,129
11	April Total		\$ 11,055	\$ 7,933	\$ 18,988
12	Grand Total		\$ 23,302	\$ 26,023	\$ 49,325

GETPIVOTDATA("Sales", \$A\$4) returns the grand total of the Sales field, \$49,325.

GETPIVOTDATA("Sum of Sales", \$A\$4) also returns the grand total of the Sales field, \$49,325; the field name can be entered exactly as it looks on the sheet, or as its root (without "Sum of," "Count of," and so forth).

GETPIVOTDATA("Sales", \$A\$4, "Month", "March") returns the grand total for March, \$30,337.

GETPIVOTDATA("Sales", \$A\$4, "Month", "March", "Product", "Produce", "Sales") returns \$10,201.

GETPIVOTDATA("Sales", \$A\$4, "Region", "South") returns #REF! because the South region data is not visible.

GETPIVOTDATA("Sales", \$A\$4, "Product", "Beverages", "Salesperson", "Davolio") returns #REF! because there is no total value of beverage sales for Davolio.

# REGISTER.ID

[See Also](#)

**Caution** Incorrectly editing the registry may severely damage your operating system, requiring you to reinstall it. Microsoft cannot guarantee that problems resulting from editing the registry incorrectly can be resolved. Before editing the registry, back up any valuable data. For the most recent information about using and protecting your computer's registry, see Microsoft Windows Help.

Returns the register ID of the specified dynamic link library (DLL) or code resource that has been previously registered. If the DLL or code resource has not been registered, this function registers the DLL or code resource and then returns the register ID.

REGISTER.ID can be used on worksheets (unlike REGISTER), but you cannot specify a function name and argument names with REGISTER.ID.

For more information about DLLs and code resources and data types, see [Using the CALL and REGISTER Functions](#).

**Note** Because Microsoft Excel for Windows and Microsoft Excel for the Macintosh use different types of code resources, REGISTER.ID has a slightly different syntax for each operating environment.

## Syntax 1

For Microsoft Excel for Windows

**REGISTER.ID**(*module\_text*,*procedure*,*type\_text*)

## Syntax 2

For Microsoft Excel for the Macintosh

**REGISTER.ID(file\_text,resource,type\_text)**

Module\_text is text specifying the name of the DLL that contains the function in Microsoft Excel for Windows.

Procedure is text specifying the name of the function in the DLL in Microsoft Excel for Windows. You can also use the ordinal value of the function from the EXPORTS statement in the module-definition file (.DEF). The ordinal value or resource ID number must not be in text form.

Type\_text is text specifying the data type of the return value and the data types of all arguments to the DLL. The first letter of type\_text specifies the return value. If the function or code resource is already registered, you can omit this argument.

File\_text is text specifying the name of the file that contains the code resource in Microsoft Excel for the Macintosh.

Resource is text specifying the name of the function in the code resource in Microsoft Excel for the Macintosh. You can also use the resource ID number. The ordinal value or resource ID number must not be in text form.

### Examples (32-Bit Microsoft Excel)

The following formula registers the GetTickCount function from 32-bit Microsoft Windows and returns the register ID:

```
REGISTER.ID("Kernel32", "GetTickCount", "J!")
```

Assuming that GetTickCount was already registered on another sheet using the preceding formula, the following formula returns the register ID for GetTickCount:

```
REGISTER.ID("Kernel32", "GetTickCount")
```

### Examples (16-Bit Microsoft Excel)

The following formula registers the GetTickCount function from 16-bit Microsoft Windows and returns the register ID:

```
REGISTER.ID("User", "GetTickCount", "J!")
```

Assuming that GetTickCount was already registered on another sheet using the preceding formula, the following formula returns the register ID for GetTickCount:

```
REGISTER.ID("User", "GetTickCount")
```

[Show All](#)

# SQL.REQUEST

## [See Also](#)

Some of the content in this topic may not be applicable to some languages.

Connects with an external data source, and runs a query from a worksheet.

SQL.REQUEST then returns the result as an array without the need for macro programming. If this function is not available, you must install the Microsoft Excel ODBC [add-in program](#) (XLODBC.XLA). You can install the add-in from the Microsoft Office Web site.

## Syntax

**SQL.REQUEST(connection\_string,output\_ref,driver\_prompt,query\_text,col\_r**

Connection\_string supplies information, such as the data source name, user ID, and passwords, required by the driver being used to connect to a data source and must follow the driver's format. The following table provides three example connection strings for three drivers.

Driver	Connection_string
dBASE	DSN=NWind;PWD=test
SQL Server	DSN=MyServer;UID=dbayer; PWD=123;Database=Pubs
ORACLE	DNS=My Oracle Data Source;DBQ=MYSER VER;UID=JohnS;PWD=Sesame

- You must define the data source name (DSN) used in connection\_string before you try to connect to it.
- You can enter connection\_string as an array or a string. If connection\_string exceeds 250 characters, you must enter it as an array.
- If SQL.REQUEST is unable to gain access to the data source using

connection\_string, it returns the #N/A error value.

Output\_ref is a cell reference where you want the completed connection string placed. If you enter SQL.REQUEST on a worksheet, then output\_ref is ignored.

- Use output\_ref when you want SQL.REQUEST to return the completed connection string (you must enter SQL.REQUEST on a macro sheet in this case).
- If you omit output\_ref, SQL.REQUEST does not return a completed connection string.

Driver\_prompt specifies when the driver dialog box is displayed and which options are available. Use one of the numbers described in the following table. If driver\_prompt is omitted, SQL.REQUEST uses 2 as the default.

<b>Driver_prompt</b>	<b>Description</b>
1	Driver dialog box is always displayed.
2	Driver dialog box is displayed only if information provided by the connection string and the data source specification is not sufficient to complete the connection. All dialog box options are available.
3	Driver dialog box is displayed only if information provided by the connection string and the data source specification is not sufficient to complete the connection. Dialog box options appear dimmed and unavailable if they are not required.
4	Driver dialog box is not displayed. If the connection is not successful, it returns an error.

- If SQL.REQUEST is unable to execute query\_text on the specified data source, it returns the #N/A error value.
- You can update a query by concatenating references into query\_text. In the following example, every time \$A\$3 changes, SQL.REQUEST uses the new value to update the query.

```
"SELECT Name FROM Customers WHERE Balance > "&$A$3&"".
```

Microsoft Excel limits strings to a length of 255 characters. If query\_text

exceeds that length, enter the query in a vertical range of cells, and use the entire range as the `query_text`. The values of the cells are concatenated to form the complete SQL statement.

`Column_names_logical` indicates whether column names are returned as the first row of the results. Set this argument to `TRUE` if you want the column names to be returned as the first row of the results. Use `FALSE` if you do not want the column names returned. If `column_names_logical` is omitted, `SQL.REQUEST` does not return column names.

### Return Value

- If this function completes all of its actions, it returns an array of query results or the number of rows affected by the query.
- If `SQL.REQUEST` is unable to access the data source using `connection_string`, it returns the `#N/A` error value.

### Remarks

- `SQL.REQUEST` can be entered as an array. When you enter `SQL.REQUEST` as an array, it returns an array to fit that range.
- If the range of cells is larger than the result set, `SQL.REQUEST` adds empty cells to the returned array to increase it to the necessary size.
- If the result set is larger than the range entered as an array, `SQL.REQUEST` returns the whole array.
- The arguments to `SQL.REQUEST` are in a different order than the arguments to the `SQLRequest` function in Visual Basic for Applications.

### Example

Suppose you want to make a query of a dBASE database named `DBASE4`. When you enter the following formula in a cell, an array of query results is returned, with the first row being the column names:

```
SQL.REQUEST("DSN=NWind;DBQ=c:\msquery;FIL=dBASE4", c15, 2,  
"Select Custmr_ID, Due_Date from Orders WHERE order_Amt>100", TRUE)
```

# Using the CALL and REGISTER Functions

Some of the content in this topic may not be applicable to some languages.

**Caution** Incorrectly editing the registry may severely damage your operating system, requiring you to reinstall it. Microsoft cannot guarantee that problems resulting from editing the registry incorrectly can be resolved. Before editing the registry, back up any valuable data. For the most recent information about using and protecting your computer's registry, see Microsoft Windows Help.

The following describes the argument and return value data types used by the CALL, REGISTER, and REGISTER.ID functions. Arguments and return values differ slightly depending on your operating environment, and these differences are noted in the data type table.

## Data Types

In the CALL, REGISTER, and REGISTER.ID functions, the type\_text argument specifies the data type of the return value and the data types of all arguments to the DLL function or code resource. The first character of type\_text specifies the data type of the return value. The remaining characters indicate the data types of all the arguments. For example, a DLL function that returns a floating-point number and takes an integer and a floating-point number as arguments would require "BIB" for the type\_text argument.

The following table contains a complete list of the data type codes that Microsoft Excel recognizes, a description of each data type, how the argument or return value is passed, and a typical declaration for the data type in the C programming language.

Code	Description	Pass by	C Declaration
A	Logical (FALSE = 0), TRUE = 1)	Value	short int
		Value (Windows)	double (Windows)
B	IEEE 8-byte floating-point number	Reference (Macintosh)	double * (Macintosh)
C	Null-terminated string (maximum string length = 255)	Reference	char *
D	Byte-counted string (first byte contains length of string, maximum string length = 255 characters)	Reference	Unsigned char *
E	IEEE 8-byte floating-point number	Reference	double *
F	Null-terminated string (maximum string length = 255 characters)	Reference (modify in place)	char *
G	Byte-counted string (first byte contains length of string, maximum string length = 255)	Reference (modify in	unsigned

	characters)	place)	char *
H	Unsigned 2-byte integer	Value	unsigned short int
I	Signed 2-byte integer	Value	short int
J	Signed 4-byte integer	Value	long int
K	Array	Reference	FP *
L	Logical (FALSE = 0, TRUE = 1)	Reference	short int *
M	Signed 2-byte integer	Reference	short int *
N	Signed 4-byte integer	Reference	long int *
			Three arguments are passed:
O	Array	Reference	unsigned short int * unsigned short int * double [ ]
P	Microsoft Excel OPER data structure	Reference	OPER *
R	Microsoft Excel XLOPER data structure	Reference	XLOPER *

## Remarks

- The C-language declarations are based on the assumption that your compiler defaults to 8-byte doubles, 2-byte short integers, and 4-byte long integers.
- In the Microsoft Windows programming environment, all pointers are far pointers. For example, you must declare the D data type code as `unsigned char far *` in Microsoft Windows.
- All functions in DLLs and code resources are called using the Pascal calling convention. Most C compilers allow you to use the Pascal calling convention by adding the Pascal keyword to the function declaration, as shown in the following example:

```
pascal void main (rows,columns,a)
```

- If a function uses a pass-by-reference data type for its return value, you can pass a null pointer as the return value. Microsoft Excel will interpret the null pointer as the #NUM! error value.

## Additional Data Type Information

This section contains detailed information about the F, G, K, O, P, and R data types and other information about the `type_text` argument.

### F and G Data Types

With the F and G data types, a function can modify a string buffer that is allocated by Microsoft Excel. If the return value type code is F or G, then Microsoft Excel ignores the value returned by the function. Instead, Microsoft Excel searches the list of function arguments for the first corresponding data type (F or G) and then takes the current contents of the allocated string buffer as the return value. Microsoft Excel allocates 256 bytes for the argument, so the function may return a larger string than it received.

### K Data Type

The K data type uses a pointer to a variable-size FP structure. You must define this structure in the DLL or code resource as follows:

```
typedef struct _FP
{
    unsigned short int rows;
    unsigned short int columns;
    double array[1];          /* Actually, array[rows][columns] */
} FP;
```

The declaration `double array[1]` allocates storage for only a single-element array. The number of elements in the actual array equals the number of rows multiplied by the number of columns.

### O Data Type

The O data type can be used only as an argument, not as a return value. It passes three items: a pointer to the number of rows in an array, a pointer to the number of columns in an array, and a pointer to a two-dimensional array of floating-point numbers.

Instead of returning a value, a function can modify an array passed by the O data

type. To do this, you can use ">O" as the type\_text argument. For more information, see "Modifying in Place— Functions Declared as Void" below.

The O data type was created for direct compatibility with Fortran DLLs, which pass arguments by reference.

## P Data Type

The P data type is a pointer to an OPER structure. The OPER structure contains 8 bytes of data, followed by a 2-byte identifier that specifies the type of data. With the P data type, a DLL function or code resource can take and return any Microsoft Excel data type.

The OPER structure is defined as follows:

```
typedef struct _oper
{
    union
    {
        double num;
        unsigned char *str;
        unsigned short int bool;
        unsigned short int err;
        struct
        {
            struct _oper *lparray;
            unsigned short int rows;
            unsigned short int columns;
        } array;
    } val;
    unsigned short int type;
} OPER;
```

The type field contains one of these values.

Type	Description	Val field to use
1	Numeric	num
2	String (first byte contains length of string)	str
4	Boolean (logical)	bool

Error: the error values are:

	0#NULL!	
	7#DIV/0!	
	15#Value!	
16	23#REF!	err
	29#NAME?	
	36#NUM!	
	42#N/A	
64	Array	array
128	Missing argument	
256	Empty cell	

The last two values can be used only as arguments, not return values. The missing argument value (128) is passed when the caller omits an argument. The empty cell value (256) is passed when the caller passes a reference to an empty cell.

## **R Data Type— Calling Microsoft Excel Functions from DLLs**

The R data type is a pointer to an XLOPER structure, which is an enhanced version of the OPER structure. In Microsoft Excel version 4.0 and later, you can use the R data type to write DLLs and code resources that call Microsoft Excel functions. With the XLOPER structure, a DLL function can pass sheet references and implement flow control, in addition to passing data. A complete description of the R data type and the Microsoft Excel application programming interface (API) is beyond the scope of this topic. The *Microsoft Office XP Developer's Guide* contains detailed information about the R data type, the Microsoft Excel API, and many other technical aspects of Microsoft Excel.

## **Volatile Functions and Recalculation**

Microsoft Excel usually calculates a DLL function (or a code resource) only when it is entered into a cell, when one of its precedents changes, or when the cell is calculated during a macro. On a worksheet, you can make a DLL function

or code resource volatile, which means that it recalculates every time the worksheet recalculates. To make a function volatile, add an exclamation point (!) as the last character in the `type_text` argument.

For example, in Microsoft Excel for Windows, the following worksheet formula recalculates every time the worksheet recalculates:

```
CALL("Kernel32", "GetTickCount", "J!")
```

### **Modifying in Place— Functions Declared as Void**

You can use a single digit `n` for the return type code in `type_text`, where `n` is a number from 1 to 9. This tells Microsoft Excel to modify the variable in the location pointed to by the `n`th argument in `type_text`, instead of returning a value. This is also known as modifying in place. The `n`th argument must be a pass-by-reference data type (C, D, E, F, G, K, L, M, N, O, P, or R). The DLL function or code resource must also be declared with the `void` keyword in the C language (or the `procedure` keyword in the Pascal language).

For example, a DLL function that takes a null-terminated string and two pointers to integers as arguments can modify the string in place. Use "1FMM" as the `type_text` argument, and declare the function as `void`.

Versions prior to Microsoft Excel 4.0 used the `>` character to modify the first argument in place; there was no way to modify any argument other than the first. The `>` character is equivalent to `n = 1` in Microsoft Excel version 4.0 and later.

# Statistical functions

[AVEDEV](#) Returns the average of the absolute deviations of data points from their mean

[AVERAGE](#) Returns the average of its arguments

[AVERAGEA](#) Returns the average of its arguments, including numbers, text, and logical values

[BETADIST](#) Returns the beta cumulative distribution function

[BETAINV](#) Returns the inverse of the cumulative distribution function for a specified beta distribution

[BINOMDIST](#) Returns the individual term binomial distribution probability

[CHIDIST](#) Returns the one-tailed probability of the chi-squared distribution

[CHIINV](#) Returns the inverse of the one-tailed probability of the chi-squared distribution

[CHITEST](#) Returns the test for independence

[CONFIDENCE](#) Returns the confidence interval for a population mean

[CORREL](#) Returns the correlation coefficient between two data sets

[COUNT](#) Counts how many numbers are in the list of arguments

[COUNTA](#) Counts how many values are in the list of arguments

[COUNTBLANK](#) Counts the number of blank cells within a range

[COUNTIF](#) Counts the number of nonblank cells within a range that meet the given criteria

[COVAR](#) Returns covariance, the average of the products of paired deviations

[CRITBINOM](#) Returns the smallest value for which the cumulative binomial distribution is less than or equal to a criterion value

[DEVSQ](#) Returns the sum of squares of deviations

[EXPONDIST](#) Returns the exponential distribution

[FDIST](#) Returns the F probability distribution

[FINV](#) Returns the inverse of the F probability distribution

[FISHER](#) Returns the Fisher transformation

[FISHERINV](#) Returns the inverse of the Fisher transformation

[FORECAST](#) Returns a value along a linear trend

[FREQUENCY](#) Returns a frequency distribution as a vertical array

[FTEST](#) Returns the result of an F-test

[GAMMADIST](#) Returns the gamma distribution

[GAMMAINV](#) Returns the inverse of the gamma cumulative distribution

[GAMMALN](#) Returns the natural logarithm of the gamma function,  $\Gamma(x)$

[GEOMEAN](#) Returns the geometric mean

[GROWTH](#) Returns values along an exponential trend

[HARMEAN](#) Returns the harmonic mean

[HYPGEOMDIST](#) Returns the hypergeometric distribution

[INTERCEPT](#) Returns the intercept of the linear regression line

[KURT](#) Returns the kurtosis of a data set

[LARGE](#) Returns the k-th largest value in a data set

[LINEST](#) Returns the parameters of a linear trend

[LOGEST](#) Returns the parameters of an exponential trend

[LOGINV](#) Returns the inverse of the lognormal distribution

[LOGNORMDIST](#) Returns the cumulative lognormal distribution

[MAX](#) Returns the maximum value in a list of arguments

[MAXA](#) Returns the maximum value in a list of arguments, including numbers, text, and logical values

[MEDIAN](#) Returns the median of the given numbers

[MIN](#) Returns the minimum value in a list of arguments

[MINA](#) Returns the smallest value in a list of arguments, including numbers, text, and logical values

[MODE](#) Returns the most common value in a data set

[NEGBINOMDIST](#) Returns the negative binomial distribution

[NORMDIST](#) Returns the normal cumulative distribution

[NORMINV](#) Returns the inverse of the normal cumulative distribution

[NORMSDIST](#) Returns the standard normal cumulative distribution

[NORMSINV](#) Returns the inverse of the standard normal cumulative distribution

[PEARSON](#) Returns the Pearson product moment correlation coefficient

[PERCENTILE](#) Returns the k-th percentile of values in a range

[PERCENTRANK](#) Returns the percentage rank of a value in a data set

[PERMUT](#) Returns the number of permutations for a given number of objects

[POISSON](#) Returns the Poisson distribution

[PROB](#) Returns the probability that values in a range are between two limits

[QUARTILE](#) Returns the quartile of a data set

[RANK](#) Returns the rank of a number in a list of numbers

[RSQ](#) Returns the square of the Pearson product moment correlation coefficient

[SKEW](#) Returns the skewness of a distribution

[SLOPE](#) Returns the slope of the linear regression line

[SMALL](#) Returns the k-th smallest value in a data set

[STANDARDIZE](#) Returns a normalized value

[STDEV](#) Estimates standard deviation based on a sample

[STDEVA](#) Estimates standard deviation based on a sample, including numbers, text, and logical values

[STDEVP](#) Calculates standard deviation based on the entire population

[STDEVPA](#) Calculates standard deviation based on the entire population, including numbers, text, and logical values

[STEYX](#) Returns the standard error of the predicted y-value for each x in the regression

[TDIST](#) Returns the Student's t-distribution

[TINV](#) Returns the inverse of the Student's t-distribution

[TREND](#) Returns values along a linear trend

[TRIMMEAN](#) Returns the mean of the interior of a data set

[TTEST](#) Returns the probability associated with a Student's t-test

[VAR](#) Estimates variance based on a sample

[VARA](#) Estimates variance based on a sample, including numbers, text, and logical values

[VARP](#) Calculates variance based on the entire population

[VARPA](#) Calculates variance based on the entire population, including numbers, text, and logical values

[WEIBULL](#) Returns the Weibull distribution

[ZTEST](#) Returns the one-tailed probability-value of a z-test

[Show All](#)

# AVEDEV

## [See Also](#)

Returns the average of the absolute deviations of data points from their mean. AVEDEV is a measure of the variability in a data set.

## Syntax

**AVEDEV(number1,number2,...)**

Number1, number2, ... are 1 to 30 arguments for which you want the average of the absolute deviations. You can also use a single array or a reference to an array instead of arguments separated by commas.

## Remarks

- The arguments must either be numbers or be names, arrays, or references that contain numbers.
- If an array or reference argument contains text, logical values, or empty cells, those values are ignored; however, cells with the value zero are included.
- The equation for average deviation is:

$$\frac{1}{n} \sum |x - \bar{x}|$$

AVEDEV is influenced by the unit of measurement in the input data.

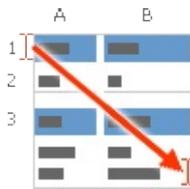
## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.

2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	
	<b>Data</b>	
<b>1</b>	4	
<b>2</b>	5	
<b>3</b>	6	
<b>4</b>	7	
<b>5</b>	5	
<b>6</b>	4	
<b>7</b>	3	
<b>8</b>	<b>Formula</b>	<b>Description (Result)</b>
	=AVEDEV(A2:A8)	Average of the absolute deviations of the numbers above from their mean (1.020408)

[Show All](#)

# AVERAGE

## [See Also](#)

Returns the average (arithmetic mean) of the arguments.

## Syntax

**AVERAGE**(**number1**,number2,...)

Number1, number2, ... are 1 to 30 numeric arguments for which you want the average.

## Remarks

- The arguments must either be numbers or be names, arrays, or references that contain numbers.
- If an array or reference argument contains text, logical values, or empty cells, those values are ignored; however, cells with the value zero are included.



When averaging cells, keep in mind the difference between empty cells and those containing the value zero, especially if you have cleared the **Zero values** check box on the **View** tab (**Options** command, **Tools** menu). Empty cells are not counted, but zero values are.

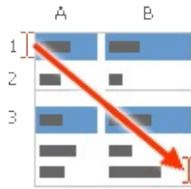
## Example

The example may be easier to understand if you copy it to a blank worksheet.



1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column

headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	
	<b>Data</b>	
	10	
<b>1</b>	7	
<b>2</b>	9	
<b>3</b>	27	
<b>4</b>	2	
<b>5</b>		
<b>6</b>	<b>Formula</b>	<b>Description (Result)</b>
	=AVERAGE(A2:A6)	Average of the numbers above (11)
	=AVERAGE(A2:A6, 5)	Average of the numbers above and 5 (10)

[Show All](#)

# AVERAGEA

## [See Also](#)

Calculates the average (arithmetic mean) of the values in the list of arguments. In addition to numbers, text and logical values such as TRUE and FALSE are included in the calculation.

## Syntax

**AVERAGEA**(value1,value2,...)

Value1, value2, ... are 1 to 30 cells, ranges of cells, or values for which you want the average.

## Remarks

- The arguments must be numbers, names, arrays, or references.
- Array or reference arguments that contain text evaluate as 0 (zero). Empty text ("") evaluates as 0 (zero). If the calculation must not include text values in the average, use the AVERAGE function.
- Arguments that contain TRUE evaluate as 1; arguments that contain FALSE evaluate as 0 (zero).



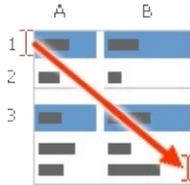
When averaging cells, keep in mind the difference between empty cells and those containing the value zero, especially if you have cleared the **Zero values** check box on the **View** tab (**Options** command, **Tools** menu). Empty cells are not counted, but zero values are.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

## How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

A	
Data	
10	
7	
9	
2	
Not available	
Formula	Description (Result)
=AVERAGEA(A2:A6)	Average of the numbers above, and the text "Not Available". The cell with the text "Not available" is used in the calculation. (5.6)
=AVERAGEA(A2:A5,A7)	Average of the numbers above, and the empty cell. (7)

[Show All](#)

# BETADIST

## [See Also](#)

Returns the beta cumulative distribution function. The beta distribution is commonly used to study variation in the percentage of something across samples, such as the fraction of the day people spend watching television.

## Syntax

**BETADIST(x,alpha,beta,A,B)**

X is the value between A and B at which to evaluate the function.

Alpha is a parameter of the distribution.

Beta is a parameter of the distribution.

A is an optional lower bound to the interval of x.

B is an optional upper bound to the interval of x.

## Remarks

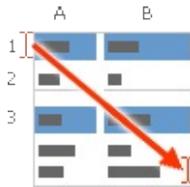
- If any argument is nonnumeric, BETADIST returns the #VALUE! error value.
- If  $\alpha \leq 0$  or  $\beta \leq 0$ , BETADIST returns the #NUM! error value.
- If  $x < A$ ,  $x > B$ , or  $A = B$ , BETADIST returns the #NUM! error value.
- If you omit values for A and B, BETADIST uses the standard cumulative beta distribution, so that  $A = 0$  and  $B = 1$ .

## Example

The example may be easier to understand if you copy it to a blank worksheet.

## How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
2		Value at which to evaluate the function
1 8		Parameter of the distribution
2 10		Parameter of the distribution
3 1		Lower bound
4 3		Upper bound
5	<b>Formula</b>	<b>Description (Result)</b>
6		Cumulative beta probability density
	=BETADIST(A2,A3,A4,A5,A6)	function, for the above parameters (0.685470581)

[Show All](#)

# BETAINV

## [See Also](#)

Returns the inverse of the cumulative distribution function for a specified beta distribution. That is, if  $\text{probability} = \text{BETADIST}(x, \dots)$ , then  $\text{BETAINV}(\text{probability}, \dots) = x$ . The beta distribution can be used in project planning to model probable completion times given an expected completion time and variability.

## Syntax

**BETAINV(probability,alpha,beta,A,B)**

Probability is a probability associated with the beta distribution.

Alpha is a parameter of the distribution.

Beta is a parameter the distribution.

A is an optional lower bound to the interval of x.

B is an optional upper bound to the interval of x.

## Remarks

- If any argument is nonnumeric, BETAINV returns the #VALUE! error value.
- If  $\alpha \leq 0$  or  $\beta \leq 0$ , BETAINV returns the #NUM! error value.
- If  $\text{probability} \leq 0$  or  $\text{probability} > 1$ , BETAINV returns the #NUM! error value.
- If you omit values for A and B, BETAINV uses the standard cumulative beta distribution, so that  $A = 0$  and  $B = 1$ .

Given a value for probability, BETAINV seeks that value x such that  $\text{BETADIST}(x, \alpha, \beta, A, B) = \text{probability}$ . Thus, precision of BETAINV

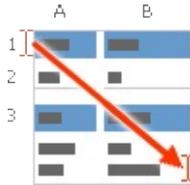
depends on precision of BETADIST. BETAINV uses an iterative search technique. If the search has not converged after 100 iterations, the function returns the #N/A error value.

### Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
<b>1</b>	0.685470581	Probability associated with the beta distribution
<b>2</b>	8	Parameter of the distribution
<b>3</b>	10	Parameter of the distribution
<b>4</b>	1	Lower bound
<b>5</b>	3	Upper bound
<b>6</b>	<b>Formula</b>	<b>Description (Result)</b>
	=BETAINV(A2,A3,A4,A5,A6)	Inverse of the cumulative beta probability density function for the parameters above (2)

[Show All](#)

# BINOMDIST

## [See Also](#)

Returns the individual term binomial distribution probability. Use BINOMDIST in problems with a fixed number of tests or trials, when the outcomes of any trial are only success or failure, when trials are independent, and when the probability of success is constant throughout the experiment. For example, BINOMDIST can calculate the probability that two of the next three babies born are male.

## Syntax

**BINOMDIST(number\_s, trials, probability\_s, cumulative)**

Number\_s is the number of successes in trials.

Trials is the number of independent trials.

Probability\_s is the probability of success on each trial.

Cumulative is a logical value that determines the form of the function. If cumulative is TRUE, then BINOMDIST returns the cumulative distribution function, which is the probability that there are at most number\_s successes; if FALSE, it returns the probability mass function, which is the probability that there are number\_s successes.

## Remarks

- Number\_s and trials are truncated to integers.
- If number\_s, trials, or probability\_s is nonnumeric, BINOMDIST returns the #VALUE! error value.
- If number\_s < 0 or number\_s > trials, BINOMDIST returns the #NUM! error value.
- If probability\_s < 0 or probability\_s > 1, BINOMDIST returns the #NUM!

error value.

- The binomial probability mass function is:

$$b(x; n, p) = \binom{n}{x} p^x (1-p)^{n-x}$$

where:

$$\binom{n}{x}$$

is COMBIN(n,x).

The cumulative binomial distribution is:

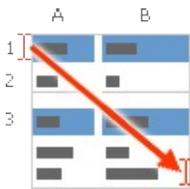
$$B(x; n, p) = \sum_{y=0}^x b(y; n, p)$$

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
<b>1</b>	6	Number of successes in trials
<b>2</b>	10	Number of independent trials
<b>3</b>	0.5	Probability of success on each trial
<b>4</b>	<b>Formula</b>	<b>Description (Result)</b>
	=BINOMDIST(A2,A3,A4,FALSE)	Probability of exactly 6 of 10 trials being successful (0.205078)

[Show All](#)

# CHIDIST

## [See Also](#)

Returns the one-tailed probability of the chi-squared distribution. The  $\chi^2$  distribution is associated with a  $\chi^2$  test. Use the  $\chi^2$  test to compare observed and expected values. For example, a genetic experiment might hypothesize that the next generation of plants will exhibit a certain set of colors. By comparing the observed results with the expected ones, you can decide whether your original hypothesis is valid.

## Syntax

**CHIDIST(x,degrees\_freedom)**

X is the value at which you want to evaluate the distribution.

Degrees\_freedom is the number of degrees of freedom.

## Remarks

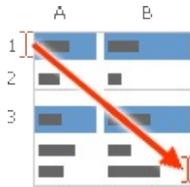
- If either argument is nonnumeric, CHIDIST returns the #VALUE! error value.
- If x is negative, CHIDIST returns the #NUM! error value.
- If degrees\_freedom is not an integer, it is truncated.
- If degrees\_freedom < 1 or degrees\_freedom  $\geq 10^{10}$ , CHIDIST returns the #NUM! error value.
- CHIDIST is calculated as  $\text{CHIDIST} = P(X > x)$ , where X is a  $\chi^2$  random variable.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
<b>1</b>	18.307	Value at which you want to evaluate the distribution
<b>2</b>	10	Degrees of freedom
<b>3</b>	<b>Formula</b>	<b>Description (Result)</b>
	=CHIDIST(A2,A3)	One-tailed probability of the chi-squared distribution, for the above terms (0.050001)

[Show All](#)

# CHIINV

## [See Also](#)

Returns the inverse of the one-tailed probability of the chi-squared distribution. If  $\text{probability} = \text{CHIDIST}(x, \dots)$ , then  $\text{CHIINV}(\text{probability}, \dots) = x$ . Use this function to compare observed results with expected ones in order to decide whether your original hypothesis is valid.

## Syntax

**CHIINV(probability,degrees\_freedom)**

**Probability** is a probability associated with the chi-squared distribution.

**Degrees\_freedom** is the number of degrees of freedom.

## Remarks

- If either argument is nonnumeric, CHIINV returns the #VALUE! error value.
- If  $\text{probability} < 0$  or  $\text{probability} > 1$ , CHIINV returns the #NUM! error value.
- If **degrees\_freedom** is not an integer, it is truncated.
- If  $\text{degrees\_freedom} < 1$  or  $\text{degrees\_freedom} \geq 10^{10}$ , CHIINV returns the #NUM! error value.

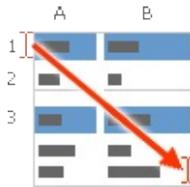
Given a value for probability, CHIINV seeks that value  $x$  such that  $\text{CHIDIST}(x, \text{degrees\_freedom}) = \text{probability}$ . Thus, precision of CHIINV depends on precision of CHIDIST. CHIINV uses an iterative search technique. If the search has not converged after 100 iterations, the function returns the #N/A error value.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

## How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
<b>1</b>	0.05	Probability associated with the chi-squared distribution
<b>2</b>	10	Degrees of freedom
<b>3</b>	<b>Formula</b>	<b>Description (Result)</b>
	=CHIINV(A2,A3)	Inverse of the one-tailed probability of the chi-squared distribution (18.30703)

[Show All](#)

# CHITEST

## [See Also](#)

Returns the test for independence.

CHITEST returns the value from the chi-squared ( $c^2$ ) distribution for the statistic and the appropriate degrees of freedom.

You can use  $c^2$  tests to determine whether hypothesized results are verified by an experiment.

## Syntax

**CHITEST(actual\_range,expected\_range)**

Actual\_range is the range of data that contains observations to test against expected values.

Expected\_range is the range of data that contains the ratio of the product of row totals and column totals to the grand total.

## Remarks

- If actual\_range and expected\_range have a different number of data points, CHITEST returns the #N/A error value.
- The  $c^2$  test first calculates a  $c^2$  statistic using the formula:

$$\chi^2 = \sum_{i=1}^r \sum_{j=1}^c \frac{(A_{ij} - E_{ij})^2}{E_{ij}}$$

where:

$A_{ij}$  = actual frequency in the i-th row, j-th column

$E_{ij}$  = expected frequency in the i-th row, j-th column

r = number of rows

$c$  = number of columns

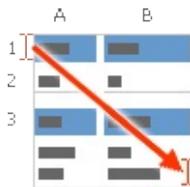
- A low value of  $c^2$  is an indicator of independence. As can be seen from the formula,  $c^2$  is always positive or 0, and is 0 only if  $A_{ij} = E_{ij}$  for every  $i, j$ .
- CHITEST returns the probability that a value of the  $c^2$  statistic at least as high as the value calculated by the above formula could have happened by chance under the assumption of independence. In computing this probability, CHITEST uses the  $c^2$  distribution with an appropriate number of degrees of freedom,  $df$ . If  $r > 1$  and  $c > 1$ , then  $df = (r - 1)(c - 1)$ . If  $r = 1$  and  $c > 1$ , then  $df = c - 1$  or if  $r > 1$  and  $c = 1$ , then  $df = r - 1$ .  $r = c = 1$  is not allowed and #N/A is returned.
- Use of CHITEST is most appropriate when  $E_{ij}$ 's are not too small. Some statisticians suggest that each  $E_{ij}$  should be greater than or equal to 5.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>	<b>C</b>
	<b>Men (Actual)</b>	<b>Women (Actual)</b>	<b>Description</b>
	58	35	Agree
<b>1</b>	11	25	Neutral
<b>2</b>	10	23	Disagree
<b>3</b>	<b>Men (Expected)</b>	<b>Women (Expected)</b>	<b>Description</b>
<b>4</b>	45.35	47.65	Agree
<b>5</b>	17.56	18.44	Neutral
<b>6</b>	16.09	16.91	Disagree
<b>7</b>	<b>Formula</b>	<b>Description (Result)</b>	
<b>8</b>	The $\chi^2$ statistic for the data above is		
	=CHITEST(A2:B4,A6:B8) 16.16957 with 2 degrees of freedom		
	(0.000308)		

[Show All](#)

# CONFIDENCE

## [See Also](#)

Returns a value that you can use to construct a confidence interval for a population mean. The confidence interval is a range of values. Your sample mean,  $\bar{x}$ , is at the center of this range and the range is  $\bar{x} \pm \text{CONFIDENCE}$ . For example, if  $\bar{x}$  is the sample mean of delivery times for products ordered through the mail,  $\bar{x} \pm \text{CONFIDENCE}$  is a range of population means. For any population mean,  $\mu_0$ , in this range, the probability of obtaining a sample mean further from  $\mu_0$  than  $\bar{x}$  is greater than alpha; for any population mean,  $\mu_0$ , not in this range, the probability of obtaining a sample mean further from  $\mu_0$  than  $\bar{x}$  is less than alpha. In other words, assume that we use  $\bar{x}$ , `standard_dev`, and `size` to construct a two-tailed test at significance level alpha of the hypothesis that the population mean is  $\mu_0$ . Then we will not reject that hypothesis if  $\mu_0$  is in the confidence interval and will reject that hypothesis if  $\mu_0$  is not in the confidence interval. The confidence interval does not allow us to infer that there is probability  $1 - \alpha$  that our next package will take a delivery time that is in the confidence interval.

## Syntax

**CONFIDENCE(alpha,standard\_dev,size)**

`Alpha` is the significance level used to compute the confidence level. The confidence level equals  $100 \times (1 - \alpha)\%$ , or in other words, an alpha of 0.05 indicates a 95 percent confidence level.

`Standard_dev` is the population standard deviation for the data range and is assumed to be known.

`Size` is the sample size.

## Remarks

- If any argument is nonnumeric, CONFIDENCE returns the #VALUE! error value.
- If  $\alpha \leq 0$  or  $\alpha \geq 1$ , CONFIDENCE returns the #NUM! error value.
- If  $\text{standard\_dev} \leq 0$ , CONFIDENCE returns the #NUM! error value.
- If size is not an integer, it is truncated.
- If  $\text{size} < 1$ , CONFIDENCE returns the #NUM! error value.
- If we assume alpha equals 0.05, we need to calculate the area under the standard normal curve that equals  $(1 - \alpha)$ , or 95 percent. This value is  $\pm 1.96$ . The confidence interval is therefore:

$$\bar{x} \pm 1.96 \left( \frac{\sigma}{\sqrt{n}} \right)$$

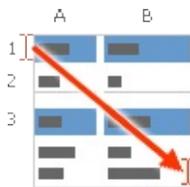
### Example

Suppose we observe that, in our sample of 50 commuters, the average length of travel to work is 30 minutes with a population standard deviation of 2.5. With  $\alpha = .05$ ,  $\text{CONFIDENCE}(.05, 2.5, 50)$  returns 0.69291. The corresponding confidence interval is then  $30 \pm 0.69291 =$  approximately [29.3, 30.7]. For any population mean,  $\mu_0$ , in this interval, the probability of obtaining a sample mean further from  $\mu_0$  than 30 is more than 0.05. Likewise, for any population mean,  $\mu_0$ , outside this interval, the probability of obtaining a sample mean further from  $\mu_0$  than 30 is less than 0.05.

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

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3. Press CTRL+C.
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	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
	0.05	Significance level
	2.5	Standard deviation of the population
<b>1</b>	50	Sample size
<b>2</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>3</b>		Confidence interval for a population mean. In
<b>4</b>	=CONFIDENCE(A2,A3,A4)	other words, the confidence interval for the underlying population mean for travel to work equals 30 ± 0.692951 minutes, or 29.3 to 30.7 minutes. (0.692951)

[Show All](#)

# CORREL

## [See Also](#)

Returns the correlation coefficient of the array1 and array2 cell ranges. Use the correlation coefficient to determine the relationship between two properties. For example, you can examine the relationship between a location's average temperature and the use of air conditioners.

## Syntax

**CORREL(array1,array2)**

Array1 is a cell range of values.

Array2 is a second cell range of values.

## Remarks

- If an array or reference argument contains text, logical values, or empty cells, those values are ignored; however, cells with the value zero are included.
- If array1 and array2 have a different number of data points, CORREL returns the #N/A error value.
- If either array1 or array2 is empty, or if s (the standard deviation) of their values equals zero, CORREL returns the #DIV/0! error value.
- The equation for the correlation coefficient is:

$$\text{Correl}(X, Y) = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sqrt{\sum (x - \bar{x})^2 \sum (y - \bar{y})^2}}$$

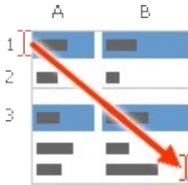
where x and y are the sample means AVERAGE(array1) and AVERAGE(array2).

## Example

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 [How?](#)

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	<b>A</b>	<b>B</b>
	<b>Data1</b>	<b>Data2</b>
<b>1</b>	3	9
<b>2</b>	2	7
<b>3</b>	4	12
<b>4</b>	5	15
<b>5</b>	6	17
<b>6</b>	<b>Formula</b>	<b>Description (Result)</b>
	=CORREL(A2:A6,B2:B6)	Correlation coefficient of the two data sets above (0.997054)

[Show All](#)

# COUNT

## [See Also](#)

Counts the number of cells that contain numbers and also numbers within the list of arguments. Use COUNT to get the number of entries in a number field that's in a range or array of numbers.

## Syntax

**COUNT**(value1,value2,...)

Value1, value2, ... are 1 to 30 arguments that can contain or refer to a variety of different types of data, but only numbers are counted.

## Remarks

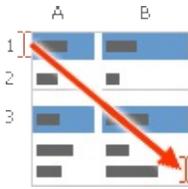
- Arguments that are numbers, dates, or text representations of numbers are counted; arguments that are error values or text that cannot be translated into numbers are ignored.
- If an argument is an array or reference, only numbers in that array or reference are counted. Empty cells, logical values, text, or error values in the array or reference are ignored. If you need to count logical values, text, or error values, use the COUNTA function.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
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**A**  
**Data**

Sales  
12/8/2008

- 1
- 2 19
- 3 22.24
- 4 TRUE
- 5 #DIV/0!

6	Formula	Description (Result)
7	=COUNT(A2:A8)	Counts the number of cells that contain numbers in the list above (3)
8	=COUNT(A5:A8)	Counts the number of cells that contain numbers in the last 4 rows of the list (2)
	=COUNT(A2:A8,2)	Counts the number of cells that contain numbers in the list, and the value 2 (4)

[Show All](#)

# COUNTA

## [See Also](#)

Counts the number of cells that are not empty and the values within the list of arguments. Use COUNTA to count the number of cells that contain data in a range or array.

## Syntax

**COUNTA**(value1,value2,...)

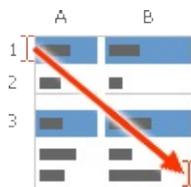
Value1, value2, ... are 1 to 30 arguments representing the values you want to count. In this case, a value is any type of information, including empty text ("") but not including empty cells. If an argument is an array or reference, empty cells within the array or reference are ignored. If you do not need to count logical values, text, or error values, use the COUNT function.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

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4. In the worksheet, select cell A1, and press CTRL+V.
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**A**  
**Data**

Sales  
12/8/2008

<p><b>1</b> 19 <b>2</b> 22.24 <b>3</b> TRUE <b>4</b> #DIV/0!</p>	<p><b>5</b>           <b>Formula</b></p> <p><b>6</b> =COUNTA(A2:A8) <b>7</b> <b>8</b> =COUNTA(A5:A8)  =COUNTA(A1:A7,2)  =COUNTA(A1:A7,"Two")</p>	<p style="text-align: center;"><b>Description (Result)</b></p> <p>Counts the number of nonblank cells in the list above (6)</p> <p>Counts the number of nonblank cells in the last 4 rows of the list (4)</p> <p>Counts the number of nonblank cells in the list above and the value 2 (7)</p> <p>Counts the number of nonblank cells in the list above and the value "Two" (7)</p>
--	--	---

[Show All](#)

# COVAR

## [See Also](#)

Returns covariance, the average of the products of deviations for each data point pair. Use covariance to determine the relationship between two data sets. For example, you can examine whether greater income accompanies greater levels of education.

## Syntax

**COVAR(array1,array2)**

Array1 is the first cell range of integers.

Array2 is the second cell range of integers.

## Remarks

- The arguments must either be numbers or be names, arrays, or references that contain numbers.
- If an array or reference argument contains text, logical values, or empty cells, those values are ignored; however, cells with the value zero are included.
- If array1 and array2 have different numbers of data points, COVAR returns the #N/A error value.
- If either array1 or array2 is empty, COVAR returns the #DIV/0! error value.
- The covariance is:

$$Cov(X,Y) = \frac{\sum (x - \bar{x})(y - \bar{y})}{n}$$

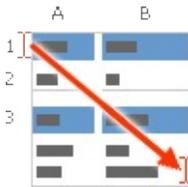
where x and y are the sample means AVERAGE(array1) and AVERAGE(array2), and n is the sample size.

## Example

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[How?](#)

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	<b>A</b>	<b>B</b>
	<b>Data1</b>	<b>Data2</b>
<b>1</b>	3	9
<b>2</b>	2	7
<b>3</b>	4	12
<b>4</b>	5	15
<b>5</b>	6	17
<b>6</b>	<b>Formula</b>	<b>Description (Result)</b>
	=COVAR(A2:A6, Covariance, the average of the products of deviations for B2:B6)	each data point pair above (5.2)

[Show All](#)

# CRITBINOM

## [See Also](#)

Returns the smallest value for which the cumulative binomial distribution is greater than or equal to a criterion value. Use this function for quality assurance applications. For example, use CRITBINOM to determine the greatest number of defective parts that are allowed to come off an assembly line run without rejecting the entire lot.

## Syntax

**CRITBINOM(trials,probability\_s,alpha)**

**Trials** is the number of Bernoulli trials.

**Probability\_s** is the probability of a success on each trial.

**Alpha** is the criterion value.

## Remarks

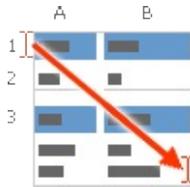
- If any argument is nonnumeric, CRITBINOM returns the #VALUE! error value.
- If trials is not an integer, it is truncated.
- If trials < 0, CRITBINOM returns the #NUM! error value.
- If probability\_s is < 0 or probability\_s > 1, CRITBINOM returns the #NUM! error value.
- If alpha < 0 or alpha > 1, CRITBINOM returns the #NUM! error value.

## Example

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[How?](#)

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	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
6		Number of Bernoulli trials
1	0.5	Probability of a success on each trial
2	0.75	Criterion value
3	<b>Formula</b>	<b>Description (Result)</b>
4	=CRITBINOM(A2,A3,A4)	Smallest value for which the cumulative binomial distribution is greater than or equal to a criterion value (4)

[Show All](#)

# DEVSQ

## [See Also](#)

Returns the sum of squares of deviations of data points from their sample mean.

## Syntax

**DEVSQ(number1,number2,...)**

Number1, number2, ... are 1 to 30 arguments for which you want to calculate the sum of squared deviations. You can also use a single array or a reference to an array instead of arguments separated by commas.

## Remarks

- The arguments must be numbers, or names, arrays, or references that contain numbers.
- If an array or reference argument contains text, logical values, or empty cells, those values are ignored; however, cells with the value zero are included.
- The equation for the sum of squared deviations is:

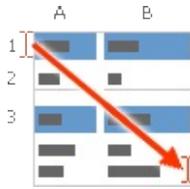
$$\text{DEVSQ} = \sum (x - \bar{x})^2$$

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

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<b>A</b>	
<b>Data</b>	
<b>1</b>	4
<b>2</b>	5
<b>3</b>	8
<b>4</b>	7
<b>5</b>	11
<b>6</b>	4
<b>7</b>	3
<b>8</b>	<b>Formula</b>
	<b>Description (Result)</b>
	=DEVSQ(A2:A8) Sum of squares of deviations of data above from their sample mean (48)

[Show All](#)

# EXPONDIST

## [See Also](#)

Returns the exponential distribution. Use EXPONDIST to model the time between events, such as how long an automated bank teller takes to deliver cash. For example, you can use EXPONDIST to determine the probability that the process takes at most 1 minute.

## Syntax

**EXPONDIST(x,lambda,cumulative)**

X is the value of the function.

Lambda is the parameter value.

Cumulative is a logical value that indicates which form of the exponential function to provide. If cumulative is TRUE, EXPONDIST returns the cumulative distribution function; if FALSE, it returns the probability density function.

## Remarks

- If x or lambda is nonnumeric, EXPONDIST returns the #VALUE! error value.
- If  $x < 0$ , EXPONDIST returns the #NUM! error value.
- If  $\lambda \leq 0$ , EXPONDIST returns the #NUM! error value.
- The equation for the probability density function is:

$$f(x; \lambda) = \lambda e^{-\lambda x}$$

- The equation for the cumulative distribution function is:

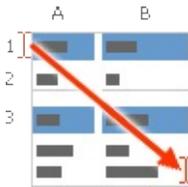
$$F(x; \lambda) = 1 - e^{-\lambda x}$$

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

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	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
	0.2	Value of the function
<b>1</b>	10	Parameter value
	<b>Formula</b>	<b>Description (Result)</b>
<b>3</b>	=EXPONDIST(A2,A3,TRUE)	Cumulative exponential distribution function (0.864665)
	=EXPONDIST(0.2,10,FALSE)	Probability exponential distribution function (1.353353)

[Show All](#)

# FDIST

## [See Also](#)

Returns the F probability distribution. You can use this function to determine whether two data sets have different degrees of diversity. For example, you can examine the test scores of men and women entering high school and determine if the variability in the females is different from that found in the males.

## Syntax

**FDIST(x,degrees\_freedom1,degrees\_freedom2)**

X is the value at which to evaluate the function.

Degrees\_freedom1 is the numerator degrees of freedom.

Degrees\_freedom2 is the denominator degrees of freedom.

## Remarks

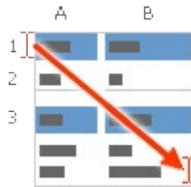
- If any argument is nonnumeric, FDIST returns the #VALUE! error value.
- If x is negative, FDIST returns the #NUM! error value.
- If degrees\_freedom1 or degrees\_freedom2 is not an integer, it is truncated.
- If degrees\_freedom1 < 1 or degrees\_freedom1 ≥ 10<sup>10</sup>, FDIST returns the #NUM! error value.
- If degrees\_freedom2 < 1 or degrees\_freedom2 ≥ 10<sup>10</sup>, FDIST returns the #NUM! error value.
- FDIST is calculated as  $FDIST=P(F>x)$ , where F is a random variable that has an F distribution with degrees\_freedom1 and degrees\_freedom2 degrees of freedom.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

## How?

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3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
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	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
<b>1</b>	15.20675	Value at which to evaluate the function
<b>2</b>	6	Numerator degrees of freedom
<b>3</b>	4	Denominator degrees of freedom
<b>4</b>	<b>Formula</b>	<b>Description (Result)</b>
	=FDIST(A2,A3,A4)	F probability distribution for the terms above (0.01)

[Show All](#)

# FINV

## [See Also](#)

Returns the inverse of the F probability distribution. If  $p = \text{FDIST}(x, \dots)$ , then  $\text{FINV}(p, \dots) = x$ .

The F distribution can be used in an F-test that compares the degree of variability in two data sets. For example, you can analyze income distributions in the United States and Canada to determine whether the two countries have a similar degree of income diversity.

## Syntax

**FINV(probability,degrees\_freedom1,degrees\_freedom2)**

Probability is a probability associated with the F cumulative distribution.

Degrees\_freedom1 is the numerator degrees of freedom.

Degrees\_freedom2 is the denominator degrees of freedom.

## Remarks

- If any argument is nonnumeric, FINV returns the #VALUE! error value.
- If probability < 0 or probability > 1, FINV returns the #NUM! error value.
- If degrees\_freedom1 or degrees\_freedom2 is not an integer, it is truncated.
- If degrees\_freedom1 < 1 or degrees\_freedom1  $\geq 10^{10}$ , FINV returns the #NUM! error value.
- If degrees\_freedom2 < 1 or degrees\_freedom2  $\geq 10^{10}$ , FINV returns the #NUM! error value.

FINV can be used to return critical values from the F distribution. For example, the output of an ANOVA calculation often includes data for the F statistic, F probability, and F critical value at the 0.05 significance level. To return the critical value of F, use the significance level as the probability argument to FINV.

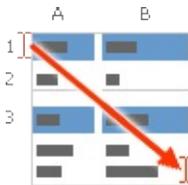
Given a value for probability, FINV seeks that value x such that  $FDIST(x, \text{degrees\_freedom1}, \text{degrees\_freedom2}) = \text{probability}$ . Thus, precision of FINV depends on precision of FDIST. FINV uses an iterative search technique. If the search has not converged after 100 iterations, the function returns the #N/A error value.

### Example

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[How?](#)

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Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
<b>1</b>	0.01	Probability associated with the F cumulative distribution
<b>2</b>	6	Numerator degrees of freedom
<b>3</b>	4	Denominator degrees of freedom
<b>4</b>	<b>Formula</b>	<b>Description (Result)</b>
	=FINV(A2,A3,A4)	Inverse of the F probability distribution for the terms above (15.20675)

[Show All](#)

# FISHER

## [See Also](#)

Returns the Fisher transformation at  $x$ . This transformation produces a function that is normally distributed rather than skewed. Use this function to perform hypothesis testing on the correlation coefficient.

## Syntax

### FISHER( $x$ )

$X$  is a numeric value for which you want the transformation.

## Remarks

- If  $x$  is nonnumeric, FISHER returns the #VALUE! error value.
- If  $x \leq -1$  or if  $x \geq 1$ , FISHER returns the #NUM! error value.
- The equation for the Fisher transformation is:

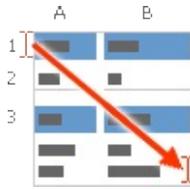
$$z' = \frac{1}{2} \ln \left( \frac{1+x}{1-x} \right)$$

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=FISHER(0.75)	Fisher transformation at 0.75 (0.972955)

[Show All](#)

# FISHERINV

## [See Also](#)

Returns the inverse of the Fisher transformation. Use this transformation when analyzing correlations between ranges or arrays of data. If  $y = \text{FISHER}(x)$ , then  $\text{FISHERINV}(y) = x$ .

## Syntax

### **FISHERINV(y)**

Y is the value for which you want to perform the inverse of the transformation.

## Remarks

- If y is nonnumeric, FISHERINV returns the #VALUE! error value.
- The equation for the inverse of the Fisher transformation is:

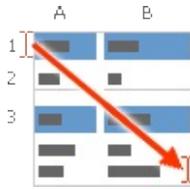
$$x = \frac{e^{2y} - 1}{e^{2y} + 1}$$

## Example

The example may be easier to understand if you copy it to a blank worksheet.

### [How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=FISHERINV(0.972955)	Inverse of the Fisher transformation at 0.972955 (0.75)

[Show All](#)

# FORECAST

## [See Also](#)

Calculates, or predicts, a future value by using existing values. The predicted value is a y-value for a given x-value. The known values are existing x-values and y-values, and the new value is predicted by using linear regression. You can use this function to predict future sales, inventory requirements, or consumer trends.

## Syntax

**FORECAST(x,known\_y's,known\_x's)**

X is the data point for which you want to predict a value.

Known\_y's is the dependent array or range of data.

Known\_x's is the independent array or range of data.

## Remarks

- If x is nonnumeric, FORECAST returns the #VALUE! error value.
- If known\_y's and known\_x's are empty or contain a different number of data points, FORECAST returns the #N/A error value.
- If the variance of known\_x's equals zero, then FORECAST returns the #DIV/0! error value.
- The equation for FORECAST is  $a+bx$ , where:

$$a = \bar{y} - b\bar{x}$$

and:

$$b = \frac{\sum(x - \bar{x})(y - \bar{y})}{\sum(x - \bar{x})^2}$$

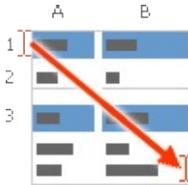
and where  $x$  and  $y$  are the sample means  $AVERAGE(\text{known\_x's})$  and  $AVERAGE(\text{known\_y's})$ .

### Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Known Y</b>	<b>Known X</b>
<b>1</b>	6	20
<b>2</b>	7	28
<b>3</b>	9	31
<b>4</b>	15	38
<b>5</b>	21	40
<b>6</b>	<b>Formula</b>	<b>Description (Result)</b>
	=FORECAST(30,A2:A6,B2:B6)	Predicts a value for y given an x value of 30 (10.60725)

[Show All](#)

# FREQUENCY

## [See Also](#)

Calculates how often values occur within a range of values, and then returns a vertical array of numbers. For example, use FREQUENCY to count the number of test scores that fall within ranges of scores. Because FREQUENCY returns an array, it must be entered as an array formula.

## Syntax

**FREQUENCY(data\_array,bins\_array)**

**Data\_array** is an array of or reference to a set of values for which you want to count frequencies. If data\_array contains no values, FREQUENCY returns an array of zeros.

**Bins\_array** is an array of or reference to intervals into which you want to group the values in data\_array. If bins\_array contains no values, FREQUENCY returns the number of elements in data\_array.

## Remarks

- FREQUENCY is entered as an array formula after you select a range of adjacent cells into which you want the returned distribution to appear.
- The number of elements in the returned array is one more than the number of elements in bins\_array. The extra element in the returned array returns the count of any values above the highest interval. For example, when counting three ranges of values (intervals) that are entered into three cells, be sure to enter FREQUENCY into four cells for the results. The extra cell returns the number of values in data\_array that are greater than the third interval value.
- FREQUENCY ignores blank cells and text.
- Formulas that return arrays must be entered as array formulas.

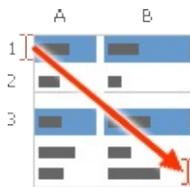
## Example

This example assumes all test scores are integers.

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Scores</b>	<b>Bins</b>
	79	70
	85	79
<b>1</b>	78	89
<b>2</b>	85	
<b>3</b>	50	
<b>4</b>	81	
<b>5</b>	95	
<b>6</b>	88	
<b>7</b>	97	
	<b>Formula</b>	<b>Description (Result)</b>

<b>8</b>	=FREQUENCY(A2:A10,B2:B5)	Number of scores less than or equal to 70
<b>9</b>		(1)
<b>10</b>		Number of scores in the bin 71-79 (2)
		Number of scores in the bin 80-89 (4)
		Number of scores greater than or equal to 90 (2)

**Note** The formula in the example must be entered as an array formula. After copying the example to a blank worksheet, select the range A13:A16 starting with the formula cell. Press F2, and then press CTRL+SHIFT+ENTER. If the formula is not entered as an array formula, the single result is 1.

[Show All](#)

# FTEST

## [See Also](#)

Returns the result of an F-test. An F-test returns the one-tailed probability that the variances in array1 and array2 are not significantly different. Use this function to determine whether two samples have different variances. For example, given test scores from public and private schools, you can test whether these schools have different levels of test score diversity.

## Syntax

**FTEST(array1,array2)**

Array1 is the first array or range of data.

Array2 is the second array or range of data.

## Remarks

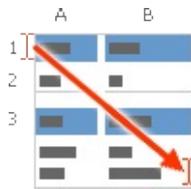
- The arguments must be either numbers or names, arrays, or references that contain numbers.
- If an array or reference argument contains text, logical values, or empty cells, those values are ignored; however, cells with the value zero are included.
- If the number of data points in array1 or array2 is less than 2, or if the variance of array1 or array2 is zero, FTEST returns the #DIV/0! error value.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data1</b>	<b>Data2</b>
<b>1</b>	6	20
<b>2</b>	7	28
<b>3</b>	9	31
<b>4</b>	15	38
<b>5</b>	21	40
<b>6</b>	<b>Formula</b>	<b>Description (Result)</b>
	=FTEST(A2:A6,B2:B6)	F-test for the data sets above (0.648318)

[Show All](#)

# GAMMADIST

## [See Also](#)

Returns the gamma distribution. You can use this function to study variables that may have a skewed distribution. The gamma distribution is commonly used in queuing analysis.

## Syntax

**GAMMADIST(x,alpha,beta,cumulative)**

X is the value at which you want to evaluate the distribution.

Alpha is a parameter to the distribution.

Beta is a parameter to the distribution. If beta = 1, GAMMADIST returns the standard gamma distribution.

Cumulative is a logical value that determines the form of the function. If cumulative is TRUE, GAMMADIST returns the cumulative distribution function; if FALSE, it returns the probability density function.

## Remarks

- If x, alpha, or beta is nonnumeric, GAMMADIST returns the #VALUE! error value.
- If x < 0, GAMMADIST returns the #NUM! error value.
- If alpha ≤ 0 or if beta ≤ 0, GAMMADIST returns the #NUM! error value.
- The equation for the gamma probability density function is:

$$f(x, \alpha, \beta) = \frac{1}{\beta^\alpha \Gamma(\alpha)} x^{\alpha-1} e^{-\frac{x}{\beta}}$$

The standard gamma probability density function is:

$$f(x, \alpha) = \frac{x^{\alpha-1} e^{-x}}{\Gamma(\alpha)}$$

- When alpha = 1, GAMMADIST returns the exponential distribution with:

$$\lambda = \frac{1}{\alpha}$$

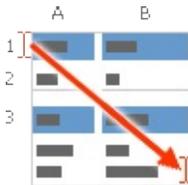
- For a positive integer n, when alpha = n/2, beta = 2, and cumulative = TRUE, GAMMADIST returns (1 - CHIDIST(x)) with n degrees of freedom.
- When alpha is a positive integer, GAMMADIST is also known as the Erlang distribution.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

**A**  
**Data**

**B**  
**Description**

		the distribution
1	9	Alpha parameter to the distribution
2	2	Beta parameter to the distribution
3	<b>Formula</b>	<b>Description (Result)</b>
4	=GAMMADIST(A2,A3,A4,FALSE)	Probability gamma distribution with the terms above (0.032639)
	=GAMMADIST(A2,A3,A4,TRUE)	Cumulative gamma distribution with the terms above (0.068094)

[Show All](#)

# GAMMAINV

## [See Also](#)

Returns the inverse of the gamma cumulative distribution. If  $p = \text{GAMMADIST}(x, \dots)$ , then  $\text{GAMMAINV}(p, \dots) = x$ .

You can use this function to study a variable whose distribution may be skewed.

## Syntax

**GAMMAINV(probability,alpha,beta)**

Probability is the probability associated with the gamma distribution.

Alpha is a parameter to the distribution.

Beta is a parameter to the distribution. If  $\text{beta} = 1$ , GAMMAINV returns the standard gamma distribution.

## Remarks

- If any argument is nonnumeric, GAMMAINV returns the #VALUE! error value.
- If  $\text{probability} < 0$  or  $\text{probability} > 1$ , GAMMAINV returns the #NUM! error value.
- If  $\text{alpha} \leq 0$  or if  $\text{beta} \leq 0$ , GAMMAINV returns the #NUM! error value.

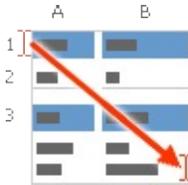
Given a value for probability, GAMMAINV seeks that value  $x$  such that  $\text{GAMMADIST}(x, \text{alpha}, \text{beta}, \text{TRUE}) = \text{probability}$ . Thus, precision of GAMMAINV depends on precision of GAMMADIST. GAMMAINV uses an iterative search technique. If the search has not converged after 100 iterations, the function returns the #N/A error value.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

**How?**

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
<b>1</b>	0.068094	Probability associated with the gamma distribution
<b>2</b>	9	Alpha parameter to the distribution
<b>3</b>	2	Beta parameter to the distribution
<b>4</b>	<b>Formula</b>	<b>Description (Result)</b>
	=GAMMAINV(A2,A3,A4)	Inverse of the gamma cumulative distribution for the above terms (10)

[Show All](#)

# GAMMALN

## [See Also](#)

Returns the natural logarithm of the gamma function,  $\Gamma(x)$ .

## Syntax

**GAMMALN(x)**

X is the value for which you want to calculate GAMMALN.

## Remarks

- If x is nonnumeric, GAMMALN returns the #VALUE! error value.
- If  $x \leq 0$ , GAMMALN returns the #NUM! error value.
- The number e raised to the GAMMALN(i) power, where i is an integer, returns the same result as (i - 1)!.
- GAMMALN is calculated as follows:

$$\text{GAMMALN} = \text{LN}(\Gamma(x))$$

where:

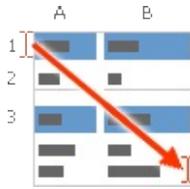
$$\Gamma(x) = \int_0^{\infty} e^{-u} u^{x-1} du$$

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=GAMMALN(4)	Natural logarithm of the gamma function at 4 (1.791759)

[Show All](#)

# GEOMEAN

## [See Also](#)

Returns the geometric mean of an array or range of positive data. For example, you can use GEOMEAN to calculate average growth rate given compound interest with variable rates.

## Syntax

**GEOMEAN(number1,number2,...)**

Number1, number2, ... are 1 to 30 arguments for which you want to calculate the mean. You can also use a single array or a reference to an array instead of arguments separated by commas.

## Remarks

- The arguments must be either numbers or names, arrays, or references that contain numbers.
- If an array or reference argument contains text, logical values, or empty cells, those values are ignored; however, cells with the value zero are included.
- If any data point  $\leq 0$ , GEOMEAN returns the #NUM! error value.
- The equation for the geometric mean is:

$$GM_{\bar{y}} = \sqrt[n]{y_1 y_2 y_3 \dots y_n}$$

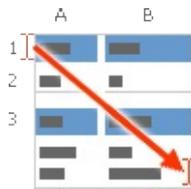
## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.

2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

**A**  
**Data**

1 4  
2 5  
3 8  
4 7  
5 11  
6 4  
7 3

8	<b>Formula</b>	<b>Description (Result)</b>
	=GEOMEAN(A2:A8)	Geometric mean of the data set above (5.476987)

[Show All](#)

# GROWTH

## [See Also](#)

Calculates predicted exponential growth by using existing data. GROWTH returns the y-values for a series of new x-values that you specify by using existing x-values and y-values. You can also use the GROWTH worksheet function to fit an exponential curve to existing x-values and y-values.

## Syntax

**GROWTH(known\_y's,known\_x's,new\_x's,const)**

Known\_y's is the set of y-values you already know in the relationship  $y = b \cdot m^x$ .

- If the array known\_y's is in a single column, then each column of known\_x's is interpreted as a separate variable.
- If the array known\_y's is in a single row, then each row of known\_x's is interpreted as a separate variable.
- If any of the numbers in known\_y's is 0 or negative, GROWTH returns the #NUM! error value.

Known\_x's is an optional set of x-values that you may already know in the relationship  $y = b \cdot m^x$ .

- The array known\_x's can include one or more sets of variables. If only one variable is used, known\_y's and known\_x's can be ranges of any shape, as long as they have equal dimensions. If more than one variable is used, known\_y's must be a vector (that is, a range with a height of one row or a width of one column).
- If known\_x's is omitted, it is assumed to be the array {1,2,3,...} that is the

same size as known\_y's.

New\_x's are new x-values for which you want GROWTH to return corresponding y-values.

- New\_x's must include a column (or row) for each independent variable, just as known\_x's does. So, if known\_y's is in a single column, known\_x's and new\_x's must have the same number of columns. If known\_y's is in a single row, known\_x's and new\_x's must have the same number of rows.
- If new\_x's is omitted, it is assumed to be the same as known\_x's.
- If both known\_x's and new\_x's are omitted, they are assumed to be the array {1,2,3,...} that is the same size as known\_y's.

Const is a logical value specifying whether to force the constant b to equal 1.

- If const is TRUE or omitted, b is calculated normally.
- If const is FALSE, b is set equal to 1 and the m-values are adjusted so that  $y = m^x$ .

## Remarks

- Formulas that return arrays must be entered as array formulas after selecting the correct number of cells.
- When entering an array constant for an argument such as known\_x's, use commas to separate values in the same row and semicolons to separate rows.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

This example uses the same data as the LOGEST example. The first formula shows corresponding values to the known values. The second formula predicts the next months values, if the exponential trend continues.

	<b>A</b>	<b>B</b>	<b>C</b>
	<b>Month</b>	<b>Units</b>	<b>Formula (Corresponding Units)</b>
<b>1</b>	11	33,100	=GROWTH(B2:B7,A2:A7)
<b>2</b>	12	47,300	
<b>3</b>	13	69,000	
<b>4</b>	14	102,000	
<b>5</b>	15	150,000	
<b>6</b>	16	220,000	
<b>7</b>	<b>Month</b>	<b>Formula (Predicted Units)</b>	
	17	=GROWTH(B2:B7,A2:A7, A9:A10)	
	18		

**Note** The formula in the example must be entered as an array formula. After copying the example to a blank worksheet, select the range C2:C7 or B9:B10 starting with the formula cell. Press F2, and then press CTRL+SHIFT+ENTER. If the formula is not entered as an array formula, the single results are 32618.20377 and 320196.7184.

[Show All](#)

# HARMEAN

## [See Also](#)

Returns the harmonic mean of a data set. The harmonic mean is the reciprocal of the arithmetic mean of reciprocals.

## Syntax

**HARMEAN(number1,number2,...)**

Number1, number2, ... are 1 to 30 arguments for which you want to calculate the mean. You can also use a single array or a reference to an array instead of arguments separated by commas.

## Remarks

- The arguments must be either numbers or names, arrays, or references that contain numbers.
- If an array or reference argument contains text, logical values, or empty cells, those values are ignored; however, cells with the value zero are included.
- If any data point  $\leq 0$ , HARMEAN returns the #NUM! error value.
- The harmonic mean is always less than the geometric mean, which is always less than the arithmetic mean.
- The equation for the harmonic mean is:

$$\frac{1}{H_H} = \frac{1}{n} \sum \frac{1}{Y_j}$$

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.



[Show All](#)

# HYPGEOMDIST

## [See Also](#)

Returns the hypergeometric distribution. HYPGEOMDIST returns the probability of a given number of sample successes, given the sample size, population successes, and population size. Use HYPGEOMDIST for problems with a finite population, where each observation is either a success or a failure, and where each subset of a given size is chosen with equal likelihood.

## Syntax

**HYPGEOMDIST(sample\_s,number\_sample,population\_s,number\_populati**

Sample\_s is the number of successes in the sample.

Number\_sample is the size of the sample.

Population\_s is the number of successes in the population.

Number\_population is the population size.

## Remarks

- All arguments are truncated to integers.
- If any argument is nonnumeric, HYPGEOMDIST returns the #VALUE! error value.
- If sample\_s < 0 or sample\_s is greater than the lesser of number\_sample or population\_s, HYPGEOMDIST returns the #NUM! error value.
- If sample\_s is less than the larger of 0 or (number\_sample - number\_population + population\_s), HYPGEOMDIST returns the #NUM! error value.
- If number\_sample < 0 or number\_sample > number\_population, HYPGEOMDIST returns the #NUM! error value.

- If  $\text{population\_s} < 0$  or  $\text{population\_s} > \text{number\_population}$ , HYPGEOMDIST returns the #NUM! error value.
- If  $\text{number\_population} < 0$ , HYPGEOMDIST returns the #NUM! error value.
- The equation for the hypergeometric distribution is:

$$P(X = x) = h(x; n, M, N) = \frac{\binom{M}{x} \binom{N - M}{n - x}}{\binom{N}{n}}$$

where:

$x$  = sample\_s

$n$  = number\_sample

$M$  = population\_s

$N$  = number\_population

HYPGEOMDIST is used in sampling without replacement from a finite population.

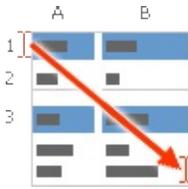
### Example

A sampler of chocolates contains 20 pieces. Eight pieces are caramels, and the remaining 12 are nuts. If a person selects 4 pieces at random, the following function returns the probability that exactly 1 piece is a caramel.

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
<b>1</b>	1	Number of successes in the sample
<b>2</b>	4	Sample size
<b>3</b>	8	Number of successes in the population
<b>4</b>	20	Population size
	<b>Formula</b>	<b>Description (Result)</b>
<b>5</b>	=HYPGEOMDIST(A2,A3,A4,A5)	Hypergeometric distribution for sample and population above (0.363261)

[Show All](#)

# INTERCEPT

## [See Also](#)

Calculates the point at which a line will intersect the y-axis by using existing x-values and y-values. The intercept point is based on a best-fit regression line plotted through the known x-values and known y-values. Use the INTERCEPT function when you want to determine the value of the dependent variable when the independent variable is 0 (zero). For example, you can use the INTERCEPT function to predict a metal's electrical resistance at 0°C when your data points were taken at room temperature and higher.

## Syntax

**INTERCEPT(known\_y's,known\_x's)**

Known\_y's is the dependent set of observations or data.

Known\_x's is the independent set of observations or data.

## Remarks

- The arguments should be either numbers or names, arrays, or references that contain numbers.
- If an array or reference argument contains text, logical values, or empty cells, those values are ignored; however, cells with the value zero are included.
- If known\_y's and known\_x's contain a different number of data points or contain no data points, INTERCEPT returns the #N/A error value.
- The equation for the intercept of the regression line, a, is:

$$a = \bar{y} - b\bar{x}$$

where the slope, b, is calculated as:

$$b = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sum (x - \bar{x})^2}$$

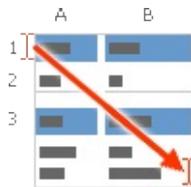
and where  $\bar{x}$  and  $\bar{y}$  are the sample means `AVERAGE(known_x's)` and `AVERAGE(known_y's)`.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Known y</b>	<b>Known x</b>
2		6
<b>1</b> 3		5
2 9		11
<b>3</b> 1		7
4 8		5
<b>5</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>6</b>		

=INTERCEPT(A2:A6, Point at which a line will intersect the y-axis by  
B2:B6) using the x-values and y-values above (0.0483871)

[Show All](#)

# KURT

## [See Also](#)

Returns the kurtosis of a data set. Kurtosis characterizes the relative peakedness or flatness of a distribution compared with the normal distribution. Positive kurtosis indicates a relatively peaked distribution. Negative kurtosis indicates a relatively flat distribution.

## Syntax

**KURT(number1,number2,...)**

Number1, number2, ... are 1 to 30 arguments for which you want to calculate kurtosis. You can also use a single array or a reference to an array instead of arguments separated by commas.

## Remarks

- The arguments must be either numbers or names, arrays, or references that contain numbers.
- If an array or reference argument contains text, logical values, or empty cells, those values are ignored; however, cells with the value zero are included.
- If there are fewer than four data points, or if the standard deviation of the sample equals zero, KURT returns the #DIV/0! error value.
- Kurtosis is defined as:

$$\left\{ \frac{n(n+1)}{(n-1)(n-2)(n-3)} \sum \left( \frac{x_j - \bar{x}}{s} \right)^4 \right\} - \frac{3(n-1)^2}{(n-2)(n-3)}$$

where:

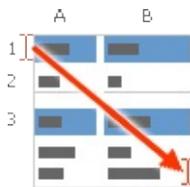
s is the sample standard deviation.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

**A**  
**Data**

<b>1</b>	3
<b>2</b>	4
<b>3</b>	5
<b>4</b>	2
<b>5</b>	3
<b>6</b>	4
<b>7</b>	5
<b>8</b>	6
<b>9</b>	4
<b>10</b>	7

<b>11</b>	<b>Formula</b>	<b>Description (Result)</b>
	=KURT(A2:A11)	Kurtosis of the data set above (-0.1518)

[Show All](#)

# LARGE

## [See Also](#)

Returns the k-th largest value in a data set. You can use this function to select a value based on its relative standing. For example, you can use LARGE to return the highest, runner-up, or third-place score.

## Syntax

**LARGE(array,k)**

Array is the array or range of data for which you want to determine the k-th largest value.

K is the position (from the largest) in the array or cell range of data to return.

## Remarks

- If array is empty, LARGE returns the #NUM! error value.
- If  $k \leq 0$  or if k is greater than the number of data points, LARGE returns the #NUM! error value.

If n is the number of data points in a range, then LARGE(array,1) returns the largest value, and LARGE(array,n) returns the smallest value.

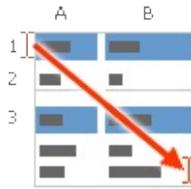
## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column

headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>		<b>B</b>
	<b>Data</b>		<b>Data</b>
<b>1</b>	3		4
<b>2</b>	5		2
<b>3</b>	3		4
<b>4</b>	5		6
<b>5</b>	4		7
<b>6</b>	<b>Formula</b>		<b>Description (Result)</b>
	=LARGE(A2:B6,3)		3rd largest number in the numbers above (5)
	=LARGE(A2:B6,7)		7th largest number in the numbers above (4)

[Show All](#)

# LINEST

## [See Also](#)

Calculates the statistics for a line by using the "least squares" method to calculate a straight line that best fits your data, and returns an array that describes the line. Because this function returns an array of values, it must be entered as an array formula.

The equation for the line is:

$$y = mx + b \text{ or}$$

$$y = m_1x_1 + m_2x_2 + \dots + b \text{ (if there are multiple ranges of x-values)}$$

where the dependent y-value is a function of the independent x-values. The m-values are coefficients corresponding to each x-value, and b is a constant value. Note that y, x, and m can be vectors. The array that LINEST returns is {m<sub>n</sub>,m<sub>n-1</sub>,...,m<sub>1</sub>,b}. LINEST can also return additional regression statistics.

## Syntax

**LINEST(known\_y's,known\_x's,const,stats)**

Known\_y's is the set of y-values you already know in the relationship  $y = mx + b$ .

- If the array known\_y's is in a single column, then each column of known\_x's is interpreted as a separate variable.
- If the array known\_y's is in a single row, then each row of known\_x's is interpreted as a separate variable.

Known\_x's is an optional set of x-values that you may already know in the relationship  $y = mx + b$ .

- The array `known_x's` can include one or more sets of variables. If only one variable is used, `known_y's` and `known_x's` can be ranges of any shape, as long as they have equal dimensions. If more than one variable is used, `known_y's` must be a vector (that is, a range with a height of one row or a width of one column).
- If `known_x's` is omitted, it is assumed to be the array `{1,2,3,...}` that is the same size as `known_y's`.

`Const` is a logical value specifying whether to force the constant `b` to equal 0.

- If `const` is `TRUE` or omitted, `b` is calculated normally.
- If `const` is `FALSE`, `b` is set equal to 0 and the `m`-values are adjusted to fit  $y = mx$ .

`Stats` is a logical value specifying whether to return additional regression statistics.

- If `stats` is `TRUE`, `LINEST` returns the additional regression statistics, so the returned array is `{mn,mn-1,...,m1,b;sen,sen-1,...,se1,seb;r2,sey;F,df;ssreg,ssresid}`.
- If `stats` is `FALSE` or omitted, `LINEST` returns only the `m`-coefficients and the constant `b`.

The additional regression statistics are as follows.

<b>Statistic</b>	<b>Description</b>
<code>se1,se2,...,sen</code>	The standard error values for the coefficients <code>m1,m2,...,mn</code> .
<code>seb</code>	The standard error value for the constant <code>b</code> ( <code>seb = #N/A</code> when <code>const</code> is <code>FALSE</code> ).
<code>r2</code>	The coefficient of determination. Compares estimated and actual <code>y</code> -values, and ranges in value from 0 to 1. If it is 1, there is a perfect correlation in the sample— there is no difference between the estimated <code>y</code> -value and the actual <code>y</code> -value. At the other extreme, if the coefficient of determination is 0, the regression equation is not helpful in predicting a <code>y</code> -value. For information about how <code>r2</code> is calculated, see "Remarks" later in this topic.

sey	The standard error for the y estimate.
F	The F statistic, or the F-observed value. Use the F statistic to determine whether the observed relationship between the dependent and independent variables occurs by chance.
df	The degrees of freedom. Use the degrees of freedom to help you find F-critical values in a statistical table. Compare the values you find in the table to the F statistic returned by LINEST to determine a confidence level for the model. For information about how df is calculated, see "Remarks" later in this topic. Example 4 below shows use of F and df.
ssreg	The regression sum of squares.
ssresid	The residual sum of squares. For information about how ssreg and ssresid are calculated, see "Remarks" later in this topic.

The following illustration shows the order in which the additional regression statistics are returned.

	A	B	C	D	E	F
1	$m_n$	$m_{n-1}$	...	$m_2$	$m_1$	b
2	$se_n$	$se_{n-1}$	...	$se_2$	$se_1$	$se_b$
3	$r^2$	$se_y$				
4	F	df				
5	ssreg	ssresid				

## Remarks

- You can describe any straight line with the slope and the y-intercept:

Slope (m):

To find the slope of a line, often written as m, take two points on the line, (x1,y1) and (x2,y2); the slope is equal to  $(y_2 - y_1)/(x_2 - x_1)$ .

Y-intercept (b):

The y-intercept of a line, often written as b, is the value of y at the point where the line crosses the y-axis.

The equation of a straight line is  $y = mx + b$ . Once you know the values of m and b, you can calculate any point on the line by plugging the y- or x-value into that equation. You can also use the TREND function.

- When you have only one independent x-variable, you can obtain the slope

and y-intercept values directly by using the following formulas:

Slope:

=INDEX(LINEST(known\_y's,known\_x's),1)

Y-intercept:

=INDEX(LINEST(known\_y's,known\_x's),2)

- The accuracy of the line calculated by LINEST depends on the degree of scatter in your data. The more linear the data, the more accurate the LINEST model. LINEST uses the method of least squares for determining the best fit for the data. When you have only one independent x-variable, the calculations for m and b are based on the following formulas:

$$m = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sum (x - \bar{x})^2}$$

$$b = \bar{y} - m\bar{x}$$

where  $\bar{x}$  and  $\bar{y}$  are sample means, i.e.,  $\bar{x} = \text{AVERAGE}(\text{known x's})$  and  $\bar{y} = \text{AVERAGE}(\text{known y's})$ .

- The line- and curve-fitting functions LINEST and LOGEST can calculate the best straight line or exponential curve that fits your data. However, you have to decide which of the two results best fits your data. You can calculate TREND(known\_y's,known\_x's) for a straight line, or GROWTH(known\_y's, known\_x's) for an exponential curve. These functions, without the new\_x's argument, return an array of y-values predicted along that line or curve at your actual data points. You can then compare the predicted values with the actual values. You may want to chart them both for a visual comparison.
- In regression analysis, Microsoft Excel calculates for each point the squared difference between the y-value estimated for that point and its actual y-value. The sum of these squared differences is called the residual sum of squares, ssresid. Microsoft Excel then calculates the total sum of squares, sstotal. When const = TRUE, or omitted, the total sum of squares is the sum of the squared differences between the actual y-values and the average of the y-values. When const = FALSE, the total sum of squares is the sum of the squares of the actual y-values (without subtracting the average y-value

from each individual y-value). Then regression sum of squares,  $ss_{reg}$ , can be found from:  $ss_{reg} = ss_{total} - ss_{resid}$ . The smaller the residual sum of squares is, compared with the total sum of squares, the larger the value of the coefficient of determination,  $r^2$ , which is an indicator of how well the equation resulting from the regression analysis explains the relationship among the variables.  $r^2$  equals  $ss_{reg}/ss_{total}$ .

- In some cases, one or more of the X columns (assume that Y's and X's are in columns) may have no additional predictive value in the presence of the other X columns. In other words, eliminating one or more X columns might lead to predicted Y values that are equally accurate. In that case these redundant X columns should be omitted from the regression model. This phenomenon is called "collinearity" because any redundant X column can be expressed as a sum of multiples of the non-redundant X columns. LINEST checks for collinearity and removes any redundant X columns from the regression model when it identifies them. Removed X columns can be recognized in LINEST output as having 0 coefficients as well as 0 se's. If one or more columns are removed as redundant, then df is affected because df depends on the number of X columns actually used for predictive purposes. For details on the computation of df, see Example 4 below. If df is changed because redundant X columns are removed, values of sey and F are also affected. Collinearity should be relatively rare in practice. However, one case where it is more likely to arise is when some X columns contain only 0's and 1's as indicators of whether a subject in an experiment is or is not a member of a particular group. If `const = TRUE` or omitted, LINEST effectively inserts an additional X column of all 1's to model the intercept. If you have a column with a 1 for each subject if male, or 0 if not, and you also have a column with a 1 for each subject if female, or 0 if not, this latter column is redundant because entries in it can be obtained from subtracting the entry in the "male indicator" column from the entry in the additional column of all 1's added by LINEST.
- df is calculated as follows when no X columns are removed from the model due to collinearity: if there are k columns of known\_x's and `const = TRUE` or omitted, then  $df = n - k - 1$ . If `const = FALSE`, then  $df = n - k$ . In both cases, each X column removed due to collinearity increases df by 1.
- Formulas that return arrays must be entered as array formulas.
- When entering an array constant such as known\_x's as an argument, use commas to separate values in the same row and semicolons to separate rows. Separator characters may be different depending on your locale setting in **Regional Settings** or **Regional Options** in **Control Panel**.

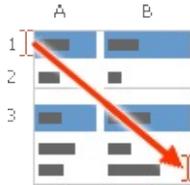
- Note that the y-values predicted by the regression equation may not be valid if they are outside the range of the y-values you used to determine the equation.

### Example 1 Slope and Y-Intercept

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Known y</b>	<b>Known x</b>
<b>1</b>	1	0
<b>2</b>	9	4
<b>3</b>	5	2
<b>4</b>	7	3
<b>5</b>	<b>Formula</b>	<b>Formula</b>
	=LINEST(A2:A5,B2:B5,,FALSE)	

**Note** The formula in the example must be entered as an array formula. After copying the example to a blank worksheet, select the range A7:B7 starting with

the formula cell. Press F2, and then press CTRL+SHIFT+ENTER. If the formula is not entered as an array formula, the single result is 2.

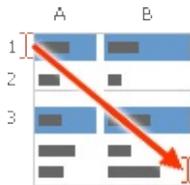
When entered as an array, the slope (2) and the y-intercept (1) are returned.

## Example 2 Simple Linear Regression

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Month</b>	<b>Sales</b>
<b>1</b>	1	3100
<b>2</b>	2	4500
<b>3</b>	3	4400
<b>4</b>	4	5400
<b>5</b>	5	7500
<b>6</b>	6	8100
<b>7</b>	<b>Formula</b>	<b>Description (Result)</b>
	=SUM(LINEST(B2:B7, A2:A7)*	Estimate sales for the ninth month

{9,1})

(11000)

In general,  $SUM(\{m,b\}*\{x,1\})$  equals  $mx + b$ , the estimated y-value for a given x-value. You can also use the TREND function.

### Example 3 Multiple Linear Regression

Suppose a commercial developer is considering purchasing a group of small office buildings in an established business district.

The developer can use multiple linear regression analysis to estimate the value of an office building in a given area based on the following variables.

<b>Variable</b>	<b>Refers to the</b>
y	Assessed value of the office building
x1	Floor space in square feet
x2	Number of offices
x3	Number of entrances
x4	Age of the office building in years

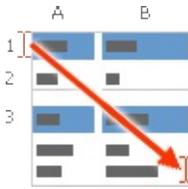
This example assumes that a straight-line relationship exists between each independent variable (x1, x2, x3, and x4) and the dependent variable (y), the value of office buildings in the area.

The developer randomly chooses a sample of 11 office buildings from a possible 1,500 office buildings and obtains the following data. "Half an entrance" means an entrance for deliveries only.

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>
	<b>Floor space (x1)</b>	<b>Offices (x2)</b>	<b>Entrances (x3)</b>	<b>Age (x4)</b>	<b>Assessed value (y)</b>
<b>1</b>	2310	2	2	20	142,000
<b>2</b>	2333	2	2	12	144,000
<b>3</b>	2356	3	1.5	33	151,000
<b>4</b>	2379	3	2	43	150,000
<b>5</b>	2402	2	3	53	139,000
<b>6</b>	2425	4	2	23	169,000
<b>7</b>	2448	2	1.5	99	126,000
<b>8</b>	2471	2	2	34	142,900
<b>9</b>	2494	3	3	23	163,000
<b>10</b>	2517	4	4	55	169,000
<b>11</b>	2540	2	3	22	149,000
<b>12</b>	<b>Formula</b>				
	=LINEST(E2:E12,A2:D12,TRUE,TRUE)				

**Note** The formula in the example must be entered as an array formula. After copying the example to a blank worksheet, select the range A14:E18 starting with the formula cell. Press F2, and then press CTRL+SHIFT+ENTER. If the formula is not entered as an array formula, the single result is -234.2371645.

When entered as an array, the following regression statistics are returned. Use

this key to identify the statistic you want.

	A	B	C	D	E	F
1	$m_n$	$m_{n-1}$	...	$m_2$	$m_1$	b
2	$se_n$	$se_{n-1}$	...	$se_2$	$se_1$	$se_b$
3	$r^2$	$se_y$				
4	F	$df$				
5	$ss_{reg}$	$ss_{resid}$				

The multiple regression equation,  $y = m_1*x_1 + m_2*x_2 + m_3*x_3 + m_4*x_4 + b$ , can now be obtained using the values from row 14:

$$y = 27.64*x_1 + 12,530*x_2 + 2,553*x_3 - 234.24*x_4 + 52,318$$

The developer can now estimate the assessed value of an office building in the same area that has 2,500 square feet, three offices, and two entrances and is 25 years old, by using the following equation:

$$y = 27.64*2500 + 12530*3 + 2553*2 - 234.24*25 + 52318 = \$158,261$$

Or you can copy the following table to cell A21 of the example workbook.

<b>Floor space (x1)</b>	<b>Offices (x2)</b>	<b>Entrances (x3)</b>	<b>Age (x4)</b>	<b>Assessed value (y)</b>
2500	3	2	25	=D14*A22 + C14*B22 + B14*C22 + A14*D22 + E14

You can also use the TREND function to calculate this value.

#### Example 4 Using the F and r2 Statistics

In the previous example, the coefficient of determination, or  $r^2$ , is 0.99675 (see cell A17 in the output for LINEST), which would indicate a strong relationship between the independent variables and the sale price. You can use the F statistic to determine whether these results, with such a high  $r^2$  value, occurred by chance.

Assume for the moment that in fact there is no relationship among the variables, but that you have drawn a rare sample of 11 office buildings that causes the statistical analysis to demonstrate a strong relationship. The term "Alpha" is used for the probability of erroneously concluding that there is a relationship.

F and df in LINEST output can be used to assess the likelihood of a higher F value occurring by chance. F can be compared with critical values in published F-distribution tables or Excel's FDIST can be used to calculate the probability of a larger F value occurring by chance. The appropriate F distribution has v1 and v2 degrees of freedom. If n is the number of data points and const = TRUE or omitted, then  $v1 = n - df - 1$  and  $v2 = df$ . (If const = FALSE, then  $v1 = n - df$  and  $v2 = df$ .) Excel's FDIST(F,v1,v2) will return the probability of a higher F value occurring by chance. In Example 4,  $df = 6$  (cell B18) and  $F = 459.753674$  (cell A18).

Assuming an Alpha value of 0.05,  $v1 = 11 - 6 - 1 = 4$  and  $v2 = 6$ , the critical level of F is 4.53. Since  $F = 459.753674$  is much higher than 4.53, it is extremely unlikely that an F value this high occurred by chance. (With Alpha = 0.05, the hypothesis that there is no relationship between known\_y's and known\_x's is to be rejected when F exceeds the critical level, 4.53.) Using Excel's FDIST you can obtain the probability that an F value this high occurred by chance.  $FDIST(459.753674, 4, 6) = 1.37E-7$ , an extremely small probability. You can conclude, either by finding the critical level of F in a table or by using Excel's FDIST, that the regression equation is useful in predicting the assessed value of office buildings in this area. Remember that it is critical to use correct values of v1 and v2 computed in the previous paragraph.

### **Example 5 Calculating the t-Statistics**

Another hypothesis test will determine whether each slope coefficient is useful in estimating the assessed value of an office building in example 3. For example, to test the age coefficient for statistical significance, divide -234.24 (age slope coefficient) by 13.268 (the estimated standard error of age coefficients in cell A15). The following is the t-observed value:

$$t = m_4 \div se_4 = -234.24 \div 13.268 = -17.7$$

If the absolute value of t is sufficiently high, it can be concluded that the slope coefficient is useful in estimating the assessed value of an office building in Example 3. The table below shows the absolute values of the 4 t-observed values.

If you consult a table in a statistics manual, you will find that t-critical, two tailed, with 6 degrees of freedom and Alpha = 0.05 is 2.447. This critical value

can also be found using Excel's TINV function.  $TINV(0.05,6) = 2.447$ . Because the absolute value of t, 17.7, is greater than 2.447, age is an important variable when estimating the assessed value of an office building. Each of the other independent variables can be tested for statistical significance in a similar manner. The following are the t-observed values for each of the independent variables.

<b>Variable</b>	<b>t-observed value</b>
Floor space	5.1
Number of offices	31.3
Number of entrances	4.8
Age	17.7

These values all have an absolute value greater than 2.447; therefore, all the variables used in the regression equation are useful in predicting the assessed value of office buildings in this area.<SPAN FPRev

[Show All](#)

# LOGEST

## [See Also](#)

In regression analysis, calculates an exponential curve that fits your data and returns an array of values that describes the curve. Because this function returns an array of values, it must be entered as an array formula.

The equation for the curve is:

$$y = b * m^x \text{ or}$$

$$y = (b * (m1^{x1}) * (m2^{x2}) * \dots) \text{ (if there are multiple x-values)}$$

where the dependent y-value is a function of the independent x-values. The m-values are bases corresponding to each exponent x-value, and b is a constant value. Note that y, x, and m can be vectors. The array that LOGEST returns is {m<sub>n</sub>, m<sub>n-1</sub>, ..., m<sub>1</sub>, b}.

## Syntax

**LOGEST**(known\_y's, known\_x's, const, stats)

Known\_y's is the set of y-values you already know in the relationship  $y = b * m^x$ .

- If the array known\_y's is in a single column, then each column of known\_x's is interpreted as a separate variable.
- If the array known\_y's is in a single row, then each row of known\_x's is interpreted as a separate variable.

Known\_x's is an optional set of x-values that you may already know in the relationship  $y = b * m^x$ .

- The array known\_x's can include one or more sets of variables. If only one variable is used, known\_y's and known\_x's can be ranges of any shape, as long as they have equal dimensions. If more than one variable is used, known\_y's must be a range of cells with a height of one row or a width of one column (which is also known as a vector).
- If known\_x's is omitted, it is assumed to be the array {1,2,3,...} that is the same size as known\_y's.

Const is a logical value specifying whether to force the constant b to equal 1.

- If const is TRUE or omitted, b is calculated normally.
- If const is FALSE, b is set equal to 1, and the m-values are fitted to  $y = m^x$ .

Stats is a logical value specifying whether to return additional regression statistics.

- If stats is TRUE, LOGEST returns the additional regression statistics, so the returned array is {mn,mn-1,...,m1,b;sen,sen-1,...,se1,seb;r 2,sey; F,df;ssreg,ssresid}.
- If stats is FALSE or omitted, LOGEST returns only the m-coefficients and the constant b.

For more information about additional regression statistics, see LINEST.

## Remarks

- The more a plot of your data resembles an exponential curve, the better the calculated line will fit your data. Like LINEST, LOGEST returns an array of values that describes a relationship among the values, but LINEST fits a straight line to your data; LOGEST fits an exponential curve. For more information, see LINEST.
- When you have only one independent x-variable, you can obtain the slope (m) and y-intercept (b) values directly by using the following formulas:

Slope (m):

INDEX(LOGEST(known\_y's,known\_x's),1)

Y-intercept (b):

`INDEX(LOGEST(known_y's,known_x's),2)`

You can use the  $y = b \cdot m^x$  equation to predict future values of  $y$ , but Microsoft Excel provides the GROWTH function to do this for you. For more information, see GROWTH.

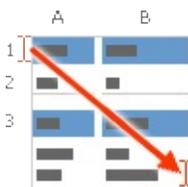
- Formulas that return arrays must be entered as array formulas.
- When entering an array constant such as known\_x's as an argument, use commas to separate values in the same row and semicolons to separate rows. Separator characters may be different depending on your locale setting in **Regional Settings** or **Regional Options** in **Control Panel**.
- You should note that the  $y$ -values predicted by the regression equation may not be valid if they are outside the range of  $y$ -values you used to determine the equation.

### Example 1 m-coefficients and the constant b

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Month</b>	<b>Units</b>
<b>2</b>	11	33,100
<b>3</b>	12	47,300
<b>4</b>	13	69,000
<b>5</b>	14	102,000
<b>6</b>	15	150,000
<b>7</b>	16	220,000
	<b>Formula</b>	<b>Formula</b>
	=LOGEST(B2:B7,A2:A7, TRUE, FALSE)	

**Note** The formula in the example must be entered as an array formula. After copying the example to a blank worksheet, select the range A9:B9 starting with the formula cell. Press F2, and then press CTRL+SHIFT+ENTER. If the formula is not entered as an array formula, the single result is 1.463275628.

When entered as an array, the m-coefficients and the constant b are returned.

$y = b * m1^{x1}$  or using the values from the array:

$$y = 495.3 * 1.4633x$$

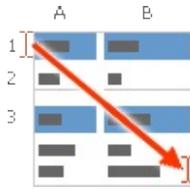
You can estimate sales for future months by substituting the month number for x in this equation, or you can use the GROWTH function.

### Example 2 Full statistics

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Month</b>	<b>Units</b>
<b>1</b>	11	33,100
<b>2</b>	12	47,300
<b>3</b>	13	69,000
<b>4</b>	14	102,000
<b>5</b>	15	150,000
<b>6</b>	16	220,000
<b>7</b>	<b>Formula</b>	
	=LOGEST(B2:B7,A2:A7, TRUE, TRUE)	

**Note** The formula in the example must be entered as an array formula. After copying the example to a blank worksheet, select the range A9:B13 starting with the formula cell. Press F2, and then press CTRL+SHIFT+ENTER. If the formula is not entered as an array formula, the single result is 1.463275628.

When entered as an array, the following regression statistics are returned. Use this key to identify the statistic you want.

	A	B	C	D	E	F
<b>1</b>	$m_n$	$m_{n-1}$	...	$m_2$	$m_1$	$b$
<b>2</b>	$se_n$	$se_{n-1}$	...	$se_2$	$se_1$	$se_b$
<b>3</b>	$r^2$	$se_y$				
<b>4</b>	F	$df$				
<b>5</b>	ssreg	ssresid				

You can use the additional regression statistics (cells A10:B13 in the above

output array) to determine how useful the equation is for predicting future values.

**Important** The methods you use to test an equation using LOGEST are similar to the methods for LINEST. However, the additional statistics LOGEST returns are based on the following linear model:

$$\ln y = x_1 \ln m_1 + \dots + x_n \ln m_n + \ln b$$

You should keep this in mind when you evaluate the additional statistics, especially the  $se_i$  and  $se_b$  values, which should be compared to  $\ln m_i$  and  $\ln b$ , not to  $m_i$  and  $b$ . For more information, consult an advanced statistics manual.

[Show All](#)

# LOGINV

## [See Also](#)

Returns the inverse of the lognormal cumulative distribution function of x, where  $\ln(x)$  is normally distributed with parameters mean and standard\_dev. If  $p = \text{LOGNORMDIST}(x, \dots)$  then  $\text{LOGINV}(p, \dots) = x$ .

Use the lognormal distribution to analyze logarithmically transformed data.

## Syntax

**LOGINV(probability,mean,standard\_dev)**

Probability is a probability associated with the lognormal distribution.

Mean is the mean of  $\ln(x)$ .

Standard\_dev is the standard deviation of  $\ln(x)$ .

## Remarks

- If any argument is nonnumeric, LOGINV returns the #VALUE! error value.
- If probability < 0 or probability > 1, LOGINV returns the #NUM! error value.
- If standard\_dev <= 0, LOGINV returns the #NUM! error value.
- The inverse of the lognormal distribution function is:

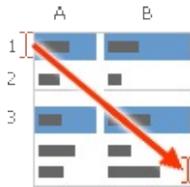
$$\text{LOGINV}(p, \mu, \sigma) = e^{[\mu + \sigma \times \text{NORMSINV}(p)]}$$

## Example

The example may be easier to understand if you copy it to a blank worksheet.

## How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
<b>1</b>	0.039084	Probability associated with the lognormal distribution
<b>2</b>	3.5	Mean of ln(x)
<b>3</b>	1.2	Standard deviation of ln(x)
<b>4</b>	<b>Formula</b>	<b>Description (Result)</b>
	=LOGINV(A2, A3, A4)	Inverse of the lognormal cumulative distribution function for the terms above (4.000014)

[Show All](#)

# LOGNORMDIST

## [See Also](#)

Returns the cumulative lognormal distribution of  $x$ , where  $\ln(x)$  is normally distributed with parameters mean and standard\_dev. Use this function to analyze data that has been logarithmically transformed.

## Syntax

**LOGNORMDIST(x,mean,standard\_dev)**

$X$  is the value at which to evaluate the function.

Mean is the mean of  $\ln(x)$ .

Standard\_dev is the standard deviation of  $\ln(x)$ .

## Remarks

- If any argument is nonnumeric, LOGNORMDIST returns the #VALUE! error value.
- If  $x \leq 0$  or if  $\text{standard\_dev} \leq 0$ , LOGNORMDIST returns the #NUM! error value.
- The equation for the lognormal cumulative distribution function is:

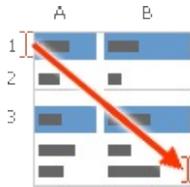
$$\text{LOGNORMDIST}(x, \mu, \sigma) = \text{NORMSDIST}\left(\frac{\ln(x) - \mu}{\sigma}\right)$$

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
<b>1</b>	4	Value at which to evaluate the function (x)
<b>2</b>	3.5	Mean of ln(x)
<b>3</b>	1.2	Standard deviation of ln(x)
<b>4</b>	<b>Formula</b>	<b>Description (Result)</b>
	=LOGNORMDIST(A2,A3,A4)	Cumulative lognormal distribution at 4 with the terms above (0.039084)

[Show All](#)

# MAX

## [See Also](#)

Returns the largest value in a set of values.

## Syntax

**MAX**(number1,number2,...)

Number1, number2, ... are 1 to 30 numbers for which you want to find the maximum value.

## Remarks

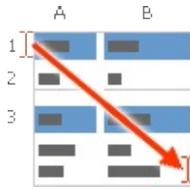
- You can specify arguments that are numbers, empty cells, logical values, or text representations of numbers. Arguments that are error values or text that cannot be translated into numbers cause errors.
- If an argument is an array or reference, only numbers in that array or reference are used. Empty cells, logical values, or text in the array or reference are ignored. If logical values and text must not be ignored, use MAXA instead.
- If the arguments contain no numbers, MAX returns 0 (zero).

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

<b>A</b>	
<b>Data</b>	
<b>1</b>	10
<b>2</b>	7
<b>3</b>	9
<b>4</b>	27
<b>5</b>	2
<b>6</b>	<b>Formula</b> <b>Description (Result)</b>
	=MAX(A2:A6)      Largest of the numbers above (27)
	=MAX(A2:A6, 30) Largest of the numbers above and 30 (30)

[Show All](#)

# MAXA

## [See Also](#)

Returns the largest value in a list of arguments. Text and logical values such as TRUE and FALSE are compared as well as numbers.

MAXA is similar to MINA. For more information, see the examples for MINA.

## Syntax

**MAXA(value1,value2,...)**

Value1, value2, ... are 1 to 30 values for which you want to find the largest value.

## Remarks

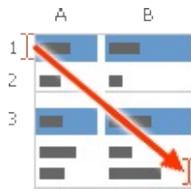
- You can specify arguments that are numbers, empty cells, logical values, or text representations of numbers. Arguments that are error values cause errors. If the calculation must not include text or logical values, use the MAX worksheet function instead.
- If an argument is an array or reference, only values in that array or reference are used. Empty cells and text values in the array or reference are ignored.
- Arguments that contain TRUE evaluate as 1; arguments that contain text or FALSE evaluate as 0 (zero).
- If the arguments contain no values, MAXA returns 0 (zero).

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

A	
Data	
1	0
2	0.2
3	0.5
4	0.4
5	TRUE
6	Formula
	=MAXA(A2:A6)
Description (Result)	
	Largest of the numbers above. TRUE evaluates to 1 (1)

[Show All](#)

# MEDIAN

## [See Also](#)

Returns the median of the given numbers. The median is the number in the middle of a set of numbers; that is, half the numbers have values that are greater than the median, and half have values that are less.

## Syntax

**MEDIAN**(number1,number2,...)

Number1, number2, ... are 1 to 30 numbers for which you want the median.

## Remarks

- The arguments should be either numbers or names, arrays, or references that contain numbers. Microsoft Excel examines all the numbers in each reference or array argument.
- If an array or reference argument contains text, logical values, or empty cells, those values are ignored; however, cells with the value zero are included.
- If there is an even number of numbers in the set, then MEDIAN calculates the average of the two numbers in the middle. See the second formula in the example.

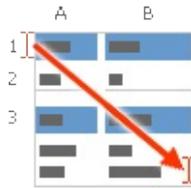
## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column

headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

**A**  
**Data**

1

1 2

2 3

3 4

4 5

5 6

**6      Formula**

**Description (Result)**

7 =MEDIAN(A2:A6) Median of the first 5 numbers in the list above (3)

=MEDIAN(A2:A7) Median of all the numbers above, or the average of 3 and 4 (3.5)

[Show All](#)

# MIN

## [See Also](#)

Returns the smallest number in a set of values.

## Syntax

**MIN**(number1,number2,...)

Number1, number2, ... are 1 to 30 numbers for which you want to find the minimum value.

## Remarks

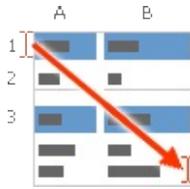
- You can specify arguments that are numbers, empty cells, logical values, or text representations of numbers. Arguments that are error values or text that cannot be translated into numbers cause errors.
- If an argument is an array or reference, only numbers in that array or reference are used. Empty cells, logical values, or text in the array or reference are ignored. If logical values and text should not be ignored, use MINA instead.
- If the arguments contain no numbers, MIN returns 0.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

<b>A</b>	
<b>Data</b>	
<b>1</b>	10
<b>2</b>	7
<b>3</b>	9
<b>4</b>	27
<b>5</b>	2
<b>6</b>	<b>Formula</b> <b>Description (Result)</b>
	=MIN(A2:A6)    Smallest of the numbers above (2)
	=MIN(A2:A6,0) Smallest of the numbers above and 0 (0)

[Show All](#)

# MINA

## [See Also](#)

Returns the smallest value in the list of arguments. Text and logical values such as TRUE and FALSE are compared as well as numbers.

## Syntax

**MINA**(value1,value2,...)

Value1, value2, ... are 1 to 30 values for which you want to find the smallest value.

## Remarks

- You can specify arguments that are numbers, empty cells, logical values, or text representations of numbers. Arguments that are error values cause errors. If the calculation must not include text or logical values, use the MIN worksheet function instead.
- If an argument is an array or reference, only values in that array or reference are used. Empty cells and text values in the array or reference are ignored.
- Arguments that contain TRUE evaluate as 1; arguments that contain text or FALSE evaluate as 0 (zero).
- If the arguments contain no values, MINA returns 0.

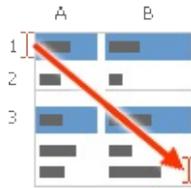
## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column

headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

**A**

**Data**

**1** FALSE

**2** 0.2

**3** 0.5

**4** 0.4

**5** 0.8

**6** **Formula**

**Description (Result)**

=MINA(A2:A6) Smallest of the numbers above. FALSE evaluates to 0 (0)

[Show All](#)

# MODE

## [See Also](#)

Returns the most frequently occurring, or repetitive, value in an array or range of data. Like MEDIAN, MODE is a location measure.

## Syntax

**MODE**(number1,number2,...)

Number1, number2, ... are 1 to 30 arguments for which you want to calculate the mode. You can also use a single array or a reference to an array instead of arguments separated by commas.

## Remarks

- The arguments should be numbers, names, arrays, or references that contain numbers.
- If an array or reference argument contains text, logical values, or empty cells, those values are ignored; however, cells with the value zero are included.
- If the data set contains no duplicate data points, MODE returns the #N/A error value.

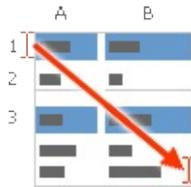
In a set of values, the mode is the most frequently occurring value; the median is the middle value; and the mean is the average value. No single measure of central tendency provides a complete picture of the data. Suppose data is clustered in three areas, half around a single low value, and half around two large values. Both AVERAGE and MEDIAN may return a value in the relatively empty middle, and MODE may return the dominant low value.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

## How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	
	<b>Data</b>	
<b>1</b>	5.6	
<b>2</b>	4	
<b>3</b>	4	
<b>4</b>	3	
<b>5</b>	2	
<b>6</b>	4	
<b>7</b>	<b>Formula</b>	<b>Description (Result)</b>
	=MODE(A2:A7)	Mode, or most frequently occurring number above (4)

[Show All](#)

# NEGBINOMDIST

## [See Also](#)

Returns the negative binomial distribution. NEGBINOMDIST returns the probability that there will be number\_f failures before the number\_s-th success, when the constant probability of a success is probability\_s. This function is similar to the binomial distribution, except that the number of successes is fixed, and the number of trials is variable. Like the binomial, trials are assumed to be independent.

For example, you need to find 10 people with excellent reflexes, and you know the probability that a candidate has these qualifications is 0.3. NEGBINOMDIST calculates the probability that you will interview a certain number of unqualified candidates before finding all 10 qualified candidates.

## Syntax

**NEGBINOMDIST(number\_f,number\_s,probability\_s)**

Number\_f is the number of failures.

Number\_s is the threshold number of successes.

Probability\_s is the probability of a success.

## Remarks

- Number\_f and number\_s are truncated to integers.
- If any argument is nonnumeric, NEGBINOMDIST returns the #VALUE! error value.
- If probability\_s < 0 or if probability > 1, NEGBINOMDIST returns the #NUM! error value.
- If number\_f < 0 or number\_s < 1, NEGBINOMDIST returns the #NUM! error value.

- The equation for the negative binomial distribution is:

$$nb(x; r, p) = \binom{x+r-1}{r-1} p^r (1-p)^x$$

where:

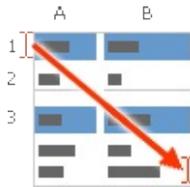
x is number\_f, r is number\_s, and p is probability\_s.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
<b>1</b>	10	Number of failures
<b>2</b>	5	Threshold number of successes
<b>3</b>	0.25	Probability of a success
<b>4</b>	<b>Formula</b>	<b>Description (Result)</b>
		Negative binomial distribution for the terms

=NEGBINOMDIST(A2,A3,A4) above (0.055049)

[Show All](#)

# NORMDIST

## [See Also](#)

Returns the normal distribution for the specified mean and standard deviation. This function has a very wide range of applications in statistics, including hypothesis testing.

## Syntax

**NORMDIST(x,mean,standard\_dev,cumulative)**

X is the value for which you want the distribution.

Mean is the arithmetic mean of the distribution.

Standard\_dev is the standard deviation of the distribution.

Cumulative is a logical value that determines the form of the function. If cumulative is TRUE, NORMDIST returns the cumulative distribution function; if FALSE, it returns the probability mass function.

## Remarks

- If mean or standard\_dev is nonnumeric, NORMDIST returns the #VALUE! error value.
- If standard\_dev  $\leq 0$ , NORMDIST returns the #NUM! error value.
- If mean = 0, standard\_dev = 1, and cumulative = TRUE, NORMDIST returns the standard normal distribution, NORMSDIST.
- The equation for the normal density function (cumulative = FALSE) is:

$$f(x; \mu, \sigma) = \frac{1}{\sqrt{2\pi}\sigma} e^{-\left(\frac{(x-\mu)^2}{2\sigma^2}\right)}$$

- When cumulative = TRUE, the formula is the integral from negative

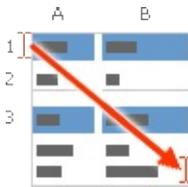
infinity to x of the given formula.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
	42	Value for which you want the distribution
<b>1</b>	40	Arithmetic mean of the distribution
<b>2</b>	1.5	Standard deviation of the distribution
<b>3</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>4</b>	=NORMDIST(A2,A3,A4,TRUE)	Cumulative distribution function for the terms above (0.908789)
	=NORMDIST(A2,A3,A4,FALSE)	Probability mass function for the terms above (0.10934005)

[Show All](#)

# NORMINV

## [See Also](#)

Returns the inverse of the normal cumulative distribution for the specified mean and standard deviation.

## Syntax

**NORMINV(probability,mean,standard\_dev)**

Probability is a probability corresponding to the normal distribution.

Mean is the arithmetic mean of the distribution.

Standard\_dev is the standard deviation of the distribution.

## Remarks

- If any argument is nonnumeric, NORMINV returns the #VALUE! error value.
- If probability < 0 or if probability > 1, NORMINV returns the #NUM! error value.
- If standard\_dev ≤ 0, NORMINV returns the #NUM! error value.
- If mean = 0 and standard\_dev = 1, NORMINV uses the standard normal distribution (see NORMSINV).

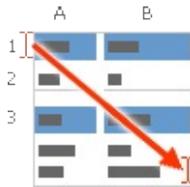
Given a value for probability, NORMINV seeks that value x such that NORMDIST(x, mean, standard\_dev, TRUE) = probability. Thus, precision of NORMINV depends on precision of NORMDIST. NORMINV uses an iterative search technique. If the search has not converged after 100 iterations, the function returns the #N/A error value.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

## How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
<b>1</b>	0.908789	Probability corresponding to the normal distribution
<b>2</b>	40	Arithmetic mean of the distribution
<b>3</b>	1.5	Standard deviation of the distribution
<b>4</b>	<b>Formula</b>	<b>Description (Result)</b>
	=NORMINV(A2,A3,A4)	Inverse of the normal cumulative distribution for the terms above (42)

[Show All](#)

# NORMSDIST

## [See Also](#)

Returns the standard normal cumulative distribution function. The distribution has a mean of 0 (zero) and a standard deviation of one. Use this function in place of a table of standard normal curve areas.

## Syntax

**NORMSDIST(z)**

Z is the value for which you want the distribution.

## Remarks

- If z is nonnumeric, NORMSDIST returns the #VALUE! error value.
- The equation for the standard normal density function is:

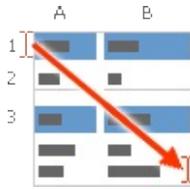
$$f(z) = \frac{1}{\sqrt{2\pi}} e^{-\frac{z^2}{2}}$$

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	B
1	Formula	Description (Result)
2	=NORMSDIST(1.333333)	Normal cumulative distribution function at 1.333333 (0.908789)

[Show All](#)

# NORMSINV

## [See Also](#)

Returns the inverse of the standard normal cumulative distribution. The distribution has a mean of zero and a standard deviation of one.

## Syntax

**NORMSINV(probability)**

Probability is a probability corresponding to the normal distribution.

## Remarks

- If probability is nonnumeric, NORMSINV returns the #VALUE! error value.
- If probability < 0 or if probability > 1, NORMSINV returns the #NUM! error value.

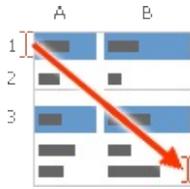
Given a value for probability, NORMSINV seeks that value  $z$  such that  $\text{NORMSDIST}(z) = \text{probability}$ . Thus, precision of NORMSINV depends on precision of NORMSDIST. NORMSINV uses an iterative search technique. If the search has not converged after 100 iterations, the function returns the #N/A error value.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Formula</b>	<b>Description (Result)</b>
<b>1</b>		Inverse of the standard normal cumulative
<b>2</b>	=NORMSINV(0.908789)	distribution, with a probability of 0.908789 (1.3333)

[Show All](#)

# PEARSON

## [See Also](#)

Returns the Pearson product moment correlation coefficient, r, a dimensionless index that ranges from -1.0 to 1.0 inclusive and reflects the extent of a linear relationship between two data sets.

## Syntax

**PEARSON(array1,array2)**

Array1 is a set of independent values.

Array2 is a set of dependent values.

## Remarks

- The arguments must be either numbers or names, array constants, or references that contain numbers.
- If an array or reference argument contains text, logical values, or empty cells, those values are ignored; however, cells with the value zero are included.
- If array1 and array2 are empty or have a different number of data points, PEARSON returns the #N/A error value.
- The formula for the Pearson product moment correlation coefficient, r, is:

$$r = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sqrt{\sum (x - \bar{x})^2 \sum (y - \bar{y})^2}}$$

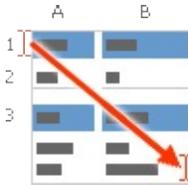
where x and y are the sample means AVERAGE(array1) and AVERAGE(array2).

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>		<b>B</b>
	<b>Independent values</b>		<b>Dependent values</b>
<b>1</b>	9		10
<b>2</b>	7		6
<b>3</b>	5		1
<b>4</b>	3		5
<b>5</b>	1		3
<b>6</b>	<b>Formula</b>		<b>Description (Result)</b>
	=PEARSON(A2:A6,B2:B6)		Pearson product moment correlation coefficient for the data sets above (0.699379)

[Show All](#)

# PERCENTILE

## [See Also](#)

Returns the k-th percentile of values in a range. You can use this function to establish a threshold of acceptance. For example, you can decide to examine candidates who score above the 90th percentile.

## Syntax

**PERCENTILE(array,k)**

Array is the array or range of data that defines relative standing.

K is the percentile value in the range 0..1, inclusive.

## Remarks

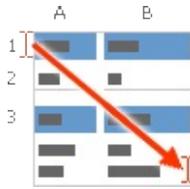
- If array is empty or contains more than 8,191 data points, PERCENTILE returns the #NUM! error value.
- If k is nonnumeric, PERCENTILE returns the #VALUE! error value.
- If k is  $< 0$  or if  $k > 1$ , PERCENTILE returns the #NUM! error value.
- If k is not a multiple of  $1/(n - 1)$ , PERCENTILE interpolates to determine the value at the k-th percentile.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

<b>A</b>	
<b>Data</b>	
<b>1</b>	1
<b>2</b>	3
<b>3</b>	2
<b>4</b>	4
<b>5</b>	
<b>Formula</b>	<b>Description (Result)</b>
=PERCENTILE(A2:A5,0.3)	30th percentile of the list above (1.9)

[Show All](#)

# PERCENTRANK

## [See Also](#)

Returns the rank of a value in a data set as a percentage of the data set. This function can be used to evaluate the relative standing of a value within a data set. For example, you can use PERCENTRANK to evaluate the standing of an aptitude test score among all scores for the test.

## Syntax

**PERCENTRANK(array,x,significance)**

**Array** is the array or range of data with numeric values that defines relative standing.

**X** is the value for which you want to know the rank.

**Significance** is an optional value that identifies the number of significant digits for the returned percentage value. If omitted, PERCENTRANK uses three digits (0.xxx).

## Remarks

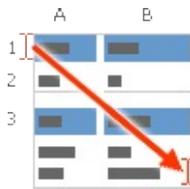
- If array is empty, PERCENTRANK returns the #NUM! error value.
- If significance < 1, PERCENTRANK returns the #NUM! error value.
- If x does not match one of the values in array, PERCENTRANK interpolates to return the correct percentage rank.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

**A**  
**Data**

13  
12  
11  
8  
4  
3  
2  
1  
1  
1

**Formula**

**Description (Result)**

=PERCENTRANK(A2:A11,2) Percent rank of 2 in the list above (0.333, because 3 values in the set are smaller than 2, and 6 are larger than 2;  $3/(3+6)=0.333$ )

=PERCENTRANK(A2:A11,4) Percent rank of 4 in the list above (0.555)

=PERCENTRANK(A2:A11,8) Percent rank of 8 in the list above (0.666)

Percent rank of 5 in the list above (0.583, one-

=PERCENTRANK(A2:A11,5) quarter of the way between the  
PERCENTRANK of 4 and the  
PERCENTRANK of 8)

**Note** To view the number as a percentage, select the cell and click **Cells** on the **Format** menu. Click the **Number** tab, and then click **Percentage** in the **Category** box.

[Show All](#)

# PERMUT

## [See Also](#)

Returns the number of permutations for a given number of objects that can be selected from number objects. A permutation is any set or subset of objects or events where internal order is significant. Permutations are different from combinations, for which the internal order is not significant. Use this function for lottery-style probability calculations.

## Syntax

**PERMUT(number,number\_chosen)**

Number is an integer that describes the number of objects.

Number\_chosen is an integer that describes the number of objects in each permutation.

## Remarks

- Both arguments are truncated to integers.
- If number or number\_chosen is nonnumeric, PERMUT returns the #VALUE! error value.
- If number  $\leq 0$  or if number\_chosen  $< 0$ , PERMUT returns the #NUM! error value.
- If number  $<$  number\_chosen, PERMUT returns the #NUM! error value.
- The equation for the number of permutations is:

$$P_{k,n} = \frac{n!}{(n-k)!}$$

## Example

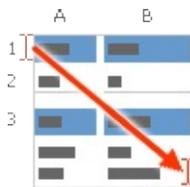
Suppose you want to calculate the odds of selecting a winning lottery number.

Each lottery number contains three numbers, each of which can be between 0 (zero) and 99, inclusive. The following function calculates the number of possible permutations:

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
<b>1</b>	100	Number of objects
<b>2</b>	3	Number of objects in each permutation
<b>3</b>	<b>Formula</b>	<b>Description (Result)</b>
	=PERMUT(A2,A3)	Permutations possible for the terms above (970200)

[Show All](#)

# POISSON

## [See Also](#)

Returns the Poisson distribution. A common application of the Poisson distribution is predicting the number of events over a specific time, such as the number of cars arriving at a toll plaza in 1 minute.

## Syntax

**POISSON(x,mean,cumulative)**

X is the number of events.

Mean is the expected numeric value.

Cumulative is a logical value that determines the form of the probability distribution returned. If cumulative is TRUE, POISSON returns the cumulative Poisson probability that the number of random events occurring will be between zero and x inclusive; if FALSE, it returns the Poisson probability mass function that the number of events occurring will be exactly x.

## Remarks

- If x is not an integer, it is truncated.
- If x or mean is nonnumeric, POISSON returns the #VALUE! error value.
- If  $x < 0$ , POISSON returns the #NUM! error value.
- If  $\text{mean} \leq 0$ , POISSON returns the #NUM! error value.
- POISSON is calculated as follows.

For cumulative = FALSE:

$$POISSON = \frac{e^{-\lambda} \lambda^x}{x!}$$

For cumulative = TRUE:

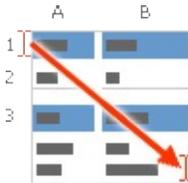
$$CUMPOISSON = \sum_{k=0}^x \frac{e^{-\lambda} \lambda^k}{k!}$$

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	B
	<b>Data</b>	<b>Description</b>
2		Number of events
1 5		Expected mean
2	<b>Formula</b>	<b>Description (Result)</b>
3	=POISSON(A2,A3,TRUE)	Cumulative Poisson probability with the terms above (0.124652)
	=POISSON(A2,A3,FALSE)	Poisson probability mass function with the terms above (0.084224)

[Show All](#)

# PROB

## [See Also](#)

Returns the probability that values in a range are between two limits. If upper\_limit is not supplied, returns the probability that values in x\_range are equal to lower\_limit.

## Syntax

**PROB(x\_range,prob\_range,lower\_limit,upper\_limit)**

X\_range is the range of numeric values of x with which there are associated probabilities.

Prob\_range is a set of probabilities associated with values in x\_range.

Lower\_limit is the lower bound on the value for which you want a probability.

Upper\_limit is the optional upper bound on the value for which you want a probability.

## Remarks

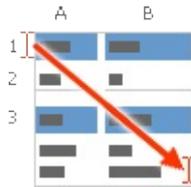
- If any value in prob\_range  $\leq 0$  or if any value in prob\_range  $> 1$ , PROB returns the #NUM! error value.
- If the sum of the values in prob\_range  $\neq 1$ , PROB returns the #NUM! error value.
- If upper\_limit is omitted, PROB returns the probability of being equal to lower\_limit.
- If x\_range and prob\_range contain a different number of data points, PROB returns the #N/A error value.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

## How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>x</b>	<b>Probability</b>
<b>1</b>	0	0.2
<b>2</b>	1	0.3
<b>3</b>	2	0.1
<b>4</b>	3	0.4
<b>5</b>	<b>Formula</b>	<b>Description (Result)</b>
	=PROB(A2:A5,B2:B5,2)	Probability that x is 2 (0.1)
	=PROB(A2:A5,B2:B5,1,3)	Probability that x is between 1 and 3 (0.8)

[Show All](#)

# QUARTILE

## [See Also](#)

Returns the quartile of a data set. Quartiles often are used in sales and survey data to divide populations into groups. For example, you can use QUARTILE to find the top 25 percent of incomes in a population.

## Syntax

### QUARTILE(array,quart)

Array is the array or cell range of numeric values for which you want the quartile value.

Quart indicates which value to return.

If quart equals	QUARTILE returns
0	Minimum value
1	First quartile (25th percentile)
2	Median value (50th percentile)
3	Third quartile (75th percentile)
4	Maximum value

## Remarks

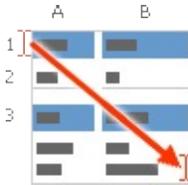
- If array is empty, QUARTILE returns the #NUM! error value.
- If quart is not an integer, it is truncated.
- If quart < 0 or if quart > 4, QUARTILE returns the #NUM! error value.
- MIN, MEDIAN, and MAX return the same value as QUARTILE when quart is equal to 0 (zero), 2, and 4, respectively.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	
	Data	
1		
2		
3		
4		
5		
6		
7		
8		
9		
	Formula	Description (Result)
	=QUARTILE(A2:A9,1)	First quartile (25th percentile) of the data above (3.5)

[Show All](#)

# RANK

## [See Also](#)

Returns the rank of a number in a list of numbers. The rank of a number is its size relative to other values in a list. (If you were to sort the list, the rank of the number would be its position.)

## Syntax

**RANK(number,ref,order)**

Number is the number whose rank you want to find.

Ref is an array of, or a reference to, a list of numbers. Nonnumeric values in ref are ignored.

Order is a number specifying how to rank number.

- If order is 0 (zero) or omitted, Microsoft Excel ranks number as if ref were a list sorted in descending order.
- If order is any nonzero value, Microsoft Excel ranks number as if ref were a list sorted in ascending order.

## Remarks

- RANK gives duplicate numbers the same rank. However, the presence of duplicate numbers affects the ranks of subsequent numbers. For example, in a list of integers sorted in ascending order, if the number 10 appears twice and has a rank of 5, then 11 would have a rank of 7 (no number would have a rank of 6).
- For some purposes one might want to use a definition of rank that takes ties into account. In the previous example, one would want a revised rank of 5.5 for the number 10. This can be done by adding the following correction factor to the value returned by RANK. This correction factor is appropriate

both for the case where rank is computed in descending order (order = 0 or omitted) or ascending order (order = nonzero value).

Correction factor for tied ranks= $[\text{COUNT}(\text{ref}) + 1 - \text{RANK}(\text{number}, \text{ref}, 0) - \text{RANK}(\text{number}, \text{ref}, 1)]/2$ .

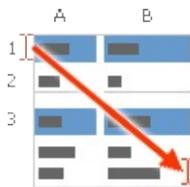
In the following example,  $\text{RANK}(A2,A1:A5,1)$  equals 3. The correction factor is  $(5 + 1 - 2 - 3)/2 = 0.5$  and the revised rank that takes ties into account is  $3 + 0.5 = 3.5$ . If number occurs only once in ref, the correction factor will be 0, since RANK would not have to be adjusted for a tie.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A
	<b>Data</b>
1	7
2	3.5
3	3.5

3 1

4 2

5           **Formula**                      **Description (Result)**

6 =RANK(A3,A2:A6,1) Rank of 3.5 in the list above (3)

=RANK(A2,A2:A6,1) Rank of 7 in the list above (5)

[Show All](#)

# RSQ

## [See Also](#)

Returns the square of the Pearson product moment correlation coefficient through data points in known\_y's and known\_x's.

For more information, see PEARSON.

The r-squared value can be interpreted as the proportion of the variance in y attributable to the variance in x.

## Syntax

**RSQ(known\_y's,known\_x's)**

Known\_y's is an array or range of data points.

Known\_x's is an array or range of data points.

## Remarks

- The arguments must be either numbers or names, arrays, or references that contain numbers.
- If an array or reference argument contains text, logical values, or empty cells, those values are ignored; however, cells with the value zero are included.
- If known\_y's and known\_x's are empty or have a different number of data points, RSQ returns the #N/A error value.
- The equation for the Pearson product moment correlation coefficient, r, is:

$$r = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sqrt{\sum (x - \bar{x})^2 \sum (y - \bar{y})^2}}$$

where x and y are the sample means AVERAGE(known\_x's) and AVERAGE(known\_y's).

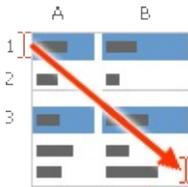
RSQ returns r<sup>2</sup>, which is the square of this correlation coefficient.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Known y</b>	<b>Known x</b>
<b>1</b>	2	6
<b>2</b>	3	5
<b>3</b>	9	11
<b>4</b>	1	7
<b>5</b>	8	5
<b>6</b>	7	4
<b>7</b>	5	4
<b>8</b>	<b>Formula</b>	<b>Description (Result)</b>
	=RSQ(A2:A8,B2:B8)	Square of the Pearson product moment correlation coefficient through data points above (0.05795)

[Show All](#)

# SKEW

## [See Also](#)

Returns the skewness of a distribution. Skewness characterizes the degree of asymmetry of a distribution around its mean. Positive skewness indicates a distribution with an asymmetric tail extending toward more positive values. Negative skewness indicates a distribution with an asymmetric tail extending toward more negative values.

## Syntax

**SKEW**(number1,number2,...)

Number1, number2 ... are 1 to 30 arguments for which you want to calculate skewness. You can also use a single array or a reference to an array instead of arguments separated by commas.

## Remarks

- The arguments must be either numbers or names, arrays, or references that contain numbers.
- If an array or reference argument contains text, logical values, or empty cells, those values are ignored; however, cells with the value zero are included.
- If there are fewer than three data points, or the sample standard deviation is zero, SKEW returns the #DIV/0! error value.
- The equation for skewness is defined as:

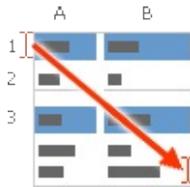
$$\frac{n}{(n-1)(n-2)} \sum \left( \frac{x_j - \bar{x}}{s} \right)^3$$

## Example

The example may be easier to understand if you copy it to a blank worksheet.

## How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	
	<b>Data</b>	
<b>1</b>	3	
<b>2</b>	4	
<b>3</b>	5	
<b>4</b>	2	
<b>5</b>	3	
<b>6</b>	4	
<b>7</b>	5	
<b>8</b>	6	
<b>9</b>	4	
<b>10</b>	7	
<b>11</b>	<b>Formula</b>	<b>Description (Result)</b>
	=SKEW(A2:A11)	Skewness of a distribution of the data set above (0.359543)

[Show All](#)

# SLOPE

## [See Also](#)

Returns the slope of the linear regression line through data points in known\_y's and known\_x's. The slope is the vertical distance divided by the horizontal distance between any two points on the line, which is the rate of change along the regression line.

## Syntax

**SLOPE(known\_y's,known\_x's)**

Known\_y's is an array or cell range of numeric dependent data points.

Known\_x's is the set of independent data points.

## Remarks

- The arguments must be either numbers or names, arrays, or references that contain numbers.
- If an array or reference argument contains text, logical values, or empty cells, those values are ignored; however, cells with the value zero are included.
- If known\_y's and known\_x's are empty or have a different number of data points, SLOPE returns the #N/A error value.
- The equation for the slope of the regression line is:

$$b = \frac{\sum(x - \bar{x})(y - \bar{y})}{\sum(x - \bar{x})^2}$$

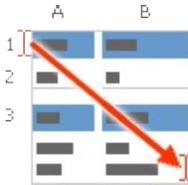
where  $\bar{x}$  and  $\bar{y}$  are the sample means `AVERAGE(known_x's)` and `AVERAGE(known_y's)`.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Known y</b>	<b>Known x</b>
<b>1</b>	2	6
<b>2</b>	3	5
<b>3</b>	9	11
<b>4</b>	1	7
<b>5</b>	8	5
<b>6</b>	7	4
<b>7</b>	5	4
<b>8</b>	<b>Formula</b>	<b>Description (Result)</b>
	=SLOPE(A2:A8,B2:B8)	Slope of the linear regression line through the data points above (0.305556)

[Show All](#)

# SMALL

## [See Also](#)

Returns the k-th smallest value in a data set. Use this function to return values with a particular relative standing in a data set.

## Syntax

**SMALL(array,k)**

Array is an array or range of numerical data for which you want to determine the k-th smallest value.

K is the position (from the smallest) in the array or range of data to return.

## Remarks

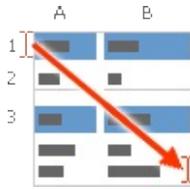
- If array is empty, SMALL returns the #NUM! error value.
- If  $k \leq 0$  or if k exceeds the number of data points, SMALL returns the #NUM! error value.
- If n is the number of data points in array, SMALL(array,1) equals the smallest value, and SMALL(array,n) equals the largest value.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>		<b>B</b>
	<b>Data</b>		<b>Data</b>
<b>1</b>	3		1
<b>2</b>	4		4
<b>3</b>	5		8
<b>4</b>	2		3
<b>5</b>	3		7
<b>6</b>	4		12
<b>7</b>	6		54
<b>8</b>	4		8
<b>9</b>	7		23
	<b>Formula</b>		<b>Description (Result)</b>
<b>10</b>	=SMALL(A2:A10,4)		4th smallest number in first column (4)
			=SMALL(B2:B10,2) 2nd smallest number in the second column (3)

[Show All](#)

# STANDARDIZE

## [See Also](#)

Returns a normalized value from a distribution characterized by mean and standard\_dev.

## Syntax

**STANDARDIZE(x,mean,standard\_dev)**

X is the value you want to normalize.

Mean is the arithmetic mean of the distribution.

Standard\_dev is the standard deviation of the distribution.

## Remarks

- If standard\_dev ≤ 0, STANDARDIZE returns the #NUM! error value.
- The equation for the normalized value is:

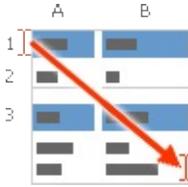
$$Z = \frac{X - \mu}{\sigma}$$

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
<b>1</b>	42	Value to normalize
<b>2</b>	40	Arithmetic mean of the distribution
<b>3</b>	1.5	Standard deviation of the distribution
<b>4</b>	<b>Formula</b>	<b>Description (Result)</b>
	=STANDARDIZE(A2,A3,A4)	Normalized value of 42 for the terms above (1.333333)

[Show All](#)

# STDEV

## [See Also](#)

Estimates standard deviation based on a sample. The standard deviation is a measure of how widely values are dispersed from the average value (the mean).

## Syntax

**STDEV(number1,number2,...)**

Number1, number2, ... are 1 to 30 number arguments corresponding to a sample of a population. You can also use a single array or a reference to an array instead of arguments separated by commas.

## Remarks

- STDEV assumes that its arguments are a sample of the population. If your data represents the entire population, then compute the standard deviation using STDEVP.
- The standard deviation is calculated using the "unbiased" or "n-1" method.
- STDEV uses the following formula:

$$\sqrt{\frac{\sum (x - \bar{x})^2}{(n-1)}}$$

where  $\bar{x}$  is the sample mean `AVERAGE(number1,number2,...)` and  $n$  is the sample size.

- Logical values such as TRUE and FALSE and text are ignored. If logical values and text must not be ignored, use the STDEVA worksheet function.

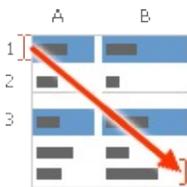
## Example

Suppose 10 tools stamped from the same machine during a production run are collected as a random sample and measured for breaking strength.

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	
	Strength	
1	1345	
2	1301	
3	1368	
4	1322	
5	1310	
6	1370	
7	1318	
8	1350	
9	1303	
10	1299	
11	<b>Formula</b>	<b>Description (Result)</b>

=STDEV(A2:A11) Standard deviation of breaking strength (27.46391572)

[Show All](#)

# STDEVA

## [See Also](#)

Estimates standard deviation based on a sample. The standard deviation is a measure of how widely values are dispersed from the average value (the mean). Text and logical values such as TRUE and FALSE are included in the calculation.

## Syntax

**STDEVA**(value1,value2,...)

Value1, value2, ... are 1 to 30 values corresponding to a sample of a population. You can also use a single array or a reference to an array instead of arguments separated by commas.

## Remarks

- STDEVA assumes that its arguments are a sample of the population. If your data represents the entire population, you must compute the standard deviation using STDEVPA.
- Arguments that contain TRUE evaluate as 1; arguments that contain text or FALSE evaluate as 0 (zero). If the calculation must not include text or logical values, use the STDEV worksheet function instead.
- The standard deviation is calculated using the "unbiased" or "n-1" method.
- STDEVA uses the following formula:

$$\sqrt{\frac{\sum (x - \bar{x})^2}{(n-1)}}$$

where  $\bar{x}$  is the sample mean AVERAGE(value1,value2,...) and n is the sample size.

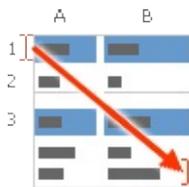
## Example

Suppose 10 tools stamped from the same machine during a production run are collected as a random sample and measured for breaking strength.

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	
	<b>Strength</b>	
<b>1</b>	1345	
<b>2</b>	1301	
<b>3</b>	1368	
<b>4</b>	1322	
<b>5</b>	1310	
<b>6</b>	1370	
<b>7</b>	1318	
<b>8</b>	1350	
<b>9</b>	1303	
<b>10</b>	1299	
<b>11</b>	<b>Formula</b>	<b>Description (Result)</b>

=STDEVA(A2:A11) Standard deviation of breaking strength for all the tools (27.46391572)

[Show All](#)

# STDEVP

## [See Also](#)

Calculates standard deviation based on the entire population given as arguments. The standard deviation is a measure of how widely values are dispersed from the average value (the mean).

## Syntax

**STDEVP**(number1,number2,...)

Number1, number2, ... are 1 to 30 number arguments corresponding to a population. You can also use a single array or a reference to an array instead of arguments separated by commas.

- Text and logical values such as TRUE and FALSE are ignored. If logical values and text must not be ignored, use the STDEVPA worksheet function.

## Remarks

- STDEVP assumes that its arguments are the entire population. If your data represents a sample of the population, then compute the standard deviation using STDEV.
- For large sample sizes, STDEV and STDEVP return approximately equal values.
- The standard deviation is calculated using the "biased" or "n" method.
- STDEVP uses the following formula:

$$\sqrt{\frac{\sum (x - \bar{x})^2}{n}}$$

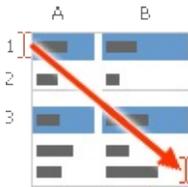
where x is the sample mean AVERAGE(number1,number2,...) and n is the sample size.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	
	Strength	
	1345	
1	1301	
2	1368	
3	1322	
4	1310	
5	1370	
6	1318	
7	1350	
8	1303	
9	1299	
10		<b>Description (Result)</b>
11	<b>Formula</b>	Standard deviation of breaking strength, assuming

=STDEVP(A2:A11) only 10 tools are produced (26.05455814)

[Show All](#)

# STDEVPA

## [See Also](#)

Calculates standard deviation based on the entire population given as arguments, including text and logical values. The standard deviation is a measure of how widely values are dispersed from the average value (the mean).

## Syntax

**STDEVPA(value1,value2,...)**

Value1, value2, ... are 1 to 30 values corresponding to a population. You can also use a single array or a reference to an array instead of arguments separated by commas.

## Remarks

- STDEVPA assumes that its arguments are the entire population. If your data represents a sample of the population, you must compute the standard deviation using STDEVA.
- Arguments that contain TRUE evaluate as 1; arguments that contain text or FALSE evaluate as 0 (zero). If the calculation must not include text or logical values, use the STDEV worksheet function instead.
- For large sample sizes, STDEVA and STDEVPA return approximately equal values.
- The standard deviation is calculated using the "biased" or "n" method.
- STDEVPA uses the following formula:

$$\sqrt{\frac{\sum (x - \bar{x})^2}{n}}$$

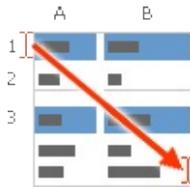
where  $\bar{x}$  is the sample mean `AVERAGE(value1,value2,...)` and  $n$  is the sample size.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	
	<b>Strength</b>	
	1345	
<b>1</b>	1301	
<b>2</b>	1368	
<b>3</b>	1322	
<b>4</b>	1310	
<b>5</b>	1370	
<b>6</b>	1318	
<b>7</b>	1350	
<b>8</b>	1303	
<b>9</b>	1299	
<b>10</b>		<b>Description (Result)</b>
<b>11</b>	<b>Formula</b>	Standard deviation of breaking strength, assuming

=STDEVPA(A2:A11) only 10 tools are produced (26.05455814)

[Show All](#)

# STEYX

## [See Also](#)

Returns the standard error of the predicted y-value for each x in the regression. The standard error is a measure of the amount of error in the prediction of y for an individual x.

## Syntax

**STEYX(known\_y's,known\_x's)**

Known\_y's is an array or range of dependent data points.

Known\_x's is an array or range of independent data points.

## Remarks

- The arguments must either be numbers or be names, arrays, or references that contain numbers.
- If an array or reference argument contains text, logical values, or empty cells, those values are ignored; however, cells with the value zero are included.
- If known\_y's and known\_x's are empty or have a different number of data points, STEYX returns the #N/A error value.
- The equation for the standard error of the predicted y is:

$$\sqrt{\frac{1}{(n-2)} \left[ \sum (y-\bar{y})^2 - \frac{[\sum (x-\bar{x})(y-\bar{y})]^2}{\sum (x-\bar{x})^2} \right]}$$

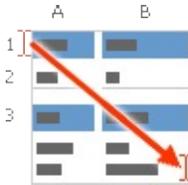
where x and y are the sample means AVERAGE(known\_x's) and AVERAGE(known\_y's), and n is the sample size.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Known y</b>	<b>Known x</b>
<b>1</b>	2	6
<b>2</b>	3	5
<b>3</b>	9	11
<b>4</b>	1	7
<b>5</b>	8	5
<b>6</b>	7	4
<b>7</b>	5	4
<b>8</b>	<b>Formula</b>	<b>Description (Result)</b>
	=STEYX(A2:A8,B2:B8)	Standard error of the predicted y-value for each x in the regression (3.305719)

[Show All](#)

# TDIST

## [See Also](#)

Returns the Percentage Points (probability) for the Student t-distribution where a numeric value ( $x$ ) is a calculated value of  $t$  for which the Percentage Points are to be computed. The t-distribution is used in the hypothesis testing of small sample data sets. Use this function in place of a table of critical values for the t-distribution.

## Syntax

**TDIST( $x$ ,degrees\_freedom,tails)**

$X$  is the numeric value at which to evaluate the distribution.

Degrees\_freedom is an integer indicating the number of degrees of freedom.

Tails specifies the number of distribution tails to return. If tails = 1, TDIST returns the one-tailed distribution. If tails = 2, TDIST returns the two-tailed distribution.

## Remarks

- If any argument is nonnumeric, TDIST returns the #VALUE! error value.
- If degrees\_freedom < 1, TDIST returns the #NUM! error value.
- The degrees\_freedom and tails arguments are truncated to integers.
- If tails is any value other than 1 or 2, TDIST returns the #NUM! error value.
- If  $x < 0$ , then TDIST returns the #NUM! error value.
- If tails = 1, TDIST is calculated as  $TDIST = P(X > x)$ , where  $X$  is a random variable that follows the t-distribution. If tails = 2, TDIST is calculated as  $TDIST = P(|X| > x) = P(X > x \text{ or } X < -x)$ .
- Since  $x < 0$  is not allowed, to use TDIST when  $x < 0$ , note that  $TDIST(-x,df,1) = 1 - TDIST(x,df,1) = P(X > -x)$  and  $TDIST(-x,df,2) = TDIST(x$

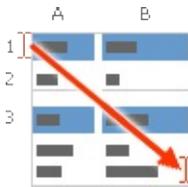
$$df,2) = P(|X| > x).$$

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
<b>1</b>	1.96	Value at which to evaluate the distribution
<b>2</b>	60	Degrees of freedom
	<b>Formula</b>	<b>Description (Result)</b>
<b>3</b>	=TDIST(A2,A3,2)	Two-tailed distribution (0.054644927, or 5.46 percent)
	=TDIST(A2,A3,1)	One-tailed distribution (0.027322463 or 2.73 percent)

**Note** To view the number as a percent, select the cell and, on the **Format** menu, click **Cells**. Click the **Number** tab, and then click **Percentage** in the **Category** box.

[Show All](#)

# TINV

## [See Also](#)

Returns the t-value of the Student's t-distribution as a function of the probability and the degrees of freedom.

## Syntax

**TINV(probability,degrees\_freedom)**

**Probability** is the probability associated with the two-tailed Student's t-distribution.

**Degrees\_freedom** is the number of degrees of freedom with which to characterize the distribution.

## Remarks

- If either argument is nonnumeric, TINV returns the #VALUE! error value.
- If probability < 0 or if probability > 1, TINV returns the #NUM! error value.
- If degrees\_freedom is not an integer, it is truncated.
- If degrees\_freedom < 1, TINV returns the #NUM! error value.
- TINV returns that value t, such that  $P(|X| > t) = \text{probability}$  where X is a random variable that follows the t-distribution and  $P(|X| > t) = P(X < -t \text{ or } X > t)$ .
- A one-tailed t-value can be returned by replacing probability with 2\*probability. For a probability of 0.05 and degrees of freedom of 10, the two-tailed value is calculated with TINV(0.05,10), which returns 2.28139. The one-tailed value for the same probability and degrees of freedom can be calculated with TINV(2\*0.05,10), which returns 1.812462.

**Note** In some tables, probability is described as (1-p).

Given a value for probability, TINV seeks that value x such that TDIST(x,

degrees\_freedom, 2) = probability. Thus, precision of TINV depends on precision of TDIST. TINV uses an iterative search technique. If the search has not converged after 100 iterations, the function returns the #N/A error value.

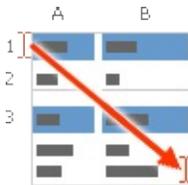
- 

### Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
<b>1</b>	0.054645	Probability associated with the two-tailed Student's t-distribution
<b>2</b>	60	Degrees of freedom
<b>3</b>	<b>Formula</b>	<b>Description (Result)</b>
	=TINV(A2,A3)	t-value of the Student's t-distribution for the terms above (1.959997462)

[Show All](#)

# TREND

## [See Also](#)

Returns values along a linear trend. Fits a straight line (using the method of least squares) to the arrays `known_y's` and `known_x's`. Returns the y-values along that line for the array of `new_x's` that you specify.

## Syntax

**TREND(known\_y's,known\_x's,new\_x's,const)**

`Known_y's` is the set of y-values you already know in the relationship  $y = mx + b$ .

- If the array `known_y's` is in a single column, then each column of `known_x's` is interpreted as a separate variable.
- If the array `known_y's` is in a single row, then each row of `known_x's` is interpreted as a separate variable.

`Known_x's` is an optional set of x-values that you may already know in the relationship  $y = mx + b$ .

- The array `known_x's` can include one or more sets of variables. If only one variable is used, `known_y's` and `known_x's` can be ranges of any shape, as long as they have equal dimensions. If more than one variable is used, `known_y's` must be a vector (that is, a range with a height of one row or a width of one column).
- If `known_x's` is omitted, it is assumed to be the array `{1,2,3,...}` that is the same size as `known_y's`.

`New_x's` are new x-values for which you want TREND to return corresponding y-values.

- New\_x's must include a column (or row) for each independent variable, just as known\_x's does. So, if known\_y's is in a single column, known\_x's and new\_x's must have the same number of columns. If known\_y's is in a single row, known\_x's and new\_x's must have the same number of rows.
- If you omit new\_x's, it is assumed to be the same as known\_x's.
- If you omit both known\_x's and new\_x's, they are assumed to be the array {1,2,3,...} that is the same size as known\_y's.

Const is a logical value specifying whether to force the constant b to equal 0.

- If const is TRUE or omitted, b is calculated normally.
- If const is FALSE, b is set equal to 0 (zero), and the m-values are adjusted so that  $y = mx$ .

### Remarks

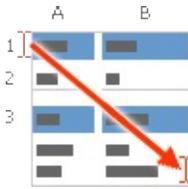
- For information about how Microsoft Excel fits a line to data, see LINEST.
- You can use TREND for polynomial curve fitting by regressing against the same variable raised to different powers. For example, suppose column A contains y-values and column B contains x-values. You can enter  $x^2$  in column C,  $x^3$  in column D, and so on, and then regress columns B through D against column A.
- Formulas that return arrays must be entered as array formulas.
- When entering an array constant for an argument such as known\_x's, use commas to separate values in the same row and semicolons to separate rows.

### Example

The example may be easier to understand if you copy it to a blank worksheet.

 [How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

The first formula shows corresponding values to the known values. The second formula predicts the next months values, if the linear trend continues.

	<b>A</b>	<b>B</b>	<b>C</b>
	<b>Month</b>	<b>Cost</b>	<b>Formula (Corresponding Cost)</b>
	1	\$133,890	=TREND(B2:B13,A2:A13)
	2	\$135,000	
<b>1</b>	3	\$135,790	
<b>2</b>	4	\$137,300	
<b>3</b>	5	\$138,130	
<b>4</b>	6	\$139,100	
<b>5</b>	7	\$139,900	
<b>6</b>	8	\$141,120	
<b>7</b>	9	\$141,890	
<b>8</b>	10	\$143,230	
<b>9</b>	11	\$144,000	
<b>10</b>	12	\$145,290	
<b>11</b>	<b>Month</b>	<b>Formula (Predicted Cost)</b>	
<b>12</b>	13	=TREND(B2:B13,A2:A13,A15:A19)	
<b>13</b>	14		
	15		
	16		

**Note** The formula in the example must be entered as an array formula. After copying the example to a blank worksheet, select the range C2:C13 or B15:B19 starting with the formula cell. Press F2, and then press CTRL+SHIFT+ENTER. If the formula is not entered as an array formula, the single results are 133953.3333 and 146171.5152.

[Show All](#)

# TRIMMEAN

## [See Also](#)

Returns the mean of the interior of a data set. TRIMMEAN calculates the mean taken by excluding a percentage of data points from the top and bottom tails of a data set. You can use this function when you wish to exclude outlying data from your analysis.

## Syntax

**TRIMMEAN(array,percent)**

Array is the array or range of values to trim and average.

Percent is the fractional number of data points to exclude from the calculation. For example, if percent = 0.2, 4 points are trimmed from a data set of 20 points (20 x 0.2): 2 from the top and 2 from the bottom of the set.

## Remarks

- If percent < 0 or percent > 1, TRIMMEAN returns the #NUM! error value.
- TRIMMEAN rounds the number of excluded data points down to the nearest multiple of 2. If percent = 0.1, 10 percent of 30 data points equals 3 points. For symmetry, TRIMMEAN excludes a single value from the top and bottom of the data set.

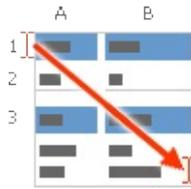
## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column

headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	
	<b>Data</b>	
		4
<b>1</b>	5	
<b>2</b>	6	
<b>3</b>	7	
<b>4</b>	2	
<b>5</b>	3	
<b>6</b>	4	
<b>7</b>	5	
<b>8</b>	1	
<b>9</b>	2	
<b>10</b>	3	
<b>11</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>12</b>	=TRIMMEAN(A2:A12,0.2)	Mean of the interior of a data set above, with 20 percent excluded from calculation (3.777778)

[Show All](#)

# TTEST

## [See Also](#)

Returns the probability associated with a Student's t-Test. Use TTEST to determine whether two samples are likely to have come from the same two underlying populations that have the same mean.

## Syntax

**TTEST(array1,array2,tails,type)**

Array1 is the first data set.

Array2 is the second data set.

Tails specifies the number of distribution tails. If tails = 1, TTEST uses the one-tailed distribution. If tails = 2, TTEST uses the two-tailed distribution.

Type is the kind of t-Test to perform.

<b>If type equals</b>	<b>This test is performed</b>
1	Paired
2	Two-sample equal variance (homoscedastic)
3	Two-sample unequal variance (heteroscedastic)

## Remarks

- If array1 and array2 have a different number of data points, and type = 1 (paired), TTEST returns the #N/A error value.
- The tails and type arguments are truncated to integers.
- If tails or type is nonnumeric, TTEST returns the #VALUE! error value.
- If tails is any value other than 1 or 2, TTEST returns the #NUM! error value.
- TTEST uses the data in array1 and array2 to compute a non-negative t-

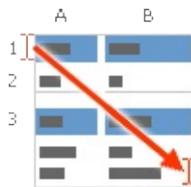
statistic. If tails=1, TTEST returns the probability of a higher value of the t-statistic under the assumption that array1 and array2 are samples from populations with the same mean. The value returned by TTEST when tails=2 is double that returned when tails=1 and corresponds to the probability of a higher absolute value of the t-statistic under the “same population means” assumption.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>		<b>B</b>
	<b>Data 1</b>		<b>Data 2</b>
<b>1</b>	4		19
<b>2</b>	5		3
<b>3</b>	8		2
<b>4</b>	9		14
<b>5</b>	1		4

6 2

5

7 4

17

8 5

1

9

**Formula**

**Description (Result)**

10

=TTEST(A2:A10,B2:B10,2,1) paired t-Test, with a two-tailed distribution  
(0.196016)

[Show All](#)

# VAR

## [See Also](#)

Estimates variance based on a sample.

## Syntax

**VAR(number1,number2,...)**

Number1, number2, ... are 1 to 30 number arguments corresponding to a sample of a population.

## Remarks

- VAR assumes that its arguments are a sample of the population. If your data represents the entire population, then compute the variance using VARP.
- Logical values such as TRUE, FALSE, and text are ignored. If logical values and text must not be ignored, use the VARA worksheet function.
- VAR uses the following formula:

$$\frac{\sum(x-\bar{x})^2}{(n-1)}$$

where  $\bar{x}$  is the sample mean `AVERAGE(number1,number2,...)` and  $n$  is the sample size.

## Example

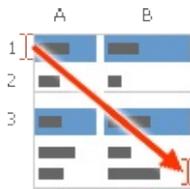
Suppose 10 tools stamped from the same machine during a production run are collected as a random sample and measured for breaking strength.

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.

2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	
	<b>Strength</b>	
<b>1</b>	1345	
<b>2</b>	1301	
<b>3</b>	1368	
<b>4</b>	1322	
<b>5</b>	1310	
<b>6</b>	1370	
<b>7</b>	1318	
<b>8</b>	1350	
<b>9</b>	1303	
<b>10</b>	1299	
<b>11</b>	<b>Formula</b>	<b>Description (Result)</b>
	=VAR(A2:A11)	Variance for the breaking strength of the tools (754.2666667)

[Show All](#)

# VARA

## [See Also](#)

Estimates variance based on a sample. In addition to numbers, text and logical values such as TRUE and FALSE are included in the calculation.

## Syntax

**VARA**(value1,value2,...)

Value1, value2, ... are 1 to 30 value arguments corresponding to a sample of a population.

## Remarks

- VARA assumes that its arguments are a sample of the population. If your data represents the entire population, you must compute the variance using VARPA.
- Arguments that contain TRUE evaluate as 1; arguments that contain text or FALSE evaluate as 0 (zero). If the calculation must not include text or logical values, use the VAR worksheet function instead.
- VARA uses the following formula:

$$\frac{\sum (x - \bar{x})^2}{(n-1)}$$

where  $\bar{x}$  is the sample mean AVERAGE(value1,value2,...) and n is the sample size.

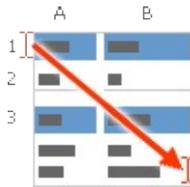
## Example

Suppose 10 tools stamped from the same machine during a production run are collected as a random sample and measured for breaking strength.

The example may be easier to understand if you copy it to a blank worksheet.

## How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	
	<b>Strength</b>	
<b>1</b>	1345	
<b>2</b>	1301	
<b>3</b>	1368	
<b>4</b>	1322	
<b>5</b>	1310	
<b>6</b>	1370	
<b>7</b>	1318	
<b>8</b>	1350	
<b>9</b>	1303	
<b>10</b>	1299	
<b>11</b>	<b>Formula</b>	<b>Description (Result)</b>
	=VARA(A2:A11)	Estimates the variance for the breaking strength (754.2666667)

[Show All](#)

# VARP

## [See Also](#)

Calculates variance based on the entire population.

## Syntax

**VARP(number1,number2,...)**

Number1, number2, ... are 1 to 30 number arguments corresponding to a population.

## Remarks

- VARP assumes that its arguments are the entire population. If your data represents a sample of the population, then compute the variance using VAR.
- The equation for VARP is:

$$\frac{\sum (x - \bar{x})^2}{n}$$

where  $\bar{x}$  is the sample mean `AVERAGE(number1,number2,...)` and  $n$  is the sample size.

- Logical values such as TRUE and FALSE and text are ignored. If logical values and text must not be ignored, use the VARPA worksheet function.

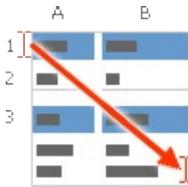
## Example

Suppose all 10 tools stamped from the same machine during a production run are collected and measured for breaking strength.

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

A	
Strength	
1	1345
2	1301
3	1368
4	1322
5	1310
6	1370
7	1318
8	1350
9	1303
10	1299
11	Formula
	=VARP(A2:A11)
Description (Result)	
	Variance of breaking strengths for all the tools, assuming that only 10 tools are produced (678.84)

[Show All](#)

# VARPA

## [See Also](#)

Calculates variance based on the entire population. In addition to numbers, text and logical values such as TRUE and FALSE are included in the calculation.

## Syntax

**VARPA**(value1,value2,...)

Value1, value2, ... are 1 to 30 value arguments corresponding to a population.

## Remarks

- VARPA assumes that its arguments are the entire population. If your data represents a sample of the population, you must compute the variance using VARA.
- Arguments that contain TRUE evaluate as 1; arguments that contain text or FALSE evaluate as 0 (zero). If the calculation must not include text or logical values, use the VARP worksheet function instead.
- The equation for VARPA is :

$$\frac{\sum (x - \bar{x})^2}{n}$$

where  $\bar{x}$  is the sample mean `AVERAGE(value1,value2,...)` and  $n$  is the sample size.

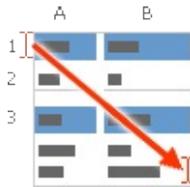
## Example

Suppose all 10 tools stamped from the same machine during a production run are collected and measured for breaking strength.

The example may be easier to understand if you copy it to a blank worksheet.

## How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
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	<b>A</b>	
	<b>Strength</b>	
<b>1</b>	1345	
<b>2</b>	1301	
<b>3</b>	1368	
<b>4</b>	1322	
<b>5</b>	1310	
<b>6</b>	1370	
<b>7</b>	1318	
<b>8</b>	1350	
<b>9</b>	1303	
<b>10</b>	1299	
<b>11</b>	<b>Formula</b>	<b>Description (Result)</b>
	=VARPA(A2:A11)	Variance of breaking strengths for all the tools, assuming that only 10 tools are produced (678.84)

[Show All](#)

# WEIBULL

## [See Also](#)

Returns the Weibull distribution. Use this distribution in reliability analysis, such as calculating a device's mean time to failure.

## Syntax

**WEIBULL(x,alpha,beta,cumulative)**

X is the value at which to evaluate the function.

Alpha is a parameter to the distribution.

Beta is a parameter to the distribution.

Cumulative determines the form of the function.

## Remarks

- If x, alpha, or beta is nonnumeric, WEIBULL returns the #VALUE! error value.
- If  $x < 0$ , WEIBULL returns the #NUM! error value.
- If  $\alpha \leq 0$  or if  $\beta \leq 0$ , WEIBULL returns the #NUM! error value.
- The equation for the Weibull cumulative distribution function is:

$$F(x; \alpha, \beta) = 1 - e^{-(x/\beta)^\alpha}$$

- The equation for the Weibull probability density function is:

$$f(x; \alpha, \beta) = \frac{\alpha}{\beta^\alpha} x^{\alpha-1} e^{-(x/\beta)^\alpha}$$

- When  $\alpha = 1$ , WEIBULL returns the exponential distribution with:

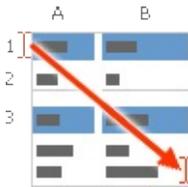
$$\lambda = \frac{1}{\beta}$$

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Description</b>
	105	Value at which to evaluate the function
<b>1</b>	20	Alpha parameter to the distribution
<b>2</b>	100	Beta parameter to the distribution
	<b>Formula</b>	<b>Description (Result)</b>
<b>4</b>	=WEIBULL(A2,A3,A4,TRUE)	Weibull cumulative distribution function for the terms above (0.929581)
	=WEIBULL(A2,A3,A4,FALSE)	Weibull probability density function for the terms above (0.035589)

[Show All](#)

# ZTEST

## [See Also](#)

Returns the one-tailed probability-value of a z-test. For a given hypothesized population mean,  $\mu_0$ , ZTEST returns the probability that the sample mean would be greater than the average of observations in the data set (array)— that is, the observed sample mean.

To see how ZTEST can be used in a formula to compute a two-tailed probability value, see "Remarks" below.

## Syntax

**ZTEST(array,  $\mu_0$ , sigma)**

Array is the array or range of data against which to test  $\mu_0$

$\mu_0$  is the value to test.

Sigma is the population (known) standard deviation. If omitted, the sample standard deviation is used.

## Remarks

- If array is empty, ZTEST returns the #N/A error value.
- ZTEST is calculated as follows when sigma is not omitted:

$$ZTEST(array, \mu_0) = 1 - NORMSDIST((\bar{x} - \mu_0) / (\text{sigma} / \sqrt{n}))$$

or when sigma is omitted:

$$ZTEST(array, \mu_0) = 1 - NORMSDIST((\bar{x} - \mu_0) / (s / \sqrt{n}))$$

where  $\bar{x}$  is the sample mean AVERAGE(array); s is the sample standard

deviation STDEV(array); and n is the number of observations in the sample COUNT(array).

- ZTEST represents the probability that the sample mean would be greater than the observed value AVERAGE(array), when the underlying population mean is  $\mu_0$ . From the symmetry of the Normal distribution, if  $AVERAGE(array) < \mu_0$ , ZTEST will return a value greater than 0.5.
- The following Excel formula can be used to calculate the two-tailed probability that the sample mean would be further from  $\mu_0$  (in either direction) than AVERAGE(array), when the underlying population mean is  $\mu_0$ :

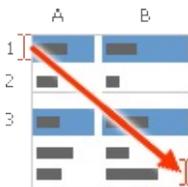
$$=2 * \text{MIN}(\text{ZTEST}(\text{array}, \mu_0, \text{sigma}), 1 - \text{ZTEST}(\text{array}, \mu_0, \text{sigma})).$$

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

## Data

3  
6  
7  
8  
6  
1 5  
2 4  
3 2  
4 1  
5 9

	<b>Formula</b>	<b>Description (Result)</b>
7		One-tailed probability-value of a z-test for the
8	=ZTEST(A2:A11,4)	data set above, at the hypothesized population
9		mean of 4 (0.090574)
10	=2 *	Two-tailed probability-value of a z-test for the
11	MIN(ZTEST(A2:A11,4),	data set above, at the hypothesized population
	1 - ZTEST(A2:A11,4))	mean of 4 (0.181149)
	=ZTEST(A2:A11,6)	One-tailed probability-value of a z-test for the
		data set above, at the hypothesized population
		mean of 6 (0.863043)
	=2 *	Two-tailed probability-value of a z-test for the
	MIN(ZTEST(A2:A11,6),	data set above, at the hypothesized population
	1 - ZTEST(A2:A11,6))	mean of 6 (0.273913)

# Text and Data functions

[ASC](#) Changes full-width (double-byte) English letters or katakana within a character string to half-width (single-byte) characters

[BAHTTEXT](#) Converts a number to text, using the ฿ (baht) currency format

[CHAR](#) Returns the character specified by the code number

[CLEAN](#) Removes all nonprintable characters from text

[CODE](#) Returns a numeric code for the first character in a text string

[CONCATENATE](#) Joins several text items into one text item

[DOLLAR](#) Converts a number to text, using the \$ (dollar) currency format

[EXACT](#) Checks to see if two text values are identical

[FIND](#) Finds one text value within another (case-sensitive)

[FIXED](#) Formats a number as text with a fixed number of decimals

[JIS](#) Changes half-width (single-byte) English letters or katakana within a character string to full-width (double-byte) characters

[LEFT](#) Returns the leftmost characters from a text value

[LEN](#) Returns the number of characters in a text string

[LOWER](#) Converts text to lowercase

[MID](#) Returns a specific number of characters from a text string starting at the position you specify

[PHONETIC](#) Extracts the phonetic (furigana) characters from a text string

[PROPER](#) Capitalizes the first letter in each word of a text value

[REPLACE](#) Replaces characters within text

[REPT](#) Repeats text a given number of times

[RIGHT](#) Returns the rightmost characters from a text value

[SEARCH](#) Finds one text value within another (not case-sensitive)

[SUBSTITUTE](#) Substitutes new text for old text in a text string

[T](#) Converts its arguments to text

[TEXT](#) Formats a number and converts it to text

[TRIM](#) Removes spaces from text

[UPPER](#) Converts text to uppercase

[VALUE](#) Converts a text argument to a number

# ASC

## [See Also](#)

For Double-byte character set (DBCS) languages, changes full-width (double-byte) characters to half-width (single-byte) characters.

## Syntax

### ASC(text)

Text is the text or a reference to a cell that contains the text you want to change. If text does not contain any full-width letters, text is not changed.

## Examples

=ASC("EXCEL") equals "EXCEL"

=ASC("エクセル") equals "エケセル"

[Show All](#)

# BAHTTEXT

## [See Also](#)

Converts a number to Thai text and adds a suffix of "Baht."

In Microsoft Excel for Windows, you can change the Baht format to a different style by using **Regional Settings** or **Regional Options** in **Control Panel**.

In Excel for the Macintosh, you can change the Baht number format to a different style by using **Control Panel for Numbers**.

## Syntax

### **BAHTTEXT(number)**

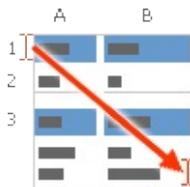
Number is a number you want to convert to text, or a reference to a cell containing a number, or a formula that evaluates to a number.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



## Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

<b>A</b>		
<b>Data</b>		
<b>1</b>	1234	
<b>2</b>	<b>Formula</b>	<b>Description (Result)</b>
	=BAHTTEXT(A2)	Displays the number in text. (One thousand two hundred thirty four Baht in Thai text)

[Show All](#)

# CHAR

## [See Also](#)

Returns the character specified by a number. Use CHAR to translate code page numbers you might get from files on other types of computers into characters.

<b>Operating environment</b>	<b>Character set</b>
Macintosh	Macintosh character set
Windows	ANSI

## **Syntax**

### **CHAR(number)**

Number is a number between 1 and 255 specifying which character you want. The character is from the character set used by your computer.

## **Example**

The example may be easier to understand if you copy it to a blank worksheet.



1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.

4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

<b>A</b>	<b>B</b>
<b>1 Formula</b>	<b>Description (Result)</b>
<b>2</b>	=CHAR(65) Displays the 65 character in the set (A)
<b>3</b>	=CHAR(33) Displays the 33 character in the set (!)

[Show All](#)

# CLEAN

## [See Also](#)

Removes all nonprintable characters from text. Use CLEAN on text imported from other applications that contains characters that may not print with your operating system. For example, you can use CLEAN to remove some low-level computer code that is frequently at the beginning and end of data files and cannot be printed.

## Syntax

### CLEAN(text)

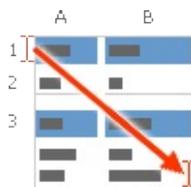
Text is any worksheet information from which you want to remove nonprintable characters.

## Example

The example may be easier to understand if you copy it to a blank worksheet.



1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.

4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

<b>A</b>		
<b>Data</b>		
<b>1</b>	=CHAR(7)&"text"&CHAR(7)	
<b>2</b>	<b>Formula</b>	<b>Description (Result)</b>
	=CLEAN(A2)	Removes the nonprintable character, CHAR(7), from the string above (text)

[Show All](#)

# CODE

## [See Also](#)

Returns a numeric code for the first character in a text string. The returned code corresponds to the character set used by your computer.

<b>Operating environment</b>	<b>Character set</b>
Macintosh	Macintosh character set
Windows	ANSI

## **Syntax**

### **CODE(text)**

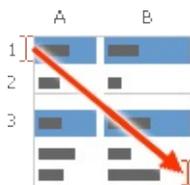
Text is the text for which you want the code of the first character.

## **Example**

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.

5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

<b>A</b>	<b>B</b>
<b>1 Formula</b>	<b>Description (Result)</b>
<b>2</b>	=CODE("A") Displays the numeric code for A (65)
<b>3</b>	=CODE("!") Displays the numeric code for ! (33)

[Show All](#)

# CONCATENATE

## [See Also](#)

Joins several text strings into one text string.

## Syntax

**CONCATENATE (text1,text2,...)**

Text1, text2, ... are 1 to 30 text items to be joined into a single text item. The text items can be text strings, numbers, or single-cell references.

## Remarks

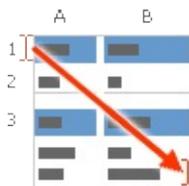
The "&" operator can be used instead of CONCATENATE to join text items.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.

- To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

**A**

**Data**

brook trout

**1** species

**2** 32

**3**

**Formula**

**Description**

**4** =CONCATENATE("Stream population for ",A2," ",A3," is ",A4,"/mile")

Concatenates a sentence from the data above (Stream population for brook trout species is 32/mile)

[Show All](#)

# DOLLAR

## [See Also](#)

The function described in this Help topic converts a number to text format and applies a currency symbol. The name of the function (and the symbol that it applies) depends upon your language settings.

This function converts a number to text using currency format, with the decimals rounded to the specified place. The format used is `$#,##0.00_);($#,##0.00)`.

## Syntax

**DOLLAR**(**number**,decimals)

**Number** is a number, a reference to a cell containing a number, or a formula that evaluates to a number.

**Decimals** is the number of digits to the right of the decimal point. If decimals is negative, number is rounded to the left of the decimal point. If you omit decimals, it is assumed to be 2.

## Remark

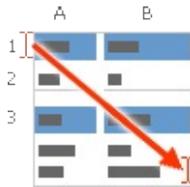
The major difference between formatting a cell that contains a number with the **Cells** command (**Format** menu) and formatting a number directly with the DOLLAR function is that DOLLAR converts its result to text. A number formatted with the **Cells** command is still a number. You can continue to use numbers formatted with DOLLAR in formulas, because Microsoft Excel converts numbers entered as text values to numbers when it calculates.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

## How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

**A**  
**Data**  
1234.567  
-1234.567  
-0.123  
99.888

<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=DOLLAR(A2,	Displays the first number in a currency format, 2 digits to
<b>3</b>	2)	the right of the decimal point (\$1,234.57)
<b>4</b>	=DOLLAR(A2,	Displays the first number in a currency format, 2 digits to
<b>5</b>	-2)	the left of the decimal point (\$1,200)
	=DOLLAR(A3,	Displays the second number in a currency format, 2 digits
	-2)	to the left of the decimal point ((\$1,200))
	=DOLLAR(A4,	Displays the third number in a currency format, 4 digits to
	4)	the right of the decimal point((\$0.1230))
	=DOLLAR(A5)	Displays the fourth number in a currency format, 2 digit to
		the left of the decimal point (\$99.89)

[Show All](#)

# EXACT

## [See Also](#)

Compares two text strings and returns TRUE if they are exactly the same, FALSE otherwise. EXACT is case-sensitive but ignores formatting differences. Use EXACT to test text being entered into a document.

## Syntax

**EXACT(text1,text2)**

Text1 is the first text string.

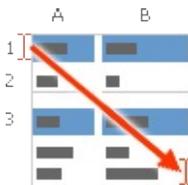
Text2 is the second text string.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.

4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>First string</b>	<b>Second string</b>
	word	word
	Word	word
<b>1</b>	w ord	word
<b>2</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>3</b>	=EXACT(A2,B2)	Checks whether the strings in the first row match (TRUE)
<b>4</b>	=EXACT(A3,B3)	Checks whether the strings in the second row match (FALSE)
	=EXACT(A4,B4)	Checks whether the strings in the third row match (FALSE)

[Show All](#)

# FIND

[See Also](#)

Also applies to:

## FINDB

FIND finds one text string (`find_text`) within another text string (`within_text`), and returns the number of the starting position of `find_text`, from the first character of `within_text`. You can also use SEARCH to find one text string within another, but unlike SEARCH, FIND is case sensitive and doesn't allow wildcard characters.

FINDB finds one text string (`find_text`) within another text string (`within_text`), and returns the number of the starting position of `find_text`, based on the number of bytes each character uses, from the first character of `within_text`. This function is for use with double-byte characters. You can also use SEARCHB to find one text string within another.

## Syntax

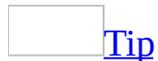
**FIND(`find_text`,`within_text`,`start_num`)**

**FINDB(`find_text`,`within_text`,`start_num`)**

`Find_text` is the text you want to find.

`Within_text` is the text containing the text you want to find.

`Start_num` specifies the character at which to start the search. The first character in `within_text` is character number 1. If you omit `start_num`, it is assumed to be 1.



Use start\_num to skip a specified number of characters. For example, suppose you are working with the text string "AYF0093.YoungMensApparel". To find the number of the first "Y" in the descriptive part of the text string, set start\_num equal to 8 so that the serial-number portion of the text is not searched. FIND begins with character 8, finds find\_text at the next character, and returns the number 9. FIND always returns the number of characters from the start of within\_text, counting the characters you skip if start\_num is greater than 1.

## Remarks

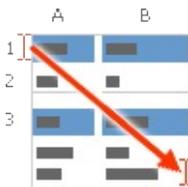
- If find\_text is "" (empty text), FIND matches the first character in the search string (that is, the character numbered start\_num or 1).
- Find\_text cannot contain any wildcard characters.
- If find\_text does not appear in within\_text, FIND and FINDB return the #VALUE! error value.
- If start\_num is not greater than zero, FIND and FINDB return the #VALUE! error value.
- If start\_num is greater than the length of within\_text, FIND and FINDB return the #VALUE! error value.

## Example 1 (FIND)

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.

- To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

**A**

**Data**

Miriam

McGovern

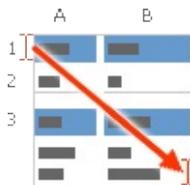
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=FIND("M",A2)	Position of the first "M" in the string above (1)
	=FIND("m",A2)	Position of the first "m" in the string above (6)
	=FIND("M",A2,3)	Position of the first "M" in the string above, starting with the third character (8)

**Example 2 (FIND)**

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

- Create a blank workbook or worksheet.
- Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

- Press CTRL+C.
- In the worksheet, select cell A1, and press CTRL+V.
- To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

**A**

## Data

Ceramic Insulators

#124-TD45-87

Copper Coils #12-

671-6772

1 Variable Resistors

2 #116010

3 **Formula**

**Description (Result)**

4 =MID(A2,1,FIND("#",A2,1)-1) Extracts text from position 1 to the position of "#" in the first string above (Ceramic Insulators)

=MID(A3,1,FIND("#",A3,1)-1) Extracts text from position 1 to the position of "#" in the second string above (Copper Coils)

=MID(A4,1,FIND("#",A4,1)-1) Extracts text from position 1 to the position of "#" in the third string above (Variable Resistors)

## Example (FINDB)

In the following examples, FIND returns 2 because "" is in the second position within the string, and FINDB returns 3 because each character is counted by its bytes; the first character has 2 bytes, so the second character begins at byte 3.

=FIND("京", "東京都") equals 2

=FINDB("京", "東京都") equals 3

[Show All](#)

# FIXED

## [See Also](#)

Rounds a number to the specified number of decimals, formats the number in decimal format using a period and commas, and returns the result as text.

## Syntax

**FIXED**(number,decimals,no\_commas)

Number is the number you want to round and convert to text.

Decimals is the number of digits to the right of the decimal point.

No\_commas is a logical value that, if TRUE, prevents FIXED from including commas in the returned text.

## Remarks

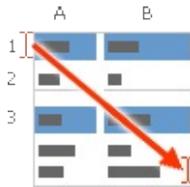
- Numbers in Microsoft Excel can never have more than 15 significant digits, but decimals can be as large as 127.
- If decimals is negative, number is rounded to the left of the decimal point.
- If you omit decimals, it is assumed to be 2.
- If no\_commas is FALSE or omitted, then the returned text includes commas as usual.
  
- The major difference between formatting a cell containing a number with the **Cells** command (**Format** menu) and formatting a number directly with the FIXED function is that FIXED converts its result to text. A number formatted with the **Cells** command is still a number.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

## How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

### A Data

1234.567

-1234.567

44.332

1	Formula	Description (Result)
2	=FIXED(A2, 1)	Rounds the first number 1 digit to the right of the decimal point (1,234.6)
3		
4	=FIXED(A2, -1)	Rounds the first number 1 digit to the left of the decimal point (1,230)
	=FIXED(-1234.567, -1, TRUE)	Rounds the second number 1 digit to the left of the decimal point, without commas (-1230)
	=FIXED(44.332)	Rounds the third number 2 digits to the left of the decimal point (44.33)

# Hidden function

This function is available only in another language version of Microsoft Excel.

# JIS

## [See Also](#)

The function described in this Help topic converts half-width (single-byte) letters within a character string to full-width (double-byte) characters. The name of the function (and the characters that it converts) depends upon your language settings.

For Japanese, this function changes half-width (single-byte) English letters or katakana within a character string to full-width (double-byte) characters.

## Syntax

### **JIS(text)**

Text is the text or a reference to a cell that contains the text you want to change. If text does not contain any half-width English letters or katakana, text is not changed.

## Example

=JIS("EXCEL") equals "EXCEL"

=JIS("エクセル") equals "エクセル"

[Show All](#)

# LEFT

## [See Also](#)

Also applies to:

## **LEFTB**

LEFT returns the first character or characters in a text string, based on the number of characters you specify.

LEFTB returns the first character or characters in a text string, based on the number of bytes you specify. This function is for use with double-byte characters.

## **Syntax**

**LEFT(text,num\_chars)**

**LEFTB(text,num\_bytes)**

Text is the text string that contains the characters you want to extract.

Num\_chars specifies the number of characters you want LEFT to extract.

- Num\_chars must be greater than or equal to zero.
- If num\_chars is greater than the length of text, LEFT returns all of text.
- If num\_chars is omitted, it is assumed to be 1.

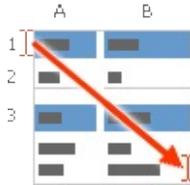
Num\_bytes specifies the number of characters you want LEFTB to extract, based on bytes.

## **Example (LEFT)**

The example may be easier to understand if you copy it to a blank worksheet.

## How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

A	
Data	
1	Sale Price
2	Sweden
Formula	
Description (Result)	
3	=LEFT(A2,4) First four characters in the first string (Sale)
	=LEFT(A3) First character in the second string (S)

### Example (LEFTB)

LEFTB("東京都 渋谷区",4) equals "東京"

[Show All](#)

# LEN

[See Also](#)

Also applies to:

## LENB

LEN returns the number of characters in a text string.

LENB returns the number of bytes used to represent the characters in a text string. This function is for use with double-byte characters.

## Syntax

**LEN(text)**

**LENB(text)**

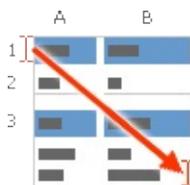
Text is the text whose length you want to find. Spaces count as characters.

## Example (LEN)

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

**A**

**Data**

Phoenix, AZ

**1**

**2** One

**3** **Formula** **Description (Result)**

**4** =LEN(A2) Length of the first string (11)

=LEN(A3) Length of the second string (0)

=LEN(A4) Length of the third string, which includes 5 spaces (8)

**Example (LENB)**

=LENB("東京都") equals 6

[Show All](#)

# LOWER

## [See Also](#)

Converts all uppercase letters in a text string to lowercase.

## Syntax

### LOWER(text)

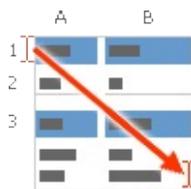
Text is the text you want to convert to lowercase. LOWER does not change characters in text that are not letters.

## Example

The example may be easier to understand if you copy it to a blank worksheet.



1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

## **A**

### **Data**

1 E. E. Cummings

2 Apt. 2B

3 **Formula** **Description (Result)**

=LOWER(A2) Lower case of first string (e. e. cummings)

=LOWER(A3) Lower case of last string (apt. 2b)

[Show All](#)

# MID

[See Also](#)

Also applies to:

## MIDB

MID returns a specific number of characters from a text string, starting at the position you specify, based on the number of characters you specify.

MIDB returns a specific number of characters from a text string, starting at the position you specify, based on the number of bytes you specify. This function is for use with double-byte characters.

## Syntax

**MID(text,start\_num,num\_chars)**

**MIDB(text,start\_num,num\_bytes)**

**Text** is the text string containing the characters you want to extract.

**Start\_num** is the position of the first character you want to extract in text. The first character in text has start\_num 1, and so on.

**Num\_chars** specifies the number of characters you want MID to return from text.

**Num\_bytes** specifies the number of characters you want MIDB to return from text, in bytes.

## Remarks

- If start\_num is greater than the length of text, MID returns "" (empty text).
- If start\_num is less than the length of text, but start\_num plus num\_chars exceeds the length of text, MID returns the characters up to the end of text.

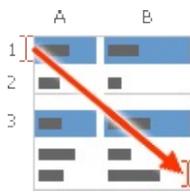
- If start\_num is less than 1, MID returns the #VALUE! error value.
- If num\_chars is negative, MID returns the #VALUE! error value.
- If num\_bytes is negative, MIDB returns the #VALUE! error value.

### Example (MID)

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

A	
Data	
Formula	Description (Result)
1 =MID(A2,1,5)	Five characters from the string above, starting at the first character (Fluid)
2 =MID(A2,7,20)	Twenty characters from the string above, starting at the seventh (Flow)
	Because the starting point is greater than the length of the

=MID(A2,20,5) string, empty text is returned ()

### **Example (MIDB)**

=MIDB("東京都 渋谷区",1,6) equals "東京都"

# PHONETIC

## [See Also](#)

Extracts the phonetic (furigana) characters from a text string.

## Syntax

### PHONETIC(reference)

Reference is a text string or a reference to a single cell or a range of cells that contain a furigana text string.

## Remarks

- If reference is a range of cells, the furigana text string in the upper-left corner cell of the range is returned.
- If the reference is a range of nonadjacent cells, the #N/A error value is returned.

## Example

If cells C4 contains "東京都" and cell B7 contains "大阪府", the following are true:

=PHONETIC(C4) equals "トウキョウト"

=PHONETIC(B7) equals "オオサカフ"

[Show All](#)

# PROPER

## [See Also](#)

Capitalizes the first letter in a text string and any other letters in text that follow any character other than a letter. Converts all other letters to lowercase letters.

## Syntax

### PROPER(text)

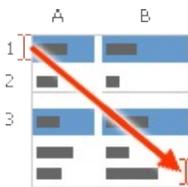
Text is text enclosed in quotation marks, a formula that returns text, or a reference to a cell containing the text you want to partially capitalize.

## Example

The example may be easier to understand if you copy it to a blank worksheet.



1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to

**Formula Auditing**, and then click **Formula Auditing Mode**.

**A**

**Data**

this is a TITLE

**1** 2-cent's worth

**2** 76BudGet

**3** **Formula**

**Description (Result)**

**4** =PROPER(A2) Proper case of first string (This Is A Title)

=PROPER(A3) Proper case of second string (2-Cent'S Worth)

=PROPER(A4) Proper case of third string (76Budget)

[Show All](#)

# REPLACE

[See Also](#)

Also applies to:

## **REPLACEB**

REPLACE replaces part of a text string, based on the number of characters you specify, with a different text string.

REPLACEB replaces part of a text string, based on the number of bytes you specify, with a different text string. This function is for use with double-byte characters.

## **Syntax**

**REPLACE(old\_text,start\_num,num\_chars,new\_text)**

**REPLACEB(old\_text,start\_num,num\_bytes,new\_text)**

Old\_text is text in which you want to replace some characters.

Start\_num is the position of the character in old\_text that you want to replace with new\_text.

Num\_chars is the number of characters in old\_text that you want REPLACE to replace with new\_text.

Num\_bytes is the number of bytes in old\_text that you want REPLACEB to replace with new\_text.

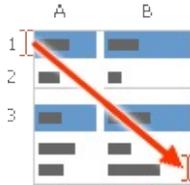
New\_text is the text that will replace characters in old\_text.

## **Example (REPLACE)**

The example may be easier to understand if you copy it to a blank worksheet.

## How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

A	
Data	
	abcdefghijkl
	2009
1	123456
2	Formula
3	Description (Result)
4	=REPLACE(A2,6,5,"*") Replaces five characters, starting with the sixth character (abcde*k)
	=REPLACE(A3,3,2,"10") Replaces the last two digits of 2009 with 10 (2010)
	=REPLACE(A4,1,3,"@") Replaces the first three characters with @ (@456)

### Example (REPLACEB)

In the following example, the first three double-byte characters in cell C4 are replaced with "東京都":

```
=REPLACEB(C4, 1, 6, "東京都")
```

[Show All](#)

# REPT

## [See Also](#)

Repeats text a given number of times. Use REPT to fill a cell with a number of instances of a text string.

## Syntax

**REPT(text,number\_times)**

**Text** is the text you want to repeat.

**Number\_times** is a positive number specifying the number of times to repeat text.

## Remarks

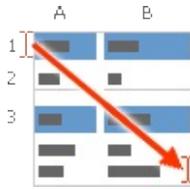
- If **number\_times** is 0 (zero), REPT returns "" (empty text).
- If **number\_times** is not an integer, it is truncated.
- The result of the REPT function cannot be longer than 32,767 characters, or REPT returns #VALUE!.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=REPT("*-", 3)	Displays the string 3 times (*-*-*-)
<b>3</b>	=REPT("-",10)	Displays a dash 10 times (-----)

[Show All](#)

# RIGHT

[See Also](#)

Also applies to:

## RIGHTB

RIGHT returns the last character or characters in a text string, based on the number of characters you specify.

RIGHTB returns the last character or characters in a text string, based on the number of bytes you specify. This function is for use with double-byte characters.

## Syntax

**RIGHT**(text,num\_chars)

**RIGHTB**(text,num\_bytes)

Text is the text string containing the characters you want to extract.

Num\_chars specifies the number of characters you want RIGHT to extract.

Num\_bytes specifies the number of characters you want RIGHTB to extract, based on bytes.

## Remarks

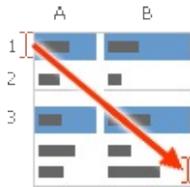
- Num\_chars must be greater than or equal to zero.
- If num\_chars is greater than the length of text, RIGHT returns all of text.
- If num\_chars is omitted, it is assumed to be 1.

## Example (RIGHT)

The example may be easier to understand if you copy it to a blank worksheet.

## How?

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

A	
Data	
1	Sale Price
2	Stock Number
Formula	
Description (Result)	
3	=RIGHT(A2,5) Last 5 characters of the first string (Price)
	=RIGHT(A3) Last character of the second string (r)

### Example (RIGHTB)

=RIGHTB("東京都", 2) equals "都"

[Show All](#)

# SEARCH

[See Also](#)

Also applies to:

## SEARCHB

SEARCH returns the number of the character at which a specific character or text string is first found, beginning with start\_num. Use SEARCH to determine the location of a character or text string within another text string so that you can use the MID or REPLACE functions to change the text.

SEARCHB also finds one text string (find\_text) within another text string (within\_text), and returns the number of the starting position of find\_text. The result is based on the number of bytes each character uses, beginning with start\_num. This function is for use with double-byte characters. You can also use FINDB to find one text string within another.

## Syntax

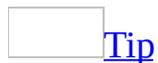
**SEARCH(find\_text,within\_text,start\_num)**

**SEARCHB(find\_text,within\_text,start\_num)**

Find\_text is the text you want to find. You can use the wildcard characters, question mark (?) and asterisk (\*), in find\_text. A question mark matches any single character; an asterisk matches any sequence of characters. If you want to find an actual question mark or asterisk, type a tilde (~) before the character.

Within\_text is the text in which you want to search for find\_text.

Start\_num is the character number in within\_text at which you want to start searching.



Tip

Use start\_num to skip a specified number of characters. For example, suppose you are working with the text string "AYF0093.YoungMensApparel". To find the number of the first "Y" in the descriptive part of the text string, set start\_num equal to 8 so that the serial-number portion of the text is not searched. SEARCH begins with character 8, finds find\_text at the next character, and returns the number 9. SEARCH always returns the number of characters from the start of within\_text, counting the characters you skip if start\_num is greater than 1.

## Remarks

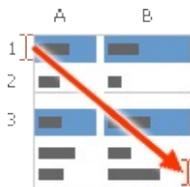
- SEARCH and SEARCHB do not distinguish between uppercase and lowercase letters when searching text.
- SEARCH and SEARCHB are similar to FIND and FINDB, except that FIND and FINDB are case sensitive.
- If find\_text is not found, the #VALUE! error value is returned.
- If start\_num is omitted, it is assumed to be 1.
- If start\_num is not greater than 0 (zero) or is greater than the length of within\_text, the #VALUE! error value is returned.

## Example (SEARCH)

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return

the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

**A**  
**Data**

Statements  
Profit Margin  
margin

1	Formula	Description (Result)
2		Position of the first "e" in the first string above, starting at the sixth position (7)
3	=SEARCH("e",A2,6)	
4		Position of "margin" in "Profit Margin" (8)
	=SEARCH(A4,A3)	
	=REPLACE(A3,SEARCH(A4,A3),6,"Amount")	Replaces "Margin" with "Amount" (Profit Amount)

**Example (SEARCHB)**

In the following examples, SEARCH returns 2 because "" is in the second position within the string, and SEARCHB returns 3 because each character is counted by its bytes; the first character has 2 bytes, so the second character begins at byte 3.

=SEARCH("京","東京都") equals 2

=SEARCHB("京","東京都") equals 3

[Show All](#)

# SUBSTITUTE

## [See Also](#)

Substitutes new\_text for old\_text in a text string. Use SUBSTITUTE when you want to replace specific text in a text string; use REPLACE when you want to replace any text that occurs in a specific location in a text string.

## Syntax

**SUBSTITUTE(text,old\_text,new\_text,instance\_num)**

Text is the text or the reference to a cell containing text for which you want to substitute characters.

Old\_text is the text you want to replace.

New\_text is the text you want to replace old\_text with.

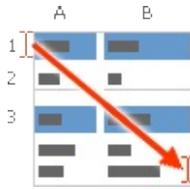
Instance\_num specifies which occurrence of old\_text you want to replace with new\_text. If you specify instance\_num, only that instance of old\_text is replaced. Otherwise, every occurrence of old\_text in text is changed to new\_text.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

**A**

**Data**

Sales Data

Quarter 1, 2008

**1** Quarter 1, 2011

**2** **Formula**

**Description (Result)**

**3** =SUBSTITUTE(A2, "Sales", "Cost") Substitutes Cost for Sales (Cost Data)

**4** =SUBSTITUTE(A3, "1", "2", 1) Substitutes first instance of "1" with "2" (Quarter 2, 2008)

=SUBSTITUTE(A4, "1", "2", 3) Substitutes third instance of "1" with "2" (Quarter 1, 2012)

[Show All](#)

# T

## [See Also](#)

Returns the text referred to by value.

## Syntax

### T(value)

Value is the value you want to test.

## Remarks

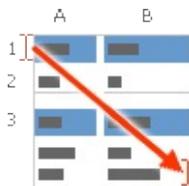
- If value is or refers to text, T returns value. If value does not refer to text, T returns "" (empty text).
- You do not generally need to use the T function in a formula because Microsoft Excel automatically converts values as necessary. This function is provided for compatibility with other spreadsheet programs.

## Example

The example may be easier to understand if you copy it to a blank worksheet.



1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

**A**

**Data**

Rainfall

1 19

2 TRUE

3 **Formula**

**Description (Result)**

4 =T(A2) Because the first value is text, the text is returned (Rainfall)

=T(A3) Because the second value is a number, empty text is returned ()

=T(A4) Because the third value is a logical value, empty text is returned ()

[Show All](#)

# TEXT

## [See Also](#)

Converts a value to text in a specific number format.

## Syntax

**TEXT**(value,format\_text)

Value is a numeric value, a formula that evaluates to a numeric value, or a reference to a cell containing a numeric value.

Format\_text is a number format in text form from in the **Category** box on the **Number** tab in the **Format Cells** dialog box.

## Remarks

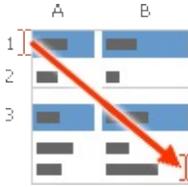
- Format\_text cannot contain an asterisk (\*).
- Formatting a cell with an option on the **Number** tab (**Cells** command, **Format** menu) changes only the format, not the value. Using the TEXT function converts a value to formatted text, and the result is no longer calculated as a number.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Salesperson</b>	<b>Sales</b>
	Buchanan	2800
	Dodsworth	40%
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>	=A2&" sold "&TEXT(B2,	Combines contents above into a phrase
<b>3</b>	"\$0.00")&" worth of units."	(Buchanan sold \$2800.00 worth of units.)
	=A3&" sold	Combines contents above into a phrase
	"&TEXT(B3,"0%")&" of the	(Dodsworth sold 40% of the total sales.)
	total sales."	

[Show All](#)

# TRIM

## [See Also](#)

Removes all spaces from text except for single spaces between words. Use TRIM on text that you have received from another application that may have irregular spacing.

## Syntax

### TRIM(text)

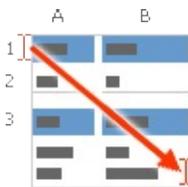
Text is the text from which you want spaces removed.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

## [How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to

**Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Formula</b>	<b>Description (Result)</b>
<b>1</b>	=TRIM(" First	Removes leading and trailing spaces from the text in the formula (First Quarter Earnings)
<b>2</b>	Quarter Earnings ")	

[Show All](#)

# UPPER

## [See Also](#)

Converts text to uppercase.

## Syntax

### UPPER(text)

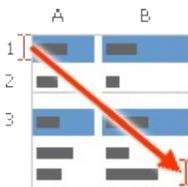
Text is the text you want converted to uppercase. Text can be a reference or text string.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

**A**

## Data

1 total

2 Yield

3 **Formula**                      **Description (Result)**

=UPPER(A2) Upper case of first string (TOTAL)

=UPPER(A3) Upper case of second string (YIELD)

[Show All](#)

# VALUE

## [See Also](#)

Converts a text string that represents a number to a number.

## Syntax

### VALUE(text)

Text is the text enclosed in quotation marks or a reference to a cell containing the text you want to convert.

## Remarks

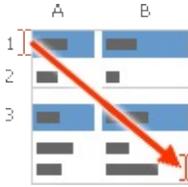
- Text can be in any of the constant number, date, or time formats recognized by Microsoft Excel. If text is not in one of these formats, VALUE returns the #VALUE! error value.
- You do not generally need to use the VALUE function in a formula because Excel automatically converts text to numbers as necessary. This function is provided for compatibility with other spreadsheet programs.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Formula</b>	<b>Description (Result)</b>
<b>1</b>	=VALUE("\$1,000")	Number equivalent of the string (1000)
<b>2</b>	=VALUE("16:48:00")-	The serial number equivalent to 4 hours and 48 minutes, which is "16:48:00"-"12:00:00" (0.2 or 4:48)
<b>3</b>	VALUE("12:00:00")	

**Note** To view the number as a time, select the cell and click **Cells** on the **Format** menu. Click the **Number** tab, and then click **Time** in the **Category** box.

[Show All](#)

# About smart tags

You can save time by using [smart tags](#) to perform [actions](#) in Microsoft Excel that you'd usually open other programs to perform.

The purple triangles in the corners of cells on your worksheet indicate the smart tags.



## 1 Smart tag indicators

**Financial symbol** After typing a U.S. stock symbol in a cell on a worksheet in Excel— for example MSFT— you can use the smart tag options to gain instant access to published Web information about a company without having to open a separate Internet browser window.

For example, you can click a smart tag and then select the action **Recent news on MSN MoneyCentral**. The browser opens to a Web page of news and information about the company you selected. When you're finished, you can close the browser, and continue to work in Excel.

**A person's name** Another action you can take is to add a person's name and address from your worksheet to a Office Outlook 2003 contact folder— without having to copy the information in Excel, open Outlook, and then paste the information into Outlook.

Instead, type a name, click **Smart Tag Actions** , and then select the action **Add to Contacts**. The **Contact** dialog box opens with the name and address already entered. If you want, you can fill in additional information, and then continue to work in Excel.



## [How smart tags work](#)

Excel recognizes certain types of data that it labels with smart tags. The type of actions you can take depend on the data that Excel recognizes and labels with a smart tag.

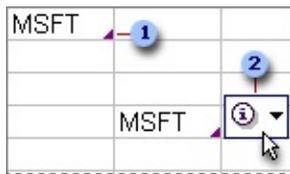
For example, if you recently sent mail to "Nate Sun", and you type the name into a cell on an Excel worksheet, the name is recognized and given a smart tag with actions you can take including **Send Mail**, **Schedule a Meeting**, **Open Contact**, or **Add to Contacts**.

The smart tag indicators appear in the cell on your worksheet as you type. They may also appear when you open a previously saved document.

**Note** Smart tags are turned off by default in Excel.

[How to use smart tags](#)

When Excel recognizes types of data, the data is marked with a smart tag indicator—a purple triangle in a worksheet cell. To find out what actions you can take with a smart tag, move the insertion point over the text with a smart tag indicator until **Smart Tag Actions**  appears, and then click the arrow next to the button to see a menu of actions.



1 Smart tag indicator

2 **Smart Tag Actions** button

If you save an Excel document that contains smart tags as a Web page, some tasks can be performed on the Web by using Microsoft Internet Explorer 5 or later. You can also use smart tags in your Outlook e-mail messages and in Microsoft Word.

[How to get more smart tags](#)

You can click **More Smart Tags** (on the **Tools** menu, click **AutoCorrect Options**, and then click the **Smart Tags** tab) to go to Web sites to find new smart tags and actions.

You might find additional smart tags created by Microsoft, by third-party

companies, or by Information Technology (IT) professionals, who may design smart tags and actions for the specific products or services that you work with. For example, if you work in a sales department, you might be able to click a "product name" smart tag in your document that offers actions such as "check quantity" in stock or price.

**Note** The types of smart tags that come with Excel vary with the language that is enabled.

## Other buttons you may see in your worksheet

At times other buttons may appear as you work in your workbook.

 [AutoCorrect Options button](#)

The **AutoCorrect Options**  button first appears as a small, blue box when you rest the mouse pointer near text that was automatically corrected, and changes to a button icon when you point to it.

If you find on occasion that you don't want text to be corrected, you can undo a correction or turn AutoCorrect options on or off by clicking the button and making a selection.

 [Paste Options button](#)

The **Paste Options**  button appears just below your pasted selection after you paste text or data. When you click the button, a list appears that lets you determine how the information is pasted into your worksheet.

The available options depend on the type of content you are pasting, the program you are pasting from, and the format of the text where you are pasting.

 [Auto Fill Options button](#)

The **Auto Fill Options**  button appears just below your filled selection after you fill text or data in a worksheet. When you click the button, a list appears to give you options for how to fill the text or data.

The available options depend on the content you are filling, the program you are filling from, and the format of the text or data you are filling.

 [Error Checking Options button](#)

The **Trace Error**  button appears next to the cell in which a formula error occurs, and a green triangle appears in the upper-left of the cell. When you click

the arrow next to **Trace Error** , a list appears to give you options for error checking.

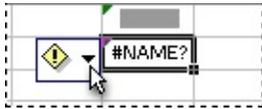
 [Insert Options button](#)

The **Insert Options**  button appears next to your inserted cells, rows, or columns. When you click the arrow next to **Insert Options** , a list of formatting options appears.

[Show All](#)

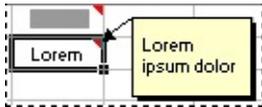
# About triangle indicators in cells

Triangles in the corners of cells in Microsoft Excel indicate formula errors, comments, or [smart tag](#) options.



A green triangle in the upper-left corner of a cell indicates an error in the formula in the cell. If you select the cell, **Trace Error**  appears. Click the arrow next to the button for a list of options.

**Note** The color of the error checking triangle indicator can be changed by clicking **Options** on the **Tools** menu, and then clicking the **Error Checking** tab.



A red triangle in the upper-right corner of a cell indicates a comment in the cell. If you rest the mouse cursor over the triangle, you can view the text of the comment.



A purple triangle in the lower-right corner of a cell indicates a smart tag. If you rest the mouse cursor over the triangle, **Smart Tag Actions**  appears. Click the arrow next to the button for a list of smart tag options.

[Show All](#)

# Change smart tag options

## [Turn on or off smart tags](#)

1. On the **Tools** menu, click **AutoCorrect Options**, and then click the **Smart Tags** tab.
2. Select or clear the **Label data with smart tags** check box.

## [Change the smart tags indicator](#)

You can show the **Smart Tag Actions** button only, or the button and the purple triangle.

1. On the **Tools** menu, click **AutoCorrect Options**, and then click the **Smart Tags** tab.
2. In the **Show smart tags as list**, choose **Button Only** or **Indicator and Button**.

## [Check a workbook for new smart tags](#)

1. On the **Tools** menu, click **AutoCorrect Options**, and then click the **Smart Tags** tab.
2. Select the **Label data with smart tags** check box.
3. Click **Check Workbook** to find all [smart tags](#) in the workbook.

## [Hide smart tags](#)

You can hide the [smart tags](#) from view in a workbook.

1. On the **Tools** menu, click **AutoCorrect Options**, and then click the **Smart Tags** tab.
2. In the **Show smart tags as list**, click **None**.

## [Save or discard smart tags](#)

1. On the **Tools** menu, click **AutoCorrect Options**, and then click the **Smart**

**Tags** tab.

2. Do one of the following:
  - To save all [smart tags](#), select the **Embed smart tags in this workbook** check box.
  - To discard all smart tags, clear the **Label data with smart tags** check box and clear the **Embed smart tags in this workbook** check box.
3. Close and reopen the workbook.

[Show All](#)

# Check for new smart tags and actions

Additional [smart tags](#) and actions may be developed by Microsoft or third-party companies.

You may also find smart tags and actions created by Information Technology (IT) professionals for the specific products or services you work with.

## Check for new smart tags

1. On the **Tools** menu, click **AutoCorrect Options**, and then click the **Smart Tags** tab.
2. Click **More Smart Tags**.

A Web page listing smart tags and actions is displayed in your [Web browser](#).

[Show All](#)

# Get a stock quote

1. Make sure [smart tags](#) are turned on.

[How?](#)

1. Click **AutoCorrect** options on the **Tools** menu.
2. Click the **Smart Tags** tab, and select the **Label data with smart tags** check box.
2. Type a recognized U.S. financial symbol (for example, MSFT) in a cell. Type the symbol in capital letters.
3. Click outside of the cell.
4. Move your mouse cursor over the purple triangle in the lower-right of the cell, and then click the arrow next to **Smart Tag Actions**  to see a list of options.
5. Click **Insert refreshable stock price**.
6. In the **Insert Stock Price** dialog box, choose whether to insert the stock price on a new worksheet or in a specific area of your current worksheet.

The data that is returned may fill a large portion of your worksheet.

**Note** You can also use an add-in to insert a function that retrieves stock quotes and stock data. For more information, see the Microsoft Office Web site.

[Show All](#)

# Remove smart tags

## [Remove a single smart tag from a cell](#)

1. Move the insertion point over the cell until **Smart Tag Actions**  appears.
2. Click the arrow next to **Smart Tag Actions** , and then click **Remove this Smart Tag**.

## [Remove specific types of smart tags](#)

This procedure removes some [smart tags](#), but leaves the feature turned on.

1. On the **Tools** menu, click **AutoCorrect Options**, and then click the **Smart Tags** tab.
2. Under **Recognizers**, clear the check boxes for the smart tags you want to remove.
3. Click **OK**.
4. Close and reopen the workbook for your changes to take effect.

## [Remove all smart tags](#)

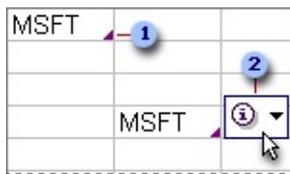
This procedure removes all [smart tags](#), including smart tags labeled by recognizers you may no longer have and smart tags recognized in a document opened on someone else's computer. You cannot undo this action.

1. On the **Tools** menu, click **AutoCorrect Options**, and then click the **Smart Tags** tab.
2. Clear the **Label data with smart tags** check box, and clear the **Embed smart tags in this workbook** check box.
3. Close and reopen the workbook for your changes to take effect.

[Show All](#)

# Use smart tags

You can use [smart tags](#) to perform actions in Microsoft Excel that you'd usually open other programs to perform. For example, if you type a U.S. financial symbol such as MSFT in a cell, the **Smart Tag Actions** button provides a list of smart tag actions you can perform. The purple triangle in the corner of a worksheet cell indicates smart tags.



1 Smart tag indicators

2 **Smart Tag Actions** button

1. Make sure smart tags are turned on.

[How?](#)

1. On the Tools menu, click **AutoCorrect** options.
2. Click the **Smart Tags** tab, and select the **Label data with smart tags** check box.
2. Move the insertion point over the purple triangle in a cell until **Smart Tag Actions**  appears.
3. Click the arrow next to **Smart Tag Actions**  to see the actions you can perform, and then select an action.

[Show All](#)

# Troubleshoot smart tags

[I don't want smart tags in my workbooks.](#)

You can turn off [smart tags](#).

1. On the **Tools** menu, click **AutoCorrect Options**, and then click the **Smart Tags** tab.
2. Clear the **Embed smart tags in this workbook** check box.
3. Close and reopen the workbook.

You can also hide all smart tags in a workbook.

1. On the **Tools** menu, click **AutoCorrect Options**, and then click the **Smart Tags** tab.
2. In the **Show smart tags as** box, click **None**.

[I turned off smart tags, but they still show up in my workbooks.](#)

You may have copied text containing a [smart tag](#) from another document into your workbook, or smart tags may have been recognized in a document opened on someone else's computer.

To delete the smart tags:

1. On the **Tools** menu, click **AutoCorrect Options**, and then click the **Smart Tags** tab.
2. Clear the **Embed smart tags in this workbook** check box.
3. Close and reopen the workbook.

To remove individual smart tags as they occur:

1. Move the insertion point over the text until **Smart Tag Actions**

appears.

2. Click the arrow next to **Smart Tag Actions** , and then click **Remove this Smart Tag**.

[I'd like to use smart tags, but I don't want purple triangles on my worksheet.](#)

You can hide the purple triangles and still use the [smart tags](#) feature.

1. On the **Tools** menu, click **AutoCorrect Options**, and then click the **Smart Tag** tab.
2. In the **Show smart tags as** list, click **Button Only**.
3. Move the insertion point over the text that might be recognized as a smart tag, such as a financial symbol.
4. Click the arrow next to **Smart Tag Actions** . You can select an action, even though the purple triangle is absent.

[My workbook file size is larger when I include smart tags in my workbook.](#)

[Smart tags](#) increase the file size. When size is a concern, turn off the option to embed and save smart tags.

1. On the **Tools** menu, click **AutoCorrect Options**, and then click the **Smart Tag** tab.
2. Clear the **Embed smart tags in this workbook** check box.

## Smart tags aren't available

[I don't see any smart tags in my workbook.](#)

1. On the **Tools** menu, click **AutoCorrect Options**, and then click the **Smart Tag** tab.

2. Select the **Label data with smart tags** check box.
3. In the **Show smart tags as** list, make sure that either **Indicator and Button** or **Button Only** are selected.

[I don't see smart tags when I type a person's name.](#)

Microsoft Excel recognizes names as [smart tags](#) only if you've recently sent the person e-mail.

## Saving smart tags

[Some smart tags are lost when I save my worksheet as a Web page.](#)

- [Smart tags](#) can only be viewed using Microsoft Internet Explorer 5 or later.
- Smart tags are not saved if the user chooses to publish to a Web page instead of saving the workbook as a Web page.

# About XML maps

**Note** XML features, except for saving files in the XML Spreadsheet format, are available only in Microsoft Office Professional Edition 2003 and Microsoft Office Excel 2003.

When you add an XML schema to your workbook, an object called an XML map is created. XML maps are used to create mapped ranges, and manage the relationship between mapped ranges and elements in the XML schema. In addition, these maps are used to relate the contents of a mapped range to elements in the schema when you import or export XML data.

A workbook can contain many XML maps. Each XML map is an independent entity, even if multiple maps refer to the same schema.

An XML map must contain one root element. If you add a schema that defines more than one root element, then you will be prompted to choose the root element to use for the new XML map.

# Add an XML map to a workbook

**Note** XML features, except for saving files in the XML Spreadsheet format, are available only in Microsoft Office Professional Edition 2003 and Microsoft Office Excel 2003.

1. On the **Data** menu, point to **XML**, and then click **XML Source**.

The **XML Source** task pane is opened.

2. Click **XML Maps**.
3. Click **Add**.
4. In the Look in list, click the drive, folder, or Internet location that contains the file you want to open.
5. Click the file, and then click **Open**.
6. Click **OK** to dismiss the **XML Maps** dialog box.

The XML map is displayed in the **XML Source** task pane.

# Change the XML expansion pack attached to a smart document

1. On the **Data** menu, point to **XML**, and then click **XML Expansion Packs**.
2. Do any of the following:
  - Click **Remove** to remove the XML expansion pack's name and URL properties from the document. The XML expansion pack will still be available in the **Available XML expansion packs** list.
  - In the **Available XML expansion packs** list, click a different XML expansion pack, and then click **Attach** to replace the current XML expansion pack with the new XML expansion pack.
  - XML expansion packs can be set to update automatically at regular intervals. If you want to check for updates outside of those intervals, click **Update**. If an updated XML expansion pack is available, the new components will download.

[Show All](#)

# Import an XML document into an existing mapping

**Note** XML features, except for saving files in the XML Spreadsheet format, are available only in Microsoft Office Professional Edition 2003 and Microsoft Office Excel 2003.

1. Select a cell in the mapped range to which you want to import XML data.
2. On the **List** toolbar, click **Import** .
3. In the **Look in** list, click the drive, folder, or Internet location that contains the XML data file you want to import.
4. In the folder list, locate and open the folder that contains the file.
5. Click the file, and then click **Import**.

## [Tips](#)

By default, existing data in a mapped range will be overwritten when you import data. Follow these steps if you want to append new data to the existing data when you import data:

1. Select a cell in the mapped range.
2. On the **List** toolbar, click **XML Map Properties**.
3. Click **Append new data to existing XML lists** and then click **OK**.

[Show All](#)

# Open an XML data file

**Note** XML features, except for saving files in the XML Spreadsheet format, are available only in Microsoft Office Professional Edition 2003 and Microsoft Office Excel 2003.

1. Click **File**, and then click **Open**.
2. In the **Look in** list, click the drive, folder, or Internet location that contains the file you want to open.
3. In the folder list, locate and open the folder that contains the file.
4. Click the file, and then click **Open**.

The **Open XML** dialog box appears.

5. Select one of the following options and then click **OK**.

[As an XML list](#)

An XML list is created in a new workbook.

The contents of the file are imported into the XML list. If the XML data file does not refer to a schema, then Microsoft Excel will infer the schema of the XML data file.

[As a read-only workbook](#)

The XML data file is opened as a read-only workbook. The structure of the file is flattened.

[Use the XML Source task pane](#)

The schema of the XML data file is displayed in the **XML Source** task pane. You can then drag elements of the schema to the worksheet to map those elements to the worksheet.

If you are opening an XML data file that does not refer to a schema, then Excel will infer the schema of the XML data file.

[Show All](#)

# Save or export XML data

**Note** XML features, except for saving files in the XML Spreadsheet format, are available only in Microsoft Office Professional Edition 2003 and Microsoft Office Excel 2003.

There are several methods that you can use to save or export the contents of your worksheet to an XML data file. Choose the appropriate method.



[Save the contents of a mapped range to an XML data file.](#)

1. On the **File** menu, click **Save**.

This step ensures that any changes made to your workbook that won't be lost when saving as an XML data file.

2. On the **File** menu, click **Save As**.
3. In the **File name** box, type a name for the XML data file.
4. In the **Save as type** list, click **XML Data**.
5. Click **Save**.
6. Click **Continue** when you receive an alert stating that saving the file as XML Data may result in the loss of features.
7. If the **Export XML** dialog box appears, then click the XML map that you want to use and then click **OK**.

The **Export XML** dialog box appears only if you have added more than one XML map to your workbook.

**Note** The active workbook is now the XML data file. If you want to continue working in the original workbook, then you should close the XML data file and reopen the original workbook.



[Export the contents of a mapped range to an XML data file.](#)

1. On the **List** toolbar, click **Export** .
2. If the **Export XML** dialog box appears, then click the XML map that you want to use and then click **OK**.

The **Export XML** dialog box appears only if you have added more than one XML map to your workbook.

3. In the **File name** box, type a name for the XML data file.
4. Click **Export**.

[Save the contents of the workbook in the XML Spreadsheet file format.](#)

1. On the **File** menu, click **Save As**.
2. In the **File name** box, type a name for the file.
3. In the **Save as type** list, click **XML Spreadsheet**.
4. Click **Save**.

# About exporting XML data

**Note** XML features, except for saving files in the XML Spreadsheet format, are available only in Microsoft Office Professional Edition 2003 and Microsoft Office Excel 2003.

This topic explains some rules that Microsoft Excel applies every time that you export XML data.

## Validation

Excel validates data against the XML map when the **Validate data against schema for import and export** option is enabled in the **XML Map Properties** dialog box.

## Rules Applied When Exporting XML Data

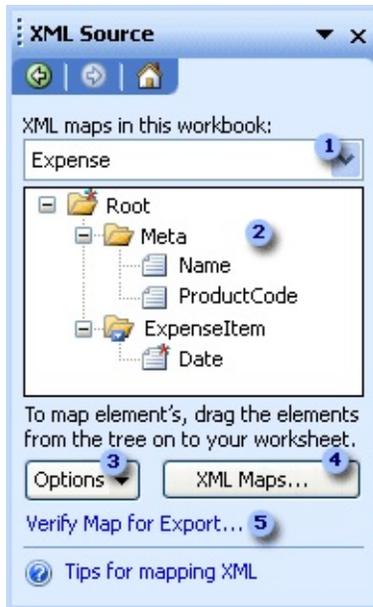
The following rules are applied when exporting XML data:

- UTF-8 encoding is used to write the data.
- All namespaces are defined in the Root element.
- Comment nodes are not preserved.
- Empty items are not created when blank cells exist for an optional element.
- Empty items are created when blank cells exist for a required element.
- Excel overwrites existing namespace prefixes. The default namespace is assigned a prefix of ns0. Successive namespace will be designated ns1, ns2 to ns<count> where <count> is the number of namespaces in written to the XML file.

[Show All](#)

# About The XML Source Task Pane

**Note** XML features, except for saving files in the XML Spreadsheet format, are available only in Microsoft Office Professional Edition 2003 and Microsoft Office Excel 2003.



- 1 List of XML maps that have been added to the workbook.
- 2 Hierarchical list of elements in the XML map.
- 3 Set options relating to the use of the **XML Source** task pane.

**Preview Data in Task Pane** When checked, displays sample data in the element list if you have imported XML data associated with the XML map in the current session of Excel.

**Hide Help Text in the Task Pane** When checked, hides the help text that is displayed below the element list.

**Automatically Merge Elements When Mapping** When checked, XML lists are automatically expanded when you drag an element to a cell adjacent to the XML list.

**My Data Has Headings** When checked, existing data can be used as a column heading when you map repeating elements to your worksheet.

**Hide Border of Inactive Lists** When checked, the borders of a list, an XML list, or a single-mapped cell are not displayed when a cell outside of the list is selected.

4 Opens the **XML Maps** dialog box, which you can use to add, delete, or rename XML maps.

5 Verifies whether you can export XML data through the current XML map.



### [How to map XML elements to your worksheet](#)

1. To map one or more elements to your worksheet, select the elements in the **XML Source** task pane. To select nonadjacent elements, click one element, and then hold down CTRL and click each element.
2. Drag the selected elements to the worksheet location where you want them to appear.



### [What do the icons in the element list mean?](#)

Icon	Element Type
	Parent Element
	Required parent element
	Repeating parent element
	Required repeating parent element
	Child element
	Required child element
	Repeating child element
	Required repeating child element
	Attribute
	Required attribute
	Simple content in a complex structure

# About XML data bindings

**Note** XML features, except for saving files in the XML Spreadsheet format, are available only in Microsoft Office Professional Edition 2003 and Microsoft Office Excel 2003.

An XML data binding is created when you perform any of the following actions:

- Import the contents of an XML data file into an existing XML mapping.
- Use a Data Retrieval Service Connection (.uxdc) file to connect to a data source.

## XML Data Binding Guidelines

Some facts that you should know about XML data bindings are:

- An XML map can only have one XML data binding.
- An XML data binding is bound to all of the mappings that have been created from a single XML map.

## Refresh an XML Data Binding

Click **Refresh**  on the **List** toolbar to import the latest data from the data source.

## Control Refresh Behavior

The **XML Map Properties** dialog box contains settings that relate to an XML data binding. Click **XML Map Properties**  on the **List** toolbar to display the **XML Map Properties** dialog box.

The following settings in the **XML Map Properties** dialog box relate to XML data bindings:

**Validate data against schema for import and export** This option specifies whether Excel validates data against the XML map when importing or exporting data. This option is disabled by default.

**Save data source definition in workbook** Clearing this check box removes the XML binding from the workbook. Clearing this option does not delete any data from the worksheet. This option is enabled by default.

**Overwrite existing data with new data** Existing data is overwritten with newly returned data. This option is enabled by default.

**Append new data to existing XML lists** The contents of the data source are appended to the existing data on the worksheet. This option is disabled by default.

# About XML lists

**Note** XML features, except for saving files in the XML Spreadsheet format, are available only in Microsoft Office Professional Edition 2003 and Microsoft Office Excel 2003.

XML lists are similar in appearance and functionality to [Excel lists](#). An XML list is an Excel list that has been mapped to one or more XML elements. Each column in the XML list represents an XML element.

## Create an XML list

An XML list is created by performing either of the following actions:

- Selecting **As an XML list** in the **Open XML** dialog box when opening an XML data file.
- Dragging one or more repeating elements from the **XML Source** task pane to the worksheet.

When you create an XML list by opening an XML file or dragging repeating XML elements onto a blank area of a worksheet, the XML element names are automatically used as column headings for the list. You can change the column headings to any heading that you want. However, the XML element names are always used when you export data from the mapping.

## Use Formulas in an XML List

You can use formulas in columns mapped to XML elements with an XML Schema Definition (XSD) data type that Excel interprets as a number, date, or time. Just as in an Excel list, formulas in an XML list are filled down the column when new rows are added to the list. See [XML Schema Definition \(XSD\) data type support](#) for more information about how Excel supports XSD data types.

## Hide the Border of an XML List

By default, XML Lists are displayed with a border. To turn off the border, click **List** on the **Data** menu, and then click **Hide Border of Inactive Lists**.

**Note** This setting affects all Excel lists, XML lists, and single-mapped cells in the workbook. You cannot hide the border of a particular XML list.

# Layout limitations of XML lists

**Note** XML features, except for saving files in the XML Spreadsheet format, are available only in Microsoft Office Professional Edition 2003 and Microsoft Office Excel 2003.

An XML list is created when you map a repeating XML element onto a worksheet. XML lists allow you to easily import, export, sort, filter, and print data based on an XML data source. However, XML lists do have some limitations regarding how they can be arranged on the worksheet.

XML lists are row-based, meaning that they grow from the header row downwards. You cannot add new entries above existing rows. You also cannot transpose an XML list so that new entries would be added to the right.

# Map XML elements to a worksheet

**Note** XML features, except for saving files in the XML Spreadsheet format, are available only in Microsoft Office Professional Edition 2003 and Microsoft Office Excel 2003.

1. On the **Data** menu, point to **XML**, and then click **XML Source** to open the **XML Source** task pane.
2. To map one or more elements to your worksheet, select the elements in the **XML Source** task pane. To select nonadjacent elements, click one element, and then hold down CTRL and click each element.
3. Drag the selected elements to the worksheet location where you want them to appear.

# Unsupported XML schema constructs

**Note** XML features, except for saving files in the XML Spreadsheet format, are available only in Microsoft Office Professional Edition 2003 and Microsoft Office Excel 2003.

Microsoft Office Excel 2003 supports importing and exporting XML data through a wide variety of XML schema constructs. However, there are some XML schema constructs that Excel does not support. The following list details the XML schema constructs that cannot be imported into Excel:

**<any>** The **<any>** elements allows you to include elements that are not declared by the schema.

**<anyAttribute>** The **<anyAttribute>** elements allows you to include attributes that are not declared by the schema.

**Recursive structures** Excel does not support recursive structures that are more than one level deep.

**Abstract elements** Abstract elements are meant to be declared in the schema, but never used as elements. Abstract elements depend on other elements being substituted for the abstract element.

**Substitution groups** Substitution groups allow an element to be swapped wherever another element is referenced. An element indicates that it's a member of another element's substitution group through the **<substitutionGroup>** attribute.

**Mixed content** Mixed content occurs when an element contains a child element and simple text outside of a child element. One common case is where formatting tags (such as the bold tags) are being used to mark up data within an element.

# Features and limitations of XML Spreadsheet format

When you save an Microsoft Excel worksheet in XML Spreadsheet format, many Excel features are retained, but some are not. Details are listed in the following table.

<b>Excel feature</b>	<b>Result when saved as XML Spreadsheet</b>
1904 date system	Retained
Asterisks that mark totals for OLAP data	Retained
Auditing tracer arrows	Not retained
Background refresh, retrieving data for each item in a page field individually	Retained
Calculated fields	Retained
Calculated items	Retained
Cell comments	Retained
Changes to Excel source data	Retained
Character and cell formatting	Retained
Chart and other graphic objects	Not retained
Chart sheets, Macro sheets,	Not retained

Dialog sheets	
Conditional formatting	Retained
Custom calculations	Retained
Custom sort order	Retained
Custom views	Not retained
Customized error values and empty cell values	Retained
Data consolidation	References are not retained.
Data validation restrictions and messages	Retained
Distributed alignment	Retained
Drawing object layers	Not retained
External data ranges	Retained
Grouped items in fields	Retained
Indented formats	Retained
Indented text	Retained
Labels in formulas	Retained
Lists	List functionality is lost, but the data is retained.
Multiple fonts in a single cell	Retained
Number formats	Retained
Offline cube file	Retained

Outlining	Not retained
Page fields in rows or columns	Retained
Password settings	Data in password-protected worksheets and workbooks cannot be saved. To publish data that's protected, do not use a password. You can, however, save a database password with a worksheet query; users will be required to enter the password when the XML Spreadsheet is opened.
Pattern fills	Retained
PivotTable Reports	Retained
Precision as displayed	Retained
Printing and page setup features	Retained
R1C1 reference style	Retained
References to data on other worksheets	Retained
Rotated or vertical text	Retained
Scenarios	Not retained
Shared workbook information	Not retained
Subtotals	Numbers and calculations are retained. Group and outline features are not retained.
Subtotals displayed at the top of item groups	Retained
Thai alignment	Retained
Transition settings for	Retained

Lotus compatibility	
User-defined function categories	Not retained
Visual Basic for Applications projects	Not retained
Web queries	Retained

# **XML Schema Definition (XSD) data type support**

**Note** XML features, except for saving files in the XML Spreadsheet format, are available only in Microsoft Office Professional Edition 2003 and Microsoft Office Excel 2003.

## How Excel handles XSD data types when importing XML data

The following table lists the display format that is applied when an item with a particular XSD data type is imported into an Excel worksheet. Data with an XSD format listed in the **Unsupported Formats** column are imported as text values.

XSD Data Type	Excel Display Format	Unsupported Formats
time	h:mm:ss	hh:mm:ssZ Hh:mm:ss.f-f
dateTime	m/d/yyyy h:mm	yyyy-mm-ddThh:mm:ssZ yyyy-mm-ddThh:mm:ss+/-hh:mm yyyy-mm-ddThh:mm:ss.f-f Years outside of the range between 1900 to 9999
date	Date *3/14/2001	yyyy-mm-ddZ yyyy-mm-dd+/-hh:mm Years outside of the range between 1900 to 9999
gYear	Number, no decimals	yyyy+/-hh:mm Years outside of the range between 1900 to 9999
gDay gMonth	Number, no decimals	
gYearMonth	Custom mmm-yy	yyyy-mm+/-hh:mm Years outside of the range between 1900 to 9999
gMonthDay	Custom d- mmm	
anytype anyURI base64Binary duration		

ENTITIES

ENTITY

hexBinary

ID

IDREF

IDREFS Text

language

Name

NCName

NMTOKEN

NMTOKENS

normalizedString

NOTATION

QName

string

token

boolean Boolean

decimal

float

double

General

Leading and trailing zeros will be dropped.  
'-' and '+' signs will be respected, although  
only negative signs will be displayed.  
Excel stores and calculates with 15 significant  
digits of precision.

byte

int

integer

long

negativeInteger

nonNegativeInteger

nonPositiveInteger General

positiveInteger

short

unsignedByte

unsignedInt

unsignedLong

unsignedShort

## How Excel display formats map to XSD data types when exporting XML data

When you export XML data, the exported data will match the data displayed in the worksheet under the following circumstances:

- The Excel display format is **Text**.
- You have not changed the display format of the data

If you change the display format of a cell with numeric, date, or time data, then the underlying value of the cell is exported. For example, you apply a **Percentage** display format to a cell that results in the display of 51.50%. The cell's value will be exported as .515.

[Show All](#)

# About smart documents

Smart documents are documents that are programmed to give you help as you use them. Several types of documents, such as forms and templates, work well as smart documents.

Several types of workbooks, such as forms and templates, work well as smart documents. Smart documents work especially well for workbooks that are part of a process. For example, your company may have a process for filling out annual employee expense forms, and you may already use an Microsoft Office Excel 2003 template for this purpose. If that template is turned into a smart document, it can be connected to a database that automatically fills in some of the required information, such as your name, employee number, manager's name, and so on. When you complete the expense report, the smart document can display a button that allows you to send it on to the next step in the process. Because the smart document knows who your manager is, it can automatically route itself to that person. And, no matter who has it, the smart document knows where it is in the expense review process and what needs to happen next.

Smart documents can help you reuse existing content. For example, attorneys can use existing boilerplate when writing contracts, and journalists can insert bylines and other commonly used text.

Smart documents can make it easier to share information. They can interact with a variety of databases and use Microsoft BizTalk Server for tracking workflow. They can even interact with other Microsoft Office applications. For example, you can use smart documents to send e-mail messages through Microsoft Outlook, all without leaving the document or starting Outlook.

You convert your Excel workbooks into smart documents by attaching XML expansion packs to them. An XML expansion pack contains multiple components, including [Extensible Markup Language \(XML\)](#) files and a manifest that references those components. When you open a document attached to an expansion pack, Excel also opens the **Document Actions** task pane. That pane can include tools for completing tasks and help for using the smart document. The specific features that a smart document provides depend on the developer or IT professional who creates it.

If you don't have development or IT resources, you can download smart documents created by third parties. If you're a developer and you want to know more about creating smart documents, see the Smart Document Software Development Kit on the Microsoft Developer Network (MSDN) Web site.

**Note** When you first try to use Smart Documents, you may see an error message saying that you need to install the common language runtime components, or you need a different version of the components. If you see that type of message, contact your system administrator.

[Show All](#)

# Add or delete a smart document XML expansion pack

To add an XML expansion pack for a smart document, you must have an XML expansion pack available. Contact your Information Technology (IT) professional for the location of your smart document solution.

## [Add and attach a smart document solution](#)

When you add a smart document solution, it appears in your list of available solutions whenever you open a new smart document. To use a solution, you must attach it to your document.

1. On the **Data** menu, point to **XML**, and then click **XML Expansion Packs**.
2. Click **Add**.
3. In the **Install XML Expansion Pack** dialog box, find the location of the manifest for the solution you want to add.
4. Click **Open**.
5. In the **Available XML expansion packs** list, click the solution you want to attach to your document.
6. Click **Attach**.

## [Delete a smart document solution](#)

1. On the **Data** menu, point to **XML**, and then click **XML Expansion Packs**.
2. In the **Available XML expansion packs** list, click the solution that you want to delete.
3. Click **Delete**.

**Note** Deleting a smart document solution removes the registry information for that solution. This does not uninstall any file installed on your computer by the XML expansion pack because another smart document may use that file.

[Show All](#)

# About worksheet and workbook protection

Microsoft Excel provides several layers of protection to control who can access and change your Excel data.

**Note** The features in Microsoft Excel related to hiding data and protecting worksheets and workbooks with passwords are not intended to be mechanisms for securing data or protecting confidential information in Excel. You can use these features to present information more clearly by hiding data or formulas that might confuse some users. These features also help prevent other users from making accidental changes to data. Excel doesn't encrypt data that is hidden or locked in a workbook. With enough time, users can obtain and modify all the data in a workbook, as long as they have access to it. To help prevent modification of data and to help protect confidential information, limit access to any Excel files containing such information by storing them in locations available only to authorized users.

**Worksheet protection** You can protect elements on a worksheet— such as cells with formulas— from all user access, or you can grant individual users access to the ranges you specify.

**Workbook-level protection** You can apply protection to workbook elements and you can protect a workbook file from viewing and changes. If a workbook is [shared](#) you can protect it from being returned to exclusive use and prevent the [change history](#) from being deleted.



[Protecting worksheet elements](#)

**Protecting elements from all users** You can prevent users from inserting, deleting, and formatting rows and columns, from changing the contents of locked cells, and from moving the cursor to cells that are locked or to cells that are unlocked.

By default all cells on a worksheet are locked. Before you protect a worksheet, you can unlock cells where you want users to enter and change data, in two

ways. To unlock cells for all users, you can use the **Protection** tab of the **Format Cells** dialog box. To unlock cells for specific users, you can use the **Allow Users to Edit Ranges** dialog box. Any ranges that you specify in this dialog box and don't assign a [password](#) for are also unlocked for all users. The cells you leave locked become protected only after you protect the worksheet.

Other worksheet features and elements for which you can restrict access for all users include [hyperlinks](#), sorting, AutoFiltering, [PivotTable reports](#), graphic objects, and [scenarios](#). These protections apply to all users and the entire worksheet, not to individual users or data ranges.

For chart sheets, you can protect the contents of the chart from changes, and you can protect any graphic objects on the sheet, such as text boxes, from being changed or deleted. A protected chart sheet continues to be updated whenever the source data for the chart changes.

**Giving specific users access to protected ranges** If you have the Windows 2000 operating system, you can allow specific users to edit specific cells or ranges. Users to whom you grant access can edit the cells even if the cells are locked. Your access restrictions take effect only after you protect the worksheet.

The users you specify in the **Permissions for range** dialog box can automatically edit the range without entering the password. Other users are prompted for the password, and users who enter the password can then edit the range. If a cell belongs to more than one range, users who are authorized to edit any of the ranges can then edit the cell. If a user attempts to edit multiple cells at once and is authorized to edit some but not all of those cells, the user will be prompted to select and edit the cells one by one.

 [Protecting workbook elements and files](#)

**Protecting workbook elements** You can prevent users from adding or deleting worksheets, or displaying hidden worksheets. You can also prevent users from changing the sizes or positions of the windows you set up to display a workbook. These protections apply to the entire workbook.

To hide an entire workbook so that users can't see it but can gain access to contents such as [macros](#), use the **Hide** command on the **Window** menu, and then save the hidden workbook.

**Protecting a shared workbook** You can protect a shared workbook so that users cannot return it to exclusive use or delete the change history log. If you want to require a [password](#) to remove this type of protection, you must apply the protection before you share the workbook. Applying the protection automatically turns on sharing. Unprotecting these features turns off sharing and deletes all of the saved change history.

Alternatively, you can protect the sharing and change history without a password. You can apply this protection when a workbook is already shared, and then unprotecting won't turn off sharing or delete the change history.

**Protecting a workbook file from viewing and editing** You can help restrict who can open and use the data in a workbook file by requiring a password to view or save changes to the file. You can set two separate passwords, one that users must enter to open and view the file, and another that users must enter before they can edit and save changes to the file. These passwords apply to the workbook file and are separate from the protection provided by the **Protect Workbook** dialog box.

[Show All](#)

# Change protection or passwords

## [Change the protection or password for a worksheet](#)

1. Switch to the protected worksheet.
2. On the **Tools** menu, point to **Protection**, and then click **Unprotect Sheet**.
3. If prompted type the current [password](#), and then click **OK**.
4. On the **Tools** menu, point to **Protection**, and then click **Protect Sheet**.
5. In the **Allow all users of this worksheet to** list, make any changes you want to the elements users will be able to change.
6. Type the password in the **Password to unprotect sheet** box.
7. Click **OK**, and if prompted retype the password.

## [Change the password for a range](#)

1. Switch to the protected worksheet.
2. On the **Tools** menu, point to **Protection**, and then click **Unprotect Sheet**.
3. If prompted type the worksheet [password](#), and then click **OK**.
4. On the **Tools** menu, point to **Protection**, and then click **Allow Users to Edit Ranges**.
5. In the **Ranges unlocked by a password when sheet is protected** list, click the range for which you want to change the password.
6. Click **Modify**, and then click **Password**.
7. Type the new password for the range in the **New password** box.
8. Type the same password in the **Confirm new password** box, and then click **OK** twice.
9. Click **Protect Sheet**.
10. Type the worksheet password in the **Password to unprotect sheet** box.
11. Click **OK**, and then retype the worksheet password to confirm it.

## [Change which users can edit which cells](#)

1. Open the workbook and switch to the protected worksheet.
2. On the **Tools** menu, point to **Protection**, and then click **Unprotect Sheet**.
3. If prompted type the worksheet [password](#), and then click **OK**.
4. On the **Tools** menu, point to **Protection**, and then click **Allow Users to**

## **Edit Ranges.**

5. Do one or more of the following:

### [Change which users are allowed to edit a range](#)

1. In the **Ranges unlocked by a password when sheet is protected** box, click the range for which you want to change the users.
2. Click **Modify**, and then click **Permissions**.
3. Do one or more of the following:
  - To block a user temporarily from editing the range, click the user in the **Name** list, and then select the **Deny** check box for the user.
  - To unblock a user, click the user in the **Name** list, and then select the **Allow** check box for the user.
  - To remove a user permanently, click the user in the **Name** list, and then click **Remove**.
  - To add a new user, click **Add**, locate and select the new user, click **Add**, and then click **OK**.
4. Click **OK**, and if prompted about denying users click **Yes**, and then click **OK** again.

### [Change which cells are included in a range](#)

1. In the **Ranges unlocked by a password when sheet is protected** box, click the range for which you want to change the included cells.
2. Click **Modify**.
3. In the **Refers to cells** box, type or select the new range, and then click **OK**.

### [Remove protection for a range](#)

1. In the **Ranges unlocked by a password when sheet is protected** box, click the range you want to delete.
2. Click **Delete**.
6. When you are finished making changes in the **Allow Users to Edit Ranges** dialog box, click **OK**.
7. On the **Tools** menu, point to **Protection**, and then click **Protect Sheet**.
8. Type the worksheet password in the **Password to unprotect sheet** box.
9. Click **OK**, and then retype the worksheet password to confirm it.

## [Change the protection or password for a workbook](#)

1. Open the protected workbook.
2. On the **Tools** menu, point to **Protection**, and then click **Unprotect Workbook**.
3. If prompted type the current [password](#), and then click **OK**.
4. On the **Tools** menu, point to **Protection**, and then click **Protect Workbook**.
5. If you want to change the protection, select the **Structure** or **Windows** check box, or both check boxes.
6. Do one of the following:
  - To keep the same password, type it in the **Password** box.
  - To change the password, type a new password instead.
7. Click **OK**, and if prompted retype the password to confirm it.

## [Change the password for viewing or editing a workbook file](#)

1. Open the workbook.
2. On the **File** menu, click **Save As**.
3. On the **Tools** menu, click **General Options**.
4. In the **Password to open** or **Password to modify** box, double-click the asterisks.
5. Type the new [password](#), and then click **OK**.
6. When prompted retype the new password, and then click **OK**.
7. Click **Save**.
8. If prompted, click **Yes** to replace the existing workbook.

### Notes

- If you have protected a [shared workbook](#) with a password, you can't change the password without unsharing the workbook, which deletes the [change history](#).
- Use strong passwords that combine upper- and lowercase letters, numbers, and symbols. Weak passwords don't mix these elements. Strong password: Y6dh!et5. Weak password: House27. Use a strong password that you can remember so that you don't have to write it down.

[Show All](#)

# Elements you can protect in worksheets and workbooks

## [Worksheets and chart sheets](#)

When you protect a chart sheet or worksheet, you can protect or unprotect individual elements of the sheet in the **Protect Sheet** dialog box (**Protection** menu, **Tools** command) by selecting or clearing check boxes for each element.

## [Worksheet elements](#)

**Protect worksheet and contents of locked cells** When selected, prevents users from:

- Making changes to cells that you did not unlock before protecting the worksheet, unless you've granted a specific user permission to edit to the cells in the **Allow Users to Edit Ranges** dialog box.
- Viewing rows or columns that you hid before you protected the worksheet.
- Viewing the formulas for the cells for which you hid the formulas before you protected the worksheet.

**Select locked cells** When cleared, prevents users from moving the pointer to cells for which the **Locked** check box is selected on the **Protection** tab of the **Format Cells** dialog box.

**Select unlocked cells** When cleared, prevents users from moving the pointer to cells for which the **Locked** check box is cleared on the **Protection** tab of the **Format Cells** dialog box. When users are allowed to select unlocked cells, they can press the TAB key to move between the unlocked cells on a protected worksheet.

**Format cells** When cleared, prevents users from changing any of the options in the **Format Cells** or **Conditional Formatting** dialog boxes. If you applied conditional formats before you protected the worksheet, the formatting continues

to change when a user enters a value that satisfies a different condition.

**Format columns** When cleared, prevents users from using any of the commands on the **Column** submenu of the **Format** menu, including changing column width or hiding columns.

**Format rows** When cleared, prevents users from using any of the commands on the **Row** submenu of the **Format** menu, including changing row height or hiding rows.

**Insert columns** When cleared, prevents users from inserting columns.

**Insert rows** When cleared, prevents users from inserting rows.

**Insert hyperlinks** When cleared, prevents users from inserting new [hyperlinks](#), even in unlocked cells.

**Delete columns** When cleared, prevents users from deleting columns. Note that if **Delete columns** is protected and **Insert columns** is not also protected, a user can insert columns that he or she cannot delete.

**Delete rows** When cleared, prevents users from deleting rows. Note that if delete rows is protected and insert rows is not also protected, a user can insert rows that he or she cannot delete.

**Sort** When cleared, prevents users from using any of the **Sort** commands on the **Data** menu, or the **Sort** buttons on the **Standard** toolbar. Users can't sort ranges containing locked cells on a protected worksheet, regardless of this setting.

**Use AutoFilter** When cleared, prevents users from using the drop-down arrows to change the filter on an AutoFiltered range. Users cannot create or remove AutoFiltered ranges on a protected worksheet, regardless of this setting.

**Use PivotTable reports** When cleared, prevents users from formatting, changing the layout, refreshing, or otherwise modifying [PivotTable reports](#), or creating new reports.

**Edit objects** When cleared, prevents users from:

- Making changes to graphic objects—including maps, embedded charts, shapes, text boxes, and controls—that you did not unlock before you protected the worksheet. For example, if a worksheet has a button that runs a macro, you can click the button to run the macro, but you cannot delete the button.
- Making any changes, such as formatting, to an embedded chart. The chart continues to update when you change its source data.
- Adding or editing comments.

**Edit scenarios** When cleared, prevents users from viewing [scenarios](#) that you have hidden, making changes to scenarios that you have prevented changes to, and deleting these scenarios. Users can edit the values in the changing cells, if the cells are not protected, and add new scenarios.

**Note** If you run a macro that includes an operation that's protected on the worksheet, a message appears and the macro stops running.

#### [Chart sheet elements](#)

**Contents** When selected, users are prevented from making changes to items that are part of the chart, such as data series, axes, and legends. The chart continues to reflect changes made to its source data.

**Objects** When selected, prevents users from making changes to graphic objects—including shapes, text boxes, and controls—unless you unlock the objects before you protect the chart sheet.

#### [Workbook elements](#)

When you protect a workbook, you can protect or unprotect the structure of the workbook or workbook windows in the **Protect Workbook** dialog box (**Protection** menu, **Tools** command) by selecting or clearing check boxes for each element.

**Structure** When selected, users are prevented from:

- Viewing worksheets that you have hidden.

- Moving, deleting, hiding, or changing the names of worksheets.
- Inserting new worksheets or chart sheets. Users can add embedded charts to existing worksheets by running the Chart Wizard.
- Moving or copying worksheets to another workbook.
- In [PivotTable reports](#), displaying the source data for a cell in the data area, or displaying [page field](#) pages on separate worksheets.
- For [scenarios](#), creating a scenario summary report.
- In the Analysis ToolPak, using the analysis tools that place results on a new worksheet.
- Recording new macros. If you run a macro that includes an operation that can't be performed in a protected workbook, a message appears and the macro stops running.

**Windows** When selected, prevents users from:

- Changing the size and position of the windows for the workbook when the workbook is opened.
- Moving, resizing, or closing the windows. However, they can hide and unhide windows.

**Note** In the [Visual Basic Editor](#), programmers can protect macros so that they can't be viewed or changed by users. Programmers can protect macros by using the **Protection** tab of the **Project Properties** dialog box in the Visual Basic Editor (**Tools** menu, **Project Properties** command). For more information, see [Visual Basic Editor Help](#).

[Show All](#)

# Password protect a worksheet or workbook

## Protect worksheet elements

[Protect worksheet elements from all users](#)

1. Switch to the worksheet you want to protect.
2. Unlock any cells you want users to be able to change: select each cell or range, click **Cells** on the **Format** menu, click the **Protection** tab, and then clear the **Locked** check box.
3. Hide any formulas that you don't want to be visible: select the cells with the formulas, click **Cells** on the **Format** menu, click the **Protection** tab, and then select the **Hidden** check box.
4. Unlock any graphic objects you want users to be able to change.

[How?](#)

You don't need to unlock buttons or controls for users to be able to click and use them. You can unlock embedded charts, text boxes, and other objects created with the drawing tools that you want users to be able to modify. To see which elements on a worksheet are graphic objects, click **Go To** on the **Edit** menu, click **Special**, and then click **Objects**.

1. Hold down CTRL and click each object that you want to unlock.
  2. On the **Format** menu, click the command for the object you selected: **AutoShape**, **Object**, **Text Box**, **Picture**, **Control**, or **WordArt**.
  3. Click the **Protection** tab.
  4. Clear the **Locked** check box, and if present, clear the **Lock text** check box.
5. On the **Tools** menu, point to **Protection**, and then click **Protect Sheet**.

6. Type a [password](#) for the sheet.

**Note** The password is optional; however, if you don't supply a password, any user will be able to unprotect the sheet and change the protected elements. Make sure you choose a password you can remember, because if you lose the password, you cannot gain access to the protected elements on the worksheet.

7. In the **Allow all users of this worksheet to** list, select the elements that you want users to be able to change.
8. Click **OK**, and if prompted retype the password.

### [Give specific users access to protected ranges](#)

You must have Windows 2000 or later and the machine has to be on a domain to give specific users access to ranges.

1. On the **Tools** menu, point to **Protection**, and then click **Allow Users to Edit Ranges**. (This command is available only when the worksheet is not protected.)
2. Click **New**.
3. In the **Title** box, type a title for the range you're granting access to.
4. In the **Refers to cells** box, type an equal sign (=), and then type a reference or select the range.
5. In the **Range password** box, type a [password](#) to access the range.

The password is optional; if you don't supply a password, any user will be able to edit the cells.

6. Click **Permissions**, and then click **Add**.
7. Locate and select the users to whom you want to grant access. If you want to select multiple users, hold down CTRL while you click the names.
8. Click **OK** twice, and if prompted retype the password.

9. Repeat the previous steps for each range for which you're granting access.
10. To retain a separate record of the ranges and users, select the **Paste permissions information into a new workbook** check box in the **Allow Users to Edit Ranges** dialog box.
11. Protect the worksheet: Click **Protect Sheet** in the **Allow Users to Edit Ranges** dialog box.
12. In the **Protect Sheet** dialog box, make sure the **Protect worksheet and contents of locked cells** check box is selected, type a password for the worksheet, click **OK**, and retype the password to confirm.

**Note** A sheet password is required to prevent other users from being able to edit your designated ranges. Make sure you choose a password you can remember, because if you lose the password, you cannot gain access to the protected elements on the worksheet.

## Help protect workbook elements and files

### [Protect workbook elements](#)

1. On the **Tools** menu, point to **Protection**, and then click **Protect Workbook**.
2. Do one or more of the following:
  - To protect the structure of a workbook so that worksheets in the workbook can't be moved, deleted, hidden, unhidden, or renamed, and new worksheets can't be inserted, select the **Structure** check box.
  - To protect windows so that they are the same size and position each time the workbook is opened, select the **Windows** check box.
  - To prevent others from removing workbook protection, type a [password](#), click **OK**, and then retype the password to confirm it.

### [Protect a shared workbook](#)

1. If the workbook is already shared, and you want to assign a [password](#) to protect the sharing, unshare the workbook.

[How?](#)

1. Have all other users save and close the [shared workbook](#). If other users are editing, they will lose any unsaved work.
2. Unsharing the workbook deletes the [change history](#). If you want to keep a copy of this information, print out the [History worksheet](#) or copy it to another workbook.

[How?](#)

1. On the **Tools** menu, point to **Track Changes**, and then click **Highlight Changes**.
2. In the **When** box, click **All**.
3. Clear the **Who** and **Where** check boxes.
4. Select the **List changes on a new sheet** check box, and then click **OK**.
5. Do one or more of the following:
  - To print the History worksheet, click **Print** .
  - To copy the history to another workbook, select the cells you want to copy, click **Copy** , switch to another workbook, click where you want the copy to go, and click **Paste** .

**Note** You may also want to save or print the current version of the workbook, because this history might not apply to later versions. For example, cell locations, including row numbers, in the copied history may no longer be current.

3. On the **Tools** menu, click **Share Workbook**, and then click the **Editing** tab.
4. Make sure that you are the only person listed in the **Who has this workbook open now** box.
5. Clear the **Allow changes by more than one user at the same time** check box.

If this check box is not available, you must unprotect the workbook before clearing the check box.

[How?](#)

1. Click **OK**, point to **Protection** on the **Tools** menu, and then click **Unprotect Shared Workbook**.
  2. Enter the [password](#) if prompted, and then click **OK**.
  3. On the **Tools** menu, click **Share Workbook**, and then click the **Editing** tab.
  6. When prompted about the effects on other users, click **Yes**.
2. Set other types of protection if you want: Give specific users access to ranges, protect worksheets, protect workbook elements, and set passwords for viewing and editing.
  3. On the **Tools** menu, point to **Protection**, and then click **Protect Shared Workbook** or **Protect and Share Workbook**.
  4. Select the **Sharing with track changes** check box.
  5. If you want to require other users to supply a password to turn off the [change history](#) or remove the workbook from shared use, type the password in the **Password** box, and then retype the password when prompted.
  6. If prompted, save the workbook.

#### [Protect a workbook file from viewing or editing](#)

1. On the **File** menu, click **Save As**.
2. On the **Tools** menu, click **General Options**.
3. Do either or both of the following:
  - If you want users to enter a [password](#) before they can view the workbook, type a password in the **Password to open** box, and then click **OK**.
  - If you want users to enter a password before they can save changes to the workbook, type a password in the **Password to modify** box, and then click **OK**.
4. When prompted, retype your passwords to confirm them.

5. Click **Save**.

6. If prompted, click **Yes** to replace the existing workbook.

[Show All](#)

# Remove protection and passwords

## [Remove user permissions for a range](#)

1. Switch to the protected worksheet.
2. On the **Tools** menu, point to **Protection**, and then click **Unprotect Sheet**.
3. If prompted, enter the protection [password](#) for the worksheet.
4. On the **Tools** menu, point to **Protection**, and then click **Allow Users to Edit Ranges**.
5. In the **Ranges unlocked by a password when cell is protected** list, click the range for which you want to remove permissions.
6. Click **Delete**.

## [Remove protection from a worksheet](#)

1. Switch to the protected worksheet.
2. On the **Tools** menu, point to **Protection**, and then click **Unprotect Sheet**.
3. If prompted, enter the protection [password](#) for the worksheet.

## [Remove protection from a workbook](#)

1. Open the protected workbook.
2. On the **Tools** menu, point to **Protection**, and then click **Unprotect Workbook**.
3. If prompted, enter the protection [password](#) for the workbook.

## [Remove protection from a shared workbook](#)

Removing protection when a [password](#) is in use also unshares the workbook, disconnecting other users from the workbook and erasing the [change history](#). If no password is in effect, the workbook remains [shared](#) after you unprotect it.

1. Open the protected workbook
2. On the **Tools** menu, point to **Protection**, and then click **Unprotect Shared Workbook**.
3. If prompted, enter the password for the workbook.

4. If prompted about the effects on other users of removing protection, click **Yes**.

[Remove the password for viewing or editing a workbook file](#)

1. Open the workbook.
2. On the **File** menu, click **Save As**.
3. On the **Tools** menu, click **General Options**.
4. In the **Password to open** or **Password to modify** box, or both boxes, double-click the asterisks and then press the DELETE key.
5. Click **OK**, and then click **Save**.
6. Click **Yes** to replace the existing workbook.

[Show All](#)

# Remove personal or hidden information

Before you give others a copy of the workbook, it's a good idea to review personal and hidden information, and decide whether it's appropriate to include. You may want to remove some information from the workbook and from the workbook file properties before you share the workbook with others.

**Note** If you save a workbook in a file format that can be read by a great number of programs besides Microsoft Excel— for example, .txt, .htm, .mht, and .xml formats— any personal information described in this topic is easily viewed by anyone who has permission to open the file. By saving a workbook in an Excel file format (.xls), even those individuals with permission to open the file cannot necessarily find personal information easily. For example, if changes to content are password-protected, only users who know the password can see who has been granted permission to edit certain parts of the workbook.



[Where is personal or hidden information stored?](#)

## File Properties

These properties include Author, Manager, Company, and Last Saved By.

Some Excel features use the personal information in file properties. When you remove this information, these features may not work as desired. Removing personal information affects the following features:

- Send to Mail Recipient (for Review)
- Tracked changes
- Information Rights Management
- Online collaboration
- Document Workspace sites
- Comments (names are removed)
- Metadata-based search engines, such as FindFast and Microsoft SharePoint Portal Server search engines (documents can be indexed by limited data)

only, such as content and title)

## **Other hidden information**

For example, hidden, revised text, comments, or field codes can remain in a document even though you don't see it or expect it to be in the final version. If you entered personal information, such as your name or e-mail address, when you registered your software, some Microsoft Office documents store that information as part of the workbook. Information contained in custom fields that you add to the document, such as an "author" or "owner" field, is not automatically removed. You must edit or remove the custom field to remove that information.

# Remove personal information from file properties

When you use this procedure, the following personal information is removed from your document:

- File properties: Author, Manager, Company, Last saved by.
- Names associated with [comments](#) or [tracked changes](#): names are changed to "Author".
- Routing slip: The routing slip is removed.
- The e-mail message header that's generated with the **E-mail** button  is removed.
- Versioning: The name under **Saved by** is changed to "Author."

1. On the **Tools** menu, click **Options**, and click the **Security** tab.
2. Select the **Remove personal information from file properties on save** check box.
3. Save the document.

## **Your documents and Microsoft**

Unless you send your document to Microsoft, Microsoft does not have access to any information from your document.

[Show All](#)

# About macro security

## [About security levels and what they mean](#)

The following information summarizes how macro virus protection works under each setting on the **Security Level** tab in the **Security** dialog box (**Tools** menu, **Macro** submenu) under different conditions. Under all settings, if antivirus software that works with Microsoft Office 2003 is installed and the file contains macros, the file is scanned for known viruses before it is opened.

**Note** In Microsoft Office 2003 or later, a component checks all XML files that have references to XSL files for script that could be unsafe. If macro security is set to High, running this script is disabled. If macro security is set to Medium, the user is asked whether or not to run script in XSL files. If macro security is set to Low, the script is run.

## [Very High](#)

Only macros installed in trusted locations will be allowed to run. All other signed and unsigned macros are disabled. You can disable all macros entirely by setting your security level to **Very High** and disabling macros installed in trusted locations. To disable macros installed in trusted locations, click **Tools**, then select **Macro and Security**, and then click on the **Trusted Publisher** tab and “uncheck” the **Trust all installed add-ins and templates** option.

**Note** This also disables all Com Add-ins and Smart Tag .DLLs as well as macros.

## [High](#)

### **Unsigned macros**

Macros are automatically disabled, and the file is opened.

### **Signed macros**

The source of the macro and the status of the signature determine how signed macros are handled.

[A trusted source. Signature is valid.](#)

Macros are automatically enabled, and the file is opened.

[An unknown author. Signature is valid.](#)

A dialog box is displayed with information about the [certificate](#). Macros can be enabled only if the user chooses to trust the author and certification authority. A network administrator can lock the list of trusted sources and prevent the user from adding the developer to the list and enabling the macros.

[Any author. Signature is invalid, possibly because of a virus.](#)

User is warned of a possible virus. Macros are automatically disabled.

[Any author. Signature validation is not possible because public key is missing or incompatible encryption methods were used.](#)

User is warned that signature validation is not possible. Macros are automatically disabled.

[Any author. The signature was made after the certificate had expired or had been revoked.](#)

User is warned that the signature has expired or been revoked. Macros are automatically disabled.

[Medium](#)

### **Unsigned macros**

User is prompted to enable or disable macros.

### **Signed macros**

The source of the macro and the status of the signature determine how signed

macros are handled.

[A trusted source. Signature is valid.](#)

Macros are automatically enabled, and the file is opened.

[An unknown author. Signature is valid.](#)

A dialog box is displayed with information about the certificate. The user is prompted to enable or disable macros. The user can choose to trust the developer and certification authority.

[Any author. Signature is invalid, possibly because of a virus.](#)

User is warned of a possible virus. Macros are automatically disabled.

[Any author. Signature validation is not possible because public key is missing or incompatible encryption methods were used.](#)

User is warned that signature validation is not possible. User is prompted to enable or disable macros.

[Any author. The signature was made after the certificate had expired or had been revoked.](#)

User is warned that the signature has expired or been revoked. User is prompted to enable or disable macros.

[Low](#)

When security is set to low, all macros are treated equally regardless of origin or certificate status. With low security, you receive no prompt or signature validation and macros are automatically enabled. Use this setting only if you are certain that all macros in your files are from trusted sources.

[About digital signatures](#)

Office 2003 uses Microsoft Authenticode technology to enable you to [digitally](#)

[sign](#) a file or a [macro project](#). The certificate used to create this signature confirms that the macro or document originated from the signer, and the signature confirms that it has not been altered. When you set the macro security level, you can run macros based on whether they are digitally signed by a developer on your list of trusted sources.

After you have installed your [digital certificate](#), you can sign files and macro projects.

## [Signing macros](#)

You should sign macros only after your solution has been tested and is ready for distribution, because whenever code in a signed macro project is modified in any way, its digital signature is removed. However, if you have the proper digital certificate on your computer, the macro project will automatically be re-signed when saved. If you want to prevent users of your solution from accidentally modifying your macro project and invalidating your signature, lock the macro project before signing it. Your digital signature says only that you guarantee that this project is safe. It does not prove that you wrote the project. So locking your macro project doesn't prevent another user from replacing the digital signature with another signature. Corporate administrators might re-sign templates and add-ins so that they can control exactly what users may run on their computers.

If you create an add-in that adds code to a macro project, your code should determine if the project is digitally signed and notify the user of the consequences of modifying a signed project before continuing.

## [Where to get certificates](#)

You can obtain a digital certificate from a commercial certification authority, such as VeriSign, Inc., or from your internal security administrator or IT professional. Or, you can create a digital signature yourself using the Selfcert.exe tool.

**Note** Because a digital certificate you create yourself isn't issued by a formal certification authority, macro projects signed by using such a certificate are referred to as self-signed projects. Depending on how Office digital-signature features are being used in your organization, you might be prevented from using such a certificate, and other users might not be able to run self-signed macros for

security reasons.

### **Commercial certification authorities**

To obtain a digital certificate from a commercial certification authority, such as VeriSign, Inc., you or your organization must submit an application to that authority.

Depending on your status as a developer, you should apply for a Class 2 or Class 3 digital certificate for software publishers:

- A Class 2 digital certificate is designed for people who publish software as individuals. This class of digital certificate provides assurance as to the identity of the individual publisher.
- A Class 3 digital certificate is designed for companies and other organizations that publish software. This class of digital certificate provides greater assurance as to the identity of the publishing organization. Class 3 digital certificates are designed to represent the level of assurance provided today by retail channels for software. An applicant for a Class 3 digital certificate must also meet a minimum financial stability level based on ratings from Dun & Bradstreet Financial Services.

When you receive your digital certificate, you are given instructions on how to install it on the computer you use to sign your Office solutions.

### **Internal certification authorities**

Some organizations and corporations might have a security administrator or group act as their own certification authority and produce or distribute digital certificates by using tools such as Microsoft Certificate Server. Microsoft Certificate Server can function as a stand-alone certification authority or as part of an existing certification authority hierarchy. Depending on how Office digital-signature features are used in your organization, you might be able to sign macro projects by using a digital certificate from your organization's internal certification authority. Or you might need to have an administrator sign macro projects for you by using an approved certificate. For information about your organization's policy, contact your network administrator or IT department.

[Show All](#)

# Troubleshoot security and protection

## Protection and passwords

[I can't maximize or close the workbook window.](#)

The **Maximize** and **Close** buttons do not appear on windows that have been protected.

To remove protection, point to **Protection** on the **Tools** menu, and then click **Unprotect Workbook**. If prompted, enter the password. (If you are prompted for a password and you do not know the password, you cannot remove protection.)

To protect a workbook without protecting the windows, point to **Protection** on the **Tools** menu, click **Protect Workbook**, and then clear the **Windows** check box.

[I typed my password, but Microsoft Excel won't open the workbook.](#)

Passwords are case sensitive. You must type uppercase and lowercase letters exactly as they were entered when the password was created. Before you open a workbook that requires a password, make sure you have not pressed the CAPS LOCK key.

[I typed my password, but Excel won't let me edit the cells.](#)

Instead of selecting a range of cells to edit, select and edit the cells one at a time. If you still can't edit the cells, check with the person who created and protected the workbook to make sure you have the right password and access.

[I forgot the password.](#)

If you create a password that is required to open a workbook or gain access to its data, and then you forget the password, you can't open the workbook, gain access to its data in another workbook through links, remove protection from the

workbook, or recover data from the workbook.

Because you cannot gain access to password-protected workbook or worksheet elements if you lose the password, it's a good idea to keep a list of your passwords and their corresponding workbook and worksheet names in a secure place.

## Security levels and encryption

[I can't change the Excel security level.](#)

Your network administrator may have enforced a security level for your workgroup or corporation to ensure that you use only macros that are virus-free. For more information, see your network administrator.

[I get an 'encryption scheme not available' message when I try to open a workbook.](#)

Some workbook protection and encryption features vary depending on the language of the operating system they were created in. Before you can open a protected workbook, you must unprotect it with the same operating system and language in which it was created.

For example, if you are using the U.S. English version of Windows and receive a workbook that was protected with the Danish version of Windows, you can open the workbook only after it is unprotected with the Danish version.

[I can't add a macro developer to the list of trusted sources.](#)

**The list of trusted sources might be locked** Your system administrator might have locked your list of trusted sources so that you cannot add new macro developers to it.

**The macro might not be digitally signed** To add a macro developer to the list of trusted sources, the macro must be [digitally signed](#) by the developer.

**Microsoft Internet Explorer 4.0 or later might not be installed** To digitally sign a macro or verify that a developer is trusted, Internet Explorer version 4.0 or later must be installed on your computer.

**The security level might be set to Low** To add a macro developer to the list of trusted sources, you must change the security level to Medium or High. To change the security level, point to **Macro** on the **Tools** menu, click **Security**, click the **Security Level** tab, and then click the level you want.

**The certificate for the source may not be authenticated** You can only add certificates to your list of trusted sources if they have been authenticated. Note that certificates created with the Selfcert.exe tool are considered to be unauthenticated and can only be added to the list of trusted sources on the computer on which they were created.

 [The certificate I selected wasn't added to the list of trusted sources.](#)

If you use Microsoft Internet Explorer 4.0 with either Microsoft Office XP or Excel 2002, the **Certificate Properties** dialog box appears when you click the **Details** button in the **Security Warning** dialog box to get information about a certificate for a [digitally signed](#) macro.

The **Trust** tab in the **Certificate Properties** dialog box provides an option to generally trust the certificate, but Office XP and Excel 2002 ignore any options you set on the **Trust** tab. Use the **Security Warning** dialog box to add a macro developer to the list of trusted sources.

## Macro virus prevention

[Macros won't run in my workbook or add-in program.](#)

**Macros might have been disabled automatically** If the security level is set to High and you open a workbook or load an [add-in program](#) that contains unsigned macros, the macros are disabled and you cannot run them. You can enable macros that are not [digitally signed](#) if you change the security level to Medium, close the workbook or unload the add-in program, and then reopen the workbook or reload the add-in program. If you want Excel to automatically disable unsigned macros in the future, remember to change the security level back to High. To change the security level, point to **Macro** on the **Tools** menu, click **Security**, click the **Security Level** tab, and then click the level you want.

**You might have chosen to disable macros when you opened the workbook**

If the security level is set to Medium or High and you chose to disable macros because you don't trust their source, you cannot run the macros. To run the macros, close and then reopen the workbook or unload and reload the add-in program, and then click **Enable Macros**.

[Macros won't open in Excel 97.](#)

The macros might have been [digitally signed](#) from within the [Visual Basic Editor](#) in Excel 2000 or later. Excel 97 doesn't recognize digital signatures, so it can't update the signature if you modify a signed Visual Basic for Applications macro. Therefore, to prevent modifications, you cannot view in Excel 97 the code for macros that have been digitally signed in Excel 2000 or later.

[I don't get a macro warning for a workbook that I know has macros.](#)

**The security level might be set to Low** To have Excel warn you that a workbook or [add-in program](#) contains macros, change the security level to Medium: point to **Macro** on the **Tools** menu, click **Security**, click the **Security Level** tab, and then click **Medium**.

**The security level might be set to High and the macros are not digitally signed** To have Excel warn you that a workbook or add-in contains macros

that have not been [digitally signed](#), change the security level to Medium as described above.

**The security level might be set to Very High** Only macros installed in trusted locations will be allowed to run. All other signed and unsigned macros are disabled. You can disable all macros entirely by setting your security level to **Very High** and disabling macros installed in trusted locations. To disable macros installed in trusted locations, click **Tools**, then select **Macro and Security**, and then click on the **Trusted Publisher** tab and “uncheck” the **Trust all installed add-ins and templates** option.

**Note** This also disables all Com Add-ins and Smart Tag .DLLs as well as macros.

**You or a trusted source might have developed the macros** If so, Excel opens the workbook and enables macros automatically. If you no longer trust the macro developer, you can remove the developer from the list of trusted sources: on the **Tools** menu, point to **Macro**, click **Security**, click the **Trusted Sources** tab, click the developer, and then click **Remove**.

To have Excel prompt you every time you open a workbook or load an add-in program that contains macros, remove every source from the list of trusted sources. To confirm that the macros in the workbook were signed and to see the source of the macros, point to **Macro** on the **Tools** menu, and then click **Visual Basic Editor**. On the **Tools** menu in the editor, click **Digital Signature**.

[I don't want to see the warning about macros.](#)

**The macro might not be from a trusted source** If the security level is set to Medium or High and you open a workbook or load an [add-in program](#) that contains [digitally signed](#) macros that are not from a trusted source, you receive a macro warning. If you are sure that you trust the macro developer, add the name to the list of trusted sources.

**The macro might contain a virus** If you don't expect a workbook to contain a macro, you might have a virus that is adding a macro virus to the workbook. Check your computer for viruses and then try to get an uninfected copy of the workbook from the source.

**The macro might be in a temporary file that you downloaded from a Web site** If your virus scanner tells you that it has removed a virus in this file every time you open it, you are removing the virus from the temporary file only and not from the original file on the Web server. Check your computer for viruses and then notify the source about problems with the original file.

**The workbook may contain legitimate macros** Excel cannot distinguish between safe and unsafe macros. If you know that these are legitimate and safe macros, you might want to digitally sign the macros and add your name to the list of trusted sources.

[I get a "Source has not been authenticated" message.](#)

If the security level is set to High or Medium, this warning appears when you open a workbook or load an [add-in program](#) that contains a [digitally signed](#) macro for which the [digital certificate](#) has not been authenticated—for example, when the macro developer has created his or her own digital certificate.

This type of unauthenticated certificate can be forged to claim it is anyone's certificate—for example, a malicious user can create a certificate named "Microsoft Corporation". The only warning you have that the certificate might be false is this warning. You should not expect professional software developers to sign with an unauthenticated certificate. You should only expect this type of certificate from individual co-workers or friends.

If the security level is set to High and you trust the macro source, you can select the **Always trust macros from this source** check box and enable the macros.

If the security level is set to Medium, you can enable the macros without adding the developer to the list of trusted sources. If you don't trust the developer, do not enable the macros or open the workbook until you have verified that the source can be trusted.

[I can't disable a macro.](#)

You may be trying to open a workbook that contains a type of macro that cannot be disabled. Excel has two types of macros: those written in [Visual Basic for Applications \(VBA\)](#) and those written in Excel version 4.0 macro language (XLM macros). Only macros written in VBA can be disabled.

When you open a workbook that contains XLM macros, the Auto\_Open macro can be disabled, but other XLM macros still run.

It is recommended that you make sure that the source of the workbook is reliable before you open the workbook.

To find out more about macro viruses— including how to purchase antivirus software that scans your workbooks and removes known macro viruses— you can download virus protection information from the Microsoft Office Web site.

[I get a macro warning when I open a template.](#)

Excel does not consider the Excel templates to be trusted sources. Even if you selected the **Trust all installed add-ins and templates** check box on the **Trusted Sources** tab and clicked **Medium** or **High** on the **Security Level** tab (**Tools** menu, **Macro** submenu, **Security** command), the macro virus warning appears when you open a template provided with Excel that contains macros.

[Add-ins and macros do not work.](#)

If some items such as templates, wizards, or custom commands do not function the way you expect, you may be running a version of Office that does not include Visual Basic for Applications (VBA). Some organizations prefer to install Office with the VBA functionality disabled. If you use Office in this mode, certain add-ins and macros, including add-ins or macros created by third-party vendors, may not work. To find out whether you are running Office in VBA-less mode, contact your System Administrator or IT Professional.

[Show All](#)

# Troubleshoot Excel and the Web

## Accessing or copying data

[I can't create a Web query that accepts parameters.](#)

Some of the Web queries provided with Microsoft Excel allow you to enter parameters when you run the query. For example, the **MSN MoneyCentral Investor Stock Quotes** query allows you to enter stock symbols to retrieve data for specific stocks. The **New Web Query** dialog box does not allow you to create Web queries that prompt for parameters. To create this type of Web query, you need knowledge of HTML, and the Web page must be set up to accept parameter input. If you have this information, you can save a Web query file that returns data from the Web page you want, and you can then modify the .iqy file in a text editing program, such as Notepad. For more information, consult the author of the Web page you want to query.

[Table icons are blank in the New Web Query dialog box.](#)

You may have turned off the option to show pictures in your browser. To show pictures in Microsoft Internet Explorer 5, do the following:

1. Click **Internet Options** on the **Tools** menu, and then click the **Advanced** tab.
2. Under **Multimedia**, select the **Show pictures** check box.
3. Click **OK**.

[I can't refresh the data that I published or saved as an interactive spreadsheet on a Web page.](#)

Without scripting, you can't automatically refresh an [external data range](#) in an interactive spreadsheet. To refresh the data, you must republish the spreadsheet from Microsoft Excel with the new data that you want to use.

To make it possible to refresh an external data range that you put on a Web page, publish or save the data as a PivotTable list. Users can then refresh the

PivotTable list in the browser when the source data changes. For more information, see the [Microsoft Office Web Component](#) Help for PivotTable lists or spreadsheets. To display this Help, click an interactive spreadsheet or PivotTable list on your Web page in the Web browser, and then click the **Help** button on that control's toolbar.

[In my Web browser, I can't export my Web page data to Microsoft Excel.](#)

You must use Microsoft Internet Explorer version 4.01 or later if you want to export data from your Web page. You can export only interactive PivotTable lists and spreadsheets.

[Clicking the Edit button in my Web browser opens my Web page in the wrong program.](#)

Which programs are available from the **Edit** button in the Web browser depends on how the page was published.

If clicking the **Edit** button in your Web browser opens an Office program that you do not want to use, close the program, start the Office program you want to use, and open the Web page from there by doing the following:

1. Click **Open** on the **File** menu.
2. Locate and select the file you want to open.
3. Click the arrow next to **Open** at the bottom of the dialog box, and then click **Open in program name**.

[I get an error message that says the file name cannot be accessed when I try to publish or save data as a Web page.](#)

If you publish or save Microsoft Excel data as a Web page and get a message that says the file name cannot be accessed, one or more of the following might be the reason:

- You're trying to publish or save a Web page that has the same file name as an existing HTML file. Specify a new name for your Web page file and publish again.

- The location you're trying to publish to is unavailable, the path name is incorrect, or the file is already open. Check the path name, and then make sure no one else has the file open.
- The amount of information you're saving might have exceeded the limit that can be accurately saved, especially if you're putting interactive data on the Web. Try to save a smaller amount of data.

## Items don't appear correctly on the Web page

[Text doesn't appear correctly.](#)

**Upgrade to Microsoft Internet Explorer version 4.01 or later** To view a Web page that was saved with interactive data and have all the text appear correctly, you must use Microsoft Internet Explorer 4.01 or later and have the [Microsoft Office Web Components](#) installed.

**Modify cells that contain automatically wrapped text** You might have formatted cells with wrapped text before you published or saved the data as a Web page. In an interactive PivotTable list or spreadsheet on a Web page, text does not wrap within cells. To prevent text from being cut off when you publish or save it, you can shorten the text, use multiple cells for text, or widen the column in your worksheet, and then republish the data.

**Do not use CSS for font formatting** If you are using a browser that doesn't support cascading style sheets (CSS), do the following:

1. On the **Tools** menu in Excel, click **Options**, and then click the **General** tab.
2. Click **Web Options**, and then click the **Browsers** tab.
3. Clear the **Rely on CSS for font formatting** check box.
4. Republish your data.

[Text in a cell is cut off when I publish or save data as a Web page.](#)

**Modify cells that contain automatically wrapped text** You might have formatted cells with wrapped text before you published or saved the data as a Web page. In an interactive PivotTable list or spreadsheet on a Web page, text does not wrap within cells. To prevent text from being cut off when you publish or save it, you can shorten the text, use multiple cells for text, or widen the column in your worksheet, and then republish the data.

**Widen the column the text is in** If you publish a non-interactive range of cells where text in a cell overlaps another cell, the overlapping portion may not be published. Widen the column the text is in so that it does not overlap other cells.

**Realign the text** If you see text that is cut off in a cell and you are using Microsoft Internet Explorer 5, the text was longer than the length of the cell when it was published, and it was right or center aligned. You can do the following:

1. Open the original workbook (.xls file) in Excel.
2. Click the cell that contains the text that is cut off.
3. On the **Format** menu, click **Cells**, and then click the **Alignment** tab.
4. In the **Horizontal** box, click **Left (Indent)** and then click **OK**.
5. Publish or save the data as a Web page again.

**Note** In Microsoft Internet Explorer version 4.01 or earlier, centered, left-aligned, and right-aligned text automatically wraps within the cell in noninteractive Web pages.

[Rotated text doesn't appear correctly when I save or publish data as a Web page.](#)

You can't use rotated or vertical text when you publish or save Microsoft Excel data as a Web page. Rotated and vertical text are converted to horizontal text.

[Items I publish or save to an existing Web page always appear at the bottom of the page.](#)

When you publish or save Microsoft Excel data to an existing Web page, Excel always appends the data to the bottom of the page.

To move the Excel data to another position on the Web page, you can open the Web page in a design program such as Microsoft FrontPage or Microsoft Access and rearrange the items.

[I can't publish or save password-protected data as a Web page.](#)

You cannot publish or save Microsoft Excel data as a Web page if your worksheet or workbook is password protected. To publish or save your data,

remove the password, and republish your data.

[My chart doesn't appear when I save or publish it as a Web page.](#)

If you publish or save a worksheet or section of a worksheet or a PivotTable report with interactive spreadsheet functionality or PivotTable functionality, and the worksheet contains a chart, the chart is not saved on the Web page. To make the chart appear on the Web page, you must publish with chart functionality. The source data (that is, the worksheet or PivotTable list) is then published along with the chart.

[I can't publish or save my chart with interactive functionality.](#)

**Make sure you select only the chart** You must select only the chart, not the worksheet it appears on, to publish or save the chart as an interactive chart on a Web page.

**Make sure the data is on one worksheet** The chart you are trying to publish or save might be based on data ranges from two separate worksheets. Make sure all source data for your chart is on a single worksheet.

**Make sure noncontiguous data is added as a new series** Before you published the chart, you might have added data that was not contiguous with the original data for the chart and added the cells as new data points, rather than as a new series. If you add data to an existing chart, and the new range is not contiguous to the original range, make sure you add the cells as a new data series, not as new data points, before you publish the chart.

[My PivotTable report doesn't appear correctly when I publish or save it as a Web page.](#)

Some formatting and features are not retained when you publish or save a PivotTable report as a Web page. For example, indented formats aren't published.

[I published or saved a Web page, but I can't view the page in the Web browser.](#)

To view interactive data on Web pages, you must use Microsoft Internet

Explorer version 4.01 or later and have the [Microsoft Office Web Components](#) installed to view interactive Web pages. You can install these components by installing Office 2003 or, if your company has an Office 2003 site license, by downloading the Office Web Components from your corporate intranet.

[I can't filter the data that I published or saved as a Web page.](#)

The data you are trying to filter might contain merged cells. In an interactive spreadsheet on a Web page, you cannot filter a list that contains merged cells. Split the merged cells in your workbook and then republish the Web page.

## Hyperlinks

[I can't select the hyperlink text or graphic to make changes.](#)

To select a text [hyperlink](#) without jumping to the destination, do one of the following:

- Click a cell next to the cell that contains the hyperlink, and then use the arrow keys to move onto the cell that contains the hyperlink.
- Click the cell that contains the hyperlink, hold the mouse button down for at least a second, and then release the button.
- Right-click the cell that contains the hyperlink, and then click **Edit Hyperlink** on the shortcut menu.
- To select the graphic for a hyperlink without jumping to the destination, either hold down CTRL and click the graphic, or click **Select Objects**  on the **Drawing** toolbar, and then click the graphic.

[When I reopen the workbook, my hyperlinks no longer work.](#)

**Remove the drive letter from server addresses** The drive letter that was mapped to the shared network directory when you created the [hyperlink](#) might no longer be mapped to the directory. To make the hyperlink independent of the current drive mappings, edit the destination for the hyperlink, and make sure you specify the address by using the server and share name rather than a drive letter. For example, you could replace G:\myfile.xls with \\server\share\myfile.xls.

**Make sure the destination file locations are correct** Relative paths might be incorrect if the workbook or the destination files were moved since the workbook was last saved. Make sure that the locations of the destination files are correct.

**Make sure your network is running properly** You might not have network access to the destinations of the hyperlinks. Make sure that your network is running properly and that you have access to the required network resources.

[I can't open a workbook on the Internet.](#)

To open files on Internet sites, such as [World Wide Web](#) or [FTP](#) sites, you must have access to the Internet either through a direct network connection or through a dial-in Internet service provider.

If you have this access, the site might be busy; try to open the workbook later.

[When I click a hyperlink, an error message appears.](#)

**Make sure the destination file is available** The destination file for the [hyperlink](#) might have been deleted, moved, or renamed. You can reconnect the hyperlink by updating the path for the hyperlink to the new location.

**Make sure you have Internet access** If the destination of the hyperlink is located on the Internet or the [World Wide Web](#), you must have access to the Internet either through a direct network connection or through a dial-in Internet service provider. If you have this access, the site might be busy; try to open the workbook later.

**Make sure your network is running properly** If the destination of the hyperlink is located on your network or [intranet](#), check your network connections, and make sure your network server is running. See your network administrator to make sure you have access to the location of the destination file.

[When I copy data to my workbook, my hyperlinks don't work properly.](#)

If you copy data containing hyperlinks to a workbook or open in Microsoft Excel a Web page containing hyperlinks, the hyperlinks might not appear correctly. A single cell can contain only one hyperlink. If more than one

hyperlink or a hyperlink and extra text are placed in a single cell, the hyperlinks don't work.

To make a hyperlink work correctly, add it to the cell by using the **Hyperlink** command on the **Insert** menu.

[Gridlines disappear when I click a hyperlink to a new worksheet.](#)

When you insert a hyperlink to a new .htm file and then click the hyperlink to go to that Web page, the gridlines in the worksheet might not appear. To turn on the gridlines, do the following:

1. Open the Web page that the hyperlink goes to in Microsoft Excel.
2. On the **Tools** menu, click **Options**.
3. Click the **View** tab.
4. Under **Window options**, select the **Gridlines** check box.

[Updating linked data or jumping to a hyperlink destination takes a long time.](#)

The server at the destination or the destination site might be busy. Try the hyperlink again later, or try updating the linked data later. Experiment with updating links and clicking hyperlinks at different times of the day to determine when you're likely to get the best response. See your network administrator for information about the server.

## Web Page Options

[I don't want to keep my supporting Web files in a separate folder.](#)

When you save a Web page to a Web server, Microsoft Excel by default stores all supporting files— such as bullets, background textures, and graphics— in a separate subfolder. If you want to save supporting files in the same folder as the Web page, do the following:

1. On the **Tools** menu in Excel, click **Options**, and then click the **General** tab.
2. Click **Web Options**, and then click the **Files** tab.
3. Clear the **Organize supporting files in a folder** check box.

**Note** This option applies to the current page and any future pages that you save in Excel.

[I saved my Web page to a file server, and now some people can't find or view my page.](#)

If you use a long file name (a file name with spaces or more than eight characters) to save your Web page to a file server, users with Microsoft Windows 3.1 won't be able to find or open your Web page. Windows 3.1 recognizes and supports only short file names (8.3 notation). To always save files for Web pages with short file names, do the following:

1. On the **Tools** menu in Microsoft Excel, click **Options**, and then click the **General** tab.
2. Click **Web Options**, and then click the **Files** tab.
3. Clear the **Use long file names whenever possible** check box.

[I moved my Web page to another location, and now some of the links are broken.](#)

When you save a Web page, Microsoft Excel by default saves all supporting files — such as bullets, background textures, and graphics— in a supporting subfolder. If you move or copy your Web page to another location, you must also move the supporting folder so that you maintain all links to your supporting files.

[I can't automatically create a backup copy of my Web page.](#)

When you save a Web page, Microsoft Excel doesn't automatically create a backup copy. The **Always create backup** option does not apply to [HTML](#) files. (To locate this option, click **Save as** on the **File** menu, click **Tools**, and then click **General Options**.)

To save a backup copy of a Web workbook, save the original file, and then click **Save As** on the **File** menu. In the **File name** box, type a new name for the backup copy and then click **Save**. Close the backup copy and reopen your original file to continue editing.

[The file size of my Web page is too large.](#)

If you publish or save data on the Web and add interactivity with spreadsheet functionality, and your worksheet contains formulas that reference data that is not in your selected range, you can reduce the file size by not saving the external referenced data.

1. On the **Tools** menu in Excel, click **Options**, and then click the **General** tab.
2. Click **Web Options**, and then click the **General** tab.
3. Clear the **Save any additional hidden data necessary to maintain formulas** check box.

### Notes

- This option applies to the current page and any future pages that you save in Excel.
- If you choose not to save the hidden data, formulas that reference that data are replaced by the formulas' calculated values.

[My cell references are not what I expect them to be when I publish or save Excel data as a Web page.](#)

If the data you publish or save contains a reference to a cell or range of cells outside of the data you publish, Microsoft Excel, by default, saves the entire worksheet but only displays the cells in your selected range.

Depending on where your data started in your worksheet, the upper-left cell on your Web page might not be cell A1. To make the upper-left cell be A1, do the following:

1. On the **Tools** menu in Excel, click **Options**, and then click the **General** tab.
2. Click **Web Options**, and then click the **General** tab.
3. Clear the **Save any additional hidden data necessary to maintain formulas** check box.

### Notes

- This option applies to the current page and any future pages that you save in Excel.

- If you choose not to save the hidden data, formulas that reference that data are replaced by the formulas' calculated values.

[My query data is missing or is not updated properly.](#)

Check the Web page you are querying to make sure it is located in the same place and still contains the same information, and make changes if necessary. To make changes to the query:

1. Click a cell in the region of your Web query.
2. Click **Edit Query**  on the **External Data** [toolbar](#).
3. Make changes in the **Edit Web Query** dialog box.

[My Web query returns dates instead of numbers.](#)

When a Web page contains numbers that appear similar to dates, such as part number 01-01-23, Microsoft Excel might interpret these numbers as dates.

To have Excel interpret these numbers as numbers, click a cell in the [external data range](#), and then click **Edit Query**  on the **External Data** toolbar. In the **Edit Web Query** dialog box, click **Options**, and then select the **Disable date recognition** check box. Now when you run the Web query, dates on the Web page appear as dates in Excel, and numbers that are similar to dates appear correctly in Excel.

[I see a red X on my Web page.](#)

**Make sure your links are working properly** A red X indicates a missing graphic. If you move or copy your Web page to a new location without moving the supporting files, the links to graphics— such as photos, bullets, and background textures— may be broken.

To automatically make the paths for the linked pictures and hyperlinks relative when you save Web pages in Microsoft Excel, do the following:

1. On the **Tools** menu in Excel, click **Options**, and then click the **General** tab.
2. Click **Web Options**, and then click the **Files** tab.

3. Select the **Update links on save** check box.

### Notes

- When you select this option, Excel does not actually move or copy the supporting files when you move or copy a Web page. Rather, Excel updates the addresses to the relative links on the page.
- You must save the moved or copied Web page for the updating to occur.

**You might have changed a linked picture** If you make a visual change to a linked picture, such as adding a shadow, border or outline, fill, or contrast or brightness adjustment, then Excel will create another picture with those changes for displaying in a Web page. When you view the Web page in Microsoft Internet Explorer 4 or earlier, the picture will appear with the changes but the link to the original picture will be broken. To fix the link, select the picture and click **Reset Picture**  on the **Picture** toolbar.



[I see a blank image where the graphic should be on my Web page.](#)

There are several reasons why graphics may not be appearing correctly on your Web page.

**Adjust your browser settings** Because different browsers support different versions of HTML and [HTML extensions](#), text and graphics may look different in one computer's browser than they do in another. In some cases, graphic images appear as blanks because the browser is set to not display graphics. You can sometimes make missing graphics appear in your browser by adjusting the option to display graphics.

**Test your page with different browsers** When you create Web pages, consider testing them in different Web browsers— some of which are available for downloading from the Web— and with different monitor settings, to make sure all of your page elements appear correctly.

**Graphics might be turned off in your Web browser** To make sure that graphics are being downloaded, do the following:

1. Open your Web page in Microsoft Excel.

2. On the **Tools** menu, click **Options**, and then click the **General** tab.
3. Click **Web Options**, and then click the **Browsers** tab.
4. Clear the **Rely on VML for displaying graphics in browsers** check box.

**You might have used the wrong picture format** If you link a graphic to a Web page, and the graphic format isn't supported by your browser, your graphics won't show. Make sure that the linked picture is in a graphic format that is compatible with your browser. The graphic formats [JPG](#) and [GIF](#) are compatible with most browsers.

**You might have changed a linked picture** If you make a visual change to a linked picture, such as adding a shadow, border or outline, fill, or contrast or brightness adjustment, then Excel will create another picture with those changes for displaying in a Web page. When you view the Web page in Microsoft Internet Explorer 4 or earlier, the picture will appear with the changes but the link to the original picture will be broken. To fix the link, select the picture and click **Reset Picture**  on the **Picture** toolbar.

[When I view my Web page on another computer, the graphics and text look different.](#)

**Reset your video resolution when you design a Web page** Graphics and text can wrap differently, depending on the video resolution (the size of the screen elements relative to the screen size). The screen size you specify can affect the size and layout of images in a workbook, including the gradient page backgrounds. The pixel size affects the size of graphics relative to the size of text on the screen.

If your graphics and text don't look the way you expect, change the screen and pixel settings by doing the following:

1. On the **Tools** menu in Microsoft Excel, click **Options**, and then click the **General** tab.
2. Click **Web Options**, and then click the **Pictures** tab.
3. Under **Target monitor**, do one or both of the following:
  - In the **Screen size** box, select a screen size.
  - In the **Pixels per inch** box, select a pixel size.

**Note** This option applies to the current page and any future pages that you save in Excel.

**Adjust your browser settings** Because different browsers support different versions of [HTML](#) and [HTML extensions](#), text and graphics may look different in one computer's browser than they look in another. You can sometimes change the appearance of graphics and text by adjusting the custom options in your browser, such as the default text and background colors and the option to display graphics.

**Test your page with different browsers** When you create Web pages, consider testing them in different Web browsers— some of which are available for downloading from the Web— and with different monitor settings, to make sure all of your page elements appear correctly.

[Users can't open my interactive Web page.](#)

To use Microsoft Excel interactive data on the Web, your users must have Office 2003 or access to an Office 2003 license and the Office Web Components installed.

If you or your users have the appropriate Office 2003 license, you can specify that the Web components download to the user's machine when the user opens your Web page.

1. On the **Tools** menu in Excel, click **Options**, and then click the **General** tab.
2. Click **Web Options**, and then click the **Files** tab.
3. Select the **Download Office Web Components** check box.
4. In the **Location** box, type the path for the file server, such as file:\\my server\\my folder.

**Note** Users must have access to the file server and the Web Components cannot be downloaded through firewalls.

[My Web page is displaying the wrong characters for a language.](#)

When you open a Web page, Microsoft Excel tries to determine the [encoding](#) used for that page. If Excel displays the wrong characters when you open the page in a Web browser, you can select the encoding that you think the page is

using. Try each encoding until you can read the text.

1. On the **Tools** menu in Excel, click **Options**, and then click the **General** tab.
2. Click **Web Options**, and then click the **Encoding** tab.
3. In the **Reload the current document as** list, select the language you think the page is encoded in.

[A Web page that I opened has the wrong character set or font.](#)

If the wrong font for a Web page or plain text file is applied when you import a Web page into Microsoft Excel, you can select the character set that you think the page is [encoded](#) in. Then you can choose from a list of fonts that depends on which character set you chose.

1. On the **Tools** menu in Excel, click **Options**, and then click the **General** tab.
2. Click **Web Options**, and then click the **Fonts** tab.
3. In the **Character set** list, click the character set that you think the Web page uses.
4. In the **Proportional font** and **Size** lists, click a font and size for normal text.
5. In the **Fixed-width font** and **Size** lists, click a font and size for monospace text.

**Note** These options apply to the current page and any future pages that you import in Excel.

[My fonts aren't formatted correctly on a Web page.](#)

If you use a browser that does not support cascading style sheets (CSS), you can reduce the size of your file when you save or publish a Web page by saving only in [HTML](#) format.

1. On the **Tools** menu in Microsoft Excel, click **Options**, and then click the **General** tab.
2. Click **Web Options**, and then click the **Browsers** tab.
3. Clear the **Rely on CSS for font formatting** check box.

**Note** This option applies to the current page and any future pages that you save in Excel.

[I want to open a Web page in Excel, but it opens in another Microsoft Office program.](#)

In the **Open** dialog box (**File** menu), when you select a [Hypertext Markup Language \(HTML\)](#) file (a Web page) and click **Open** or double-click the file, the file opens in the program that the file was created in. For example, if you attempt to open in Microsoft Excel an HTML file that was created in Microsoft Word, the file opens in Word instead.

To open such an HTML file in Excel, select the file in the **Open** dialog box, click the arrow next to **Open** at the bottom of the dialog box, and then click **Open in Microsoft Excel**.

# Synchronize list with SharePoint site

When you publish a list and choose to link the list, in order to manage synchronization between the local Microsoft Excel list and the SharePoint list, the **List** toolbar provides two buttons that allow you to choose how you wish to handle updates to the list.

To publish any local changes to the SharePoint list, and brings any changes made to the SharePoint list down to the local Excel list do the following:

- On the **List** toolbar, click **Synchronize List** .

To discard local changes to the list, and download the current copy of the list from the Microsoft Windows SharePoint Services Web site do the following:

- On **List** toolbar, click **Discard Changes and Refresh** .

**Note** Synchronization is not automatic. Unlike a standard link in Excel (that is, between two cells), you must manually synchronize or discard local changes to the list. This is important because you are not prompted to do anything with local changes to a linked list when the file is saved or closed. You are notified when the file is opened only that the file has unsynchronized local changes.

# About the Spreadsheet Web Part

The Spreadsheet Web Part provides a way to create custom Web Parts that can be bound to external data sources such as Microsoft SQL Server, Microsoft Business Solutions (Great Plains), or Microsoft Windows SharePoint Services. When bound to an external data source, the Spreadsheet Web Part binds and retrieves data from these data sources by using a data retrieval service (an XML Web Service that resides on a Windows SharePoint Services server for connecting to and retrieving data). Once the data is retrieved, the Spreadsheet Web Part displays the queried data by mapping its XML elements to the spreadsheet grid.

The Spreadsheet Web Part can also implement a set of Web Part connection interfaces that allow it to interact with other Web Parts that support connection interfaces. When two Web Parts are connected, a user can perform an action in one Web Part to affect the contents of the other Web Part. For example, clicking a row in a connected Orders Web Part can filter the display of related sales data in a Product Sales Web Part.

## Required Files and Components

A Spreadsheet Web Part requires five supporting files and components to run:

- **The Spreadsheet Web Part assembly** A software component that resides on a Windows SharePoint Services site to provide the server-side functionality for all of the Spreadsheet Web Parts on that site. Before a Windows SharePoint Services site can support Spreadsheet Web Parts, the site administrator must install the Microsoft Office 2003 Web Parts and Components on that site. Office 2003 Web Parts and Components is available from the [Office Update Download Center](#). This installation needs to be performed only once to support any number of Spreadsheet Web Parts on that site.
- **An XML Spreadsheet file** To define the data binding, XML mapping, layout, formatting, data validations, and calculations for a Spreadsheet Web Part, an XML Spreadsheet file created in Microsoft Excel is required. You can omit the XML Spreadsheet file if you want to create a blank spreadsheet.
- **A solution specification file** An XML file that contains elements that define various settings, such as the location of the XML Spreadsheet file, declarative definitions of connection interfaces, HTML and script, the ability to retrieve the values of server properties, and whether the user interface commands that allow users to connect to data, save the layout, and edit or delete queries are hidden or disabled. You can omit the solution specification file if you want to create a blank spreadsheet.
- **A Web Part definition file** An XML file saved with a .dwp file extension that specifies the Spreadsheet Web Part assembly and the default settings for Web Part properties, such as the **Title** and **Description** properties. It also specifies the **SolutionFileLocation** property, which is the URL to the solution specification file. A Web Part definition file is used to import a Spreadsheet Web Part into a Web Part page or Web Part catalog.
- **The Spreadsheet Component** An ActiveX component that must be installed on a user's computer to support the client-side functionality of a Spreadsheet Web Part. The Spreadsheet Component is installed as part of the Office 2003 Web Components, which are installed by default along with Office 2003. You can also download and install the Office 2003 Web Components separately from Office 2003, but users opening the

Spreadsheet Web Part will experience reduced functionality if they don't already have Office 2003 installed, or have access to an Office 2003 software license.

## Creating and Deploying

You can create a simple Spreadsheet Web Part without using Excel by adding one directly to a Web Part page from the Web Part gallery on a Windows SharePoint Services site by clicking **Modify My Page** or **Modify Shared Page** (depending on whether you are viewing the page in Personal View or Shared View), and then clicking **Add Web Parts**. Once you have a Spreadsheet Web Part on a Web Part page, you can connect it to a data source by clicking **Connect to Data** on the toolstrip.

To create and deploy a more complex Spreadsheet Web Part, you need to perform several procedures before you can use the Web Part on a Web Part page:

- Create the XML Spreadsheet file:
  - Using the **Data Connection Wizard** in Excel, specify a data source and define the data that you want to bind to and retrieve.
  - Excel will map your imported data as a list of repeating rows by default, or you can also use Excel's **XML Source** task pane to map XML elements to the spreadsheet grid.
  - Using other Excel commands, format cells and define formulas or calculated columns.
  - After you are finished working in Excel, save your data binding and layout definition as an XML Spreadsheet file to a document library on the same Windows SharePoint Services server where you will be using your Spreadsheet Web Part.
- Create the solution specification file in a text editor and save it to a document library on the same Windows SharePoint Services server where you will be using your Spreadsheet Web Part.
- Create the Web Part definition file in a text editor, and then use it to import your Spreadsheet Web Part into a Web Part page or Web Part catalog.

**Note** You can make the process of creating a Spreadsheet Web Part simpler by using the Spreadsheet Web Part Add-in for Microsoft Office Excel 2003. This add-in is available for download from the [Microsoft Download Center Web Site](#).

[Show All](#)

# Create a data-bound Spreadsheet Web Part

**Important** The Spreadsheet Web Part works only on a Microsoft Windows SharePoint Services or SharePoint Portal Server server that has the Microsoft Office 2003 Web Parts and Components installed. For information about whether the server has these components installed, contact your site administrator.

Creating and importing a data-bound Spreadsheet Web Part into a Web Part page consists of four high-level steps:

- Specify the data source and import data into Excel.
- Specify layout and formulas, and save that definition as an XML Spreadsheet file (.xml) to a document library on the same Windows SharePoint Services server where you will be using your Spreadsheet Web Part.
- Create and save the solution specification file (.xml) for your Web Part in a document library on the same Windows SharePoint Services server where you will be using your Spreadsheet Web Part.
- Create a Web Part definition file (.dwp) for your Web Part and import it into a Web Part page or Web Part catalog.

**Note** Before proceeding, make sure that you have access to a document library for saving your XML Spreadsheet and solution specification files. Because these files are not intended to be edited by the users of your Spreadsheet Web Part, you should save them in a separate document library from other documents on your server. If you do not have permission to create your own document library, contact your site administrator for assistance.

**Note** You can make the process of creating a Spreadsheet Web Part simpler by using the Spreadsheet Web Part Add-in for Microsoft Office Excel 2003. This add-in is available for download from the [Microsoft Download Center Web Site](#).

[To specify and import data for your Spreadsheet Web Part](#)

1. Create a blank worksheet in Microsoft Excel.
2. On the **Data** menu, point to **Import External Data**, and then click **Import Data**.
3. In the **Select Data Source** dialog box, click **New Source**.
4. Do one of the following:
  - Select **Microsoft Business Solutions**, and then click **Next**.
  - Select **Data retrieval services**, click **Next**, select one of the data retrieval service data sources, such as **Microsoft SQL Server** or **Microsoft SharePoint lists**, and then click **Next**.
5. Type the URL for the Windows SharePoint Services server where you will deploy your Spreadsheet Web Part, and then click **Next**.
6. Type the server name and specify logon credentials, and then click **Next**.
7. Double-click the folder of the database that you want to retrieve data from (for example, Northwind), click the table, query, or other data object that you want to work with, and then click **Next**.
8. Select the columns that you want to work with, and then click **Next**.

**Note** If you want to make a connectable Web Part, you should include a column that can be used to establish a one-to-many relationship, such as an ID column.

9. Select the columns you want to sort by, and then click **Next**.
10. Specify the filter criteria (if any), and then click **Next**.
11. Choose whether to limit the number of rows returned, and then click **Next**.
12. Type the name for your Data Retrieval Service Connections file (.uxdc), and then click **Finish**.
13. Select the Data Retrieval Service Connections file (.uxdc) that you created in the preceding steps, and then click **Open**.
14. Import the data as an XML List into the current worksheet, starting at cell A1.

 [To specify the layout and formulas for your Spreadsheet Web Part](#)

1. Hide the column containing the ID field.
2. To add a formula, insert a column into your XML List, type a formula into the first cell of that column, and then double-click the [fill handle](#) to copy the formula to all rows in the list.
3. To make the XML List headers visible when scrolling, select the row below the headers, and then click **Freeze Panes** on the **Window** menu.

4. Select and format cells in the first row of the XML list to display decimal places, currency symbols, fonts, and so on.
5. To hide the Excel row and column headers and horizontal scrollbar, click **Options** on the **Tools** menu, and on the **View** tab clear the **Row & column headers** and **Horizontal scroll bar** check boxes.
6. On the **File** menu, click **Save As**, and then navigate to a document library on the Windows SharePoint Services server where you will be using the Spreadsheet Web Part, set **Save as type** to XML Spreadsheet (\*.xml), type a file name, and then click **OK**.

**Note** You can also save the XML Spreadsheet file for your Spreadsheet Web Part locally and upload it to a document library later.

 [To create and save the solution specification file for your Web Part](#)

1. Start Notepad and create an .xml file in the following format:

```
<?xml version="1.0" ?>
<SolutionSpecification>
  <WebPartSettings>
    <XMLSSFileLocation>URLToXMLSpreadsheetFile
    </XMLSSFileLocation>
    <LockedDown>True</LockedDown>
  </WebPartSettings>
</SolutionSpecification>
```

Replacing *URLToXMLSpreadsheetFile* with the URL to the XML Spreadsheet file you created in the previous steps. This will typically be in a format like:

*http://ServerName/DocumentLibraryName/XMLSpreadsheetName.xml*

Or a relative path that omits the server name:

*/DocumentLibraryName/XMLSpreadsheetName.xml*

2. Save the solution specification file with an .xml extension directly to a document library on your Windows SharePoint Services server, or save the file locally and upload it to the document library.

 [To create the Web Part definition file for your Spreadsheet Web Part and import it into a Web Part page](#)

1. Start Notepad and create a Web Part Definition file (.dwp) in the following format:

```
<?xml version="1.0"?>
<WebPart
xmlns="http://schemas.microsoft.com/WebPart/v2"
xmlns:ODP="http://schemas.microsoft.com/WebPart/v2/Spreadsheet">
  <Assembly>Microsoft.Office.DataParts,Version=11.0.0.0,Culture
  <TypeName>Microsoft.Office.DataParts.SpreadsheetCtl</TypeName>
  <Title>WebPartTitle</Title>
  <Description>WebPartDescription</Description>
  <ODP:SolutionFileLocation>URLToSolutionSpecificationFile
  </ODP:SolutionFileLocation>
</WebPart>
```

**Important** To work correctly, the line that begins with <Assembly> and ends with </Assembly> must be formatted as a single line with no line breaks or spaces. If you add spaces or line breaks between attributes, importing the Spreadsheet Web Part will fail.

The following table describes what to enter for each of the italicized items.

<b>Item</b>	<b>Description</b>
<i>WebPartTitle</i>	The title for your Web Part.
<i>WebPartDescription</i>	The description for your Web Part.
<i>URLToSolutionSpecificationFile</i>	The URL to the solution specification file ( steps. This will typically be in a format like <i>http://ServerName/DocumentLibraryName</i> ,

2. Save the file with a .dwp extension.
3. Create a new Web Part page (on the Windows SharePoint Services toolbar click **Create**, and then under **Web Pages**, click **Web Part Page**).
4. Click **Modify My Page** or **Modify Shared Page** (depending on whether you are viewing the page in Personal View or Shared View), and then click **Add Web Parts**.
5. Click **Import**, specify the .dwp file you created in the previous steps, and then click **Upload**.
6. Drag the Web Part to the zone where you want your Spreadsheet Web Part to appear.

7. Close the tool pane.

**Note** If you are an administrator of a Windows SharePoint Services site or server, you can also import the Web Part definition file for a Spreadsheet Web Part into a Web Part gallery to make it available to other users of the site or server.

[Show All](#)

# Create a connectable Spreadsheet Web Part

This procedure describes how to create two Spreadsheet Web Parts that implement Web Part connection interfaces. To make the example clearer, it assumes you are creating these two Web Parts by using the Suppliers and Products tables from the Northwind sample database on Microsoft SQL Server:

- A Web Part that displays data from the Suppliers table that can send the selected row to another Web Part.
- A Web Part that displays data from the Products table that can be filtered by the value it receives from another Web Part.

Because a one-to-many relationship exists between the Suppliers and Products tables on the SupplierID column, these two Web Parts can be connected to provide the SupplierID value from the Suppliers Web Part to filter the rows displayed in the Products Web Part. However, you can create similar Web Parts by using any data source that has a one-to-many relationship based on a single column.

**Note** You can make the process of creating a Spreadsheet Web Part simpler by using the Spreadsheet Web Part Add-in for Microsoft Office Excel 2003. This add-in is available for download from the [Microsoft Download Center Web Site](#).



## [Create a row provider Spreadsheet Web Part](#)

1. Create a Spreadsheet Web Part as described in the [Create a data-bound Spreadsheet Web Part](#) topic, selecting a table such as the Suppliers table in the Northwind sample database making sure to include the primary key SupplierID column.
2. Edit the solution specification file of the Web Part you created to include an **InterfaceConnections** element that implements an **IRowProvider** interface on the mapped table:

```
<?xml version="1.0"?>  
<SolutionSpecification
```

```

xmlns="http://schemas.microsoft.com/WebPart/v2/Spreadsheet/Sc
<WebPartSettings>
  <XMLSSFileLocation>URLToXMLSpreadsheetFile
  </XMLSSFileLocation>
  <LockedDown>True</LockedDown>
</WebPartSettings>
<InterfaceConnections>
  <RowProvider Name="RowProvider1_WPQ_"
  MaxConnections="-1"
  MenuLabel="Provide selected row"
  Description="Sends the selected row to another Web Part
  <SendRow>
    <MapEntryID>Insert Map/Entry@ID</MapEntryID>
  </SendRow>
  </RowProvider>
</InterfaceConnections>
</SolutionSpecification>

```

Where *Insert Map/Entry@ID* is the value of the ID attribute value from the <Entry> tag contained within the <Map> tag for the mapped table in the XML Spreadsheet file.

### [Create a filter consumer Spreadsheet Web Part](#)

1. Create a blank worksheet in Excel.
2. On the **Data** menu, point to **Import External Data**, and then click **Import Data**.
3. In the **Select Data Source** dialog box, click **New Source**.
4. Click **Data retrieval services**, and then click **Next**.
5. Create a Data Retrieval Service Connections file (.uxdc) that connects to a Microsoft SQL Server table with a foreign key relationship to the first Spreadsheet Web Part, such as the Products table in the Northwind sample database. Include the foreign key column in the query, such as the SupplierID column.
6. Import the data as an XML list range into the current worksheet, starting at cell A1.
7. Hide the column containing the SupplierID column.
8. On the **File** menu, click **Save As**. Navigate to a document library on the Microsoft Windows SharePoint Services server where you will be using the Spreadsheet Web Part, set **Save as type** to XML Spreadsheet (\*.xml), type a file name, and then click **OK**.
9. Create a solution specification file that points to the XML Spreadsheet file

(.xml) you created. Include an **InterfaceConnections** element that implements an **IFilterConsumer** interface that maps the ID from the first Spreadsheet Web Part to the foreign key field in the mapped table.

```
<?xml version="1.0"?>
<SolutionSpecification
  xmlns="http://schemas.microsoft.com/WebPart/v2/Spreadsheet/Sc
  <WebPartSettings>
    <XMLSSFileLocation>URLToXMLSpreadsheetFile
    </XMLSSFileLocation>
    <LockedDown>True</LockedDown>
  </WebPartSettings>
  <InterfaceConnections>
    <FilterConsumer Name="RowConsumer1_WPQ_"
      MaxConnections="-1"
      MenuLabel="Get Filter From"
      Description="Filters products by the selected Supplier"
      <LocalFilter>
        <MapEntryID>Insert Map/Entry@ID</MapEntryID>
      </LocalFilter>
    </FilterConsumer>
  </InterfaceConnections>
</SolutionSpecification>
```

Where *Insert Map/Entry@ID* is the value of the ID attribute value from the `<Entry>` tag contained within the `<Map>` tag for the mapped table in the XML Spreadsheet file.

10. Save the solution specification file with an .xml extension directly to a document library on your Windows SharePoint Services server, or save the file locally and upload it to the document library.
11. Create a Web Part definition file (.dwp) that references the Spreadsheet Web Part assembly and points to the solution specification file you created. For details, see the "To create the Web Part definition file for your Spreadsheet Web Part and import it into a Web Part page" section in the [Create a data-bound Spreadsheet Web Part](#) topic.

## [Import and connect the Web Parts](#)

1. Import the two Web Part definition files (.dwp) into a Web Part page.
2. Connect the two Spreadsheet Web Parts selecting the primary key field in the first Web Part (such as the SupplierID column in the Suppliers table) to filter the foreign key field in the second Web Part (such as the SupplierID

column in the Products table).

3. Verify that clicking on different rows in the first Web Part filters the rows shown in the second Web Part.

[Show All](#)

# About changing data on a Web page

The kinds of changes you can make to a Web page created in Microsoft Excel depend on whether the Web page was created with or without interactivity.

## [With interactivity](#)

If you saved or published interactive data from Excel, you should not open the resulting [HTML](#) file in Excel to make modifications. Instead, you should modify the original workbook (.xls file) from which you originally published and then republish the interactive items on the Web page, or open the Web page in a design program and make modifications. The recommended design programs are Microsoft Office FrontPage 2003, Microsoft Office Access 2003, and Microsoft Visual Basic.

Which design program you choose depends on what kinds of changes you want to make and how you published or saved the data.

**When to use Excel** When you want to make changes that use Excel features, you should open the original workbook (.xls) file you used to publish or save the Web page, make changes in the workbook, and republish the data. You should not open an interactive Web page in Excel for the purpose of making changes. The AutoRepublish feature (available in the **Publish** dialog box) allows you to specify that previously published items should be automatically republished every time the original workbook is saved.

If you do not have access to the original workbook, you can export interactive spreadsheets and [PivotTable lists](#) to Excel by using the control's **Export to Microsoft Excel**  [toolbar](#) button in the [Web browser](#) or use FrontPage or [data access page Design view](#) in Access to change the Web page.

**When to use Microsoft FrontPage** Use FrontPage when you want to do the following:

- Rearrange items on your Web page and customize the interactive functionality for spreadsheets, PivotTable lists, and charts
- Use advanced Web site management tools and gain access to other Web

- sites
- Use design-time controls
  - Add ActiveX controls that are available only from FrontPage
  - Change the formatting or add a theme or make the page look like other Web pages

**When to use data access page Design view in Microsoft Access** Use Access when you want to do the following:

- Add controls, such as text boxes and drop-down list controls, that display data from an Access or Microsoft SQL Server database
- Add a chart that shares the same data as your [external data range](#)
- Add ActiveX controls that are available only in data access page Design view

If you use Access to modify the page by adding [Microsoft Office Web Component](#) controls or by adding controls that aren't bound to database data, when you republish the page, users with Microsoft Internet Explorer version 4.01 or earlier will still be able to use the page. However, if you add controls other than Microsoft Office Web Component controls and those controls are bound to database data (Access or SQL Server database data), users will also need to have Internet Explorer 5 or later to use the page in the browser.

**When to use Visual Basic** Use [Visual Basic](#) when you want to add custom controls or when you want to use the Microsoft Office Web Components as COM controls or in Visual Basic forms.

**Modifying the HTML code** You can use an HTML editor, such as FrontPage, or a text editor, such as Notepad, to make changes such as moving items on the Web page. However, any changes you make directly to the HTML code might not be supported in Excel or other Office programs if you try to open the file later in one of those programs.

**Making temporary changes using the Web browser** You can make changes to your Web page while you have it open in a Web browser, but any changes you make are temporary and are not saved when you exit the browser.

[Without interactivity](#)

When you save or publish noninteractive data, such as an entire workbook without interactivity, you can open the resulting [HTML](#) file directly in Excel, make changes, and save the file. Noninteractive Web pages are the only kinds of Web pages you should open and modify in Excel.

[Show All](#)

# About putting Excel data on the Web

Would you like your employees to be able to access, from a Web page, sales data for their territories compared to sales data for other employees? Or how about a spreadsheet for standard cost calculation? Or maybe you want to use a Web page to show the profits in different areas of your company in a chart.

You can save a Microsoft Excel workbook or part of the workbook, such as a single item on the worksheet, as a Web page and make it available on an [HTTP](#) site, an [FTP](#) site, a [Web server](#), or a network server for users to view or interact with. For example, if you have sales figures set up on an Excel worksheet, you can publish the figures along with a chart to compare figures on a Web page, so that users can view or even work with the numbers in their browsers without having to open Excel.

Here are some of the different ways you can share Excel data on the Web.

 [Put an entire workbook on a Web page](#)

If you want to put all of the data in a workbook onto a Web page at one time, you can put an interactive or noninteractive version of an entire workbook on a Web page.

## **Interactive workbooks**

When you publish an interactive workbook on a Web page, the result is an [HTML](#) file that contains special components that allow browser users to interact with the workbook. For example, users can switch between sheets using a sheet selector, manipulate data and formatting, and change formulas in each sheet. The interactive components used in the HTML file cannot be opened and modified in Excel, so you should maintain a master copy of the Excel workbook from which you published so that you can make changes to it and republish the workbook if necessary.

## **Noninteractive workbooks**

When you save a noninteractive workbook, the data appears as it would in

Excel, including tabs that users can click to switch between worksheets. However, users cannot change or interact with the data in the browser. Saving an entire workbook as an HTML page is beneficial when you don't want to maintain a master copy of the Excel workbook, but rather want to be able to open the resulting HTML file directly in Excel and make and save changes using Excel features and functionality.



Salesperson	Month	Sales
Buchanan	Jan	5,574
Buchanan	Feb	3,571
Buchanan Total		9,145
Davolio	Jan	1,203
Davolio	Feb	4,133
Davolio	Mar	2,741
Davolio Total		8,077
DeDeo	Jan	2,606
DeDeo	Feb	2,375
DeDeo	Mar	4,567
DeDeo Total		9,623
Grand Total		27,000

Click a tab to see the sheet you want.

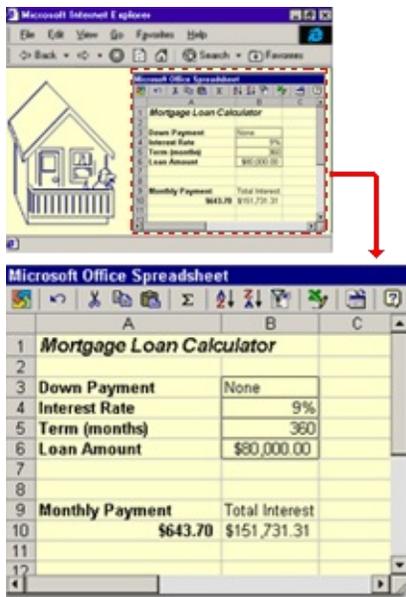
[Put a worksheet, range of cells, or other item on a sheet on a Web page](#)

You can publish a spreadsheet or portions of a spreadsheet on a Web page either with or without interactive functionality.

When you publish without interactivity, users can view the data and formatting on the Web page, but not manipulate data or formatting.

If you want users to be able to manipulate data on your Web page, you can create a Web page from a Microsoft Excel worksheet or items from the worksheet by saving the data with spreadsheet functionality. When you publish interactively with spreadsheet functionality, users can do the following:

- Enter data
- Format data
- Calculate data
- Analyze data
- Sort and filter



In interactive Web pages, users can change the data and layout of Web page items.

**You can put the following on a Web page with spreadsheet functionality:**

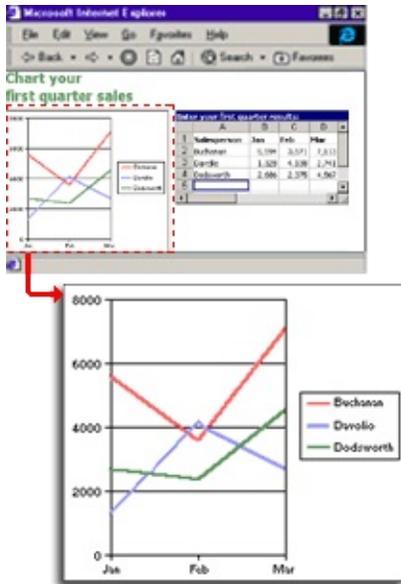
- Worksheets
- [PivotTable reports](#)
- [External data ranges](#)
- Ranges of cells
- Filtered lists
- Print areas

You might lose some formatting and features when you save with interactive functionality.

[Put a chart on a Web page](#)

You can publish a chart with or without interactivity. When you publish without interactivity, an image of the chart in a picture format (.jpg) is saved and displayed on the Web page.

If you want to put an interactive chart or [PivotChart report](#) on a Web page, you can save the chart with interactive chart functionality.



When you change the chart's corresponding data on the Web page, the chart is updated automatically.

To create a chart with interactive functionality, you must first have a chart or a PivotChart report in Excel. When you publish that chart interactively, Excel automatically includes the source data for the chart on the Web page. For a chart, Excel includes an interactive spreadsheet control. For a PivotChart report, Excel includes an interactive [PivotTable list](#).

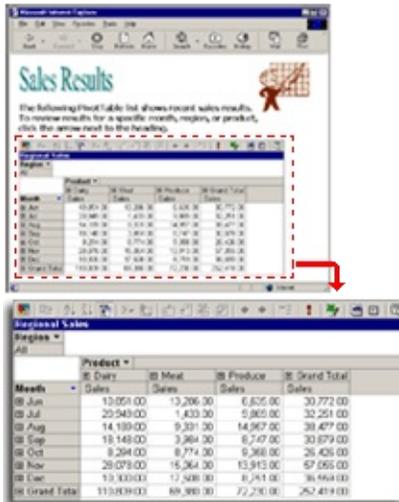
When users change the data in the spreadsheet or change the layout of the PivotTable list on the Web page, the corresponding chart is updated automatically. Users can also sort and filter the chart.

If you want to change the size of the chart on the Web page, you can open the Web page in either Microsoft FrontPage or [data access page Design view](#) in Microsoft Access and make the changes there.

### [Put a PivotTable Report on a Web page](#)

A [PivotTable report](#) is an interactive table in Excel that you can use to quickly summarize large amounts of data. Use PivotTable reports when you want to compare related totals or when you want Excel to do the sorting, subtotaling, and totaling for you.

You can publish a PivotTable Report with or without interactivity. When you publish without interactivity, users can view the report but cannot make changes to the table such as dragging fields or changing the types of summaries used, as can be done in Excel.



In a PivotTable list on a Web page, you can analyze data by changing the layout.

If you want your Web users to be able to interact with a PivotTable report or if you want to publish an [external data range](#) that you can refresh, you can put an interactive [PivotTable list](#) on a Web page. (The Web version of an interactive PivotTable report is called a PivotTable list.) When you publish interactively with PivotTable functionality, users can filter the data in the resulting PivotTable list, analyze the data by getting different views of it, and refresh external data in the browser.

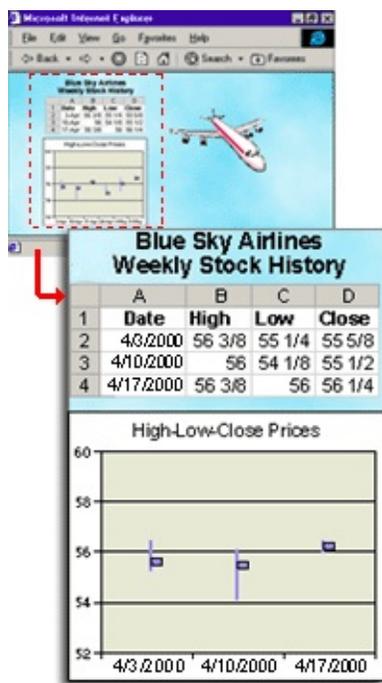
**Source data for PivotTable lists** You can create an interactive PivotTable list from an existing PivotTable report or from other Excel data. If you use other Excel data and select **PivotTable functionality** in the **Publish** dialog box, Excel creates a PivotTable list on the Web page for you.

If you want users to be able to update an external data range on your Web page, you must specify PivotTable functionality to publish the external data range to a PivotTable list. The data is updated automatically from the source database when users open your Web page in the browser or when users click **Refresh** in the PivotTable list.

**Limitations to consider** You might lose some formatting and features when you save with interactive functionality.

[Put several items on a Web page](#)

Most Web pages that you create will contain more than one item. For example, you might have a Web page that contains your logo, text, a [PivotTable list](#), a list of noninteractive data, and a chart. The advantage of putting several items on a single page is that users need to look on only one Web page for all of the information they need.



You can make parts of your Web page interactive and other parts noninteractive.

You can use features from several Microsoft Office programs to create one Web page. For example, you can save data as a Web page in Excel and then use Microsoft Access to add grouped data page controls or scripting. Then, you can open the Web page in Microsoft FrontPage and add themes to make your Web page look consistent with other pages in your site.

You can use any combination of interactive and noninteractive data, and data from any Office program. For example, you can use Access to get employee names, titles, and salaries from an employee database. Then, you can analyze the Access data in Excel. In Excel, you can add formulas that calculate the average

salary per job title and create a chart. Save the analysis as an interactive spreadsheet or PivotTable list on a Web page. Then, use FrontPage to add a company logo and description of the data on the page.

[Show All](#)

# About supporting Web files and hyperlinks

Web pages often contain images and other supporting files as well as links to other Web pages. When supporting files or pages are moved, the Web page that refers to them may no longer work properly. Following are the ways that Microsoft Excel helps you to manage supporting files and [hyperlinks](#).

## [Supporting files](#)

When you publish an Excel workbook or worksheet as a Web page, Excel creates a supporting folder named "*filename\_ files*" where it saves all the page's supporting files— such as bullets, background textures, and graphics. For example, if your file is named Page1.htm, Excel creates a subfolder named "Page1\_ files." Excel also assigns names such as image001.jpg and image002.gif to the supporting files.

When you delete elements that were saved as [relative links](#), Excel automatically deletes the corresponding supporting files from the supporting folder.

If you move or copy your Web page to another location, you must also move the supporting folder so that you maintain all links to your Web page. When you republish to another location, Excel automatically copies the supporting folder for you.

For example, suppose you have a Web page:  
http://example.microsoft.com/Page1.htm. It includes bullets, which are stored in a supporting folder: http://example.microsoft.com/Page1\_ files. The relative paths for the bullet files are /Page1\_ files/image001.gif and /Page1\_ files/image002.gif. If you move Page1.htm to a new location, such as http://example.microsoft.com/, you must also move the supporting files folder (Page1\_ files) to http://example.microsoft.com/.

By default, the name of the supporting folder is the name of the Web page plus an underscore ( \_ ) or a hyphen ( - ), and the word "files." The word "files" will appear in the language of the version of Excel used to save the file as a Web

page. For example, suppose you use the Dutch language version of Excel to save a file called Page1 as a Web page. The default name of the supporting folder would be Page1\_ bestanden.

## [Relative and absolute hyperlinks](#)

When you create Web pages, Microsoft Excel automatically manages the related files and hyperlinks so that the images appear and the links work when the pages are placed on the final [Web server](#).

When all the files— such as bullets, navigational buttons, background textures, graphics, and Web pages you create hyperlinks to— are placed on, or published to, the same Web server, Excel maintains the links as [relative links](#).

Hyperlinks to Web sites on other servers— for example, a list of your favorite places on the Web— are maintained as absolute links— that is, [fixed file locations](#).

When you save your Web pages to a different location, links that can't be converted to relative links remain as absolute links.

[Show All](#)

# Change and save data on a Web page

[Make and save changes using Microsoft Excel](#)

[Noninteractive data](#)

When you save an entire workbook without interactivity, you can open the Web page that Excel creates (an [HTML](#) version of the file with an .htm extension), modify the data, and save the file in Excel.

1. In Excel, open the Web page (.htm file) that you saved as an entire workbook without interactivity.
2. Make changes.
3. Click **Save** on the **File** menu.

**Note** You can also open and modify parts of a workbook that you save without interactivity— such as a range, sheet, or chart. However, fewer Excel features are maintained in the file, and you may not be able to modify them as you could originally. For instance, when you save a chart as a noninteractive Web page, the chart becomes a separate image and can no longer be modified on the page. However, when you save an entire workbook without interactivity that has a chart in it, the actual chart is saved rather than just an image, and it can be modified when you reopen the file.

[Interactive data](#)

When you save Excel data with interactivity, you should not open the Web page that Excel creates (an [HTML](#) version of the file with an .htm extension) in Excel. Instead, you should modify the original workbook (.xls) file from which you published, make changes, and republish to a Web page.

1. In Excel, open the workbook (.xls) from which you originally published the Web page.

2. Make changes.
3. Click **Save as Web page** on the **File** menu.
4. Click **Publish**.
5. To republish a worksheet or item that you have already published, select **Previously published items** and then select the worksheet or item you want to republish. To prevent an item from being republished, select the item and click **Remove**. To continue publishing, click another item in the list.
6. Click **Publish**.

#### [Tips](#)

- Check the **AutoRepublish every time this workbook is saved** box (**Publish** dialog box) to specify that previously published items should be automatically republished every time the original workbook is saved.
- If you do not have access to the original workbook, you can export interactive spreadsheets and [PivotTable lists](#) to Excel by using the control's **Export to Microsoft Excel**  [toolbar](#) button in the [Web browser](#) or use Microsoft FrontPage 2002 or [data access page Design view](#) in Microsoft Access 2002 to change the Web page.

#### [Make and save changes using a design program](#)

When you want to make changes to any Web page you've saved or published in Excel (with the exception of a noninteractive entire workbook) and you don't want to modify the original workbook and republish in Excel, you can open the Web page and make the changes to it in another design program such as Microsoft Office FrontPage 2003, [data access page Design view](#) in Microsoft Office Access 2003, or [Microsoft Visual Basic](#).

1. Open your Web page by using a [Web browser](#).
2. If an arrow appears next to the **Edit** button, click it and select the design program you want to use. If not, click the **Edit** button.
3. Make changes and save your work. For information on saving in the application you're using, see **Help** for that application.

**Note** If your browser doesn't have an **Edit** button, or if clicking the **Edit** button opens a program other than the one you want, you can open the Web page directly in the program you want to modify it with, such as FrontPage.

[Show All](#)

# Guidelines and limitations for saving or publishing Web pages

## [Requirements for viewing Microsoft Excel data on the Web](#)

**Requirements for viewing interactive data** Your users must have the following installed on their computers to work with interactive Excel data on a Web page:

- Microsoft Office Web Components and an appropriate Office 2003 license
- Microsoft Internet Explorer version 4.01 or later

**Requirements for viewing noninteractive data** Your users must have the following installed on their computers to view noninteractive data on a Web page:

- Internet Explorer 4.01 or later

## [Limitations of putting data on a Web page](#)

## [Limitations of putting interactive data on a Web page](#)

Depending on the type of Excel data you are saving as a Web page and how that data is formatted, some features and formatting might work and appear differently when data is saved or published as a Web page.

This topic provides information about the limitations of publishing or saving data when you select the following options for the **Add interactivity with** setting:

## [Spreadsheet functionality](#)

Feature	Result on a Web page
Shared workbook	Not retained.

information	
Pattern fills	Not retained.
Graphics	Not retained.
Drawing object layers	Not retained.
Multiple fonts in a single cell	Not retained. The font of the first character in the cell is used.
Conditional formatting	Current cell formatting is retained. Formatting is no longer conditional.
Outlining	Collapsed rows are published as hidden. Expanded rows are published normally.
Password protection	Data in password-protected worksheets and workbooks cannot be saved or published as a Web page. To publish data that's protected, you must use a blank (or no) password.
Cell comments	Not retained.
Data validation restrictions and messages	Not retained.
Precision as displayed	Not supported. Precision as displayed value is published.
Distributed alignment	Not retained.
Thai alignment	Not retained.
Auditing tracer arrows	Not retained.
Indented text	Not retained.
Printing and page setup features	Not retained.
Labels in formulas	Converted to cell references.
Rotated or vertical text	Converted to horizontal text.
References to data on other worksheets	References are converted to values when you publish an individual sheet or range of cells. References are retained when you publish an entire workbook.

1904 date system	The displayed dates remain the same, but the serial numbers for the dates are converted to the 1900 date system.
R1C1 reference style	Converted to A1 reference style.
Lotus compatibility	R1C1 reference style is converted to A1 reference style.
External data ranges	Converted to values. Ability to refresh from the source data is not retained.
Web queries	Converted to values. Ability to refresh from the source data is not retained.
Subtotals	Numbers and calculations appear correctly. Group and outline features are not retained.
Chart sheets, Macro sheets, Dialog sheets	Not retained.

 [PivotTable functionality](#)

<b>Feature</b>	<b>Result on a Web page</b>
Calculated fields	Formulas are not retained. Changed to total fields that use the default summary function for the field (Sum, Count, Min, or Max).
Calculated items	Not retained.
Custom calculations	Not retained.
Character and cell formatting	Most formatting is retained, except for changes in formatting to field text.
	Partially retained. Number formats that you apply to PivotTable fields in Excel are retained, but number formats that you apply to individual cells are not retained.
Number formats	If you use a custom number format or a number format that's not supported by PivotTable lists on the Web, the numbers appear with the same number format as the Excel <a href="#">PivotTable report</a> . If you subsequently change the number format for the field in the

PivotTable list, you cannot return the field to the custom number format.

Asterisks that mark totals for OLAP data	Even if you turned off the asterisks marking totals in Excel, the asterisks are displayed in the PivotTable list on the Web.
Print settings	Not retained. The Excel settings to repeat PivotTable row and column labels on each page, repeat items labels after page breaks, and set page breaks between sections are lost.
Grouped items in fields	Partially retained. Grouped items in data fields are retained, but any selected items that are grouped in Excel are no longer grouped in the PivotTable list on the Web.
Custom sort order	Not retained. Instead, the data is in the order in which it is retrieved from the source database.
Indented formats	Not retained. Fields are in the same positions, but the character and cell formatting are not retained. Blank rows between item groups are lost.
Subtotals displayed at the top of item groups	Not retained.
Customized error values and empty cell values	Not retained. Errors and empty cells are displayed as blank cells.
Page fields in rows or columns	Not retained. Page fields become filter fields, which are always displayed across the top.
Password settings	Data in password-protected worksheets and workbooks cannot be saved or published as a Web page. To publish data that's protected, you must use a blank (or no) password. If you save your database password with the query in Excel, users must enter the password when they open the Web page in the browser.
Background refresh, retrieving data for each item	Not retained. The PivotTable list on the Web is always refreshed in the foreground, and all data for filter fields is retrieved in one operation.

in a page field  
individually

Changes to Excel source data Not available. To redefine the range of Excel source data or change the query to select different external data, you must make the change in Excel and republish.

[Offline cube file](#) data sources

You cannot reconnect to the original server database from the published PivotTable list, or make changes to the content of the offline cube file from the PivotTable list. If you need to perform either of these operations, you can do so in Excel and then republish to the PivotTable list.

### [Chart functionality](#)

You must save or publish charts separately from other data in your workbook for the charts to appear correctly on your Web page. When you save a chart with interactive functionality, some features do not appear as they do in Excel.

<b>Feature</b>	<b>Result on a Web page</b>
Surface chart type	Not retained; returns error when Web page is opened in browser.
Auto scale fonts	Changed to default font size.
Drawing objects, text boxes, and pictures on the chart	Not retained.
Semitransparent fills	Not retained.
Custom positioning and sizing of chart items	Changed to the default position and size.
Multicolumn legend layout	Changed to the default legend layout.
Series lines	Not retained.
Shadows	Not retained.
Error bars that are calculated by using the standard error	Not retained.
Error bars that are	

calculated by using standard deviation	Not retained.
Password protection	Data in password-protected worksheets and workbooks cannot be saved or published as a Web page. To publish data that's protected, you must use a blank (or no) password.
Plot visible cells only	All data is plotted, including data in hidden cells.
Positioning of category axis labels on line charts between categories (points) by default	Centered on data points.
Trendlines	Trendlines are plotted through data points and to the borders of the plot area, giving a slightly different appearance than in Excel, where trendlines are plotted through data points but not to the borders of the plot area.

### **Chart features that cannot be added or modified in another design program**

The following Excel chart features are retained when you publish an interactive chart. However, when you open the Web page in another design program, such as Microsoft FrontPage 2000 or [data access page Design view](#) in Microsoft Access, these features cannot be added or modified. If you modify the feature or the series to which the feature is applied, the feature is no longer retained:

- The ability to vary colors by point, which is usually applied to single-series charts. When you apply the **Vary colors by point** option, each data marker in one series is a different color, rather than the standard single color for each data marker in a series.
- Some combination charts, such as a column chart that's combined with a pie chart.

#### [Limitations of putting noninteractive data on a Web page](#)

When you save or publish Excel data on a Web page without interactivity the data is saved like a static snapshot. Users can view the data and formatting on

the Web page, but cannot interact with the data.

You can change the data you have saved or published noninteractively by modifying the original workbook from which you published, and then republishing the data. To republish data automatically every time you save the original workbook, you can take advantage of the **AutoRepublish** feature (check the **AutoRepublish every time this workbook is saved** box in the **Publish** dialog box).

You can also open, modify and save the noninteractive HTML file in Excel. In this case many, but still not all, of the workbook features are retained.

[Features that are not retained when you save a entire workbook as a Web page without interactivity and then reopen it in Excel](#)

The following features are not retained when you save an entire workbook as a Web page and then reopen the Web page in Excel.

<b>Feature</b>	<b>Result</b>
Custom views	Any custom views you defined are not retained.
Data consolidation	References are not retained.
Labels in formulas	Converted to cell references.
Scenarios	Any scenarios you created are not retained.
Shared workbook information	Not retained.
Function categories	Any categories you defined are not retained.

[Show All](#)

# Preview a Web page

To get the most accurate view of what your page will look like when it is published, you should publish the page to a local location and view it in the [Web browser](#).

1. In the **Publish** dialog box, click **Browse** next to **File name** under **Publish as**, and choose a local disk folder as the location to which to publish.
2. Select the **Open published Web page in browser** check box.
3. Click **Publish**.

Your published page is saved to the local drive you specified, and the page appears in your Web browser for you to preview.

4. Make changes to the original workbook from which you published, and when you're satisfied with the results, change the location to which you save the Web page from your local disk folder to the public location, and republish.

**Note** When you're saving an entire workbook as a noninteractive Web page, you can preview the page without publishing it by clicking **Web Page Preview** on the **File** menu.

[Show All](#)

# Put Excel data on a Web page

1. Open or select the workbook that contains the items you want to publish.
2. On the **File** menu, click **Save as Web Page**.

If you have already selected the item you want to publish, or want to publish an entire workbook without interactivity, you can select the options you want in the **Save as Web Page** dialog box, click **Save**, and you're done. Otherwise, continue with the steps listed below.

3. Click **Publish**.
4. Under **Item to publish**, click what you want to publish in the **Choose** box.

[Choosing items to publish](#)

To select the worksheet or item that you want to publish, select one item from the **Choose** list. You can publish only one item at a time. To publish another item, select the new item and repeat the publishing procedure. The following list outlines what you can publish and how to publish it.

- **Entire workbooks** Select **Entire workbook**. You can publish an entire workbook with interactivity in the **Publish** dialog box, but not without interactivity.
- **Entire worksheets** Select **Items on Sheetname**, and then select **All contents of Sheetname**.
- **Items** Select **Items on Sheetname**, and then select the item you want to publish, such as a [PivotTable report](#) or a chart. Items do not include ranges of cells.
- **Ranges of cells** Select **Range of cells** and then, if the selection box does not contain the range you want, click the worksheet (the dialog box will collapse to a selection box), select a range of cells from the Microsoft Excel workbook, and then click **Expand Dialog** .
- **Charts** Select **Items on Sheetname**, and then select **Chart x**.
- **Filtered ranges** Select **Items on Sheetname**, and then select the **AutoFilter** item you want to publish.
- **External data ranges** Select **Items on Sheetname**, and then select

the **Query** item you want to publish.

- **Republishing** To republish a worksheet or item that you have already published, select **Previously published items** and then select the worksheet or item you want to republish. To prevent an item from being republished, select the item and click **Remove**. To continue publishing, click another item in the list.

5. Under **Viewing options**, select or clear the **Add interactivity with** check box, and if necessary, click the type of functionality you want.

[Publishing with or without interactivity](#)

[Publishing without interactivity](#)

If you want users to view the data you publish but not work with it in the browser, you can publish it as noninteractive data. You can open, edit and save noninteractive Web pages in Microsoft Excel, but you cannot make any changes to the data in the browser.

- Be sure the **Add interactivity with** check box under **Viewing options** is cleared.
- For a filtered range, Web page viewers can see only the data that was not filtered when you published the range. However, all data in the range is published to the Web page. Filtered (hidden) data can be viewed by viewing the [HTML](#) source code for the page.
- You cannot publish an entire workbook without interactivity in the **Publish** dialog box. Instead, click **Save As Web Page** on the **File** menu, and instead of clicking **Publish**, select **Entire Workbook** in the **Save as Web Page** dialog box and make sure the **Add interactivity** box is cleared.

[Publishing with interactivity](#)

To enable people to work with the data on your Web page in a browser, you can make your data interactive. For example, you can publish an interactive spreadsheet that calculates loan information. A user who browses to the page can enter financial information such as loan amount and interest rate to calculate a monthly payment.

- Select the **Add interactivity with** check box and select the type of

interactivity you want from the list. The type of interactivity that's available depends on what you are publishing. For example:

- For a worksheet that contains formulas, select **Spreadsheet functionality** so that users of your Web page can enter new values in a cell and the formulas will automatically calculate the results.
- For a [PivotTable report](#), select **PivotTable functionality** so that users of your Web page can change the layout of rows and columns to see different summaries of the source data.
- For an [external data range](#), select **PivotTable functionality** so that Web page viewers can update the data from its source.
- For a filtered range, select **Spreadsheet functionality**.
- For a chart or [PivotChart report](#), select **Chart functionality**. If you try to publish all contents of a worksheet that contains a chart with interactive functionality, the chart is not included on the Web page. To put an interactive chart on a Web page, you must publish the chart separately.

## Notes

- Browser users must have Microsoft Internet Explorer 4.1 or later and an appropriate Microsoft Office license to work with spreadsheets, charts, or [PivotTable lists](#) published interactively from Microsoft Excel.
  - You cannot open and modify interactive Web pages in Excel, so it's a good idea to save a copy of the original workbook from which you publish in case you want to make changes in Excel and republish.
6. To add a title over the published selection, click **Change** under **Publish as**. Type the title you want, and then click **OK**.
  7. Next to the **File name** box, click **Browse**, and locate the drive, folder, [Web folder](#), [Web server](#), or [FTP](#) location where you want to save or publish your Web page. You can also choose an existing Web page to append to or replace as long as you have permission to modify the Web page and have access to the [HTML](#) file.
  8. To view the Web page in your browser after you publish it, select the **Open published Web page in browser** check box.
  9. If you expect to make changes in the workbook later and want to automatically republish the items each time the workbook is saved, select

the **AutoRepublish every time this workbook is saved** check box.

10. Click **Publish**.

If you are publishing to an existing Web page, click **Replace file** to copy over the existing page, or **Add to file** to append your data to the end of the Web page.

[Show All](#)

# Set an alternative text description for a picture or shape on a Web page

When you save your work as a Web page, the alternative text description is used by the Web [browser](#) if pictures or shapes are slow to load or if they are missing.

1. Click the [picture](#) or [shape](#).
2. On the **Format** menu, click **AutoShape** or **Picture** and then click the **Web** tab.
3. In the **Alternative text** box, type the text you want. The text can be up to 256 characters, but some Web browsers might be able to display only a limited number of the characters.

**Note** By default, the text you enter in a WordArt object or the text you add to a shape is used as the alternative text description unless you specify text on the Web tab.

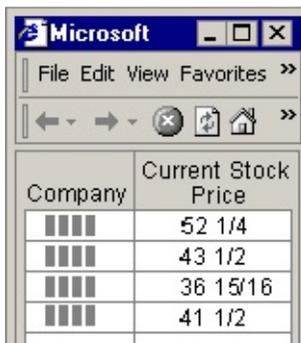
[Show All](#)

# About getting data from a Web page

Web pages often contain information that is perfect for analysis in Microsoft Excel. For example, you can analyze stock quotes in Excel using information that comes directly from a Web page. Depending on your needs, you can retrieve data that is refreshable (that is, you can update the data in Excel with the latest data on the Web page) or you can get data from a Web page and keep it static on the worksheet.

[Use a Web query to get data that's refreshable](#)

With a [Web query](#), you can retrieve data such as a single table, multiple tables, or all of the text on a Web page and analyze it by using the tools and features in Excel. With the click of a button, you can easily refresh the data with the latest information from the Web page. For example, you can retrieve and update stock quotes from a public Web page, or a table of sales information from a company Web page.



The screenshot shows a Microsoft Internet Explorer browser window. The title bar reads "Microsoft". The menu bar includes "File", "Edit", "View", and "Favorites". The address bar is empty. The main content area displays a table with two columns: "Company" and "Current Stock Price". The table contains four rows of data, each with a small bar chart icon to the left of the price.

Company	Current Stock Price
■■■■	52 1/4
■■■■	43 1/2
■■■■	36 15/16
■■■■	41 1/2

A Web query can retrieve the data on a Web page and return it to Excel for analysis.

[Copy and paste static data or a refreshable query](#)

You can use familiar copy and paste commands to bring the data from a Web page into an Excel worksheet. When you paste Web page data into Excel, you can keep the data static or make it refreshable by clicking **Paste Options**  and clicking **Create Refreshable Web Query**.

## [Export data from Microsoft Office Web Components](#)

From the browser, you can export data from interactive spreadsheets and [PivotTable lists](#) by using the **Export to Excel** toolbar button. For more information, see [Microsoft Office Web Component](#) Help for PivotTable lists or spreadsheets.

## [Open an HTML, MHTML or XML file](#)

You can open any [HTML](#) file, [MHTML](#) file, or well-formed [XML](#) file in Excel by using the **Open** command on the **File** menu.

When you open an HTML or MHTML file, you get the entire Web page, but you might lose some formatting, scripts, .gif image files (HTML only), or lists of data in a single cell.

When you open an XML file, you have the option of applying one or more referenced [stylesheets](#).

[Show All](#)

# About XML and Excel

**Note** XML features, except for saving files in the XML Spreadsheet format, are available only in Microsoft Office Professional Edition 2003 and Microsoft Office Excel 2003.

## Why XML?

[Extensible Markup Language \(XML\)](#) is a method for putting structured data (such as that in a worksheet) in a text file that follows standard guidelines and can be read by a variety of applications. Designers can create their own customized tags, enabling the definition, transmission, validation, and interpretation of data between applications and between organizations.

XML enables you to organize and work with workbooks and data in ways that were previously impossible or very difficult. By using custom XML schemas, you can now identify and extract specific pieces of business data from ordinary business documents.

For example, an invoice that contains the name and address of a customer or a report that contains last quarter's financial results are no longer static reports. The information they contain can be passed to a database or reused elsewhere, outside of the workbook.

## Excel and XML

**Use a custom XML Schema** You can create or open a workbook in Excel then attach a custom XML schema to the workbook. Then, you use the **XML Source** to map cells to elements of the schema. Once you have mapped the XML elements to your worksheet, you can seamlessly import and export XML data into and out of the mapped cells.

A few of the scenarios that the Microsoft Office Excel 2003 XML feature set is designed to address are:

- Open XML data files into a new workbook.
- Extend the functionality of existing templates by mapping XML elements onto existing fields. This makes it easier to get data into and out of your templates without having to redesign them from the ground up.
- Use XML data as input for your existing calculation models by mapping XML elements onto existing spreadsheet calculation models.
- Map custom XML schemas to data already in your workbooks.
- Incorporate XML data returned from a Web service into your Excel worksheet.

**Use the XML Spreadsheet schema** You can create a Workbook in Excel as you normally would and then save it as in the XML Spreadsheet format. Excel uses its own XML schema, XMLSS, to apply XML tags that store information, such as file properties, and define the structure of the workbook.

[Show All](#)

# Change a Web query

You can change the address of the Web page you're querying, change the selection of data returned from the Web page, and change formatting and other settings for your [Web query](#) in the **Edit Web Query** dialog box. You can change how the query is refreshed and other properties of the data range returned by your query in the **External Data Range Properties** dialog box.

## [Change address, selection of data, or formatting](#)

1. Click a cell in the region of the worksheet where your query data was returned (also known as an [external data range](#)).

If you're not sure which region of the worksheet contains your query data, but you know the name of the query, click the [Name box](#) and select your query name from the list.

2. Click **Edit Query**  on the **External Data toolbar**.
3. Do one or more of the following:

## [Change the address for the Web page you want to query](#)

Select or type a new [URL](#) in the **Address** box.

## [Change the selection of data returned from the Web page](#)

Click  to cancel the selection of a selected table or click  to select a table.

If there are no  next to tables on the page, click **Show Icons**  at the top of the dialog box to display them.

## [Change import and formatting settings](#)

1. Click **Options**.

2. Do one of the following:

Under **Formatting**, click one of the following:

- **None** Returns none of the formatting on the Web page you are querying, only text. Formatting that exists on the worksheet is applied.
- **Rich text formatting only** Returns the type of formatting that Microsoft Excel can reproduce most closely, such as font styles. Does not include [HTML](#) formatting, such as [hyperlink](#) formatting.
- **Full HTML formatting** Returns all HTML formatting that Excel supports, such as hyperlink formatting. This option clears the **Preserve cell formatting** check box in the **External Data Range Properties** dialog box.

Under **Import settings for preformatted <PRE> blocks**, select one or more of the following:

- **Import <PRE> blocks into columns** Blocks of data surrounded by <PRE> tags will be imported into separate columns on the worksheet. Clear this box to return data into a single column.
- **Treat consecutive delimiters as one** If you have characters that define, or delimit, the text for each column in your <PRE> sections (such as commas), you can specify that when Excel encounters more than one of these delimiters together, they will be treated as one so that a blank column is not placed between each consecutive delimiter. This check box is available only when you select the **Import <PRE> blocks into columns** check box.
- **Use the same import settings for the entire section** Select to use your setting for **Treat consecutive delimiters as one** for all preformatted sections on the Web page. Clear this check box to use your setting for the first preformatted section only or if you want Excel to determine the best settings. This check box is available only when you select the **Import <PRE> blocks into**

**columns** check box.

Under **Other Import settings**, select one or more of the following:

- **Disable date recognition** Ensures that numbers on a Web page that appear similar to dates appear as numbers on the worksheet. For example, a sports standing score of 03-07 is recognized by Excel as the date March 7 unless this option is selected.
  - **Disable Web query redirections** Ensures that the Web query is not redirected to a different data source than what you see on the Web page you're querying. Select this check box for compatibility with queries created in previous versions of Excel.
4. When you're done making changes in the **Edit Web Query** dialog box, click **Import**.

[Change refresh options and other properties](#)

1. Click a cell in the region of the worksheet where your query data was returned (also known as an [external data range](#)).
2. Click **Data Range Properties**  on the **External Data** [toolbar](#).
3. Under **Query definition**, make sure the **Save query definition** box is selected to allow future refreshes of the data and to have other options in the dialog box available. To prevent further refreshes of the data, clear the box.

The **Save password** option is not applicable to Web queries, so appears disabled.

4. Under **Refresh control**, select one or more of the following:
- **Enable background refresh** Runs the query in the background so that you can continue to work in Microsoft Excel while the data is refreshing.
  - **Refresh every x minutes** Allows you to set specific intervals of time in minutes at which Excel automatically refreshes the data.

- **Refresh data on file open** Automatically refreshes the data each time the file is opened.
- **Remove external data from worksheet before saving** Removes the external data, but not the query, from your worksheet before you save. The **Refresh data on file open** box must be selected for this option to be available.

5. Under **Data formatting and layout**, select one or more of the following:

- **Adjust column width** Automatically adjusts column widths to fit refreshed data.
- **Preserve cell formatting** When the data is refreshed, cell formatting changes you made in Excel are preserved. This option is automatically cleared, however, when you select **Full HTML Formatting** in the **Options** dialog box (**Edit Query** dialog box).
- **If the number of rows in the data range changes upon refresh** Specifies how to handle a smaller or larger data set returned to Excel when data is refreshed. You cannot select or clear this option; rather you must select one of three options in the dialog box.
- **Fill down formulas in columns adjacent to data** Copies formulas in columns to the right of the external data range to new rows of data added when the data is refreshed.

**Note** **Include field names**, **Include row numbers**, and **Preserve column sort/filter/layout** are not applicable to Web queries, and are disabled in the dialog box.

[Show All](#)

# Copy data from a Web page

This procedure requires Microsoft Internet Explorer 4.1 or later.

1. In your [Web browser](#), select the data you want to copy.
2. On the **Edit** menu, click **Copy**. If your browser doesn't have this command, see your browser's Help for information on copying.
3. Switch to Microsoft Excel.
4. Click in the upper-left corner of the worksheet area where you want the copied data to appear.
5. On the **Edit** menu, click **Paste**.
6. If the data does not appear as you expect, click **Paste Options**  and select one of the following options:
  - **Keep Source Formatting** Makes no changes.
  - **Match Destination Formatting** Matches the existing cell formatting.
  - **Create Refreshable Web Query** Gives you the opportunity to create a query to the Web page you copied from. This gives you the opportunity to refresh the data should the Web page change later.

[Show All](#)

# Make a Web page redirect queries

If you are a Web page author, you can increase the reliability of the data users retrieve from your page by having [Web queries](#) from Microsoft Excel redirected to a data source such as [XML](#).

1. Include the Microsoft Office namespace declaration in the opening [HTML](#) tag of your Web page:

```
<HTML xmlns:o="urn:schemas-microsoft-com:office:office">
```

2. In the body of your page, add the following attribute to opening TABLE tags:

```
<TABLE ... o:WebQuerySourceHRef="http://...>
```

where the value is a [URL](#) (relative or absolute) to which you want to redirect your Web query.

**Note** Users can bypass redirection on Web pages by checking **Disable Web query redirections** in the **Web Query Options** dialog box (**New Web Query** dialog box).

[Show All](#)

# Query for data from a Web page

You can create or run a [Web query](#) to retrieve text or data on a Web page. Web queries are especially useful for retrieving data that is in tables or preformatted areas (tables are defined with the [HTML](#) <TABLE> tag; preformatted areas are often defined with the HTML <PRE> tag). The retrieved data does not include pictures, such as .gif images, and does not include the contents of scripts.

**Note** If you retrieve data from a Web site, it is your responsibility to make sure you use the data in compliance with any applicable terms and conditions governing the use of the data by the owner and/or operator of such web site.

[Create a new Web query](#)

1. Do one of the following:

[Start in Microsoft Excel](#)

1. On the **Data** menu, point to **Import External Data**, and then click **New Web Query**.
2. In the **New Web Query** dialog box enter the [URL](#) for the Web page from which you want to get data. You can type the URL, paste it from a copied address, or click the arrow next to the **Address** list and select a recently used address.
3. Click **Go**.

[Start in the browser](#)

1. In your browser, browse to the Web page from which you want to query data.
2. Click the arrow next to the **Edit with...** button (which may appear as one of several application icons, depending on how the page was created) and click **Edit with Microsoft Excel**.

2. Click  next to the tables you want to import or click  in the upper left corner of the page to import the entire page.

If there are no  next to tables on the page, click **Show Icons**  at the top of the dialog box to display them.

3. Web queries are automatically saved with your workbook. If you want to save the query so that it can be run in other workbooks, click **Save Query** . The query is saved in a text file with an .iqy extension.
4. To set formatting and import options for how data is returned, click **Options** and select the options you want in the **Web Query Options** dialog box.
5. Click **Import**.

In the **Import Data** dialog box, do one of the following:

- To return the data from the Web page to the selected worksheet, click **Existing worksheet**. On your worksheet, click the cell where you want to place the upper-left corner of the [external data range](#), and then click **OK**.
- To return the data to a new worksheet, click **New worksheet**, and then click **OK**. Excel adds a new worksheet to your workbook and automatically starts the external data range in the upper-left corner of the new worksheet.

After you click **OK**, a spinning refresh icon  appears in the [status bar](#) to indicate that the query is running. To check the status of the query, double-click the refresh icon.

 [Run a saved query](#)

Web queries are saved in text files with .iqy extensions. Several Web query files that retrieve data such as stock quotes and currency come with Microsoft Excel.

1. On the **Data** menu, point to **Import External Data**, and then click **Import Data**.
2. Locate the folder where your query file is stored in the **Look in** box.
3. Select the Web query you want to run.
4. Click **Open**.

In the **Import Data** dialog box, do one of the following:

To return the data from the Web page to the selected worksheet, click **Existing worksheet**. On your worksheet, click the cell where you want to place the upper-left corner of the [external data range](#), and then click **OK**.

To return the data to a new worksheet, click **New worksheet**, and then click **OK**. Excel adds a new worksheet to your workbook and automatically starts the external data range in the upper-left corner of the new worksheet.

5. If prompted, enter parameters for the query. If you don't know what the valid parameters are, ask the person who created the query.

Excel runs the query. A spinning refresh icon  appears in the [status bar](#) to indicate that the query is running. To check the status of the query, double-click the refresh icon.

[Show All](#)

# Refresh a Web query

1. Click a cell in the region of the worksheet where your query data was returned (also known as an [external data range](#)).
2. Click **Refresh Data**  on the **External Data** [toolbar](#).

A spinning refresh icon  appears in the [status bar](#) to indicate that the query is running. Double-click the icon to check the status of the query.

## [Tips](#)

- You can have your data refresh automatically when the file is opened, at timed intervals, or in the background by clicking **Data Range Properties**  on the **External Data** toolbar and selecting or clearing options under **Refresh control**.
- If the data returned to your worksheet after a refresh isn't what you expected, check the Web page you are querying to make sure it is in the same location and that the data on it is provided in the same way as when you created the query.

[Show All](#)

# Save a Web query for use in other workbooks

[Web queries](#) are automatically saved for use in the current workbook. Saving a query in an .iqy file allows you to use it in a different workbook or share it with other users.

1. Point to **Import External Data** on the **Data** menu and click **New Web Query** for a new query or click **Edit Query**  on the **External Data toolbar** for an existing query.

If you're creating a new query, navigate to the page you want in the **Address** box, and click  next to the tables you want to select. If there are no  next to tables on the page, click **Show Icons**  at the top of the dialog box to display them.

2. Click **Save Query** .
3. Locate the folder in which you want to save the query in the **Save in** box.
4. Enter a file name in the **File name** box.
5. Click **Save**.

To run this query in other workbooks, click **Import External Data** on the **Data** menu, then click **Import Data**. Locate and open the .iqy file.

[Show All](#)

# About using Microsoft Query to retrieve external data

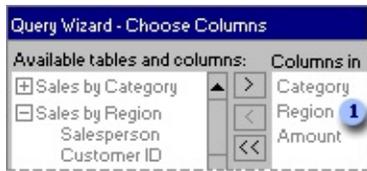
## What is Microsoft Query?

Microsoft Query is a program for bringing data from external sources into other Microsoft Office programs— in particular, Microsoft Excel. By using Query to retrieve data from your corporate [databases](#) and files, you don't have to retype the data you want to analyze in Excel. You can also update your Excel reports and summaries automatically from the original source database whenever the database is updated with new information.

**Types of databases you can access** You can retrieve data from several types of databases, including Microsoft Access, Microsoft SQL Server, and Microsoft SQL Server OLAP Services. You can also retrieve data from Excel lists and from text files.

In Excel, you can also retrieve data from Web pages, but you don't need Query to do this. For information about retrieving data from Web pages, see Excel Help.

**Selecting data from a database** You retrieve data from a database by creating a query, which is a question you ask about data stored in an external database. For example, if your data is stored in an Access database, you might want to know the sales figures for a specific product by region. You can retrieve a part of the data by selecting only the data for the product and region you want to analyze and omitting the data you don't need.



1	Category	Region	Amount
2	Beverages		
11		East Total	\$35,233
22		North Total	\$51,832
30		South Total	\$30,172
38		West Total	\$40,392
39	Dairy		
47		East Total	\$39,444
59		North Total	\$63,418
65		South Total	\$27,889
75		West Total	\$44,110
76			
77			\$332,490

- 1 Columns selected in Query Wizard
- 2 Selected columns brought into Excel

**Updating your worksheet in one operation** After you have external data in an Excel workbook, whenever your database changes, you can [refresh](#) the data to update your analysis— without having to recreate your summary reports and charts. For example, you can create a monthly sales summary and refresh it every month when the new sales figures come in.

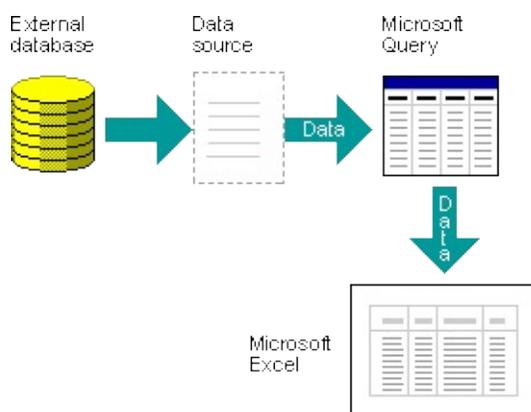
**Using Query to retrieve data** Bringing external data into Excel with Query takes three steps: First you set up a data source to connect to your database, then you use the Query Wizard to select the data you want, and finally you return the data to Excel where you can format it, summarize it, and create reports from it.

### [Setting up data sources](#)

**What is a data source?** A [data source](#) is a stored set of information that allows Microsoft Excel and Microsoft Query to connect to an external database. When you use Query to set up a data source, you give the data source a name, and then supply the name and location of the database or server, the type of database, and your logon and password information. The information also includes the name of an [ODBC driver](#) or a [data source driver](#), which is a program that makes

connections to a specific type of database. For some types of external databases ([OLAP](#) cubes), all you need to do to retrieve the data is to set up a data source.

**How Query uses data sources** After you set up a data source for a particular database, you can use it whenever you want to create a query to select and retrieve data from that database— without having to retype all of the connection information. Query uses the data source to connect to the external database and show you what data is available. After you create your query and return the data to Excel, Query retrieves the data and provides the Excel workbook with both the query and data source information so you can reconnect to the database when you want to refresh the data.



A data source is the means through which Query and Excel connect to a specific database and retrieve data.

## [Defining your query](#)

**Use the Query Wizard for most queries** The Query Wizard, which is part of Microsoft Query, is designed for users who are new to creating queries. The wizard makes it easy to select and bring together data from different tables and fields in your database. After you select the data, you can also use the wizard to filter and sort the results of your query. You can use the Query Wizard either to create a complete query or to start a query that you make further changes to directly in Query.

**Work directly in Query for other types of queries** If you are familiar with creating queries or you want to create a more complex query, you can work directly in Query. You can use Query to view and change queries you start creating in the Query Wizard, or you can create new queries without using the

wizard.

Use Query directly when you want to create queries that do the following:

- **Select specific data from a field** In a large database, you might want to choose some of the data in a field and omit data you don't need. For example, if you need data for two of the products in a field that has information for many products, you can use [criteria](#) to select data for only the two products you want.
- **Retrieve data based on different criteria each time you run the query** If you need to create the same Excel report or summary for several areas in the same external data— such as a separate sales report for each region — you can create a type of query called a [parameter query](#). When you run a parameter query, you are prompted for the data to use as the criteria when the query selects records. For example, a parameter query might prompt you to enter a specific region, and you could reuse this query to create each of your regional sales reports.
- **Combine data in different ways** You can use Query to combine, or join, the data from different tables in your database. For example, if you have a table of product sales information and a table of customer information, you might join these tables in ways that show which customers have not made purchases recently.

**Creating an OLAP cube from the data in a query** On-Line Analytical Processing ([OLAP](#)) is a way of organizing data for querying and reporting instead of processing transactions. In an OLAP database, data is organized hierarchically and stored in [cubes](#) instead of tables.

You can use Query to create an OLAP cube from the data in a query so that it takes less time and effort to create Microsoft Excel reports based on the data. To create an OLAP cube, you run the OLAP Cube Wizard from the Query Wizard or directly from Query. You can return the data to Excel as a [PivotTable report](#).

 [Working with the data in Microsoft Excel](#)

After you create a query in either the Query Wizard or Microsoft Query, you can return the data to a Microsoft Excel worksheet. The data becomes an [external data range](#) or a [PivotTable report](#) that you can format, analyze, and refresh.

**Formatting and analyzing the data** In Excel, you can use familiar tools such as the Chart Wizard or automatic subtotals to present and summarize the data. You can format the data, and your formatting is retained when you refresh the external data from the source database. If you add columns of formulas to the external data range, the formulas can be copied automatically to any new rows that are added to the range when you refresh the data. You can use your own column labels instead of the field names, and add row numbers automatically. For information about controlling the formatting and layout of an external data range, see Excel Help.

**Reusing and sharing queries** In both the Query Wizard and Query, you can save a .dqy query file that you can modify, reuse, and share. Excel can open .dqy files directly, which allows you or other users to create additional external data ranges from the same query.

If you want to share an Excel summary or report that is based on external data, you can give other users a workbook that contains an external data range, or you can create a [report template](#). A report template lets you save the summary or report without saving the external data so that the file is smaller. The external data is retrieved when a user opens the report template. For information about creating report templates, see Excel Help.

**Refreshing external data** When you [refresh](#) external data, you run the query to retrieve any new or changed data that matches your specifications. You can refresh a query in both Query and Excel. Excel provides several options for refreshing queries, including refreshing the data whenever you open the workbook and automatically refreshing it at timed intervals. You can continue to work in Excel while data is being refreshed, and you can also check the status while it's being refreshed. For information about refreshing external data in Excel, see Excel Help.

[Show All](#)

# About hyperlinks

A hyperlink is a link from a document that opens another page or file when you click it. The destination is frequently another Web page, but it can also be a picture, or an e-mail address, or a program. The hyperlink itself can be text or a picture.

When a site visitor clicks the hyperlink, the destination is shown in a [Web browser](#), opened, or run, depending on the type of destination. For example, a hyperlink to a page shows the page in the Web browser, and a hyperlink to an [AVI](#) file opens the file in a media player.

 [How hyperlinks are used](#)

You can use hyperlinks to do the following:

- Navigate to a file or Web page on a network, [intranet](#) or Internet
- Navigate to a file or Web page that you plan to create in the future
- Send an e-mail message
- Start a file transfer, such as downloading or an [FTP](#) process

When you point to text or a picture that contains a hyperlink, the pointer becomes a hand , indicating that the text or picture is something you can click.

 [What a URL is and how it works](#)

When you create a hyperlink, its destination is encoded as a [Uniform Resource Locator \(URL\)](#), such as:

`http://example.microsoft.com/news.htm`

or

`file://ComputerName/SharedFolder/FileName.htm`

A URL contains a [protocol](#), such as [HTTP](#), [FTP](#), or FILE, a [Web server](#) or network location, and a path and file name. The following illustration defines the parts of the URL:



- 1 Protocol used (http, ftp, file)
- 2 Web server or network location
- 3 Path
- 4 File name

## [Absolute and relative hyperlinks](#)

An *absolute* URL contains a full address, including the [protocol](#), the [Web server](#), and the path and file name.

A *relative* URL has one or more missing parts. The missing information is taken from the page that contains the URL. For example, if the protocol and Web server are missing, the Web browser uses the protocol and domain, such as .com, .org, or .edu, of the current page.

It is common for pages in a Web to use relative URLs containing only a partial path and file name. If the files are moved to another server, any hyperlinks will continue to work as long as the relative positions of the pages remain unchanged. For example, a hyperlink on Products.htm points to a page named apple.htm in a folder named Food; if both pages are moved to a folder named Food on a different server, the URL in the hyperlink will still be correct.

In a Microsoft Excel workbook, unspecified paths to hyperlink destination files are by default relative to the location of the active workbook. You can set a different base address to use by default so that each time you create a hyperlink to a file in that location, you'll only have to specify the file name, not the path, in the **Insert Hyperlink** dialog box.

[Show All](#)

# Create a hyperlink

## [Create a hyperlink to a new file](#)

1. Right-click the cell or graphic you want to represent the [hyperlink](#), and then click **Hyperlink** on the shortcut menu.
2. Under **Link to** on the left side of the dialog box, click **Create new document**.
3. Type a name for the new file in the **Name of new document** box.
4. To specify a location other than the one shown under **Full Path**, type the new location in the **Name of new document** box or click **Change** and then select the location you want. Click **OK**.
5. Under **When to edit**, click an option to specify whether to open the new file for editing now or later.
6. To assign a tip to be displayed when you rest the pointer on the hyperlink, click **ScreenTip** and then type the text you want in the **ScreenTip text** box. Click **OK**.

## [Create a hyperlink to an existing file or Web page](#)

1. Right-click the text or graphic you want to represent the [hyperlink](#), and then click **Hyperlink** on the shortcut menu.
2. Under **Link to** on the left side of the dialog box, click **Existing File or Web page**.
3. Do one of the following:
  - To select a file from the current folder, click **Current Folder** and then click the file you want to link to.
  - To select the Web page from a list of browsed pages, click **Browsed Pages** and then click the Web page you want to link to.
  - To select a file from a list of files you have recently used, click **Recent Files** and then click the file you want to link to.
  - If you know the name and location of the file or Web page you want to

link to, you can type that information in the **Address** box.

- To select the Web page by opening your browser and searching for the page, click **Browse the Web** , open the Web page you want to link to, and then switch back to Microsoft Excel without closing your browser.
4. To assign a tip to be displayed when you rest the pointer on the hyperlink, click **ScreenTip** and then type the text you want in the **ScreenTip text** box. Click **OK**.

### [Create a hyperlink to a specific location on a Web page](#)

To create a [hyperlink](#) to a specific location on a Web page, make sure the Web page has a [bookmark](#) at that location.

1. In Microsoft Excel, right-click the text or graphic you want to represent the hyperlink, and then click **Hyperlink** on the shortcut menu.
2. Under **Link to** on the left side of the dialog box, click **Existing file or Web page**.
3. Do one of the following:
  - To select a Web page from the current folder, click **Current Folder** and then click the Web page you want to link to.
  - To select the Web page from a list of browsed pages, click **Browsed Pages** and then click the Web page you want to link to.
  - To select a Web page from a list of files you have recently used, click **Recent Files** and then click the Web page you want to link to.
  - If you know the name and location of the Web page you want to link to, you can type that information in the **Address** box.
  - To select the Web page by opening your browser and searching for the page, click **Browse the Web** , open the Web page you want to link to, and then switch back to Excel without closing your browser.
4. Click **Bookmark**, and then double-click the bookmark you want.
5. To assign a tip to be displayed when you rest the pointer on the hyperlink,

click **ScreenTip**, type the text you want in the **ScreenTip text box**, and then click **OK**.

## [Create a hyperlink to a specific location in a workbook](#)

To link to a location in the current workbook or another workbook, you can either define a [name](#) for the [destination](#) cells or use a cell reference.

1. To use a name, name the destination cells in the destination workbook.

## [How?](#)

1. Select the cell, range of cells, or [nonadjacent selections](#) that you want to name.
2. Click the **Name** box at the left end of the [formula bar](#) .



-  Name box

3. Type the name for the cells.
4. Press ENTER.

**Note** You cannot name a cell while you are changing the contents of the cell.

2. In the [source](#) workbook, right-click the text or graphic you want to represent the [hyperlink](#), and then click **Hyperlink** on the shortcut menu.
3. Do one of the following:
  - To link to a location in your current workbook, click **Place in this document** under **Link to**.
  - To link to a location in another workbook, click **Existing file or Web page** under **Link to**.
4. If you chose **Existing file or Web page**, locate and select the workbook you want to link to, and then click the **Bookmark** button.
5. Do one of the following:

- In the list under **Cell Reference**, click the sheet you want to link to, and then type the cell reference in the **Type in the cell reference** box. Click **OK**.
  - In the list under **Defined Names**, click the name that represents the cells you want to link to. Click **OK**.
6. To assign a tip to be displayed when you rest the pointer on the hyperlink, click **ScreenTip** and then type the text you want in the **ScreenTip text** box. Click **OK**.

### [Create a customized hyperlink by using a worksheet function](#)

Creates a shortcut or jump that opens a document stored on a network server, an [intranet](#), or the Internet. When you click the cell that contains the HYPERLINK function, Microsoft Excel opens the file stored at link\_location.

#### **Syntax**

**HYPERLINK(link\_location,friendly\_name)**

Link\_location is the path and file name to the document to be opened as text. Link\_location can refer to a place in a document— such as a specific cell or named range in an Excel worksheet or workbook, or to a bookmark in a Microsoft Word document. The path can be to a file stored on a hard disk drive, or the path can be a universal naming convention (UNC) path on a server (in Microsoft Excel for Windows) or a Uniform Resource Locator ([URL](#)) path on the Internet or an intranet.

- Link\_location can be a text string enclosed in quotation marks or a cell that contains the link as a text string.
- If the jump specified in link\_location does not exist or cannot be navigated, an error appears when you click the cell.

Friendly\_name is the jump text or numeric value that is displayed in the cell. Friendly\_name is displayed in blue and is underlined. If friendly\_name is omitted, the cell displays the link\_location as the jump text.

- Friendly\_name can be a value, a text string, a name, or a cell that contains

the jump text or value.

- If `friendly_name` returns an error value (for example, `#VALUE!`), the cell displays the error instead of the jump text.

## Remark

To select a cell that contains `HYPERLINK`, click the cell and hold the mouse button until the cursor becomes a cross , then release the mouse button.

## Examples

The following example opens a worksheet named `Budget Report.xls` that is stored on the Internet at the location named `example.microsoft.com/report` and displays the text "Click for report":

```
=HYPERLINK("http://example.microsoft.com/report/budget report.xls",  
"Click for report")
```

The following example creates a hyperlink to cell `F10` on the worksheet named `Annual` in the workbook `Budget Report.xls`, which is stored on the Internet at the location named `example.microsoft.com/report`. The cell on the worksheet that contains the hyperlink displays the contents of cell `D1` as the jump text:

```
=HYPERLINK("[http://example.microsoft.com/report/budget  
report.xls]Annual!F10", D1)
```

The following example creates a hyperlink to the range named `DeptTotal` on the worksheet named `First Quarter` in the workbook `Budget Report.xls`, which is stored on the Internet at the location named `example.microsoft.com/report`. The cell on the worksheet that contains the hyperlink displays the text "Click to see First Quarter Department Total":

```
=HYPERLINK("[http://example.microsoft.com/report/budget  
report.xls]First Quarter!DeptTotal", "Click to see First Quarter  
Department Total")
```

To create a hyperlink to a specific location in a Microsoft Word document, you must use a bookmark to define the location you want to jump to in the document. The following example creates a hyperlink to the bookmark named `QrtlyProfits` in the document named `Annual Report.doc` located at `example.microsoft.com`:

```
=HYPERLINK("[http://example.microsoft.com/Annual  
Report.doc]QrtlyProfits", "Quarterly Profit Report")
```

In Excel for Windows, the following example displays the contents of cell D5 as the jump text in the cell and opens the file named 1stqtr.xls, which is stored on the server named FINANCE in the Statements share. This example uses a UNC path:

```
=HYPERLINK("\\FINANCE\Statements\1stqtr.xls", D5)
```

The following example opens the file 1stqtr.xls in Excel for Windows that is stored in a directory named Finance on drive D, and displays the numeric value stored in cell H10:

```
=HYPERLINK("D:\FINANCE\1stqtr.xls", H10)
```

In Excel for Windows, the following example creates a hyperlink to the area named Totals in another (external) workbook, Mybook.xls:

```
=HYPERLINK("[C:\My Documents\Mybook.xls]Totals")
```

In Microsoft Excel for the Macintosh, the following example displays "Click here" in the cell and opens the file named First Quarter that is stored in a folder named Budget Reports on the hard drive named Macintosh HD:

```
=HYPERLINK("Macintosh HD:Budget Reports:First Quarter", "Click  
here")
```

You can create hyperlinks within a worksheet to jump from one cell to another cell. For example, if the active worksheet is the sheet named June in the workbook named Budget, the following formula creates a hyperlink to cell E56. The link text itself is the value in cell E56.

```
=HYPERLINK("[Budget]June!E56", E56)
```

To jump to a different sheet in the same workbook, change the name of the sheet in the link. In the previous example, to create a link to cell E56 on the September sheet, change the word "June" to "September."

[Create a hyperlink to an e-mail address](#)

When you click a [hyperlink](#) to an e-mail address, your e-mail program

automatically starts and creates an e-mail message with the correct address in the **To** box, provided you have an e-mail program installed.

1. Right-click the text or graphic you want to represent the hyperlink, and then click **Hyperlink** on the shortcut menu.
2. Under **Link to** on the left side of the dialog box, click **E-mail address**.
3. In the **E-mail address** box, type the e-mail address you want.
4. In the **Subject** box, type the subject of the e-mail message.

Note that some [Web browsers](#) and e-mail programs might not recognize the subject line.

5. To assign a tip to be displayed when you rest the pointer on the hyperlink, click **ScreenTip**, type the text you want in the **ScreenTip text** box, and then click **OK**.



You can also create a hyperlink to an e-mail address in a cell by typing the address directly in the cell. For example, type **someone@microsoft.com**, and the hyperlink is created automatically.

[Show All](#)

# Change a hyperlink

## [Change the destination of a hyperlink](#)

1. Right-click the [hyperlink](#) you want to change and click **Edit Hyperlink** on the shortcut menu.
2. Make the changes you want.

**Note** If the hyperlink was created by using the HYPERLINK worksheet function, you must edit the formula to change the destination. Select the cell with the hyperlink in it (click the cell and hold the mouse button until the cursor becomes a cross ) , and then click the [formula bar](#) to edit the formula.

## [Change the appearance of hyperlink text](#)

When you make changes to the **Hyperlink** and **Followed Hyperlink** styles, your changes apply to all [hyperlinks](#) in the current workbook.

1. On the **Format** menu, click **Style**.
2. To change the appearance of hyperlinks before or after they have been clicked to make a jump, click **Hyperlink** or **Followed Hyperlink** in the **Style name** box.
3. Click **Modify**.
4. Select the options you want, and then click **OK**.
5. Clear the check boxes for any options you don't want.
6. Click **Add**, and then click **Close**.

**Note** The **Hyperlink** style appears in the **Style name** box only if you have previously created a text hyperlink in the workbook. The **Followed Hyperlink** style appears only if you have used a text hyperlink in the workbook to jump to another file and then returned to the original workbook.

## [Change the text or graphic for a hyperlink](#)

1. Select the cell or graphic that represents the [hyperlink](#).

- To select a cell that contains a text hyperlink, click the cell and hold the mouse key down until the cursor changes to a cross .
- To select a graphic, hold down CTRL and click the graphic.

2. Do one or more of the following:

- To change text, edit the text in the [formula bar](#).
- To reformat a graphic, use the **Drawing** or **Picture toolbar**.
- To change text that's part of a graphic, double-click the selected graphic and make the changes you want.
- To change the graphic that represents the hyperlink, insert the new graphic and make it a hyperlink with the same [destination](#). Then delete the old graphic or remove the hyperlink.

[Show All](#)

# Copy or move a hyperlink

1. Right-click the [hyperlink](#) you want to copy or move.
2. Click **Copy** or **Cut** on the shortcut menu to copy or move the text or graphic and the hyperlink.
3. Right-click the cell you want to copy or move the hyperlink to, and click **Paste** on the shortcut menu.

[Show All](#)

# Insert a formula link to worksheet data on your intranet or the Internet

You can insert a [link](#) from a workbook to another workbook that is located on your [intranet](#) or on the Internet. The workbook must be in Microsoft Excel Workbook Format (.xls) rather than a workbook that has been saved as an [HTML](#) file.

1. Open the source workbook and select the information you want to copy as a [linked object](#).
2. Click **Copy** .
3. Switch to the worksheet you want to place the information in, and then click where you want the information to appear.
4. On the **Edit** menu, click **Paste Special**.
5. Click **Paste link**.

**Note** To create a link without opening the workbook on the Internet, click the cell where you want the link, and type an equal sign (=) and the [URL](#) address, followed by the location in the workbook. For example, type **=[http://www.someones.homepage/\[file.xls\]Sheet1!A1](#)** or **=[ftp.server.somewhere/file.xls!MyNamedCell](#)**

[Show All](#)

# Remove a hyperlink

## [Delete a hyperlink and the text or graphic that represents it](#)

- To remove a [hyperlink](#) and the text that represents it, right-click the cell that contains the hyperlink, and click **Clear Contents** on the shortcut menu.
- To remove a hyperlink and the graphic that represents it, hold down CTRL and click the graphic, and then press DELETE.

## [Deactivate a single hyperlink](#)

- Right-click the [hyperlink](#) you want to deactivate, and then click **Remove Hyperlink** on the shortcut menu.

## [Deactivate several hyperlinks at once](#)

1. Type the number **1** in a blank cell, and right-click the cell.
2. Click **Copy** on the shortcut menu.
3. While pressing CTRL, select each [hyperlink](#) you want to deactivate.

## [How?](#)

- To select a cell that has a [hyperlink](#) in it without jumping to the hyperlink destination, click the cell and hold the mouse button until the cursor becomes a cross , then release the mouse button.
4. Click **Paste Special** on the **Edit** menu.
  5. Under **Operation**, click **Multiply** and then click **OK**.

[Show All](#)

# Select a cell that has a hyperlink in it

- To select a cell that has a [hyperlink](#) in it without jumping to the hyperlink destination, click the cell and hold the mouse button until the cursor becomes a cross , then release the mouse button.

[Show All](#)

# Set the base address for the hyperlinks in a workbook

By default, unspecified paths to [hyperlink](#) destination files are relative to the location of the active workbook. Use this procedure when you want to set a different default path. Each time you create a hyperlink to a file in that location, you'll only have to specify the file name, not the path, in the **Insert Hyperlink** dialog box.

1. On the **File** menu, click **Properties**.
2. Click the **Summary** tab.
3. In the **Hyperlink base** box, type the path you want to use.

**Note** You can override the hyperlink base address by using the full, or absolute, address for the hyperlink in the **Insert Hyperlink** dialog box.

[Show All](#)

# Language-specific names for Web page supporting folders

When you choose the **Save as Web Page** command to save a new file, or you save your file as a Web page by selecting **Web Page** in the **Save as type** box, the default Web format is [HTML](#). All supporting files— such as bullets, background textures, and graphics— are organized in a supporting folder. The name of the supporting folder is the name of the Web page plus an underscore (\_), a period (.), or a hyphen (-), and the word "files." The word "files" will appear in the language of the version of Microsoft Office that was used to save the file as a Web page. For example, suppose you use the Dutch language version of Office to save a file named Page1 as a Web page. The default name of the supporting folder would be **Page1\_bestanden**.

**Note** If you save your Web page with a short file name (maximum of eight characters, plus a three-character file extension) by clearing the **Use long file names whenever possible** check box in the **Web Options** dialog box, the supporting folder is the name of the Web page without the word "files."

[The default name for the Web page supporting folder in each language version of Office](#)

Language	Default name for Web page supporting folder
Arabic	.files
Basque	_fitxategiak
Brazilian	_arquivos
Bulgarian	.files
Catalan	_fitxers
Chinese (Simplified)	.files
Chinese (Traditional)	.files
Croatian	_datoteke
Czech	_soubory

Danish	-filer
Dutch	_bestanden
English	_files
Estonian	_failid
Finnish	_tiedostot
French	_fichiers
German	-Dateien
Greek	.files
Hebrew	.files
Hungarian	_elemei
Italian	-file
Japanese	.files
Korean	.files
Latvian	_fails
Lithuanian	_bylos
Norwegian	-filer
Polish	_pliki
Portuguese	_ficheiros
Romanian	.files
Russian	.files
Serbian (Cyrillic)	.files
Serbian (Latin)	_fajlovi
Slovakian	.files
Slovenian	_datoteke
Spanish	_archivos
Swedish	-filer
Thai	.files
Turkish	_dosyalar
Ukrainian	.files
Vietnamese	.files

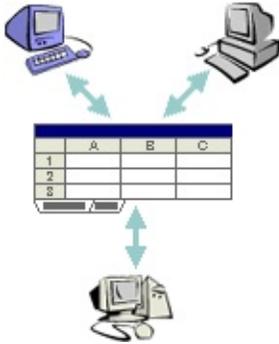
# Fax a workbook

To do this procedure, you must have installed and set up fax software and hardware.

1. Open the workbook you want to fax.
2. On the **File** menu, click **Print**.
3. In the **Name** box, click the fax driver.
4. Select the other options you want, and then click **OK**.

[Show All](#)

# About shared workbooks



A shared workbook allows several people to edit simultaneously. It's particularly useful for managing [lists](#) that change frequently.

For example, if the people in your workgroup each handle several projects and need to know each other's status, the group could use a list in a shared workbook where each person enters and updates a row of information for each project.

## [Creating a shared workbook](#)

The original author of a workbook prepares it to be shared by entering and formatting the data that needs to be present. The workbook is saved as shared, and put on a network share (not a Web server) available to the intended users.

**Allow for unavailable features** Because some Microsoft Excel features can be viewed or used but not changed once the workbook is shared, you'll want to set up these features before you share the workbook.

The following features can't be changed after a workbook is shared: merged cells, conditional formats, data validation, charts, pictures, objects including drawing objects, hyperlinks, scenarios, outlines, subtotals, data tables, PivotTable reports, workbook and worksheet protection, and macros.

**Make settings that affect all users** When you share the workbook, you can customize some sharing features. For example, you can decide whether to keep track of changes for the default 30 days or for a longer or shorter amount of time.

## Working in a shared workbook

After you open a shared workbook, you can enter and change data as you do in a regular workbook. A few aspects are different from working in a regular workbook, however.

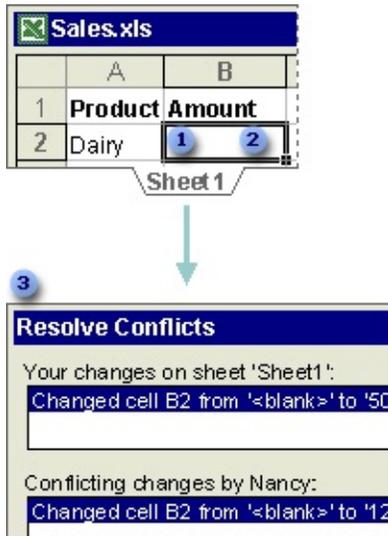
**Seeing other users' changes** Each time you save the shared workbook, you're updated with any changes that others have saved since the last time you saved. If you want to keep the shared workbook open to monitor progress, you can have Microsoft Excel update you with changes automatically, at timed intervals that you specify, with or without saving the workbook yourself.

**Resolving conflicts** When you save changes to a shared workbook, another person who's currently editing the workbook might have saved changes to the same cells. In this case, the changes conflict, and a conflict resolution dialog box appears that allows you to decide whose changes to keep.

**Keeping personal views and settings** Excel saves a [custom view](#) of the shared workbook for you that includes things like which worksheet you have displayed and your zoom settings. By default your view includes any [filter](#) and print settings you make, or you can specify that you want to use the original filter and print settings. Each time you open the shared workbook, Excel displays it with your view in effect, so that each user can have his or her own settings.

[Show All](#)

# About resolving conflicting changes in shared workbooks



- 1 Nancy enters 12 and saves the workbook
- 2 Then Joe enters 50 and saves the workbook
- 3 Joe gets the conflict dialog

A conflict happens when two users are both editing the same [shared workbook](#) and try to save changes that affect the same cell. Microsoft Excel can keep only one of the changes in that cell. When the second user saves the workbook, Excel displays the **Resolve Conflicts** dialog box.

[How conflict resolution works](#)

**Who can resolve conflicts** All users currently editing a shared workbook have equal authority to decide which changes are kept and discarded. The last user to save a conflicting change sees the **Resolve Conflicts** dialog box.

**Why a change can affect other changes** If you accept a change that deletes a row or column, for example, other changes involving that row or column may be affected. If the row or column no longer exists, data that was entered or edited in

that row or column in separate changes also no longer exists, so the additional entries and edits are affected.

**What happens to changes you don't keep** Rejected changes are recorded in the change tracking log, including a record of any additional changes that were affected. In the [History worksheet](#), conflicting changes that were kept have "Won" in the Action Type column. The row numbers in the Losing Action column identify the rows with information about the changes that weren't kept, including any deleted data.

**What if you change your mind** You can display the History worksheet and look up the information about the change. Then you can either make the change again, or if the change involved deleting data, copy the data from the History worksheet back to the original location.

 [How to prevent conflicts](#)

**Design shared workbooks with per-user protection** Before you share a workbook, use the **Protect Sheet** command (**Tools** menu, **Protection** submenu) to authorize each user to edit in a separate area of the worksheet. Users can receive and view changes to areas they aren't authorized to change, but can only make changes to their own designated areas, so conflicts can't arise.

**Assign each user an area to work in** Conflicts occur only when two users make changes that affect the same cell. To make entering [lists](#) easier, Excel allows more than one user to add data to the row at the end of a list without triggering conflicts. If users avoid each other's areas, conflicts won't arise even if you don't use worksheet protection to enforce separate work areas.

**Appoint one user tie breaker** If one user frequently generates conflicts, have the user turn off the **Resolve Conflicts** dialog box, so that their changes always happen.

[Show All](#)

# Edit a shared workbook

1. Go to the network location where the [shared workbook](#) is stored, and open the workbook.
2. Set the user name to identify your work in the shared workbook: on the **Tools** menu, click **Options**, click the **General** tab, and then type your user name in the **User name** box.
3. Enter and edit data as usual. You won't be able to add or change the following: merged cells, conditional formats, data validation, charts, pictures, objects including drawing objects, hyperlinks, scenarios, outlines, subtotals, [data tables](#), PivotTable reports, workbook and worksheet protection, and macros.
4. Make any [filter](#) and print settings you want for your personal use. Each user's settings are saved individually by default.

If you want the filter or print settings made by the original author to be in effect whenever you open the workbook, click **Share Workbook** on the **Tools** menu, click the **Advanced** tab, and under **Include in personal view**, clear the **Print settings** or **Filter settings** check box.

5. To save your changes to the workbook and see the changes other users have saved since your last save, click **Save** .

If the **Resolve Conflicts** dialog box appears, resolve the conflicts.

[How?](#)

When two users try to save changes that affect the same cell, Microsoft Excel displays the **Resolve Conflicts** dialog box for one of the users.

1. In the **Resolve Conflicts** dialog box, read the information about each change and the conflicting changes made by others.
2. To keep your change or the other person's change and go on to the next conflicting change, click **Accept Mine** or **Accept Other**.

To keep all of your remaining changes or all of the other users' changes, click **Accept All Mine** or **Accept All Others**.

3. To have your changes to override all other changes, and never see the **Resolve Conflicts** dialog box again, turn this feature off.

[How?](#)

1. On the **Tools** menu, click **Share Workbook**, and then click the **Advanced** tab.
2. Click **The changes being saved win**.
3. Click **Save** .
4. To see how you or others resolved past conflicts, view this information on the [History worksheet](#).

[How?](#)

1. On the **Tools** menu, point to **Track Changes**, and then click **Highlight Changes**.
2. In the **When** box, click **All**.
3. Clear the **Who** and **Where** check boxes.
4. Select the **List changes on a new sheet** check box, and then click **OK**.
5. On the History worksheet, scroll to the right to view the Action Type and Losing Action columns.

Conflicting changes that were kept have "Won" for Action Type. The row numbers in the Losing Action column identify the rows with information about the conflicting changes that weren't kept, including any deleted data.

[Tip](#)

To save a copy of the workbook with all your changes, click **Cancel** in the **Resolve Conflicts** dialog box, click **Save As** on the **File** menu, and then type a new name for the file.

## Notes

- To see who else has the workbook open, click **Share Workbook** on the **Tools** menu, and then click the **Editing** tab.
- If you want to get automatic updates of the other users' changes

periodically, with or without saving, click **Share Workbook** on the **Tools** menu, click the **Advanced** tab, and under **Update changes**, click the options you want.

[Show All](#)

# Features that are unavailable in shared workbooks

You can access the following features only if you stop sharing the workbook.

You cannot use [shared workbooks](#) on Web servers.

<b>Unavailable feature</b>	<b>Alternatives</b>
Create <a href="#">lists</a>	None
Insert or delete blocks of cells	You can insert entire rows and columns.
Delete worksheets	None
Merge cells or split merged cells	None
Add or change conditional formats	Existing conditional formats continue to appear as cell values change, but you can't change these formats or redefine the conditions.
Add or change data validation	Cells continue to be validated when you type new values, but you can't change existing data validation settings.
Create or change charts or PivotChart reports	You can view existing charts and reports.
Insert or change pictures or other objects	You can view existing pictures and objects.
Insert or change hyperlinks	Existing hyperlinks continue to work.
Use drawing tools	You can view existing drawings and graphics.
Assign, change, or remove	Existing passwords remain in effect.

## [passwords](#)

Protect or unprotect worksheets or the workbook	Existing protection remains in effect.
Create, change, or view scenarios	None
Group or outline data	You can continue to use existing outlines.
Insert automatic subtotals	You can view existing subtotals.
Create <a href="#">data tables</a>	You can view existing data tables.
Create or change PivotTable reports	You can view existing reports.
Write, record, change, view, or assign macros	You can run existing macros that don't access unavailable features. You can record shared workbook operations into a macro stored in another nonshared workbook.
Add or change Microsoft Excel 4 dialog sheets	None
Change or delete <a href="#">array formulas</a>	Existing array formulas continue to calculate correctly.

[Show All](#)

# Prepare workbooks to be reviewed and merged

To send workbooks for review by e-mail, you need Microsoft Outlook or another e-mail program installed and running on your computer.

1. Open the workbook that you plan to send to other users for review.
2. On the **Tools** menu, click **Share Workbook**, and then click the **Editing** tab.
3. Select the **Allow changes by more than one user at the same time** check box.
4. Click the **Advanced** tab.
5. Under **Track changes**, click **Keep change history for**. In the **Days** box, type a number at least as long as the number of days you expect reviewers to spend making changes and comments, plus the time you'll need to collect and merge the copies.
6. Click **OK**, and save the file.
7. On the **File** menu, point to **Send To**, and then click **Mail Recipient (for Review)**.
8. In the **To** and **Cc** boxes, type the recipient names, separated by semicolons.

If you want to use names from your address book instead, click the **To** or **Cc** button.

9. Type a subject in the **Subject** box, and type or edit the introductory text before the attachment if you want.
10. If Outlook is your mail program, customize the message.

[How?](#)

These options are available when you have an e-mail message open and you are using Microsoft Outlook.

## Importance and sensitivity level

[Change the importance level](#)

- To mark as very important, click **Importance: High** .
- To mark as not important, click **Importance: Low** .

### [Set a message flag](#)

Flagging a message adds a flag icon to it. You can use the flags to remind yourself to follow up on an issue or to indicate a request for someone else. You can also use flags to set a reminder for the message.

1. Click **Flag for Follow up** .
2. In the **Flag to** box, click the flag you want, or type your own.
3. Enter a date and time in the **Due by** boxes.

### [Mark a message as private, personal, or confidential](#)

1. In the message, click **Options** .
2. In the **Sensitivity** box, click the option you want.

**Note** Marking a message **Private** prevents the message from being modified after you send it.

## 1. **Security level**

 [Help add security to messages](#)

1. In the message, click **Options** .
2. Under **Security**, click **Security Settings**.
3. Set the desired options.

## 1. Track messages and replies

### [Receive notification when a message is read or delivered](#)

1. In the message, click **Options** .
2. Under **Voting and tracking options**, select the **Request a delivery receipt for this message** or **Request a read receipt for this message** check box.

### [Add voting buttons to an e-mail message](#)

This feature requires Microsoft Exchange.

1. In the message, click **Options** .
2. Select the **Use voting buttons** check box, and then click the voting button names you want to use in the box.

To create your own voting button names, delete the default button names, and then type any text you want. Separate the button names with semicolons.

3. Under **Delivery options**, select the **Save sent message to** check box. To select a folder other than the **Sent Items** folder, click **Browse**.

### [Save a copy of this message to a folder other than Sent Items](#)

1. In the message, click **Options** .
2. Under **Delivery options**, select the **Save sent message to** check box.
3. Click **Browse**, and then click the folder you want.

### [Assign a message to a category](#)

A category is a keyword or phrase that helps you keep track of [items](#) so you can easily find, sort, filter, or group them.

1. In the message, click **Options** .
2. Click **Categories**.
3. In the **Available categories** list, select the check boxes next to the categories you want, and then click **OK**.

## 1. Delivery options

[Make a message unavailable after a specified date](#)

1. In the message, click **Options** .
2. Under **Delivery options**, select the **Expires after** check box, and then enter the expiration date you want.

[Delay delivery of the message](#)

1. In the message, click **Options** .
2. Under **Delivery options**, select the **Do not deliver before** check box, and then enter the delivery date and time you want.

To enter a time, you must type in the box.

2. Click **Send** .
3. When you receive the reviewed copies of the workbook, save each attachment in the same folder with a different name.

[How?](#)

Use the following steps for Outlook, or follow the steps for your e-mail program:

1. On the **File** menu in the message, click **Save Attachments**.
2. In the **Save in** box, click the folder where you're collecting the reviewed copies.
3. In the **File name** box, type a new name for the workbook.
4. Click **Save**.

[Show All](#)

# Remove a user from a shared workbook

This procedure disconnects a user whose name currently appears in the **Share Workbook** dialog box. It does not prevent that user from editing the [shared workbook](#) again.

1. On the **Tools** menu, click **Share Workbook**, and then click the **Editing** tab.
2. In the **Who has this workbook open now** box, review the list of users.

Check with users you're removing to make sure they are no longer actually working on the workbook. If you remove an active user, the user's unsaved work will be lost.

3. Click the name of the user you want to disconnect, and then click **Remove User**.



If a user no longer needs to work with a shared workbook, you can reduce the size of the workbook file by deleting the user's personal view settings. On the **View** menu, click **Custom Views**. In the **Views** box, click the user's view, and then click **Delete**.

[Show All](#)

# Resolve conflicting changes to a shared workbook

When two users try to save changes that affect the same cell, Microsoft Excel displays the **Resolve Conflicts** dialog box for one of the users.

1. In the **Resolve Conflicts** dialog box, read the information about each change and the conflicting changes made by others.
2. To keep your change or the other person's change and go on to the next conflicting change, click **Accept Mine** or **Accept Other**.

To keep all of your remaining changes or all of the other users' changes, click **Accept All Mine** or **Accept All Others**.

3. To have your changes to override all other changes, and never see the **Resolve Conflicts** dialog box again, turn this feature off.

[How?](#)

1. On the **Tools** menu, click **Share Workbook**, and then click the **Advanced** tab.
2. Click **The changes being saved win**.
3. Click **OK**.
4. To see how you or others resolved past conflicts, view this information on the [History worksheet](#).

[How?](#)

1. On the **Tools** menu, point to **Track Changes**, and then click **Highlight Changes**.
2. In the **When** box, click **All**.

3. Clear the **Who** and **Where** check boxes.
4. Select the **List changes on a new sheet** check box, and then click **OK**.
5. On the History worksheet, scroll to the right to view the Action Type and Losing Action columns.

Conflicting changes that were kept have "Won" for Action Type. The row numbers in the Losing Action column identify the rows with information about the conflicting changes that weren't kept, including any deleted data.



[Tip](#)

To save a copy of the workbook with all your changes, click **Cancel** in the **Resolve Conflicts** dialog box, click **Save As** on the **File** menu, and then type a new name for the file.

# Send a review request

To use this procedure, you must be using Microsoft Outlook 2002 or later.

1. Open the file that you want to send for review.
2. On the **File** menu, point to **Send to**, and click **Mail Recipient (for Review)**.

## Notes

- If you want to track the reviewer's changes in a Microsoft Excel workbook, you must share the workbook before sending it for review.
- If the document is stored on a server, the mail message will contain a link to the file to be reviewed.

[Show All](#)

# Share a workbook

1. Create a workbook you want to make available for multiuser editing, and enter any data you want to provide.

If you want to include any of the following features, add them now: merged cells, conditional formats, data validation, charts, pictures, objects including drawing objects, hyperlinks, scenarios, outlines, subtotals, data tables, PivotTable reports, workbook and worksheet protection, and macros. You can't make changes to these features after you share the workbook.

2. On the **Tools** menu, click **Share Workbook**, and then click the **Editing** tab.
3. Select the **Allow changes by more than one user at the same time** check box, and then click **OK**.
4. When prompted, save the workbook.
5. On the **File** menu, click **Save As**, and then save the workbook on a network location accessible to the intended users. Use a shared network folder, not a Web server.
6. Check any links to other workbooks or documents, and fix any that are broken.

[How?](#)

1. On the **Edit** menu, click **Links**.

The **Links** command is unavailable if your file does not contain linked information.

2. Click **Check Status** to update the status for all links in the list. This may take a while if there are a lot of links, or if the source workbook for the links is on a network location, and the network is slow.
3. Check the status in the **Status** column, select the link, and then take the action needed.

**OK** No action required, the link is working and up to date.

**Unknown** Click **Check Status** to update the status for all links in the list.

**N/A** The link uses [Object Linking and Embedding \(OLE\)](#) or [Dynamic Data Exchange \(DDE\)](#). Microsoft Excel cannot check the status of these types of links.

**Error: Source not found** Click **Change Source**, and select another workbook.

**Error: Worksheet not found** Click **Change Source**, and then select another worksheet. The source may have been moved or renamed.

**Warning: Values not updated** Click **Update Values**. The link was not updated when the workbook was opened.

**Warning** Click **Open Source**, and calculate the workbook by pressing F9. The workbook may be set to manual calculation. To set to automatic calculation, on the **Tools** menu, click **Options**, select the **Calculation** tab, and then click **Automatic**.

**Warning** Some [names](#) cannot be resolved until the [source workbook](#) is opened. Click **Open Source**, switch back to the [destination workbook](#), and click **Check Status**. If this does not resolve the problem, make sure the name is not misspelled or missing. Switch to the source workbook, and then on the **Insert** menu, point to **Name**, and then click **Define**, and look for the name.

**Warning** Click **Open Source**. The link cannot be updated until the source is open.

**Source is open** The status of a link cannot be checked.

**Values updated from filename** No action required, the values have been updated.

**Warning** Excel cannot determine the status of the link. The source may contain no worksheets, or be saved in an unsupported file format. Click **Update Values**.

## Notes

- All users with access to the network share have full access to the [shared workbook](#), unless you use the **Protect Sheet** command (**Tools** menu, **Protection** submenu) to restrict access.
- The users who will edit the shared workbook need Microsoft Excel 97 or later (Microsoft Windows) or Excel 98 or later (Macintosh).

[Show All](#)

# Stop sharing a workbook

1. Have all other users save and close the [shared workbook](#). If other users are editing, they will lose any unsaved work.
2. Unsharing the workbook deletes the [change history](#). If you want to keep a copy of this information, print out the [History worksheet](#) or copy it to another workbook.

[How?](#)

1. On the **Tools** menu, point to **Track Changes**, and then click **Highlight Changes**.
2. In the **When** box, click **All**.
3. Clear the **Who** and **Where** check boxes.
4. Select the **List changes on a new sheet** check box, and then click **OK**.
5. Do one or more of the following:
  - To print the History worksheet, click **Print** .
  - To copy the history to another workbook, select the cells you want to copy, click **Copy** , switch to another workbook, click where you want the copy to go, and click **Paste** .

**Note** You may also want to save or print the current version of the workbook, because this history might not apply to later versions. For example, cell locations, including row numbers, in the copied history may no longer be current.

3. On the **Tools** menu, click **Share Workbook**, and then click the **Editing** tab.
4. Make sure that you are the only person listed in the **Who has this workbook open now** box.
5. Clear the **Allow changes by more than one user at the same time** check box.

If this check box is not available, you must unprotect the workbook before clearing the check box.

[How?](#)

1. Click **OK**, point to **Protection** on the **Tools** menu, and then click **Unprotect Shared Workbook**.
2. Enter the [password](#) if prompted, and then click **OK**.
3. On the **Tools** menu, click **Share Workbook**, and then click the **Editing** tab.
6. When prompted about the effects on other users, click **Yes**.

[Show All](#)

# Troubleshoot shared workbooks

## Commands, links, or features aren't available

 [The command I want isn't available.](#)

You can access the following features only if you stop sharing the workbook.

You cannot use [shared workbooks](#) on Web servers.

<b>Unavailable feature</b>	<b>Alternatives</b>
Insert or delete blocks of cells	You can insert entire rows and columns.
Delete worksheets	None
Merge cells or split merged cells	None
Add or change conditional formats	Existing conditional formats continue to appear as cell values change, but you can't change these formats or redefine the conditions.
Add or change data validation	Cells continue to be validated when you type new values, but you can't change existing data validation settings.
Create or change charts or PivotChart reports	You can view existing charts and reports.
Insert or change pictures or other objects	You can view existing pictures and objects.
Insert or change hyperlinks	Existing hyperlinks continue to work.
Use drawing tools	You can view existing drawings and graphics.
Assign, change,	

or remove <a href="#">passwords</a>	Existing passwords remain in effect.
Protect or unprotect worksheets or the workbook	Existing protection remains in effect.
Create, change, or view scenarios	None
Group or outline data	You can continue to use existing outlines.
Insert automatic subtotals	You can view existing subtotals.
Create <a href="#">data tables</a>	You can view existing data tables.
Create or change PivotTable reports	You can view existing reports.
Write, record, change, view, or assign macros	You can run existing macros that don't access unavailable features. You can record shared workbook operations into a macro stored in another nonshared workbook.
Add or change Microsoft Excel 4 dialog sheets	None
Change or delete <a href="#">array formulas</a>	Existing array formulas continue to calculate correctly.

[The links in my workbook don't work.](#)

**Update links that have #REF errors** If another user creates and saves a new link in a [shared workbook](#) while you are editing the same workbook, and you save or update the workbook, you get the #REF error .

1. On the **Edit** menu, click **Links**.
2. Click the link with the error.
3. To clear the #REF error and display the linked data, click **Update Link**.

**Check that link sources are correct** If you copied or moved the shared workbook from its original location to your network, or if the source workbook for the links isn't stored in a network location, you may see a message that the links cannot be updated. You can repair the links as follows:

- If you copied the workbook, open the original version of the shared workbook on your local system, and then use the **Save As** command (**File** menu) to save the shared workbook on the network location. This command updates the links for the new location.
- If you moved the shared workbook, don't have the original version, or **Save As** didn't repair the links, make sure the source workbook for the links is stored on a network location, and then fix the links.

[How?](#)

1. On the **Edit** menu, click **Links**.

The **Links** command is unavailable if your file does not contain linked information.

2. Click **Check Status** to update the status for all links in the list. This may take a while if there are a lot of links, or if the source workbook for the links is on a network location, and the network is slow.
3. Check the status in the **Status** column, select the link, and then take the action needed.

**OK** No action required, the link is working and up to date.

**Unknown** Click **Check Status** to update the status for all links in the list.

**Not applicable** The link uses [Object Linking and Embedding \(OLE\)](#) or [Dynamic Data Exchange \(DDE\)](#). Microsoft Excel cannot check the status of these types of links.

**Error: Source not found** Click **Change Source**, and select another workbook.

**Error: Worksheet not found** Click **Change Source**, and then select

another worksheet. The source may have been moved or renamed.

**Warning: Values not updated** Click **Update Values**. The link was not updated when the workbook was opened.

**Warning** Click **Open Source**, and calculate the workbook by pressing F9. The workbook may be set to manual calculation. To set to automatic calculation, on the **Tools** menu, click **Options**, select the **Calculation** tab, and then click **Automatic**.

**Warning** Some [names](#) cannot be resolved until the [source workbook](#) is opened. Click **Open Source**, switch back to the [destination workbook](#), and click **Check Status**. If this does not resolve the problem, make sure the name is not misspelled or missing. Switch to the source workbook, and then on the **Insert** menu, point to **Name**, and then click **Define**, and look for the name.

**Warning** Click **Open Source**. The link cannot be updated until the source is open.

**Source is open** The source is open. No action required unless worksheet errors are present.

**Values updated from filename** No action required, the values have been updated.

**Warning** Excel cannot determine the status of the link. The source may contain no worksheets, or be saved in an unsupported file format. Click **Update Values**.

[The \*\*Protect Workbook\*\* command isn't available or I can't type in the \*\*Password\*\* box.](#)

Your workbook is probably a [shared workbook](#), you cannot protect it or assign a password. If you want to protect a shared workbook, first stop sharing it.

[How?](#)

1. Have all other users save and close the [shared workbook](#). If other users are

editing, they will lose any unsaved work.

2. Unsharing the workbook deletes the [change history](#). If you want to keep a copy of this information, print out the [History worksheet](#) or copy it to another workbook.

[How?](#)

1. On the **Tools** menu, point to **Track Changes**, and then click **Highlight Changes**.
2. In the **When** box, click **All**.
3. Clear the **Who** and **Where** check boxes.
4. Select the **List changes on a new sheet** check box, and then click **OK**.
5. Do one or more of the following:
  - To print the History worksheet, click **Print** .
  - To copy the history to another workbook, select the cells you want to copy, click **Copy** , switch to another workbook, click where you want the copy to go, and click **Paste** .

**Note** You may also want to save or print the current version of the workbook, because this history might not apply to later versions. For example, cell locations, including row numbers, in the copied history may no longer be current.

3. On the **Tools** menu, click **Share Workbook**, and then click the **Editing** tab.
4. Make sure that you are the only person listed in the **Who has this workbook open now** box.
5. Clear the **Allow changes by more than one user at the same time** check box.

If this check box is not available, you must unprotect the workbook before clearing the check box.

[How?](#)

1. Click **OK**, point to **Protection** on the **Tools** menu, and then click **Unprotect Shared Workbook**.
2. Enter the [password](#) if prompted, and then click **OK**.
3. On the **Tools** menu, click **Share Workbook**, and then click the **Editing** tab.
6. When prompted about the effects on other users, click **Yes**.

You can then protect the workbook and assign a [password](#) if you want.

[How?](#)

### Protect worksheet elements

[Protect worksheet elements from all users](#)

1. Switch to the worksheet you want to protect.
2. Unlock any cells you want users to be able to change: select each cell or range, click **Cells** on the **Format** menu, click the **Protection** tab, and then clear the **Locked** check box.
3. Hide any formulas that you don't want to be visible: select the cells with the formulas, click **Cells** on the **Format** menu, click the **Protection** tab, and then select the **Hidden** check box.
4. Unlock any graphic objects you want users to be able to change.

[How?](#)

You don't need to unlock buttons or controls for users to be able to click and use them. You can unlock embedded charts, text boxes, and other objects created with the drawing tools that you want users to be able to modify. To see which elements on a worksheet are graphic objects, click **Go To** on the **Edit** menu, click **Special**, and then click **Objects**.

1. Hold down CTRL and click each object that you want to unlock.
2. On the **Format** menu, click the command for the object you selected: **AutoShape, Object, Text Box, Picture, Control, or WordArt.**
3. Click the **Protection** tab.
4. Clear the **Locked** check box, and if present, clear the **Lock text** check box.
5. On the **Tools** menu, point to **Protection**, and then click **Protect Sheet.**
6. Type a [password](#) for the sheet.

**Note** The password is optional; however, if you don't supply a password, any user will be able to unprotect the sheet and change the protected elements. Make sure you choose a password you can remember, because if you lose the password, you cannot gain access to the protected elements on the worksheet.

7. In the **Allow all users of this worksheet to** list, select the elements that you want users to be able to change.
8. Click **OK**, and if prompted retype the password.

[Give specific users access to protected ranges](#)

You must have Windows 2000 to give specific users access to ranges.

1. On the **Tools** menu, point to **Protection**, and then click **Allow Users to Edit Ranges.** (This command is available only when the worksheet is not protected.)
2. Click **New.**
3. In the **Title** box, type a title for the range you're granting access to.
4. In the **Refers to cells** box, type an equal sign (=), and then type a reference or select the range.

5. In the **Range password** box, type a [password](#) to access the range.

The password is optional; if you don't supply a password, any user will be able to edit the cells.

6. Click **Permissions**, and then click **Add**.
7. Locate and select the users to whom you want to grant access. If you want to select multiple users, hold down CTRL while you click the names.
8. Click **OK** twice, and if prompted retype the password.
9. Repeat the previous steps for each range for which you're granting access.
10. To retain a separate record of the ranges and users, select the **Paste permissions information into a new workbook** check box.
11. Protect the worksheet: On the **Tools** menu, point to **Protection**, click **Protect Sheet**, make sure the **Protect worksheet and contents of locked cells** check box is selected, type a password for the worksheet, click **OK**, and retype the password to confirm.

**Note** A sheet password is required to prevent other users from being able to edit your designated ranges. Make sure you choose a password you can remember, because if you lose the password, you cannot gain access to the protected elements on the worksheet.

## Help protect workbook elements and files

### [Protect workbook elements](#)

1. On the **Tools** menu, point to **Protection**, and then click **Protect Workbook**.
2. Do one or more of the following:
  - To protect the structure of a workbook so that worksheets in the workbook can't be moved, deleted, hidden, unhidden, or renamed, and new worksheets can't be inserted, select the **Structure** check box.
  - To use windows of the same size and position each time the workbook

is opened, select the **Windows** check box.

- To prevent others from removing workbook protection, type a [password](#), click **OK**, and then retype the password to confirm it.

## [Protect a shared workbook](#)

1. If the workbook is already shared, and you want to assign a [password](#) to protect the sharing, unshare the workbook.

### [How?](#)

1. Have all other users save and close the [shared workbook](#). If other users are editing, they will lose any unsaved work.
2. Unsharing the workbook deletes the [change history](#). If you want to keep a copy of this information, print out the [History worksheet](#) or copy it to another workbook.

### [How?](#)

1. On the **Tools** menu, point to **Track Changes**, and then click **Highlight Changes**.
2. In the **When** box, click **All**.
3. Clear the **Who** and **Where** check boxes.
4. Select the **List changes on a new sheet** check box, and then click **OK**.
5. Do one or more of the following:
  - To print the History worksheet, click **Print** .
  - To copy the history to another workbook, select the cells you want to copy, click **Copy** , switch to another workbook, click where you want the copy to go, and click **Paste** .

**Note** You may also want to save or print the current version of the workbook, because this history might not apply to later versions. For example, cell locations, including row numbers, in the copied history may no longer be current.

3. On the **Tools** menu, click **Share Workbook**, and then click the **Editing** tab.
4. Make sure that you are the only person listed in the **Who has this workbook open now** box.
5. Clear the **Allow changes by more than one user at the same time** check box.

If this check box is not available, you must unprotect the workbook before clearing the check box.

[How?](#)

1. Click **OK**, point to **Protection** on the **Tools** menu, and then click **Unprotect Shared Workbook**.
2. Enter the [password](#) if prompted, and then click **OK**.
3. On the **Tools** menu, click **Share Workbook**, and then click the **Editing** tab.
6. When prompted about the effects on other users, click **Yes**.
2. Set other types of protection if you want: Give specific users access to ranges, protect worksheets, protect workbook elements, and set passwords for viewing and editing.
3. On the **Tools** menu, point to **Protection**, and then click **Protect Shared Workbook** or **Protect and Share Workbook**.
4. Select the **Sharing with track changes** check box.
5. If you want to require other users to supply a password to turn off the [change history](#) or remove the workbook from shared use, type the password

in the **Password** box, and then retype the password when prompted.

6. If prompted, save the workbook.

#### [Protect a workbook file from viewing or editing](#)

1. On the **File** menu, click **Save As**.
2. On the **Tools** menu, click **General Options**.
3. Do either or both of the following:
  - If you want users to enter a [password](#) before they can view the workbook, type a password in the **Password to open** box, and then click **OK**.
  - If you want users to enter a password before they can save changes to the workbook, type a password in the **Password to modify** box, and then click **OK**.
4. When prompted, retype your passwords to confirm them.
5. Click **Save**.
6. If prompted, click **Yes** to replace the existing workbook.

Then use the **Share Workbook** command (**Tools** menu) to return the workbook to shared use.

Note that protecting a workbook is different from protecting sharing and the [change history](#). When you protect a workbook by using the **Protect Workbook** command (**Tools** menu, **Protection** submenu), you must share the workbook after you assign the password. When you assign a password by clicking the **Sharing with Track Changes** option (**Tools** menu, **Protection** submenu, **Protect and Share Workbook** command), the workbook is shared automatically.

If the workbook is already shared, when you point to **Protection** on the **Tools** menu, click **Protect Shared Workbook**, and select the **Sharing with Track Changes** check box, you cannot assign a [password](#) for this protection. To assign

this password, you must first unshare the workbook.

[The \*\*Allow changes by more than one user at the same time\*\* check box on the \*\*Share Workbook\*\* dialog box is not available.](#)

1. Click **OK**, point to **Protection** on the **Tools** menu, and then click **Unprotect Shared Workbook**.
2. Enter the [password](#) if prompted, and then click **OK**.
3. On the **Tools** menu, click **Share Workbook**, and then click the **Editing** tab.

## Data or files are gone or inaccessible

[I can only get read-only access.](#)

**Is the workbook a Microsoft Excel 95 shared list?** If so, Excel always opens the file [read-only](#). To convert the file to an Excel [shared workbook](#):

1. On the **File** menu, click **Save As**.
2. In the **Save as type** box, click **Microsoft Excel Workbook (\*.xls)**.
3. Type a new name in the **File name** box, and then click **Save**.
4. Share the workbook: on the **Tools** menu, click **Share Workbook**, click the **Editing** tab, select the **Allow changes by more than one user at the same time** check box, click **OK**, and save the shared workbook.

**Is read-only recommended?** Someone may have selected this option in the **Save Options** dialog box. To open the file read-write, click **No** in response to the message suggesting that the file should be opened read-only.

**Save a personal copy that you can edit** The workbook file may be read-only, or you may not have permissions for the location where it's stored. To edit and save the data in the file, click **Save As** on the **File** menu, and then save the shared workbook with a new name on your local disk.

[Another user saved over my data or edits.](#)

**Retrieve data from the change history** If the [change history](#) is being maintained back to the time when your change was overwritten, you can find the data that you originally entered on the [History worksheet](#), and copy it from there to its original location.

[How?](#)

1. On the **Tools** menu, point to **Track Changes**, and then click **Highlight Changes**.
2. In the **When** box, click **All**.
3. Clear the **Who** and **Where** check boxes.
4. Select the **List changes on a new sheet** check box, and then click **OK**.

5. Find your deleted data and click **Copy**  on the **Standard toolbar**.
6. Switch to the original worksheet, click where the data belongs, and click **Paste** .

**Save a copy of your changes** To keep a copy that can't be overwritten, click **Save As** on the **File** menu and save an extra copy of the [shared workbook](#) on your local disk.

 [A message says I'm no longer connected.](#)

**Another user may have stopped sharing the workbook** If sharing was stopped while you were editing, you'll see the message even after the workbook is reshared, and changes from your current editing session will have to be re-entered. Close the workbook and follow up with the owner or other users.

**You may have been disconnected** Your connection to the network share may have become broken, disconnecting you from the workbook, or another user may have disconnected you. If the workbook is still shared and available, you have two choices:

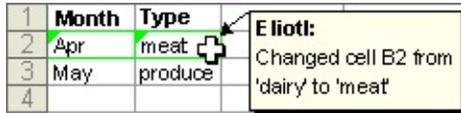
- **You can reconnect but lose current changes** You can open the [shared workbook](#) again, but any unsaved changes you made in your current editing session will be lost.
- **You can save and merge in your changes** You can preserve your unsaved work and then merge it back into the shared workbook.

 [How?](#)

1. Click **OK** in response to the message telling you that you are no longer connected.
2. On the **File** menu, click **Save As**.
3. In the **File name** box, type a new name for the workbook, and then click **Save**.
4. On the **File** menu, click **Close**.
5. Open the original shared workbook.
6. On the **Tools** menu, click **Compare and Merge Workbooks**.
7. Click the file you saved in step 3 to merge in your changes.

[Show All](#)

# About tracking changes



	Month	Type
1		
2	Apr	meat
3	May	produce
4		

Microsoft Excel can maintain and display information about how a worksheet was changed.

Change tracking logs details about workbook changes each time you save a workbook. You can use this history to understand what changes were made, and to accept or reject revisions.

This capability is particularly useful when several users edit a workbook. It's also useful when you submit a workbook to reviewers for comments, and then want to merge input into one copy, selecting which changes and comments to keep.

## [How change tracking works](#)

When you view the [change history](#), either directly on the worksheet or on a separate [History worksheet](#), you see who made each change, what type of change was made, when it was made, what cells were affected, and what data was added or deleted.

Change tracking is available only in [shared workbooks](#). In fact, when you turn on change tracking, the workbook automatically becomes a shared workbook, although you don't have to store the workbook where others can access it.

**Change tracking differs from undo and backup** Unlike the **Undo** button, you can't use the change history to back out changes. However, the history includes a record of any deleted data, so that you can copy lost data from the History worksheet back to the original cells. Because change tracking isn't designed to help you return to earlier versions of a workbook, you should continue to back up workbooks that have change tracking in effect.

**Some types of changes aren't tracked** Changes you make to cell contents are

tracked, but other changes, including formatting changes, are not. Some Excel features are unavailable in shared workbooks and therefore aren't tracked.

**History is kept only for a set interval** When you turn on change tracking, the history is kept for 30 days. This limit keeps workbook size manageable. You can increase or decrease the number of days of history to keep. If you want to keep the history indefinitely, you can specify a large number of days, or you can make periodic copies of the history information.

**How history gets deleted** Excel determines what history is kept by counting back from the current date. Each time you close the workbook, Excel erases any part of the change history that is older than the number of days in effect the last time the workbook was saved.

For example, if you're keeping 30 days of change history, and you open a workbook for the first time in two months, you'll be able to view the history from two months ago. However, when you close this workbook, the history from 31 to 60 days ago is deleted.

If you turn off change tracking or stop sharing the workbook, all change history is permanently deleted.

 [How to use change tracking](#)

Excel provides the following ways to access and use the stored [change history](#).

- **Highlight onscreen** Excel can outline changed areas in a different color for each user and display the basic details as a comment when you rest the pointer over each changed cell. Onscreen highlighting is useful when a workbook has only a few changes, or you want to see at a glance what's changed.
- **History worksheet** Excel can display a separate worksheet that provides full details in list form, so that you can [filter](#) to find changes of interest and print the information. This [History worksheet](#) is useful when a workbook has lots of changes, or you want to investigate what happened in a series of changes.
- **Review changes** Excel can step you through the changes in sequence

using a dialog box that lets you decide whether to accept or reject each change. This method is useful when you're evaluating and working with comments from others.

[Show All](#)

# Changes Excel doesn't track or highlight

Change tracking records changes you make to cell contents, including moves and copies, and also row and column insertions and deletions. Microsoft Excel does not keep track of the following types of changes:

<b>Untracked change</b>	<b>Alternatives</b>
Change sheet names	Changes aren't highlighted on the sheet tabs, but are tracked in the <a href="#">History worksheet</a> .
Insert or delete worksheets	Changes to a worksheet after it's inserted are tracked, but the insertion itself is not tracked.
Format cells or data	None
Hide or unhide rows or columns	None
Add or change comments	None
Cells that change because a formula calculates a new value	To find cells that change due to recalculation, use the tools on the <b>Auditing</b> toolbar.
Unsaved changes	You can highlight changes as you make them, but changes appear in the History worksheet only after they're saved.

Change tracking is available only in [shared workbooks](#). As a result, features that are unavailable for use in shared workbooks also are not tracked as changes.

 [Features unavailable in shared workbooks](#)

You can access the following features only if you stop sharing the workbook.

You cannot use [shared workbooks](#) on Web servers.

**Unavailable  
feature**

**Alternatives**

Insert or delete blocks of cells	You can insert entire rows and columns.
Delete worksheets	None
Merge cells or split merged cells	None
Add or change conditional formats	Existing conditional formats continue to appear as cell values change, but you can't change these formats or redefine the conditions.
Add or change data validation	Cells continue to be validated when you type new values, but you can't change existing data validation settings.
Create or change charts or PivotChart reports	You can view existing charts and reports.
Insert or change pictures or other objects	You can view existing pictures and objects.
Insert or change hyperlinks	Existing hyperlinks continue to work.
Use drawing tools	You can view existing drawings and graphics.
Assign, change, or remove <a href="#">passwords</a>	Existing passwords remain in effect.
Protect or unprotect worksheets or the workbook	Existing protection remains in effect.
Create, change, or view scenarios	None
Group or outline data	You can continue to use existing outlines.
Insert automatic subtotals	You can view existing subtotals.
Create <a href="#">data tables</a>	You can view existing data tables.
Create or change	

PivotTable reports	You can view existing reports.
Write, record, change, view, or assign macros	You can run existing macros that don't access unavailable features. You can record shared workbook operations into a macro stored in another nonshared workbook.
Add or change Microsoft Excel 4 dialog sheets	None
Change or delete <a href="#">array formulas</a>	Existing array formulas continue to calculate correctly.

[Show All](#)

# Turn off change tracking

1. Turning off change tracking deletes the [change history](#). If you want to keep a copy of this information, print out the [History worksheet](#) or copy it to another workbook.

[How?](#)

1. On the **Tools** menu, point to **Track Changes**, and then click **Highlight Changes**.
2. In the **When** box, click **All**.
3. Clear the **Who** and **Where** check boxes.
4. Select the **List changes on a new sheet** check box, and then click **OK**.
5. Do one or more of the following:

To print the History worksheet, click **Print** .

To copy the history to another workbook, select the cells you want to copy, click **Copy** , switch to another workbook, click where you want the copy to go, and click **Paste** .

When you copy or print the history, you may also want to save or print a separate copy of the [shared workbook](#). If the workbook continues to change as you or others work on it, the history that you copied may no longer apply. For example, cell locations, including row numbers, in the copied history may no longer be current.

2. Do one of the following:

If the shared workbook is protected, point to **Protection** on the **Tools** menu, and then click **Unprotect Shared Workbook**. Enter the [password](#) if prompted, and then click **OK**.

If the shared workbook is not protected, click **Share Workbook** on the **Tools** menu. Click the **Advanced** tab, and then click **Don't keep change history**.

[Show All](#)

# Turn on change tracking for a workbook

1. On the **Tools** menu, click **Share Workbook**, and then click the **Editing** tab.
2. Select the **Allow changes by more than one user at the same time** check box.
3. Click the **Advanced** tab.
4. Under **Track changes**, click **Keep change history for**, and in the **Days** box, type the number of days of [change history](#) that you want to keep.

Be sure to enter a large-enough number of days because Microsoft Excel permanently erases any change history older than this number of days.

5. Click **OK**, and if prompted to save the file, click **OK**.

**Note** Turning on change tracking also [shares](#) the workbook.

[Show All](#)

# View tracked changes

1. On the **Tools** menu, point to **Track Changes**, and then click **Highlight Changes**.

If the **Track changes while editing** check box is not selected, Microsoft Excel has not recorded any [change history](#) for the workbook.

2. Select the changes you want to see:

**All changes that have been tracked** Select the **When** check box and click **All**, and then clear the **Who** and **Where** check boxes.

**Changes made after a particular date** Select the **When** check box, click **Since date**, and then type the earliest date for which you want to view changes.

**Changes made by a specific user** Select the **Who** check box, and then click the user whose changes you want to view.

**Changes to a specific range of cells** Select the **Where** check box, and then enter a range reference, or select a range on the worksheet.

3. Select how you want to view the changes:

**Highlighted on the worksheet** Select the **Highlight changes on screen** check box. To view the details about a change, rest the pointer over a highlighted cell.

**Listed on a separate sheet** Select the **List changes on a new sheet** check box to display the [History worksheet](#). This check box is available only after you've turned on change tracking and saved some changes.

[Show All](#)

# View the History worksheet

1. On the **Tools** menu, point to **Track Changes**, and then click **Highlight Changes**.

If the **Track changes while editing** check box is not selected, Microsoft Excel has not recorded any [change history](#) for the workbook.

2. Select the **When** check box and click **All**.
3. Clear the **Who** and **Where** boxes.
4. Select the **List changes on a new sheet** check box.
5. Click **OK**, and then click the [filter](#) arrows next to the column labels on the [History worksheet](#) to find the information you want.

**Note** Saving the workbook removes the History worksheet. To view the History worksheet after saving, redisplay it.

[Show All](#)

# Troubleshoot change tracking

## Tracking changes

[I reshared a workbook, and now the change history is gone.](#)

When you stop sharing a workbook, Microsoft Excel turns off change tracking and permanently erases all [change history](#). When you reshare, changes are tracked from that point onward.

If you want to retain the full change history, don't remove the workbook from shared use. To work with features that are unavailable when the workbook is shared, work in a copy of the workbook, and stop sharing only the copy.

If you must stop sharing a workbook, you can copy or print out the change history.

1. On the **Tools** menu, point to **Track Changes**, and then click **Highlight Changes**.
2. In the **When** box, click **All**.
3. Clear the **Who** and **Where** check boxes.
4. Select the **List changes on a new sheet** check box, and then click **OK**.
5. Do one or more of the following:
  - To print the [History worksheet](#), click **Print** .
  - To copy the history to another workbook, select the cells you want to copy, click **Copy** , switch to another workbook, click where you want the copy to go, and click **Paste** .

**Note** When you copy or print the history, you may also want to save or print a separate copy of the [shared workbook](#). If the workbook continues to change as you or others work on it, the history that you copied may no longer apply. For example, cell locations, including row numbers, in the copied history may no longer be current.

[I turned on change tracking, but no changes are displayed.](#)

**Are the changes types that are tracked?** Some types of changes aren't tracked, and as a result information about them can't be displayed.

### [Changes Microsoft Excel doesn't track](#)

Change tracking records changes you make to cell contents, including moves and copies, and also row and column insertions and deletions. Microsoft Excel does not keep track of the following types of changes:

<b>Untracked change</b>	<b>Alternatives</b>
Change sheet names	Changes aren't highlighted on the sheet tabs, but are tracked in the <a href="#">History worksheet</a> .
Insert or delete worksheets	Changes to a worksheet after it's inserted are tracked, but the insertion itself is not tracked.
Format cells or data	None
Hide or unhide rows or columns	None
Add or change comments	None
Cells that change because a formula calculates a new value	To find cells that change due to recalculation, use the tools on the <b>Auditing</b> toolbar.
Unsaved changes	You can highlight changes as you make them, but changes appear in the History worksheet only after they're saved.

Change tracking is available only in [shared workbooks](#). As a result, features that are unavailable for use in shared workbooks also are not tracked as changes.

### [Features unavailable in shared workbooks](#)

You can access the following features only if you stop sharing the workbook.

You cannot use [shared workbooks](#) on Web servers.

<b>Unavailable feature</b>	<b>Alternatives</b>
Insert or delete	

blocks of cells	You can insert entire rows and columns.
Delete worksheets	None
Merge cells or split merged cells	None
Add or change conditional formats	Existing conditional formats continue to appear as cell values change, but you can't change these formats or redefine the conditions.
Add or change data validation	Cells continue to be validated when you type new values, but you can't change existing data validation settings.
Create or change charts or PivotChart reports	You can view existing charts and reports.
Insert or change pictures or other objects	You can view existing pictures and objects.
Insert or change hyperlinks	Existing hyperlinks continue to work.
Use drawing tools	You can view existing drawings and graphics.
Assign, change, or remove <a href="#">passwords</a>	Existing passwords remain in effect.
Protect or unprotect worksheets or the workbook	Existing protection remains in effect.
Create, change, or view scenarios	None
Group or outline data	You can continue to use existing outlines.
Insert automatic subtotals	You can view existing subtotals.
Create <a href="#">data tables</a>	You can view existing data tables.
Create or change	

PivotTable reports      You can view existing reports.

Write, record, change, view, or assign macros      You can run existing macros that don't access unavailable features. You can record shared workbook operations into a macro stored in another nonshared workbook.

Add or change Microsoft Excel 4 None dialog sheets

Change or delete [array formulas](#)      Existing array formulas continue to calculate correctly.

**Have you made any tracked changes?** When you turn on change tracking, Excel maintains information about changes from that point on. To view information about changes once they're being tracked, make some changes and then turn on change highlighting.

1. On the **Tools** menu, point to **Track Changes**, and then click **Highlight Changes**.
2. In the **When** box, click **Since I last saved**.
3. Clear the **Who** and **Where** check boxes.
4. Select the **Highlight changes on screen** check box, and then click **OK**.

To see the changes on the [History worksheet](#), save the workbook, and then display the History worksheet.

[How?](#)

1. On the **Tools** menu, point to **Track Changes**, and then click **Highlight Changes**.

If the **Track changes while editing** check box is not selected, Microsoft Excel has not recorded any [change history](#) for the workbook.

2. Select the **When** check box and click **All**.
3. Clear the **Who** and **Where** boxes.
4. Select the **List changes on a new sheet** check box.
5. Click **OK**, and then click the [filter](#) arrows next to the column labels on the [History worksheet](#) to find the information you want.

**Note** Saving the workbook removes the History worksheet. To view the History worksheet after saving, redisplay it.

[When I protect sharing, I can't set the number of change history days.](#)

When you use the **Protect and Share Workbook** command and apply a [password](#), Microsoft Excel does not erase the stored [change history](#) regardless of the number of days set to keep it.

If you don't specify a password, Excel uses the most recent settings for the change history, 30 days for a workbook that hasn't previously been saved with a different setting. You or other users can then increase but not decrease the number of days to keep the change history. Click **Share Workbook** on the **Tools** menu, click the **Advanced** tab, and then type a larger number in the **days** box.

[I want to track changes without sharing my workbook.](#)

Microsoft Excel can track changes only in [shared workbooks](#). When you turn on change tracking, you automatically share the workbook. As a result, the features and commands that are unavailable in shared workbooks can't be tracked either.

If you do not want to make the workbook available to others, keep it on your local hard disk, You can also assign a [password](#) to the workbook file before you turn on change tracking, to prevent others from opening it.

[How?](#)

## **Protect worksheet elements**

[Protect worksheet elements from all users](#)

1. Switch to the worksheet you want to protect.
2. Unlock any cells you want users to be able to change: select each cell or range, click **Cells** on the **Format** menu, click the **Protection** tab, and then clear the **Locked** check box.
3. Hide any formulas that you don't want to be visible: select the cells with the formulas, click **Cells** on the **Format** menu, click the **Protection** tab, and

then select the **Hidden** check box.

4. Unlock any graphic objects you want users to be able to change.

[How?](#)

You don't need to unlock buttons or controls for users to be able to click and use them. You can unlock embedded charts, text boxes, and other objects created with the drawing tools that you want users to be able to modify. To see which elements on a worksheet are graphic objects, click **Go To** on the **Edit** menu, click **Special**, and then click **Objects**.

1. Hold down CTRL and click each object that you want to unlock.
  2. On the **Format** menu, click the command for the object you selected: **AutoShape**, **Object**, **Text Box**, **Picture**, **Control**, or **WordArt**.
  3. Click the **Protection** tab.
  4. Clear the **Locked** check box, and if present, clear the **Lock text** check box.
5. On the **Tools** menu, point to **Protection**, and then click **Protect Sheet**.
  6. Type a [password](#) for the sheet.

**Note** The password is optional; however, if you don't supply a password, any user will be able to unprotect the sheet and change the protected elements. Make sure you choose a password you can remember, because if you lose the password, you cannot gain access to the protected elements on the worksheet.

7. In the **Allow all users of this worksheet to** list, select the elements that you want users to be able to change.
8. Click **OK**, and if prompted retype the password.

[Give specific users access to protected ranges](#)

You must have Windows 2000 or later to give specific users access to ranges.

1. On the **Tools** menu, point to **Protection**, and then click **Allow Users to Edit Ranges**. (This command is available only when the worksheet is not protected.)
2. Click **New**.
3. In the **Title** box, type a title for the range you're granting access to.
4. In the **Refers to cells** box, type an equal sign (=), and then type a reference or select the range.
5. In the **Range password** box, type a [password](#) to access the range.

The password is optional; if you don't supply a password, any user will be able to edit the cells.

6. Click **Permissions**, and then click **Add**.
7. Locate and select the users to whom you want to grant access. If you want to select multiple users, hold down CTRL while you click the names.
8. Click **OK** twice, and if prompted retype the password.
9. Repeat the previous steps for each range for which you're granting access.
10. To retain a separate record of the ranges and users, select the **Paste permissions information into a new workbook** check box.
11. Protect the worksheet: On the **Tools** menu, point to **Protection**, click **Protect Sheet**, make sure the **Protect worksheet and contents of locked cells** check box is selected, type a password for the worksheet, click **OK**, and retype the password to confirm.

**Note** A sheet password is required to prevent other users from being able to edit your designated ranges. Make sure you choose a password you can remember, because if you lose the password, you cannot gain access to the protected elements on the worksheet.

## Help protect workbook elements and files

## [Protect workbook elements](#)

1. On the **Tools** menu, point to **Protection**, and then click **Protect Workbook**.
2. Do one or more of the following:
  - To protect the structure of a workbook so that worksheets in the workbook can't be moved, deleted, hidden, unhidden, or renamed, and new worksheets can't be inserted, select the **Structure** check box.
  - To use windows of the same size and position each time the workbook is opened, select the **Windows** check box.
  - To prevent others from removing workbook protection, type a [password](#), click **OK**, and then retype the password to confirm it.

## [Protect a shared workbook](#)

1. If the workbook is already shared, and you want to assign a [password](#) to protect the sharing, unshare the workbook.

### [How?](#)

1. Have all other users save and close the [shared workbook](#). If other users are editing, they will lose any unsaved work.
2. Unsharing the workbook deletes the [change history](#). If you want to keep a copy of this information, print out the [History worksheet](#) or copy it to another workbook.

### [How?](#)

1. On the **Tools** menu, point to **Track Changes**, and then click **Highlight Changes**.
2. In the **When** box, click **All**.
3. Clear the **Who** and **Where** check boxes.

4. Select the **List changes on a new sheet** check box, and then click **OK**.

5. Do one or more of the following:

- To print the History worksheet, click **Print** .
- To copy the history to another workbook, select the cells you want to copy, click **Copy** , switch to another workbook, click where you want the copy to go, and click **Paste** .

**Note** You may also want to save or print the current version of the workbook, because this history might not apply to later versions. For example, cell locations, including row numbers, in the copied history may no longer be current.

3. On the **Tools** menu, click **Share Workbook**, and then click the **Editing** tab.
4. Make sure that you are the only person listed in the **Who has this workbook open now** box.
5. Clear the **Allow changes by more than one user at the same time** check box.

If this check box is not available, you must unprotect the workbook before clearing the check box.

[How?](#)

1. Click **OK**, point to **Protection** on the **Tools** menu, and then click **Unprotect Shared Workbook**.
  2. Enter the [password](#) if prompted, and then click **OK**.
  3. On the **Tools** menu, click **Share Workbook**, and then click the **Editing** tab.
6. When prompted about the effects on other users, click **Yes**.

2. Set other types of protection if you want: Give specific users access to ranges, protect worksheets, protect workbook elements, and set passwords for viewing and editing.
3. On the **Tools** menu, point to **Protection**, and then click **Protect Shared Workbook** or **Protect and Share Workbook**.
4. Select the **Sharing with track changes** check box.
5. If you want to require other users to supply a password to turn off the [change history](#) or remove the workbook from shared use, type the password in the **Password** box, and then retype the password when prompted.
6. If prompted, save the workbook.

#### [Protect a workbook file from viewing or editing](#)

1. On the **File** menu, click **Save As**.
2. On the **Tools** menu, click **General Options**.
3. Do either or both of the following:
  - If you want users to enter a [password](#) before they can view the workbook, type a password in the **Password to open** box, and then click **OK**.
  - If you want users to enter a password before they can save changes to the workbook, type a password in the **Password to modify** box, and then click **OK**.
4. When prompted, retype your passwords to confirm them.
5. Click **Save**.
6. If prompted, click **Yes** to replace the existing workbook.

## Highlighting changes

[I can see only recent changes.](#)

**Is change tracking turned off?** On the **Tools** menu, click **Share Workbook**, click the **Advanced** tab, and make sure the **Keep change history** option is available and selected. If change tracking has been turned off, you can only see changes made during your current editing session, since the last time you saved the [shared workbook](#).

**Did you specify only recent changes?** Make sure you're displaying the older [change history](#):

1. On the **Tools** menu, point to **Track Changes**, and then click **Highlight Changes**.
2. In the **When** box, click the option you want:

**Since I last saved** shows only those changes made after the last time you saved the workbook.

**Not yet reviewed** shows only changes that you and other users haven't accepted or rejected and then saved.

**Since date** shows only changes after the date you specify. Click **Since date**, and then type the date in the **When** box.

**All** shows you changes regardless of their age.

**Are you keeping enough history?** History that's older than the number of days you set is deleted whenever a user closes the workbook. To keep the change history for a long period of time, you can set a large number of days, such as 1,000. To extend the number of days to keep history, click **Share Workbook** on the **Tools** menu, click the **Advanced** tab, and then type a larger number in the **days** box.

[I don't see the changes I expect.](#)

**Turn on change tracking** If you turn off change tracking or stop sharing a

workbook, the [change history](#) is permanently deleted, and you can no longer view any changes.

### [How to turn on change tracking](#)

1. On the **Tools** menu, click **Share Workbook**, and then click the **Editing** tab.
2. Select the **Allow changes by more than one user at the same time** check box.
3. Click the **Advanced** tab.
4. Under **Track changes**, click **Keep change history for**, and in the **Days** box, type the number of days of [change history](#) that you want to keep.

Be sure to enter a large-enough number of days because Microsoft Excel permanently erases any change history older than this number of days.

5. Click **OK**, and if prompted to save the file, click **OK**.

**Note** Turning on change tracking also [shares](#) the workbook.

**Make sure other users have saved** When you save the workbook or receive an update, you receive only saved changes from other users, not changes that they haven't yet saved.

**Check which change types Microsoft Excel tracks** Excel doesn't track some types of changes, such as formatting changes and comments.

### [Changes Microsoft Excel doesn't track](#)

Change tracking records changes you make to cell contents, including moves and copies, and also row and column insertions and deletions. Microsoft Excel does not keep track of the following types of changes:

<b>Untracked change</b>	<b>Alternatives</b>
Change sheet names	Changes aren't highlighted on the sheet tabs, but are tracked in the <a href="#">History worksheet</a> .
Insert or delete worksheets	Changes to a worksheet after it's inserted are tracked, but the insertion itself is not tracked.
Format cells or data	None

Hide or unhide rows or columns	None
Add or change comments	None
Cells that change because a formula calculates a new value	To find cells that change due to recalculation, use the tools on the <b>Auditing</b> toolbar.
Unsaved changes	You can highlight changes as you make them, but changes appear in the History worksheet only after they're saved.

Change tracking is available only in [shared workbooks](#). As a result, features that are unavailable for use in shared workbooks also are not tracked as changes.

### [Features unavailable in shared workbooks](#)

You can access the following features only if you stop sharing the workbook.

You cannot use [shared workbooks](#) on Web servers.

<b>Unavailable feature</b>	<b>Alternatives</b>
Insert or delete blocks of cells	You can insert entire rows and columns.
Delete worksheets	None
Merge cells or split merged cells	None
Add or change conditional formats	Existing conditional formats continue to appear as cell values change, but you can't change these formats or redefine the conditions.
Add or change data validation	Cells continue to be validated when you type new values, but you can't change existing data validation settings.
Create or change charts or PivotChart reports	You can view existing charts and reports.
Insert or change	

pictures or other objects	You can view existing pictures and objects.
Insert or change hyperlinks	Existing hyperlinks continue to work.
Use drawing tools	You can view existing drawings and graphics.
Assign, change, or remove <a href="#">passwords</a>	Existing passwords remain in effect.
Protect or unprotect worksheets or the workbook	Existing protection remains in effect.
Create, change, or view scenarios	None
Group or outline data	You can continue to use existing outlines.
Insert automatic subtotals	You can view existing subtotals.
Create <a href="#">data tables</a>	You can view existing data tables.
Create or change PivotTable reports	You can view existing reports.
Write, record, change, view, or assign macros	You can run existing macros that don't access unavailable features. You can record shared workbook operations into a macro stored in another nonshared workbook.
Add or change Microsoft Excel 4 dialog sheets	None
Change or delete <a href="#">array formulas</a>	Existing array formulas continue to calculate correctly.

**Check your highlight settings** These settings also affect what's included on the [History worksheet](#). Point to **Track Changes** on the **Tools** menu, and click **Highlight Changes**. Make sure the **Highlight changes on screen** check box is selected, and check these settings:

- **When box** Click **All**, or clear the **When** check box, to view all available

changes for all time periods. **Since I last** saved shows only those changes made after the last time you saved the workbook. **Not yet reviewed** shows only changes that you and other users haven't accepted or rejected and then saved. **Since date** shows only changes after the date you specify.

- **Who box** **Everyone but me** shows you changes made by all other users but does not highlight your own changes. **Everyone**, or clearing the **Who** check box, shows changes from all users.
- **Where box** Enter a range to view changes only for that range. To view changes for the whole workbook, clear the **Where** check box.

[The Accept or Reject Changes command isn't available.](#)

- To make this command available, you must turn on change tracking.

[How?](#)

1. On the **Tools** menu, click **Share Workbook**, and then click the **Editing** tab.
2. Select the **Allow changes by more than one user at the same time** check box.
3. Click the **Advanced** tab.
4. Under **Track changes**, click **Keep change history for**, and in the **Days** box, type the number of days of [change history](#) that you want to keep.

Be sure to enter a large-enough number of days because Microsoft Excel permanently erases any change history older than this number of days.

5. Click **OK**, and if prompted to save the file, click **OK**.

**Note** Turning on change tracking also [shares](#) the workbook.

Changes you made before you turned on change tracking won't be available for review.

# History worksheet

[The checkbox for listing changes on a new sheet isn't available.](#)

- **Turn on change tracking** This option becomes available only after change tracking has been started.

[How to turn on change tracking](#)

1. On the **Tools** menu, click **Share Workbook**, and then click the **Editing** tab.
2. Select the **Allow changes by more than one user at the same time** check box.
3. Click the **Advanced** tab.
4. Under **Track changes**, click **Keep change history for**, and in the **Days** box, type the number of days of [change history](#) that you want to keep.

Be sure to enter a large-enough number of days because Microsoft Excel permanently erases any change history older than this number of days.

5. Click **OK**, and if prompted to save the file, click **OK**.

**Note** Turning on change tracking also [shares](#) the workbook.

**Save some changes** Once you are tracking changes, you must also make and save some changes to the workbook. The [History worksheet](#) lists only changes you've saved. You can highlight changes that you haven't yet saved, but these changes won't appear on the History worksheet until you save the workbook.

[Microsoft Excel won't display the History worksheet.](#)

**Save some changes** Once you turn on change tracking for a workbook, you or another user must also make and save some changes to the workbook. The [History worksheet](#) becomes available only after changes have been saved.

**Check your highlight settings** Your settings for the **When**, **Who**, and **Where** boxes determine what changes are listed on the History worksheet. If you aren't sure what type of changes have been saved, select all changes: point to **Track Changes** on the **Tools** menu, click **Highlight Changes**, clear all three of these check boxes, select the **List changes on a new sheet** check box, and then click **OK**.

[Changes are missing from the History worksheet.](#)

**Save, then redisplay the History worksheet** The [History worksheet](#) shows only your saved changes and changes other users saved before you last saved or received an update. If you receive an update after you display the History worksheet, the History worksheet is not updated until you redisplay it.

To see the most recent saved changes from other users, save the workbook, and then redisplay the History worksheet.

**Highlight your unsaved changes** You cannot view information about unsaved changes made by other users. You can highlight your own unsaved changes on the worksheet.

1. On the **Tools** menu, point to **Track Changes**, and then click **Highlight Changes**.
2. In the **When** box, click **Since I last saved**.
3. Clear the **Who** and **Where** check boxes.
4. Select the **Highlight changes on screen** check box, and then click **OK**.

[I can't format or edit the History worksheet.](#)

**Copy the history to a new worksheet** The [History worksheet](#) is available only for viewing, not formatting or editing.

1. On the **Tools** menu, point to **Track Changes**, and then click **Highlight Changes**.
2. In the **When** box, click **All**.
3. Clear the **Who** and **Where** check boxes.
4. Select the **List changes on a new sheet** check box, and then click **OK**.
5. Select the cells you want to copy and click **Copy**  on the **Standard toolbar**.

6. Switch to another worksheet, click where you want the copy to go, and click **Paste** .

When you copy the history, you may also want to save a separate copy of the [shared workbook](#). If the workbook continues to change as you or others work on it, the history that you copied may no longer apply. For example, cell locations, including row numbers, recorded in the copied history may no longer be current.

[The History worksheet disappears when I save.](#)

To see your saved changes, redisplay the [History worksheet](#). Microsoft Excel doesn't update the History worksheet once you display it. When you save, Excel deletes the History worksheet so that the information won't be out of date.

[Show All](#)

# Accept and reject changes

1. On the **Tools** menu, point to **Track Changes**, and then click **Accept or Reject Changes**.
2. If prompted to save the workbook, click **OK**.
3. Select the changes to review:

**Changes made after a particular date** Select the **When** check box, click **Since date**, and then type the earliest date for which you want to review the changes.

**Changes made by another user** Select the **Who** check box, and then click the user whose changes you want to review.

**Changes made by all users** Clear the **Who** check box.

**Changes to a specific area** Select the **Where** check box, and then enter a range reference, or select a range on the worksheet.

**Changes to the entire workbook** Clear the **Where** check box.

4. Click **OK** and begin reviewing the information about each change in the **Accept or Reject Changes** dialog box. The information includes other changes that are affected by the action you take for a change. You may need to scroll to see all of the information.

To accept or reject each change, click **Accept** or **Reject**. The [History worksheet](#) records a rejection with "Undo" or "Result of rejected action" in the Action Type column.

If prompted to select a value for a cell, click the value you want, and then click **Accept**.

## Notes

- You must accept or reject a change before you can advance to the next change.
- You can accept or reject all remaining changes at once by clicking **Accept**

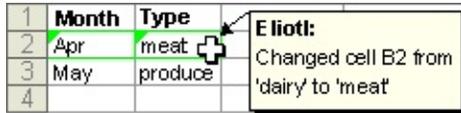
**All or Reject All.**

# Hide change highlighting

1. On the **Tools** menu, point to **Track Changes**, and then click **Highlight Changes**.
2. Clear the **Highlight changes on screen** check box.

**Note** Turning off change tracking also removes change highlighting.

# Highlight changes as you work



1	Month	Type	
2	Apr	meat	Eliott: Changed cell B2 from 'dairy' to 'meat'
3	May	produce	
4			

Microsoft Excel marks revisions, including insertions and deletions, with a highlight color.

1. On the **Tools** menu, point to **Track Changes**, and then click **Highlight Changes**.
2. Make sure the **Track changes while editing** check box is selected. This check box shares the workbook and turns on change tracking.
3. Select the **When** check box, click **Not yet reviewed**, and then click **OK**.
4. If prompted, save the workbook.
5. Make the changes you want on the worksheet. Some changes, such as formatting, aren't marked.

[Show All](#)

# Merge workbooks

1. Make sure the copies of the [shared workbook](#) that you want to merge are all stored in the same folder. To do this, you must give each copy a different name.
2. Open the copy into which you want to merge changes.
3. On the **Tools** menu, click **Compare and Merge Workbooks**.
4. If prompted, save the workbook.
5. In the **Select Files to Merge into Current Workbook** dialog box, click a copy that has changes to be merged, and then click **OK**.

To merge more than one copy at the same time, hold down CTRL or SHIFT and click the file names, and then click **OK**.

[Show All](#)

# Troubleshoot merging workbooks

[The workbooks I want to combine won't merge.](#)

**Requirements for merging** Both workbooks must meet the following requirements:

- Be copies of the same workbook, which must have been a [shared workbook](#).
- Have different file names.
- Either not have [passwords](#), or both have the same password.
- Have change tracking in effect continuously from when the copies were made.
- Keep [change history](#) back at least as far as the date when the copies were made.

For example, if the change history is being kept in the workbooks for 30 days, and the copies were made 45 days ago, you can no longer merge the workbooks.

**Plan ahead for later merging** When you turn on change tracking but aren't sure when you'll merge the workbooks, set a large number of days for the history, up to the maximum of 32,767 days.

**Merge changes manually** If the workbooks still won't merge, you can incorporate the information from one workbook into another manually, by copying and pasting from one workbook to another.

[After merging, I don't see the changes I expect.](#)

**Changes appear from the last workbook merged** Changes in the last workbook you merge replace any conflicting changes in the workbook you're merging into. If you merge more than one workbook at once, the workbooks are merged in the order in which they appear in the **Select Files to Merge into Current Workbook** dialog box. The changes from each successively merged workbook replace previously merged changes.

**View the replaced changes** The [History worksheet](#) lists information about conflicting changes that were replaced.

1. On the **Tools** menu, point to **Track Changes**, and then click **Highlight Changes**.
2. In the **When** box, click **All**.
3. Clear the **Who** and **Where** check boxes.
4. Select the **List changes on a new sheet** check box, and then click **OK**.
5. On the History worksheet, scroll to the right to view the Action Type and Losing Action columns. Conflicting changes that were kept in a merge have "Won" in the Action Type column. The row numbers in the Losing Action column identify the rows with information about the conflicting changes that weren't kept, including any deleted data.

**Review the changes** You can accept some of the changes from the merged copy and reject others.

[How?](#)

1. On the **Tools** menu, point to **Track Changes**, and then click **Accept or Reject Changes**.
2. If prompted to save the workbook, click **OK**.
3. Select the changes to review:

**Changes made after a particular date** Select the **When** check box, click **Since date**, and then type the earliest date for which you want to review the changes.

**Changes made by another user** Select the **Who** check box, and then click the user whose changes you want to review.

**Changes made by all users** Clear the **Who** check box.

**Changes to a specific area** Select the **Where** check box, and then enter a range reference, or select a range on the worksheet.

**Changes to the entire workbook** Clear the **Where** check box.

4. Click **OK** and begin reviewing the information about each change in the **Accept or Reject Changes** dialog box. The information includes other

changes that are affected by the action you take for a change. You may need to scroll to see all of the information.

To accept or reject each change, click **Accept** or **Reject**. The [History worksheet](#) records a rejection with "Undo" or "Result of rejected action" in the Action Type column.

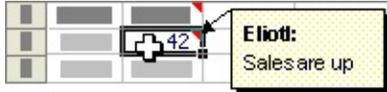
If prompted to select a value for a cell, click the value you want, and then click **Accept**.

## Notes

- You must accept or reject a change before you can advance to the next change.
- You can accept or reject all remaining changes at once by clicking **Accept All** or **Reject All**.

[Show All](#)

# About comments



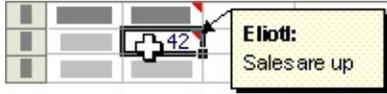
A comment is a note that you attach to a cell, separate from other cell content. Comments are useful as reminders to yourself, such as noting how a complex formula works, or to provide feedback to other users.

**Viewing comments** Microsoft Excel provides several ways to view comments. Cells with comments have indicator triangles in the upper-right corners. If you rest the pointer over a cell that has an indicator, its comment appears. You can also display comments continuously— either individual comments or all the comments on the worksheet. The **Reviewing** toolbar steps you through each comment in a workbook in sequence. You can also print out the comments, either in place on the worksheet or as a list at the end of the printout.

**User names in comments** Comments are identified by user name, so that you can tell who entered each comment in a [shared workbook](#) or a workbook being routed to several users for review. When you merge changes from several workbooks, the comments are also combined so all comment text for a cell appears in sequence.

[Show All](#)

# Add a comment to a cell



Comments are notes that you enter for a cell.

1. Click the cell you want to comment on.
2. On the **Insert** menu, click **Comment**.
3. In the box, type the comment text.

If you don't want your name in the comment, select and delete the name.

4. When you finish typing the text, click outside the comment box.

**Note** When you sort, comments are sorted along with the data. In [PivotTable reports](#), however, comments do not move when you change the layout of the report.

# Copy comments

1. Select the cells you want to copy.
2. Click **Copy** .
3. Select the upper-left cell of the paste area.
4. On the **Edit** menu, click **Paste Special**.
5. Click **Comments**.
6. Do not press ENTER after you click **OK**. If you do, the entire cells within the moving border are copied to the paste area. To cancel the moving border, press ESC.

**Note** Copied comments replace any existing comments in the destination cells.

# Delete comments

## Selected comments

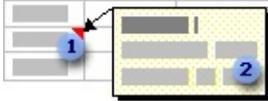
1. Select the cells containing the comments you want to delete.
2. On the **Edit** menu, point to **Clear**, and then click **Comments**.

## All comments on a worksheet

1. On the **Edit** menu, click **Go To**.
2. Click **Special**.
3. Click **Comments**, and then click **OK**.
4. On the **Edit** menu, point to **Clear**, and then click **Comments**.

[Show All](#)

# Display or hide comments and their indicators



1 Indicator

2 Comment

[All comments and indicators](#)

1. On the **Tools** menu, click **Options**, and then click the **View** tab.
2. Do one of the following:

To hide both comments and indicators throughout the workbook, click **None** under **Comments**.

To show indicators but display comments only when you rest the pointer over their cells, click **Comment indicator only**.

To display both comments and indicators, click **Comments & indicator**.

[Individual comments](#)

1. Right-click the cell containing the comment indicator.
2. To display or hide a comment, click **Show Comment** or **Hide Comment**.

[Tip](#)

To redisplay all individually hidden comments, click **Comments** on the **View** menu.

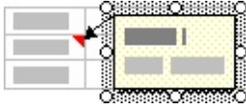
# Edit a comment

1. Click the cell with the comment you want to edit.
2. On the **Insert** menu, click **Edit Comment**.
3. When you finish editing, click outside the comment box.

[Show All](#)

# Format a comment

1. Right-click the cell with the comment you want to change, and then click **Show Comment** on the shortcut menu.
2. Click the border of the comment box so that [handles](#) appear.



3. Do one or more of the following:

[Change the text font or color](#)

1. Click **Comment** on the **Format** menu.
2. Click the **Font** tab.
3. Click the options you want.

[Change the background color](#)

To change the current comment, click the arrow beside **Fill Color**  on the **Formatting** toolbar, and then click the color you want.

**Note** To change the default color for new comments, use the Display icon on the Microsoft Windows Control Panel to change the ToolTip color (does not affect previously entered comments).

[Change the border color or thickness, or make it dashed](#)

1. Click **Comment** on the **Format** menu.
2. Click the **Colors and Lines** tab.
3. Click the options you want.

[Change the shadow or use a 3-D effect](#)

To change the shadow, click **Shadow Style**  on the **Drawing** toolbar, and then click the option you want. Click **Shadow Settings** for more options.

To use a 3-D effect instead of a shadow, click **3-D Style**  on the **Drawing** toolbar, and then click the option you want. Click **3-D Settings** for more options.

 [Change the shape](#)

1. On the **Drawing** toolbar, click **Draw**.
2. Point to **Change Autoshape**, and then point to the type of shape you want.
3. Click the shape you want.

[Show All](#)

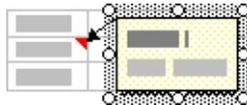
# Print comments

1. Click the worksheet.
2. If you want to print the comments in place on the worksheet, display the comments you want to print.

To display an individual comment, right-click its cell and then click **Show Comment** on the shortcut menu. To display all comments, click **Comments** on the **View** menu. Move and resize any overlapping comments as necessary.

 [How?](#)

1. Click the border of the comment box so that [handles](#) appear:



2. Do one or more of the following:

To move the comment, drag the border of the comment box.

To change the size, drag the handles on the sides and corners of the comment box.

3. On the **File** menu, click **Page Setup**, and then click the **Sheet** tab.
4. Do one of the following:

To print the comments where they appear on the worksheet, click **As displayed on sheet** in the **Comments** box.

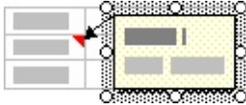
To print the comments at the end of the sheet, click **At end of sheet** in the **Comments** box.

5. Click **Print**.

[Show All](#)

# Resize or move a comment

1. Right-click the cell with the comment you want to change, and then click **Show Comment** on the shortcut menu.
2. Click the border of the comment box so that [handles](#) appear.



3. Do one of the following:

**Change the size** Drag the handles on the sides and corners of the comment box.

**Move the comment** Drag the border of the comment box.

If you hide and redisplay the comment, it returns to its default position.

# Review all comments in a workbook

1. On the **View** menu, click **Comments**.
2. To review each comment, do one or more of the following:

To view in sequence, starting from the selected cell, click **Next Comment**  on the **Reviewing** toolbar.

To view in reverse order, click **Previous Comment** .

[Show All](#)

# Troubleshoot comments

 [Part of my comment doesn't appear.](#)

**Unfreeze panes** If the comment appears at the top of the window or worksheet and the bottom or right half of the comment is cut off, you may have frozen panes. To view the entire comment, click **Unfreeze Panes** on the **Window** menu.

**Enlarge the comment box** Right-click the cell that contains the comment, click **Edit Comment** on the shortcut menu, and then drag the [handles](#) until you can see all of the comment text.

 [I don't want my name in the comments.](#)

To prevent your name from appearing in a comment, select your name and then press the DELETE key.

You can change the name that appears when you insert new comments, but you can't keep Microsoft Excel from including your user name. To change the name, click **Options** on the **Tools** menu, click the **General** tab, and type the name you want in the **User name** box. If you delete this name, Excel uses the default user name you've established for your computer.

Keep in mind that Excel also uses the user name for sharing workbooks and for identifying users when files containing multiple changes are merged.

 [Comments in a PivotTable report don't stay with their cells.](#)

Comments in a PivotTable report remain anchored to the cells where you entered them, not to the data in a cell. If you change the layout of the report so that the data values move to different cells, the comments do not move with the data.

[Show All](#)

# Copy a Word table into Excel

1. In Microsoft Word, select the rows and columns of the table you want to copy.

If you want to select the entire table, click the table, point to **Select** on the **Table** menu, and then click **Table**.

2. Click **Copy**  on the **Standard toolbar**.
3. Switch to your Microsoft Excel worksheet.
4. Click in the upper-left corner of the worksheet area where you want to paste the table.

Cells from the copied table replace any existing cells in the area.

5. Click **Paste** .
6. To adjust the formatting, click **Paste Options**  next to the data, and then click **Match Destination Formatting** to use any formatting that was previously applied to the Excel cells, or **Keep Source Formatting** to match the formatting of the Word table as closely as possible.

**Note** Excel pastes the contents of each cell in the Word table to a separate Excel cell. If you want to split the data in the cells further, for example to divide first and last names so they're in separate cells, use the **Text to Columns** command on the **Data** menu.

[Show All](#)

# Copy Excel data and charts to Word or PowerPoint

1. Select the data or chart you want to copy.
2. Click **Copy** .
3. Switch to Microsoft Word or Microsoft PowerPoint.
4. Click in the document or presentation where you want to put the Microsoft Excel data or chart, and do one of the following:

## [Paste the data into Word](#)

1. Click **Paste**  on the **Formatting toolbar**.
2. Click **Paste Options**  next to the data, and then do one of the following:

To paste the data as a Word table, click **Match Destination Table Style** or **Keep Source Formatting**.

To paste a link to the Excel data, so that the data in the Word document is updated whenever you change the data in the original Excel workbook, click **Match Destination Table Style and Link to Excel** or **Keep Source Formatting and Link to Excel**.

To paste the data as text with each row in a separate paragraph and tabs separating the cell values, click **Keep Text Only**.

## [Paste a chart into Word](#)

1. Click **Paste**  on the **Formatting toolbar**.
2. Click **Paste Options**  next to the chart, and then do one of the following:

To paste the chart as a chart, so that when you double-click the chart in the Word document you can use Excel to edit it, click **Excel Chart**.

To paste a link to the Excel chart, so that the chart in the Word document is updated whenever you change the chart in the original Excel workbook, click **Link to Excel Chart**.

To paste a bitmap picture of the chart, click **Picture of Chart**.

#### [Paste the data into PowerPoint](#)

- On the **Edit** menu, click **Paste Special**, and then do one of the following:

To paste the data as an Excel range, so that when you double-click the range in the presentation you can edit it with Excel, click **Microsoft Excel Worksheet Object**. If data is cut off, double-click the object and resize the columns to show all the data.

To paste a link to the Excel data, so that the data in the presentation is updated whenever you change the data in the original Excel workbook, click **Paste link**, and then click **Microsoft Excel Worksheet Object**.

To paste the data as text that you can edit in PowerPoint, click **Formatted Text (RTF)** or **Unformatted Text**.

To paste a bitmap picture of the data, click **Picture** or **Bitmap**.

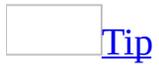
#### [Paste a chart into PowerPoint](#)

- On the **Edit** menu, click **Paste Special**, and then do one of the following:

To paste the chart as a chart, so that when you double-click the chart in the presentation you can use Excel to edit it, click **Microsoft Excel Chart Object**.

To paste a link to the Excel chart, so that the chart in the presentation is updated whenever you change the chart in the original Excel workbook, click **Paste link**, and then click **Microsoft Excel Chart Object**.

To paste a bitmap picture of the chart, click **Picture**.



If you want a range of Excel data that you've pasted into Word or PowerPoint to expand when the data expands in Excel, [name](#) the range in Excel before you copy it, and then paste a link to the named range.

[Show All](#)

# Create a Word mail merge with Excel data

1. In Microsoft Excel, set up the data to use in the mail merge.

[How?](#)

1. Make sure the data is in [list](#) format: each column has a label in the first row and contains similar facts, and there are no blank rows or columns within the list. You'll use the column labels to specify what data goes where in the mail merge.
2. Make sure the column labels clearly identify the type of data in the column; this helps you select the right data as you construct the mail merge. For example, labels such as First Name, Last Name, Address, and City are better than Column 1, Column 2, Column 3, and Column 4.
3. Make sure you have a separate column for each element that you want to include in the mail merge. For example, if you're creating form letters and want to use each recipient's first name in the body of the letter, make sure you have a column that contains first names, rather than a single column with both first and last names. If you want to refer to each recipient by title and last name, such as Mr. Smith, you can use a single column containing both titles and last names, or use one column for title and another for last name.
4. To make the list easy to find when you select it for the mail merge, give it a [name](#):

[How?](#)

1. Select the entire list.
  2. On the **Insert** menu, point to **Name**, and then click **Define**.
  3. Type a name for the list.
  4. Click **Add**, and then click **Close**.
2. Save and close the workbook that contains the data.
  3. Switch to Microsoft Word.

4. On the **Tools** menu, point to **Letters and Mailings**, and then click **Mail Merge Wizard**.
5. In the first two steps of the Mail Merge Wizard, select the document type and start the document. If you're creating mailing labels, click **Labels** in Step 1, and then click **Label options** in Step 2 to select the size and type of labels to print.

For more information about these steps, see Word Help.

6. In the third step, under **Select recipients**, click **Use an existing list**, and then click **Browse**.
7. In the **Look in** list, click the folder in which you saved the workbook with your data, click the workbook, and then click **Open**.
8. In the **Select Table** dialog box, locate and click your list. Make sure the **First row of data contains column headers** check box is selected, and then click **OK**.
9. In the **Mail Merge Recipients** dialog box, click any column labels in your data that correspond to the Word identifiers on the left. This step makes inserting your data in the form documents easier. For more information about matching fields, see Word Help.
10. If you want to include only selected recipients in the mail merge, click **Edit recipient list** and select the recipients you want.
11. Use the rest of the wizard steps to write, add recipient information, preview, personalize, save, and print or e-mail your documents. For information about these steps, see Word Help.

## Notes

- While Word has your workbook open to create the mail merge, you can't open the workbook in Excel. If you need to see the data and its column labels, go to Step 3 or 5 of the wizard and click **Edit recipient list**.
- You can continue to use mail merges with Excel data that you created in earlier versions of Word. To open and use these mail merges in Word 2002 or later, you'll need to install Microsoft Query. Query is no longer required to create new mail merges in Word 2002 or later.

[Show All](#)

# About exchanging data between Excel and Access

 [Working with Microsoft Access data in Microsoft Excel](#)

## Copy Access records to Excel

- From Access, you can copy data from any datasheet view or data access page control and then paste the data into Excel. Use this method when you want a static snapshot of a few selected Access records.
- You can also save the data from an Access [table](#), [query](#), form, or report to an Excel workbook. Use this method to make a static copy of large amounts of Access data.

**Note** Use these methods when you don't need to [refresh](#) the data in Excel every time the Access database changes.

 [Using Access to manage Excel data](#)

**Link Excel data into an Access database** You can link an Excel range into an Access database as a [table](#). Use this approach when you plan to continue maintaining the range in Excel but also want it to be available from within Access. You can view data in the linked Excel range from within the Access database. You create this type of link from within the Access database, not from Excel. For more information, see Access Help.

**Import Excel data into an Access database** If you're working in Access and want to copy data from an Excel workbook into your database, you can import the data into Access. Use this method to bring a copy of a small amount of data that you intend to continue maintaining in Excel into an existing Access database, without having to retype the data.

**Convert an Excel range to an Access database** If you have a large Excel range that you want to move permanently to an Access database, in order to take

advantage of the Access data management capabilities, security, or multiuser capabilities, you can convert the data from Excel to an Access database. Use this method when you want to move the data from Excel into Access and use and maintain the data in Access from then on.

**Create an Access report from Excel data** If you are familiar with designing Access reports and want to summarize and organize your Excel data in this type of report, you can create an Access report from the data in your Excel range. For more information about designing and using Access reports, refer to Access Help.

**Use an Access form to enter Excel data** If you want to use a customized form to enter, find, or delete data in an Excel range, you can create an Access form for your range. For example, you can create an Access form that lets you type the entries for an Excel range in a different order from the order of the columns on your worksheet. Use this method if you want specific features available in Access forms. For more information about designing and using Access forms, refer to Access Help.

[Show All](#)

# Copy Access data into Excel

Decide whether you want to analyze an entire table or query or all of the data behind a form or report, or copy only selected records.

Do one of the following:



## [Copy an entire set of data to Microsoft Excel](#)

1. In the Database window in Microsoft Access, click the table, query, form, or report you want to use in Excel.
2. On the **Tools** menu, point to **Office Links**, and then click **Analyze It With MS Excel**.

Access saves the contents of the table, query, form, or report as a Excel workbook (.xls) file and opens the file in Excel. The file is saved with the name of the table, query, or other database object in the current [working folder](#).

**Note** If you have a main form with one or more subforms or a main report with one or more subreports, Access saves only the data in the main form or report to the workbook.



## [Copy selected records to Excel](#)

1. In Microsoft Access, open the table, query, or form that contains the records you want to copy.
2. On the **View** menu, click **Datasheet View**.
3. Select the records you want to copy.

If you want to select specific columns, drag across adjacent column headings.

4. Click **Copy** .
5. Switch to Excel.
6. Click in the upper-left corner of the worksheet area where you want the first

field name to appear.

To ensure that the copied records do not replace existing records, make sure that the worksheet has no data below or to the right of the cell you click.

7. Click **Paste** .
8. You may need to adjust the row height of data you paste onto your worksheet. Do one of the following:
  - Select the rows, click **Cells** on the **Format** menu, click the **Alignment** tab, and then clear the **Wrap text** check box.
  - On the **Format** menu point to **Row**, and click **AutoFit**.

[Show All](#)

# Import Excel data to an Access database

1. Make sure the Microsoft Excel data is in [list](#) format: each column has a label in the first row and contains similar facts, and there are no blank rows or columns within the list.
2. Close the Excel workbook that contains the data you want to use in Microsoft Access.
3. In Access, open the database where you want to copy the Excel data.
4. On the Access **File** menu, point to **Get External Data**, and then click **Import**.
5. In the **Import** dialog box, click **Microsoft Excel** in the **Files of type** box.
6. In the **Look in** list, locate the file you want to import, and then double-click the file.
7. Follow the directions in the Import Spreadsheet Wizard.

For more information about this wizard and Access, click **Display Help** after the wizard is finished.

[Show All](#)

# Troubleshoot exchanging data between Excel and Access

If the **View MS Access Form** or **View MS Access Report** button on your worksheet doesn't work, try the following:

- **Locate the Microsoft Access database** The database that contains the form or report may have been moved. In the **Create Microsoft Access Form** or **Create Microsoft Access Report** dialog box, click **Browse** to find the Access .mdb file. If you created a new database for the form, the .mdb file should have the same name as the workbook file.
- **Check whether the form or report was deleted** Microsoft Excel allows you to have only one Access form and one Access report for each worksheet range. If you create a new form or report after deleting the existing form or report from the database, a second **View MS Access Form** or **View MS Access Report** button is added to the worksheet. You can delete the first button that no longer works by holding down the CTRL key, clicking the button, and then pressing DELETE.
- **Check whether the workbook was renamed or moved** If you rename or move the workbook file, the button no longer works. You can restore the original name of the workbook file by changing the file name back to the name it had when you created the form or report, and then moving the file back to the folder it was in when you created the form or report.
- **Unprotect the worksheet if it's protected** On the **Tools** menu, point to **Protection**, and click **Unprotect Sheet**. Remember to protect the worksheet when you are finished with it.
- **Check the names of the Access table and form or report** The name of the [table](#), form, or report for the Excel range in the Access database may have been changed. To restore the name, click the name of the table, form, or report in the database window two times, and then type the correct name. The name must be in the following form:

workbookname\_sheetname\_List

Underscores are used for any spaces in the workbook or worksheet names. For example, if your range is on Sheet 1 in workbook Office Supplies, the table, form, or report should be named Office\_Supplies\_Sheet\_1\_List. If your Excel range is a [named](#) range, this name is used instead of List.

[Show All](#)

# About using e-mail and Outlook features in Excel

From within Microsoft Excel, you can use e-mail to send whole workbooks, worksheets, or ranges of data, including charts and [PivotTable reports](#). You can send individual messages or route workbooks to a series of recipients, and Excel can help you send workbooks for review and gather and merge the comments.

## [Programs you need to send and view e-mail](#)

**To send e-mail from Excel** To send data as an attachment, you need Microsoft Outlook, Microsoft Outlook Express, Microsoft Exchange Client, or another 32-bit e-mail program compatible with the Messaging Application Programming Interface (MAPI). Make sure Mapi32.dll is in the Windows System folder. To send Excel data as the body of a message, you need Outlook 2000 or later.

Some customization options, such as message tracking and voting, are available only if you're using Microsoft Exchange Server.

**To view e-mail sent from Excel** To view attached workbooks, recipients need Excel 97 or later. To view Excel data sent as the body of a message, recipients need a Web browser or e-mail program (such as Outlook 98 or later) that can read documents in HTML format.

## [Deciding how to send your data](#)

**Sending data as the body of a message or as an attachment** Send Excel data as the body of a message when you want the recipients to get a range of data, a chart, or a [PivotTable report](#), rather than an entire workbook. This approach results in a smaller message than if you attach an entire workbook.

Send the data as an attachment when you want recipients to get a whole workbook that they can open and edit in Excel. You can send workbooks as attachments from within Excel or directly from many e-mail programs.

If a recipient is using Microsoft Office 97 or earlier, it is better to send the data as an attachment. If you send Excel data as the body of a message, its formatting is lost.

**Sending data versus routing data** When you send data from Excel, each recipient gets a separate copy of the message and any attachments.

When you route the data, you can only send the data as an attachment, and each recipient gets the message in turn. Use this method if you want each recipient to make changes to the workbook in Excel and see changes made by the previous recipients. You can turn on change tracking to allow each recipient to see who made each change. As the workbook is routed, you can track its status. After the last recipient makes changes, the attached workbook with all changes can be returned to you.

For routing to work, all recipients must use Microsoft Outlook as their e-mail program.

**Sending for review** If you want to circulate Excel data to several people for review and comment, and want Excel to help you track this process, you can send the data to mail recipients for review. The Send for review feature is similar to using a wizard that organizes the steps for you, making sure you've turned on change tracking and helping you merge changes from any separate copies that are returned to you.



### [Customizing your e-mail message](#)

If Microsoft Outlook is your e-mail program and you're sending (not routing) Excel data, you can set the following message options.

**Importance and sensitivity level** You can set the level of importance for a message to indicate whether the recipient needs to read your message immediately. If you want a reply to your message by a certain time, you can set a flag to remind the recipient to respond. You can also mark the sensitivity of the message content as private, personal, or confidential.

**Security level** If you and the recipients of your messages use Microsoft Exchange Server, you can help add security to a message by adding a [digital signature](#) or by sealing (encrypting) a message to ensure that it isn't readable by

anyone other than the recipients you select.

You must obtain a keyword to your [security file](#) from your system administrator to seal or digitally sign a message, and the recipients of your message must provide their passwords to open your sealed message or verify your digital signature.

These security features apply only within your organization and only if you and the recipients of your messages use Exchange Server. Your system administrator must set up the security features on your computers.

**Tracking options** You can track your messages by receiving notification when your message is delivered or opened.

**Delivery options** You can set delivery options that determine how and when your message is sent.

- Set an expiration date.
- Have replies to your messages automatically go to another user.
- Delay delivery of the message.
- Automatically save them in an Outlook folder.

**Categories** To track and organize messages by a common element, you can assign messages to categories, such as Business, Key Customer, Personal, Gifts, or Goals/Objectives. Categories allow you to find, sort, filter, and group messages. For more information about categories, see Outlook Help.

#### [Posting workbooks to Microsoft Exchange public folders](#)

When you want to make a workbook available to others but you don't want to send it through e-mail, you can post a copy of the workbook to a Microsoft Exchange [public folder](#).

#### [Tracking Excel activity in Microsoft Outlook](#)

**Tasks** You can use your Outlook task list to track tasks involving Excel workbooks, including recurring tasks. You can add a task for a workbook to your

task list from within Excel. For example, if you need to review a workbook by a certain date, you can open the workbook in Excel and then add the review to your task list. You can also use Outlook to assign tasks that others must perform for a workbook or file.

**Recording workbook activity** By using the Outlook Journal, you can automatically record work activity— for example, when each workbook was created or revised— for all workbooks. To track work for a single workbook, you can manually record the activity in the Outlook Journal.

**Linking workbooks with a contact** You can link workbook tasks, workbook journal entries, and workbooks to a contact person so that you can keep track of all items related to that contact. For example, if you want to track a workbook by the name of the person who is responsible for it, you can link contact information to a workbook and to other related items, such as e-mail messages and appointments. For more information about linking tasks, journal entries, and workbooks to a contact, see Outlook Help.

[Show All](#)

# Create an Outlook task for a workbook

These steps allow you to create a task for yourself. If you want to e-mail a task to someone else, use Microsoft Outlook rather than Microsoft Excel. For more information, see Outlook Help.

1. Open the workbook for which you want to add the task.
2. On the **Reviewing** [toolbar](#), click **Create Microsoft Outlook Task** .
3. On the **Task** tab, enter the subject, dates, status, priority, and reminder for the task.

For more information about task options, see Outlook Help.

4. Click **Save and Close** .

**Note** Once you create the task, you can open it in Outlook. For more information, see Outlook Help.

[Show All](#)

# Send a workbook or worksheet in e-mail

1. Open the workbook you want to send.
2. Do one of the following:

## [Send the entire workbook as an attachment](#)

1. On the **File** menu, point to **Send To**, and then click **Mail Recipient (as Attachment)**.
2. If you want, you can include an additional file.

## [How?](#)

1. In the message, click **Attach**.
2. Click a [shortcut](#) on the [Places Bar](#) or, in the **Look in** box, click the drive, folder, or Internet location that contains the file you want to include.
3. Click the file you want to include, and then click **Insert**.
4. Repeat steps for each additional file you want to include.

## [Send a selection or a worksheet as a message](#)

1. If you want to send specific cells on a worksheet, select the cells you want to send.
2. On the **File** menu, point to **Send To**, and then click **Mail Recipient**.
3. If prompted whether to send the entire workbook or just the current sheet, click **Send the current sheet as the message body**.
3. In the **To** and **Cc** boxes, enter recipient names, separated by semicolons.
4. If you want to verify names you've typed against your address book, click

## Check Names .

5. Type a subject in the **Subject** box.
6. If you are sending Microsoft Excel data as a message, you can include explanatory text. Type your text in the **Introduction** box.
7. If Microsoft Outlook is your mail program, you can customize the message.

[How?](#)

These options are available when you have an e-mail message open and you are using Microsoft Outlook.

## 1. Importance and sensitivity level

### [Change the importance level](#)

- To mark as very important, click **Importance: High** .
- To mark as not important, click **Importance: Low** .

### [Set a message flag](#)

Flagging a message adds a flag icon to it. You can use the flags to remind yourself to follow up on an issue or to indicate a request for someone else. You can also use flags to set a reminder for the message.

1. Click **Message Flag** .
2. In the **Flag to** box, click the flag you want, or type your own.
3. Enter a date and time in the **Due by** boxes.

### [Mark a message as private, personal, or confidential](#)

1. In the message, click **Options** .
2. In the **Sensitivity** box, click the option you want.

**Note** Marking a message **Private** prevents the message from being modified after you send it.

## 1. **Security level**

 [Help add security to messages](#)

1. In the message, click **Options** .
2. Under **Security**, click **Security Settings**.
3. Set the desired options.

## 1. Track messages and replies

### [Receive notification when a message is read or delivered](#)

1. In the message, click **Options** .
2. Under **Voting and tracking options**, select the **Request a delivery receipt for this message** or **Request a read receipt for this message** check box.

### [Add voting buttons to an e-mail message](#)

This feature requires Microsoft Exchange.

1. In the message, click **Options** .
2. Select the **Use voting buttons** check box, and then click the voting button names you want to use in the box.

To create your own voting button names, delete the default button names, and then type any text you want. Separate the button names with semicolons.

3. Under **Delivery options**, select the **Save sent message to** check box. To select a folder other than the **Sent Items** folder, click **Browse**.

### [Save a copy of this message to a folder other than Sent Items](#)

1. In the message, click **Options** .
2. Under **Delivery options**, select the **Save sent message to** check box.
3. Click **Browse**, and then click the folder you want.

### [Assign a message to a category](#)

A category is a keyword or phrase that helps you keep track of [items](#) so you can easily find, sort, filter, or group them.

1. In the message, click **Options** .

2. Click **Categories**.
3. In the **Available categories** list, select the check boxes next to the categories you want, and then click **OK**.

## 1. Delivery options

[Make a message unavailable after a specified date](#)

1. In the message, click **Options** .
2. Under **Delivery options**, select the **Expires after** check box, and then enter the expiration date you want.

[Delay delivery of the message](#)

1. In the message, click **Options** .
  2. Under **Delivery options**, select the **Do not deliver before** check box, and then enter the delivery date and time you want.
2. Click **Send**, **Send this Sheet**, or **Send this Selection** .

[Show All](#)

# Share contact data between Excel and Outlook

Do one or both of the following:

[Export Microsoft Excel names and addresses to Microsoft Outlook](#)

1. Select the data you want to export and create a [named](#) range of cells.

[How?](#)

1. Select the range of cells that you want to name.
2. Click the **Name** box at the left end of the [formula bar](#) .



 Name box

3. Type the name for the cells.
4. Press ENTER.

**Note** You cannot name a cell while you are changing the contents of the cell.

2. Close the workbook that contains the range you want to export.
3. Start Outlook.
4. On the **File** menu, click **Import and Export**.
5. In the Import a File Wizard, click **Import from another program or file**, and then click **Next**.
6. In the **Select file type to import from** box, click **Microsoft Excel**, and then click **Next**.
7. Click **Browse**, select the file you want to import, click **OK**, and then click **Next**.
8. Select the Contacts folder and click **Next**.
9. If necessary, map fields from the file you are importing to Outlook fields.

## [How?](#)

1. Click **Map Custom Fields**.
2. In the **From** box, drag the field you want to convert onto the Microsoft Outlook field listed in the **To** box.
  - If you want to see additional records in the **From** box, click **Previous** or **Next**.
  - If you want to remove all mapping, click **Clear Map**.
  - If you want to reset the original mapping, click **Default Map**.
3. To display additional fields in the **To** box, click the plus sign (+) next to the field. For example, to display the **Business Street** and **Business City** fields, click the + next to **Business Address**.
4. If no field exists in the **To** box that would accommodate a field you are importing, you can create a new custom field. Click **Add a Custom Field**, and specify the field name in the **New Field** dialog box. You can create as many custom fields as you need.
5. Click **OK**.
10. Click **Finish**.

## [Import Outlook contacts into Excel](#)

1. Start Outlook.
2. On the **File** menu, click **Import and Export**.
3. Click **Export to a file**, and then click **Next**.
4. In the **Create a file of type** box, click **Microsoft Excel**, and then click **Next**.
5. In the **Select folder to export from** box, click **Contacts**, and then click **Next**.
6. Type a name for the file, click **Next**, and then click **Finish**.
7. In Excel, open the file you created in the previous step.

## [Tip](#)

If you want to create a Microsoft Word mail merge from your Outlook contacts, you can do so without importing the contacts into Excel. Microsoft Word 2002 or later can access your contacts directly from Outlook. For more information, see Word Help.

[Show All](#)

# Troubleshoot sending e-mail from Excel

[The recipient commands don't appear on the \*\*Send To\*\* submenu of the \*\*File\*\* menu](#)

Make sure you have installed Microsoft Outlook, Microsoft Outlook Express, Microsoft Exchange Client, or another 32-bit e-mail program compatible with the Messaging Application Programming Interface (MAPI).

If you have installed Microsoft Exchange or a compatible e-mail program, make sure Mapi32.dll is in the Windows System or System32 folder.

If you have installed Lotus cc:Mail or a compatible e-mail program, make sure Mapivi32.dll, Mapivitk.dll, and Mvthksrv.exe are in the Windows System or System32 folder.

[The e-mail button doesn't appear on the standard toolbar](#)

If you don't have an e-mail program (such as Microsoft Outlook) installed on your computer, the **E-mail** button  does not appear on the standard toolbar.

[The Microsoft Excel data in e-mail doesn't look or work right](#)

You and the recipient of your mail must each have an e-mail program that can view messages in [HTML](#) format. If you view Excel data in an e-mail program that doesn't support HTML, the data may not be formatted correctly and graphics may not appear.

If you want the Excel data to look the same on the recipient's system as on yours, send the data as an attachment so that the recipient can open it in Excel. To view an attached workbook, recipients need Excel 97 or later. If you need to send a workbook that you've saved in an earlier Excel format as an attachment, use Microsoft Outlook or your e-mail program to create and send the message.

 [I can't send my Web page as an e-mail attachment](#)

Web pages cannot be sent as attachments. If you use Microsoft Excel to attach an HTML file to an e-mail message, Excel automatically converts the HTML file to an .xls file.

To send a copy of your Web page in e-mail, you must send it as the body of your message. On the **File** menu, point to **Send To**, and then click **Mail Recipient**.

[Show All](#)

# About linking Lotus 1-2-3 and Microsoft Excel worksheets

**Benefits of links** Linking lets you use your Lotus 1-2-3 data in a Microsoft Excel worksheet without converting to Excel workbook format. Then when you change the data in the Lotus 1-2-3 worksheet, the Excel worksheet is automatically updated.

For example, you can link cells containing sales figures from various Lotus 1-2-3 worksheets to cells in a single Excel worksheet. Then you can create a [PivotTable report](#) to summarize the data, create a chart to emphasize the summary values, or use the format and print features of Excel to create a summary report of sales.

**Types of files you can link to** You can link cells in Excel worksheets to cells in files saved in any of the following Lotus 1-2-3 formats: WKS, WK1, WK3, and WK4. If you use Lotus 1-2-3 to edit a Lotus 1-2-3 worksheet that is linked to an Excel worksheet, the linked cells will update when you open the Excel workbook.

**Finding the source file for a link** If you are unsure of the name or location of a Lotus 1-2-3 worksheet that provides data to an Excel worksheet, you can open the Excel workbook and then use the **Links** command (**Edit** menu) to open the Lotus 1-2-3 worksheet.

**Changing or redirecting links** You can also use the **Links** command to change or redirect the links in the Excel worksheet to refer to another worksheet.

# Calculation differences between Microsoft Excel and Lotus 1-2-3 formulas

## Mathematical operators

The following list compares the mathematical operators used by Microsoft Excel and Lotus 1-2-3.

Description	Lotus 1-2-3 operator	Microsoft Excel operator
Exponentiation	^	^
Positive and negative	+ and -	- (positive is assumed in Microsoft Excel)
Multiplication and division	* and /	* and /
Addition and subtraction	+ and -	+ and -
Comparison	= < > <= >= <>	= < > <= >= <>
Logical	#not#, #and#, and #or#	NOT, AND, and OR worksheet functions
Connect two strings of text (concatenation)	& (Release 2.0 or later only)	&

**Order of evaluation** The order in which Lotus 1-2-3 performs operations in formulas is as follows: exponentiation, positive and negative, multiplication and division, addition and subtraction, comparison (= < > <= >= <>, #not#, #and#, and #or#), and then concatenation.

## Notes

- Lotus 1-2-3 evaluates the exponentiation operator (^) before the negation operator (-); Excel evaluates negation first. For example, the formula =-2^4 produces the value -16 in Lotus 1-2-3, but it produces 16 in Excel. To correct this difference, use parentheses to change the order of evaluation;

for example  $=-(2^4)$  produces  $-16$ .

- Lotus 1-2-3 evaluates comparison operators ( $= < > <= >= <>$ ) and logical operators ( $\#not\#$ ,  $\#and\#$ , and  $\#or\#$ ) before the concatenation operator ( $\&$ ); Excel evaluates concatenation before comparison. To correct this difference, use parentheses to change the order of evaluation.
- In both Lotus 1-2-3 and Excel, operators with the same precedence, such as AND and OR, are evaluated left to right.

## Calculation rules

Excel calculates formulas and database criteria in a different way than Lotus 1-2-3. To calculate according to Lotus 1-2-3 rules, select the **Transition formula evaluation** option on the **Transition** tab (**Tools** menu, **Options** command).

**Text in calculations** In Lotus 1-2-3, cells that contain text are considered to have a value of 0 (zero) when the cell is used in a formula. In Excel, you cannot combine text and numeric entries in a mathematical expression such as addition or subtraction. Worksheet functions in Excel, however, use the value 0 for cells that contain text.

For example, if cell A10 contains text and cell B10 contains the value 100, the formula =A10+B10 returns the error value #VALUE! if the **Transition formula evaluation** check box is cleared. However, the formula =SUM(A10,B10) returns the value 100.

**Boolean values TRUE and FALSE** Boolean expressions in Lotus 1-2-3 are evaluated to 0 (zero) or 1 and display 0 or 1 in the cell. Excel allows calculations on the Lotus 1-2-3 values but displays logical values as either TRUE or FALSE (TRUE is equal to 1 and FALSE is equal to 0). For example, in Lotus 1-2-3 the expression 2<3 displays 1 in the cell to represent True; Excel displays the logical value TRUE in the cell.

If the **Transition formula evaluation** option is selected, Excel displays 0 for FALSE and 1 for TRUE.

**Database criteria** Database criteria ranges are evaluated differently when you are extracting data, finding data, and using database functions. For example, the criteria "John" will find only rows where the value John is contained within the cell. If you clear the **Transition formula evaluation** check box, the criteria "John" finds any rows where the value in the cell begins with John— John, Johnson, and Johnsen.

## Formula differences

There are also some important differences in how you create formulas in Excel:

- In Excel, you start a formula with an equal sign (=). You can also start a formula with a plus sign (+), as you would in Lotus 1-2-3.
- Although it is not required, you can type an ampersand (@) before Excel functions.
- Excel uses a colon (:) to denote a range of cells, instead of the periods (..) used in Lotus 1-2-3.

## Worksheet functions

**Functions that are evaluated differently** Some functions— including @MOD, @VLOOKUP, and @HLOOKUP— are evaluated differently. For example, the @VLOOKUP function in Lotus 1-2-3 looks for an exact match in the first column; the VLOOKUP worksheet function in Excel assumes the first column is sorted and finds the closest value in the first column without exceeding the lookup value.

The VLOOKUP and HLOOKUP worksheet functions in Excel include a fourth argument, range\_lookup, which you can use to have Excel find an exact match. If you set this argument to FALSE, Excel will look for an exact match.

**Compatible functions** Excel 2000 and later versions contain functions for compatibility with Lotus 1-2-3 Release 4.0 and later. The "A" functions — AVERAGEA, MAXA, MINA, STDEVA, STDEVPA, VARA, and VARPA — calculate results by using all of the cells in a range (including blank cells), cells that contain text, and cells that contain the logical values TRUE or FALSE.

[Show All](#)

# Enter and evaluate formulas with Lotus 1-2-3 rules

1. On the **Tools** menu, click **Options**, and then click the **Transition** tab.
2. Do one of the following:
  - To enter [formulas](#) according to Lotus 1-2-3 rules, select the **Transition formula entry** check box. With the **Transition formula entry** option selected, Microsoft Excel applies names for ranges as you enter references to ranges in formulas. In addition, if a function does not require arguments, you can type **@** followed by the Lotus 1-2-3 function name and the function is converted to its Excel equivalent.
  - To enter formulas according to Excel rules, clear the **Transition formula entry** check box.
3. Do one of the following:
  - To calculate [formulas](#) according to Lotus 1-2-3 rules, select the **Transition formula evaluation** check box.
  - To calculate formulas according to Excel rules, clear the **Transition formula evaluation** check box.

**Caution** Avoid alternately selecting and canceling the **Transition formula evaluation** option; otherwise, the values calculated on your worksheet might change.

4. Click **OK**.
5. Enter your formula.

## Notes

- When you select and clear the **Transition formula entry** check box, formulas don't automatically reapply names or restore names to references.
- The **Transition formula entry** and **Transition formula evaluation** options remain active for a worksheet until you clear them, even if you save the Lotus 1-2-3 worksheet as an Excel worksheet.

[Show All](#)

# File format converters supplied with Excel

You can convert a file from Microsoft Excel to another file format by saving it with the **Save As** command (**File** menu) in Excel. The file formats available in the **Save As** dialog box vary, depending what type of sheet is active (a worksheet, chart sheet, or other type of sheet). For most file formats, Excel converts only the active sheet. To convert the other sheets, switch to each sheet and save it separately.

You can convert a file from another program to Microsoft Excel by opening it in Excel with the **Open** command (**File** menu).

If you do not see the file format you want in the **Open** or **Save As** dialog box, you can install the converter. For more information about installing add-ins and converters, you can go to the Microsoft Office Web site.

 [Microsoft Excel formats](#)

If you plan to share your workbook with users who have different versions of Excel, and you don't mind a larger file size, the most versatile Excel file format is the Microsoft Excel 97-2003 & 5.0/95 Workbook format. This format saves two versions of a workbook (one with the Microsoft Excel 97-2003 file format and one with the Microsoft Excel 5.0/95 file format) in the same .xls file. Users of Excel 2003 can continue to work in the workbook and use any of the features or formatting unique to this version. Users of Microsoft Excel version 5.0 or Microsoft Excel 95 can open and use the workbook without having to convert the file.

It is recommended that users with older versions use the workbook [read-only](#). If the workbook is saved in the earlier version of Microsoft Excel, features and formatting unique to the current version will be lost.

**Formats that save the entire workbook**

**File name extension  
(Windows only)**

Microsoft Excel Workbook (Microsoft Excel 2003)	.xls
Template (Microsoft Excel 2003)	.xlt
Workspace (Microsoft Excel 2003)	.xlw
Microsoft Excel 97-2003 & 5.0/95 Workbook	.xls
Microsoft Excel 5.0/95 Workbook	.xls
Microsoft Excel version 4.0 workbook (saves only worksheets, chart sheets, and macro sheets)	.xlw
HTML	.htm
Web Archive	.mht
XML Spreadsheet	.xml

### Formats that save only the active sheet

### File name extension (Windows only)

Microsoft Excel version 4.0 sheet formats (including Microsoft Excel macro or international macro sheets)	.xls, .xlc, .xlm
Microsoft Excel version 3.0 formats	.xls, .xlc, .xlm
Microsoft Excel version 2.x formats	.xls, .xlc, .xlm

### [Lotus 1-2-3 formats](#)

When you open a .wk1 or .wk3 file in Excel, Excel applies the formatting in the associated .fmt, .fm3, or .all file. If you save a Lotus 1-2-3 file in Excel format, Excel saves the spreadsheet data and formatting in a single workbook file.

The WK1 (1-2-3) (\*.wk1) and WK3 (1-2-3) (\*.wk3) formats save only limited worksheet formatting. To save an Excel workbook in Lotus 1-2-3 format and retain borders, cell shading, fonts, and other formatting, select a Lotus 1-2-3 file format that stores formatting in a separate .fmt, .fm3, or .all file.

Lotus 1-2-3 file format	Release	Notes
WK4 (*.wk4)	4.0	Saves the entire workbook
WK3 (*.wk3)	3.x and Lotus 1-	Saves only worksheets and chart sheets
WK3, FM3 (*.wk3)	2-3/W	
WK1 (*.wk1)		

WK1 (FMT) (*.wk1)	2.x	Saves only the active sheet
WK1 (ALL) (*.wk1)		
WKS (FMT) (*.wks)	1.0 and 1.0A	Saves only the active sheet
.pic (when included in an .all file)	3.x and Lotus 1-2-3/W	Excel can open but cannot save this format

## [Text formats](#)

You can open and save files in the following text formats. If you save a workbook in text format, all formatting is lost.

Format	Notes
Formatted Text (Space-delimited) (*.prn)	Lotus space-delimited format Saves only the active sheet
Text (Tab-delimited) (*.txt) (Windows)	
Text (Macintosh)	
Text (OS/2 or MS-DOS)	If you are saving a workbook as a tab-delimited or comma-delimited text file for use on another operating system, select the appropriate converter to ensure that tab characters, line breaks, and other characters are interpreted correctly.
CSV (comma delimited) (*.csv) (Windows)	Saves only the active sheet.
CSV (Macintosh)	
CSV (OS/2 or MS-DOS)	

DIF (data interchange format) Saves only the active sheet

(\* .dif)

SYLK

(symbolic link format) Saves only the active sheet

(\* .slk)

### [Other spreadsheet and database formats](#)

Format	Program	Notes
DBF 2, DBF 3, DBF 4 (* .dbf)	DBASE II, III, and IV	Opens and saves only the active worksheet
WQ1 (* .wq1)	Quattro Pro for MS-DOS	Opens and saves only the active worksheet
.wb1	Quattro Pro version 5.0 for Windows	Opens only, only available with converter loaded
.wb3	Quattro Pro version 7.0 for Windows	Opens only, only available with converter loaded.
.wks	Microsoft Works version 2.0 for Windows and Microsoft Works for MS-DOS	Opens only Microsoft Works version 2.0 for Windows or Microsoft Works for MS-DOS spreadsheets

### [Clipboard formats](#)

You can paste data from the Microsoft Office Clipboard into Excel by using the **Paste** or **Paste Special** command on the **Edit** menu if the Office Clipboard data is in one of the following formats:

Format	Clipboard type identifiers
	Picture (Windows enhanced metafile, EMF)
Picture	<b>Note</b> If you copy a Windows metafile (WMF) picture from another program, Microsoft Excel pastes the item as an

enhanced metafile format (EMF) picture.

Bitmap	Bitmap (BMP)
Microsoft Excel file formats	Binary file formats for Microsoft Excel versions 3.0, 4.0, 5.0/95, Microsoft Excel 97-2000, Microsoft Excel Workbook (BIFF, BIFF3, BIFF4, BIFF5, and BIFF8)
Symbolic link format	SYLK
Lotus 1-2-3 Release 2.x format	.wk1
Data interchange format	.dif
Text (tab-delimited) format	Text
Comma-separated values format	.csv
Formatted text (only from Microsoft Excel)	Rich Text Format (RTF)
Embedded object	Microsoft Excel objects, objects from properly registered programs that support <a href="#">OLE 2.0 (OwnerLink)</a> , and Picture or another presentation format
Linked object	OwnerLink, <a href="#">ObjectLink</a> , Link, Picture, or other format
Office drawing object	Office drawing object format or Picture (Windows enhanced metafile format, EMF)
Text	Display Text, OEM Text .htm
HTML	<b>Note</b> When you copy text from another program, Microsoft Excel pastes the text in HTML format, regardless of the format of the original text.

[Show All](#)

# Formatting and features that are not transferred in Excel file format conversions

The Microsoft Excel Workbook file format preserves all worksheet and chart data, formatting, macros, and other features available in Excel 2003. If you save an Excel 2003 workbook in another file format, some of the formatting, data, and other features might be lost. For more information about compatibility, see the *Microsoft Office 2003 Resource Kit*.

 [How to obtain the \*Microsoft Office 2003 Resource Kit\*](#)

The *Microsoft Office 2003 Resource Kit* is the definitive guide to installing, configuring, and supporting Microsoft Office in your organization. Designed for system administrators, consultants, and power users, this guide offers complete coverage whether you're running Microsoft Office on Microsoft Windows 2000 or later, or the Macintosh.

You can obtain the Office Resource Kit wherever computer books are sold or order direct from Microsoft Press, or online at the Microsoft Office Resource Kit Web site.

To locate your nearest source for Microsoft Press products worldwide, visit the Microsoft Press Web site or contact your local Microsoft office.

## Microsoft Excel formats

 [Microsoft Excel 97-2003 & 5.0/95 Workbook](#)

When you save a workbook in the Microsoft Excel 97-2003 & 5.0/95 Workbook format, the workbook is saved in a single file that includes the Excel 97-2003 and Excel 5.0/95 file formats. (Excel version 5.0 and Excel 95 have identical file formats, as do Excel 97, Excel 98 for the Macintosh, and Excel 2003.) The file size will be larger because the file contains both sets of data.

Users of Excel 2000 can continue to work in a workbook saved in the dual format without losing any features or formatting unique to this version. When users of Excel version 5.0 or Excel 95 open the workbook, a message appears recommending that they use the file [read-only](#). However, if users ignore the recommendation and save the workbook in an earlier version of Excel, features and formatting available only in Excel 2003, Excel 2002, Excel 2000, or Excel 97 are lost.

To avoid losing work performed in Excel 2003, you can protect a workbook from changes by requiring a password to change the workbook or by making the workbook read-only.

### [Microsoft Excel 97 Workbook](#)

The following features of Excel 2003, are not preserved if you open and then save an Excel 2003 workbook in Excel 97.

<b>Excel 2003 feature</b>	<b>In Excel 97 Workbook format</b>
OLAP PivotTable and PivotChart reports	Appear as read-only.
External data ranges	AutoRefresh doesn't work, nor does column formatting, filtering, or sorting.
Indented format PivotTable reports	If edited in Excel 97 or earlier, reports change to nonindented layout but maintain character and cell formatting.
PivotChart reports	Appear as regular charts. Multiple level category labels are modified, and value axis display units convert to literal values.
ScreenTips for hyperlinks	Not saved.

### [Microsoft Excel 5.0/95 Workbook](#)

The following features of Excel 2003 are not preserved if you save an Excel 2003 workbook in the Excel 5.0/95 Workbook (\*.xls) format.

## **Workbook properties and settings**

<b>Excel 2003 feature</b>	<b>In Excel 5.0/95 Workbook format</b>
65,536 rows per worksheet	Rows after 16,384 are deleted.
32,767 characters per cell	Characters after 255 are deleted.
Custom views defined for a workbook	Not saved.
Attached toolbars	Not saved.

## **Formatting and layout features**

<b>Excel 2003 feature</b>	<b>In Excel 5.0/95 Workbook format</b>
Text formatted with <b>Shrink to fit</b> option on the <b>Alignment</b> tab ( <b>Format</b> menu, <b>Cells</b> command)	Text is the original point size (before the <b>Shrink to fit</b> option was applied).
Rotated text	Text rotated at angles other than 90 degrees, -90 degrees, or 0 (zero) degrees is changed to horizontal orientation.
Indentations within cells	Indentation is removed, and the contents of cells are left-aligned.
Merged cells	Cells are split into their original configuration, and data appears in the upper-left cell.
Conditional formatting	Conditional formatting is lost, and cells are reformatted with the Normal style.
Sheet backgrounds	Not saved.
New border styles	Border styles are converted to the closest style available in Excel 5.0 or Excel 95.
Aligned underlining of multiple fonts	Underlining might not be aligned.
Currency formatting	Currency formatting is lost, and cells are reformatted with the General number style.
Euro symbol	Not saved.

## **Chart features**

<b>Excel 2003 feature</b>	<b>In Excel 5.0/95 Workbook format</b>
Pie of pie/Bar of pie chart	Saved as type 1 pie chart.

Bubble chart	Saved as type 1 xy (scatter) chart.
3-D marker shape (cylinder, pyramid, and cone)	Saved as 3-D column chart (rectangular shape).
Data tables in charts	Not saved.
Rotated text on axis and data labels	Saved as horizontally oriented text (0 [zero] degrees).
Gradient fills and patterns in chart items	Saved as the closest available solid color and pattern.
Shading in surface charts	Not saved.
Time-scale axis (x-axis categories with date format)	Special scaling information is lost, and the axis is converted to a normal category axis.
Shadows on series and points	Not saved.
Sizable line and xy (scatter) data markers	Not saved.
Special placement of data labels	Saved in the default location for chart items.
PivotChart reports	Displayed as regular charts. Multiple level category labels are modified, and value axis display units are converted to literal values.

## **Analysis, PivotTable, and data access features**

<b>Excel 2003 feature</b>	<b>In Excel 5.0/95 Workbook format</b>
Natural-language references in formulas	Column and row label references are converted to A1 reference notation. Names of named cells and ranges are preserved.
New worksheet functions not supported in Excel 95 or version 5.0 (AVERAGEA; MAXA; MINA; STDEVA; STDEVPA; VARA; VARPA; HYPERLINK; GETPIVOTDATA; BAHTTEXT)	Excel calculates the function before saving the file and replaces the formula with the resulting value. The HYPERLINK function is resolved to the value =#N/A.

Calculated fields, calculated items, and formatting based on structured data tables	Preserved until the user changes or refreshes the PivotTable data, after which these features are lost.
Preserved formatting in PivotTable reports	<p>Formatting is saved, but structured behavior is lost as soon as users make changes to or refresh the PivotTable data.</p> <p>All properties new in Excel 2002 are lost, including the following:</p> <ul style="list-style-type: none"> <li>• Page field placement across columns or down rows.</li> <li>• Alternate strings for #N/A and error cell display.</li> <li>• Server-based page fields.</li> <li>• AutoSort and AutoShow on fields.</li> <li>• Multiple selection on page fields.</li> <li>• Persistent grouping and sorting.</li> <li>• Data fields displayed as numbers.</li> </ul>
PivotTable features	
Web and database queries to external data sources	Data resulting from the latest query is saved, but the query is not.
Parameterized queries	Cannot be run or edited.
Shared queries (connections without a data source name)	Supported in Excel 95 (with <a href="#">ODBC 2.0</a> ). In Excel 5.0 (with ODBC 1.0), users are prompted for connection information.
Report templates	Not saved.
Indented format PivotTable reports	If edited in Excel 97 or earlier, reports change to nonindented layout but maintain character and cell formatting.
OLAP PivotTable and PivotChart reports	Appear as read-only.

External data ranges

Not saved.

## **OLE objects and graphics**

If you use the Excel 5.0/95 Workbook file format as the default when you save a workbook, and you insert in the workbook an OLE object that contains Excel 2003 features, those features will not be saved if you open and then save the workbook in either Excel 5.0 or Excel 95. However, if you open the workbook in Excel 2003, insert a workbook object that contains Excel 2003 features, and then save the workbook, the Excel 2003 OLE object features are saved.

For example, you can open a workbook in Excel 5.0 or Excel 95 that was saved in the Excel 5.0/95 format. However, if you insert a workbook object that contains features unique to Excel 2003— such as [merged cells](#) or a bubble chart — and then save the workbook, those features are lost.

### **Excel 2003 feature**

### **In Excel 5.0/95 Workbook format**

WordArt objects Saved as filled rectangles.

[AutoShape](#) Converted to Excel 5.0/95 drawing objects; three-dimensional drawing objects shapes are preserved as two-dimensional objects.

Scanned photographic images Saved only if inserted in a graphics format that is available in Excel 5.0 or Excel 95.

## **Workgroup and Internet features**

### **Excel 2003 feature**

### **In Excel 5.0/95 Workbook format**

Comments Saved as cell notes.

Hyperlinks Not saved.

Change tracking and audit trail Change history is lost.

Shared workbooks Workbook is removed from shared use, and the change history is lost.

Data validation rules specified for cells Not saved.

## **Programmability features**

Microsoft Visual Basic modules are converted to module sheets. All text is preserved in the module; however, not all new objects, methods, and properties in Excel 2003 are supported in the Excel 5.0/95 format. In some cases, you must edit the converted code to run the macros. Excel macro sheets (.xlm sheets) are preserved with no loss of function.

<b>Excel 2003 feature</b>	<b>In Excel 5.0/95 Workbook format</b>
<a href="#">ActiveX controls</a>	Appear but cannot be used.
<b>Office Forms</b> dialog box controls	Not supported.

## [Templates](#)

The Microsoft Excel 2003 template file format preserves all worksheet and chart data, formatting, macros, and other features available in Excel 2003.

You cannot save a workbook in the template file format of an earlier version of Excel.

## **Lotus 1-2-3 formats**

### [Lotus 1-2-3 Release 4 \(WK4\)](#)

The Lotus 1-2-3 Release 4.0 (WK4) format saves sheet data and formatting in a single file.

The following features of Microsoft Excel 2003 are not preserved if you open and then save an Excel workbook in Lotus 1-2-3 Release 4 (WK4).

### **Workbook properties and settings**

<b>Excel 2003 feature</b>	<b>In Lotus 1-2-3 Release 4 format</b>
Number of worksheets	Depends on the available memory. Sheet names of up to 15 characters are saved.
65,536 rows per worksheet	Rows after 8,192 are deleted.
32,767 characters per cell	Characters after 255 are deleted.
Custom views defined	

for a workbook	Not saved.
Attached toolbars	Not saved.

## Formatting and layout features

Excel 2003 feature	In Lotus 1-2-3 Release 4 format
Cells that contain text with different text formats	Fonts, font sizes, and font colors are saved; bold, italic, and underline formats are saved; accountant underline format is converted to regular underline format. Superscript, subscript, and strikethrough formats are not saved. In cells that contain text with different text formats, all text in the cell takes on the format of the first character in the cell.
Text formatted with <b>Shrink to fit</b> option on the <b>Alignment</b> tab ( <b>Format</b> menu, <b>Cells</b> command)	Text is the original point size (before the <b>Shrink to fit</b> option was applied).
Rotated text	Rotated text and vertically oriented text are saved in their current orientation.
Indentations within cells	Indentation within cells is removed, and the contents of cells are left-aligned.
Merged cells	Merged cells are split into their original configuration. Data is placed in the top-left cell.
Conditional formatting	Not saved, and cells are reformatted with the Normal style.
Sheet backgrounds	Not saved.
New border styles	Except for diagonal borders, borders formats are saved. Dashed border line styles are not saved.
Aligned underlining of multiple fonts	Underlining might not be aligned.
Text alignment	Centered, right-aligned, and left-aligned formatting is saved. Top, centered, and bottom vertical alignment is saved.

Fill colors and patterns	Converted to the closest available color and pattern supported by Lotus 1-2-3.
Euro symbol	Not saved. Negative numbers represented as -1234 in Excel are enclosed in parentheses.  Accounting format, in which currency symbols are aligned at the left of the cell, is converted to normal currency format.  Special formats for Social Security numbers, phone numbers, and ZIP Codes are not saved.
Number formatting	Combined date and time formats (for example, 12/9/2000 2:45 PM) are saved in date-only format.  Fractional second formats are saved in General format with two decimal places.  Fractional formats (for example, 13/64) are converted to decimal fractions.  Dates represented by the first letter of the month (for example, "J" for January) are saved in General format, which causes the date to be displayed as a serial number.

## Chart features

Embedded charts are saved on the sheet in the closest available Lotus 1-2-3 chart format.

<b>Excel 2003 feature</b>	<b>In Lotus 1-2-3 Release 4 format</b>
3-D marker shape (cylinder, pyramid, and cone)	Not saved.
Trendlines and error bars	Not saved.
Rotated text on axis and data labels	Saved as horizontally oriented text (0 [zero] degrees).
Gradient fills, patterns, and shading in chart items	Saved as the closest available solid color and pattern.

Shading in surface charts	Saved as the closest available solid color and pattern.
Shadows on series and points	Not saved.

### **Analysis, PivotTable, and data access features**

<b>Excel 2003 feature</b>	<b>In Lotus 1-2-3 Release 4 format</b>
Formulas that contain 3-D references	3-D references and external references to other workbooks and sheets in formulas are saved.
PivotTable reports	The data displayed in the current view of a PivotTable report is saved; all other PivotTable data is lost.
Formulas	If a formula contains a function that is not supported by Lotus 1-2-3 Release 4, Excel calculates the function before saving the file and replaces the formula with the resulting value.
Functions available in Excel 97 and Excel 2003	Converted to the corresponding Lotus 1-2-3 functions; for example, AVERAGEA is converted to @AVG.
Excel intersection (blank space) and union (comma) operators	Not saved.
Scenarios	Not saved.

### **OLE objects and graphics**

<b>Excel 2003 feature</b>	<b>In Lotus 1-2-3 Release 4 format</b>
Imported graphics and drawing objects	Not saved.
Embedded objects	Not saved.

### **Workgroup and Internet features**

<b>Excel 2003 feature</b>	<b>In Lotus 1-2-3 Release 4 format</b>
Comments	Not saved.
Hyperlinks	Not saved.
Data validation rules specified for cells	Not saved.

## Programmability features

### Excel 2003 feature In Lotus 1-2-3 Release 4 format

Visual Basic macros Visual Basic code is not saved.

[ActiveX controls](#) Not saved.

Form controls Not saved.

### [Lotus 1-2-3 Release 3 \(WK3\)](#)

The Lotus 1-2-3 Release 3 (WK3) format saves only text, values, and formulas.

The following features of Microsoft Excel 2003 are not preserved if you open and then save an Excel workbook in Lotus 1-2-3 Release 3.

## Workbook properties and settings

Excel 2003 feature	In Lotus 1-2-3 Release 3 format
Number of worksheets	Depends on the available memory. Sheet names are converted to the Lotus 1-2-3 default names A, B, C, and so on.
65,536 rows per worksheet	Rows after 8,192 are deleted.
32,767 characters per cell	Characters after 255 are deleted.
Custom views defined for a workbook	Not saved.
Attached toolbars	Not saved.
Settings specified in the <b>Page Setup</b> dialog box ( <b>File</b> menu) and manual page breaks	Not saved.

## Formatting features

The following table lists the effect of saving a workbook in WK3 format without an associated FMT3 file. To save most formatting, save workbooks in the Lotus WK1,ALL (1-2-3) or WK1,FMT (1-2-3) format.

### Excel 2003

**feature****In Lotus 1-2-3 Release 3 format**

Column widths	Saved.
Cell and text formats	Not saved.
Fonts	Converted to 10-point Courier font.
Conditional formatting	Not saved, and cells are reformatted with the Normal style.
Euro symbol	Not saved.  Negative numbers represented as -1234 in Excel are enclosed in parentheses.  Accounting format, in which currency symbols are aligned at the left of the cell, is converted to normal currency format.  Special formats for Social Security numbers, phone numbers, and ZIP Codes are not saved.
Number formatting	Combined date and time formats (for example, 12/9/2000 2:45 PM) are saved in date-only format.  Fractional seconds formats are saved in General format.  Fractional formats (for example, 13/64) are converted to decimal fractions.  Dates represented by the first letter of the month (for example, "J" for January) are saved in General format, which causes the date to be displayed as a serial number.

**Chart features**

Embedded charts are saved as a separate chart sheets in the closest available Lotus 1-2-3 chart format.

<b>Excel 2003 feature</b>	<b>In Lotus 1-2-3 Release 3 format</b>
3-D marker shape (cylinder, pyramid, and cone)	Not saved.
Trendlines and error bars	Not saved.
Rotated text on axis and data labels	Saved as horizontally oriented text (0 [zero] degrees).
Gradient fills, patterns, and shading in chart items	Saved as the closest available solid color and pattern.
Shading in surface charts	Saved as the closest available solid color and pattern.
Shadows on series and points	Not saved.

### **Analysis, PivotTable, and data access features**

<b>Excel 2003 feature</b>	<b>In Lotus 1-2-3 Release 3 format</b>
Formulas that contain 3-D references	3-D references and external references to other workbooks and sheets in formulas are saved.
PivotTable reports	The data displayed in the current view of a PivotTable report is saved; all other PivotTable data is lost.
References	References to rows beyond 8,192 wrap to the beginning of the worksheet; for example, the reference A8193 becomes the reference A1 in the converted WK3 file.
Formulas	If a formula contains a function that is not supported by Lotus 1-2-3 Release 3, Excel calculates the function before saving the file and replaces the formula with the resulting value.
Functions available in Excel 97 and Excel 2003	Converted to the corresponding Lotus 1-2-3 functions; for example, AVERAGEA is converted to @AVG.
Excel intersection (blank space) and union (comma) operators	Not saved.
Scenarios	Not saved.
Defined names of	

ranges                      Not saved.

## **OLE objects and graphics**

<b>Excel 2003 feature</b>	<b>In Lotus 1-2-3 Release 3 format</b>
Imported graphics and drawing objects	Not saved.
Embedded objects	Not saved.

## **Workgroup and Internet features**

<b>Excel 2003 feature</b>	<b>In Lotus 1-2-3 Release 3 format</b>
Comments	Not saved.
Hyperlinks	Not saved.
Data validation rules specified for cells	Not saved.

## **Programmability features**

<b>Excel 2003 feature</b>	<b>In Lotus 1-2-3 Release 3 format</b>
Visual Basic macros	Visual Basic code is not saved.
<a href="#">ActiveX controls</a>	Not saved.
Form controls	Not saved.

### [Lotus 1-2-3 Release 3 \(WK3, FM3\)](#)

When you save a Microsoft Excel workbook in the Lotus 1-2-3 Release 3 (WK3, FM3) (\*.wk3) format, data is saved in the resulting WK3 file, and formatting information is saved separately in the FM3 (\*.fmt3) file. If you reopen the WK3 file in Microsoft Excel, the formatting in the associated FM3 file is applied automatically. The formatting files are used in Lotus 1-2-3 by the WYSIWYG or Impress add-in to format worksheets.

### [Data saved in the WK3 file](#)

The following features of Microsoft Excel 2003 are not preserved if you open and then save an Excel workbook in Lotus 1-2-3 Release 3.

## Workbook properties and settings

<b>Excel 2003 feature</b>	<b>In Lotus 1-2-3 Release 3 format</b>
Number of worksheets	Depends on the available memory. Sheet names are converted to the Lotus 1-2-3 default names A, B, C, and so on.
65,536 rows per worksheet	Rows after 8,192 are deleted.
32,767 characters per cell	Characters after 255 are deleted.
Custom views defined for a workbook	Not saved.
Attached toolbars	Not saved.
Settings specified in the <b>Page Setup</b> dialog box ( <b>File</b> menu) and manual page breaks	Not saved.

## Analysis, PivotTable, and data access features

<b>Excel 2003 feature</b>	<b>In Lotus 1-2-3 Release 3 format</b>
Formulas that contain 3-D references	3-D references and external references to other workbooks and sheets in formulas are saved.
PivotTable reports	The data displayed in the current view of a PivotTable report is saved; all other PivotTable data is lost.
References	References to rows beyond 8,192 wrap to the beginning of the worksheet; for example, the reference A8193 becomes the reference A1 in the converted WK3 file.
Formulas	If a formula contains a function that is not supported by Lotus 1-2-3 Release 3, Excel calculates the function before saving the file and replaces the formula with the resulting value.
Functions available in Excel 97 and Excel 2003	Converted to the corresponding Lotus 1-2-3 functions; for example, AVERAGEA is converted to @AVG.
Excel intersection (blank space) and union (comma) operators	Not saved.

Scenarios Not saved.

## **OLE objects and graphics**

<b>Excel 2003 feature</b>	<b>In Lotus 1-2-3 Release 3 format</b>
Imported graphics and drawing objects	Not saved.
Embedded objects	Not saved.

## **Workgroup and Internet features**

<b>Excel 2003 feature</b>	<b>In Lotus 1-2-3 Release 3 format</b>
Comments	Not saved.
Hyperlinks	Not saved.
Data validation rules specified for cells	Not saved.

## **Programmability features**

<b>Excel 2003 feature</b>	<b>In Lotus 1-2-3 Release 3 format</b>
Visual Basic macros	Visual Basic code is not saved.
<a href="#">ActiveX controls</a>	Not saved.
Form controls	Not saved.

[Data saved in the FM3 file.](#)

## **Formatting features**

<b>Excel 2003 feature</b>	<b>In Lotus 1-2-3 Release 3 format</b>
Column widths and row heights	Original column widths and row heights are saved.
Cells that contain text with different text formats	Fonts, font sizes, and font colors are saved; bold, italic, and underline formats are saved; accountant underline format is converted to regular underline format. Superscript, subscript, and strikethrough formats are not saved. In cells that contain text with different text formats, all text in the cell takes on the format of the first character in the cell.

Cells that contain TrueType fonts	TrueType fonts are converted to the closest available printer font. Font color is converted to the closest available color supported by Lotus 1-2-3. Font sizes are saved.
Text formatted with <b>Shrink to fit</b> option on the <b>Alignment</b> tab ( <b>Format</b> menu, <b>Cells</b> command)	Text is the original point size (before the <b>Shrink to fit</b> option was applied).
Rotated and vertically oriented text	Rotated text and vertically oriented text is changed to horizontal orientation.
Indentations within cells	Indentation within cells is removed, and the contents of cells are left-aligned.
Merged cells	Merged cells are split into their original configuration. Data is placed in the top-left cell.
Conditional formatting	Not saved, and cells are reformatted with the Normal style.
Sheet backgrounds	Not saved.
New border styles	Except for diagonal borders, borders formats are saved. Dashed border line styles are not saved.
Aligned underlining of multiple fonts	Underlining might not be aligned.
Text alignment	Centered, right-aligned, and left-aligned formatting is saved. Top, centered, and bottom vertical alignment is saved.
Fill colors and patterns	Converted to the closest available color and pattern supported by Lotus 1-2-3.
Border styles	Borders are converted to the closest available border style; for example, dotted borders are converted to single lines. Color borders are converted to black. Some shading colors and patterns may be converted to black shading.
Euro symbol	Not saved. Negative numbers represented as -1234 in Excel are enclosed in parentheses.

Accounting format, in which currency symbols are aligned at the left of the cell, is converted to normal currency format.

Special formats for Social Security numbers, phone numbers, and ZIP Codes are not saved.

#### Number formatting

Combined date and time formats (for example, 12/9/2000 2:45 PM) are saved in date-only format.

Fractional seconds formats are saved in General format.

Fractional formats (for example, 13/64) are converted to decimal fractions.

Dates represented by the first letter of the month (for example, "J" for January) are saved in General format, which causes the date to be displayed as a serial number.

### Chart features

Embedded charts are saved on the sheet if you save the workbook in WK3, FM3 (1-2-3) format.

<b>Excel 2003 feature</b>	<b>In Lotus 1-2-3 Release 3 format</b>
3-D marker shape (cylinder, pyramid, and cone)	Not saved.
Trendlines and error bars	Not saved.
Rotated text on axis and data labels	Saved as horizontally oriented text (0 [zero] degrees).
Gradient fills, patterns, and shading in chart items	Saved as the closest available solid color and pattern.
Shading in surface charts	Saved as the closest available solid color and pattern.
Shadows on series and points	Not saved.

 [Lotus 1-2-3 Release 2.x \(WK1\)](#)

The Lotus 1-2-3 Release 2.x (WK1) format saves text, values, and formulas of the active worksheet.

The following features of Excel 2003 are not preserved if you open and then save an Excel 2003 workbook in Lotus 1-2-3 Release 2.x.

### **Workbook properties and settings**

<b>Excel 2003 feature</b>	<b>In Lotus 1-2-3 Release 2 format</b>
Number of worksheets	Saves the active worksheet.
65,536 rows per worksheet	Rows after 8,192 are deleted.
32,767 characters per cell	Characters after 240 are deleted.
Custom views defined for a workbook	Not saved.
Attached toolbars	Not saved.
Settings specified in the <b>Page Setup</b> dialog box ( <b>File</b> menu) and manual page breaks	Not saved.

### **Formatting features**

The following table lists the effect of saving a workbook in WK1 format without an associated ALL or FMT file. To save most formatting, save workbooks in the Lotus WK1,ALL (1-2-3) or WK1,FMT (1-2-3) format.

<b>Excel 2003 feature</b>	<b>In Lotus 1-2-3 Release 2 format</b>
Column widths	Saved.
Cell and text formats	Not saved.
Fonts	Converted to 10-point Courier.
Conditional formatting	Not saved, and cells are reformatted with the Normal style.

Euro symbol

Not saved.

Negative numbers represented as -1234 in Excel are enclosed in parentheses. Negative numbers displayed in red font color are displayed in the default font color.

Accounting format, in which currency symbols are aligned at the left of the cell, is converted to normal currency format.

Special formats for Social Security numbers, phone numbers, and ZIP Codes are not saved.

Number formatting Combined date and time formats (for example, 12/9/2000 2:45 PM) are saved in date-only format.

Fractional seconds formats are saved in General format.

Fractional formats (for example, 13/64) are converted to decimal fractions.

Dates represented by the first letter of the month (for example, "J" for January) are saved in General format, which causes the date to be displayed as a serial number.

## **Chart features**

Embedded charts are not saved on the sheet if you save the workbook in WK1 format.

## **Analysis, PivotTable, and data access features**

### **Excel 2003 feature**

### **In Lotus 1-2-3 Release 2 format**

Formulas that contain 3-D references  
3-D references Formulas that contain 3-D references or other references to nonadjacent ranges of cells cannot be saved in this Lotus 1-2-3 format. However, if formulas contain references to adjacent ranges of cells, either on the same sheet or in another workbook, the formulas and references are saved.

PivotTable reports	The data displayed in the current view of a PivotTable report is saved; all other PivotTable data is lost.
References	References to rows beyond 8,192 wrap to the beginning of the worksheet; for example, the reference A8193 becomes the reference A1 in the converted WK1 file.
Formulas	Most formulas are saved. If a formula contains a function that is not supported by Lotus 1-2-3 Release 2.x, Excel calculates the function before saving the file and replaces the formula with the resulting value. For example, the A functions available in Excel 97, Excel 2000, Excel 2002, and Excel 2003 are converted to their resulting values.
Functions available in Excel 97 and Excel 2003	Converted to the corresponding Lotus 1-2-3 functions; for example, AVERAGEA is converted to @AVG.
Excel intersection (blank space) and union (comma) operators	Not saved.
Scenarios	Not saved.
Defined names of ranges	Saved.

### **OLE objects and graphics**

<b>Excel 2003 feature</b>	<b>In Lotus 1-2-3 Release 2 format</b>
Imported graphics and drawing objects	Not saved.
Embedded objects	Not saved.

### **Workgroup and Internet features**

<b>Excel 2003 feature</b>	<b>In Lotus 1-2-3 Release 2 format</b>
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Comments	Not saved.
Hyperlinks	Not saved.
Data validation rules specified for cells	Not saved.

## Programmability features

### Excel 2003 feature In Lotus 1-2-3 Release 2 format

Visual Basic macros Visual Basic code is not saved.

[ActiveX controls](#) Not saved.

Form controls Not saved.

[Lotus 1-2-3 Release 2.x \(WK1, FMT\)](#)

When you save a Microsoft Excel workbook in the Lotus 1-2-3 Release 2.x (WK1, FMT) format, data is saved in the resulting WK1 file, and formatting information is saved separately in the FMT file. If you reopen the WK1 file in Microsoft Excel, the formatting in the associated FMT file is applied automatically.

[Data saved in the WK1 file.](#)

The following features of Microsoft Excel 2003 are not preserved if you open and then save an Excel workbook in Lotus 1-2-3 Release 2.x.

## Workbook properties and settings

Excel 2003 feature	In Lotus 1-2-3 Release 2 format
Number of worksheets	Depends on the available memory. Sheet names are converted to the Lotus 1-2-3 default names A, B, C, and so on.
65,536 rows per worksheet	Rows after 8,192 are deleted.
32,767 characters per cell	Characters after 240 are deleted.
Custom views defined for a workbook	Not saved.
Attached toolbars	Not saved.
Settings specified in the <b>Page Setup</b> dialog box ( <b>File</b> menu)	Not saved.

and manual page breaks

## **Analysis, PivotTable, and data access features**

<b>Excel 2003 feature</b>	<b>In Lotus 1-2-3 Release 2 format</b>
Formulas that contain 3-D references	3-D references and external references to other workbooks and sheets in formulas are saved.
PivotTable reports	The data displayed in the current view of a PivotTable report is saved; all other PivotTable data is lost.
References	References to rows beyond 8,192 wrap to the beginning of the worksheet; for example, the reference A8193 becomes the reference A1 in the converted WK3 file.
Formulas	If a formula contains a function that is not supported by Lotus 1-2-3 Release 2.x, Excel calculates the function before saving the file and replaces the formula with the resulting value.
Functions available in Excel 97 and Excel 2003	Converted to the corresponding Lotus 1-2-3 functions; for example, AVERAGEA is converted to @AVG.
Excel intersection (blank space) and union (comma) operators	Not saved.
Scenarios	Not saved.

## **OLE objects and graphics**

<b>Excel 2003 feature</b>	<b>In Lotus 1-2-3 Release 2 format</b>
Imported graphics and drawing objects	Not saved.
Embedded objects	Not saved.

## **Workgroup and Internet features**

<b>Excel 2003 feature</b>	<b>In Lotus 1-2-3 Release 2 format</b>
Comments	Not saved.
Hyperlinks	Not saved.

Data validation rules specified for cells Not saved.

## Programmability features

### Excel 2003 feature In Lotus 1-2-3 Release 2 format

Visual Basic macros Visual Basic code is not saved.

[ActiveX controls](#) Not saved.

Form controls Not saved.

[Data saved in the FMT file.](#)

## Formatting features

### Excel 2003 feature

### In Lotus 1-2-3 Release 2 format

Column widths  
and row heights

Original column widths and row heights are saved.

Cells that  
contain text with  
different text  
formats

Fonts, font sizes, and font colors are saved; bold, italic, and underline formats are saved; accountant underline format is converted to regular underline format. Superscript, subscript, and strikethrough formats are not saved. In cells that contain text with different text formats, all text in the cell takes on the format of the first character in the cell.

Cells that  
contain  
TrueType fonts

TrueType fonts are converted to the closest available printer font. Font color is converted to the closest available color supported by Lotus 1-2-3. Font sizes are saved.

Text formatted  
with **Shrink to  
fit** option on the  
**Alignment** tab  
(**Format** menu,  
**Cells** command)

Text is the original point size (before the **Shrink to fit** option was applied).

Rotated and  
vertically  
oriented text

Rotated text and vertically oriented text is changed to horizontal orientation.

Indentations  
within cells

Indentation within cells is removed, and the contents of cells are left-aligned.

Merged cells	Merged cells are split into their original configuration. Data is placed in the top-left cell.
Conditional formatting	Not saved, and cells are reformatted with the Normal style.
Sheet backgrounds	Not saved.
Border styles	Borders are converted to the closest available border style; for example, dotted borders are converted to single lines. Color borders are converted to black. Fill colors and patterns are converted to the closest available color and pattern supported by Lotus 1-2-3; some shading colors and patterns may be converted to black shading.
New border styles	Except for diagonal borders, borders formats are saved. Dashed border line styles are not saved.
Aligned underlining of multiple fonts	Underlining might not be aligned.
Text alignment	Centered, right-aligned, and left-aligned formatting is saved. Top, centered, and bottom vertical alignment is saved.
Fill colors and patterns	Converted to the closest available color and pattern supported by Lotus 1-2-3.
Euro symbol	Not saved.
	Negative numbers represented as -1234 in Excel are enclosed in parentheses.
	Accounting format, in which currency symbols are aligned at the left of the cell, is converted to normal currency format.
	Special formats for Social Security numbers, phone numbers, and ZIP Codes are not saved.
Number formatting	Combined date and time formats (for example, 12/9/2000 2:45 PM) are saved in date-only format.
	Fractional seconds formats are saved in General format.
	Fractional formats (for example, 13/64) are converted to decimal fractions.

Dates represented by the first letter of the month (for example, "J" for January) are saved in General format, which causes the date to be displayed as a serial number.

## Chart features

Embedded charts are saved on the sheet if you save the workbook in WK1, FMT format.

<b>Excel 2003 feature</b>	<b>In Lotus 1-2-3 Release 2 format</b>
3-D marker shape (cylinder, pyramid, and cone)	Not saved.
Trendlines and error bars	Not saved.
Rotated text on axis and data labels	Saved as horizontally oriented text (0 [zero] degrees).
Data tables in chart sheets	Not saved.
Gradient fills, patterns, and shading in chart items	Saved as the closest available solid color and pattern.
Shading in surface charts	Saved as the closest available solid color and pattern.
Shadows on series and points	Not saved.

 [Lotus 1-2-3 Release 2.x \(WK1, ALL\)](#)

If you save a Microsoft Excel 2003 workbook in the Lotus 1-2-3 file format WK1,ALL (1-2-3), formatting is saved in a separate ALL file. The ALL file is used in Lotus 1-2-3 by the ALWAYS add-in to format worksheets. If you reopen the WK1 file in Excel, the formatting in the associated ALL file is applied automatically.

 [Data saved in the WK1 file.](#)

The following features of Microsoft Excel 2003 are not preserved if you open and then save an Excel workbook in Lotus 1-2-3 Release 2.x.

## Workbook properties and settings

### **Excel 2003 feature**

### **In Lotus 1-2-3 Release 2 format**

Number of worksheets

Depends on the available memory. Sheet names are converted to the Lotus 1-2-3 default names A, B, C, and so on.

65,536 rows per worksheet

Rows after 8,192 are deleted.

32,767 characters per cell

Characters after 240 are deleted.

Custom views defined for a workbook

Not saved.

Attached toolbars

Not saved.

Settings specified in the **Page Setup** dialog box (**File** menu) and manual page breaks

Not saved.

### **Analysis, PivotTable, and data access features**

#### **Excel 2003 feature**

#### **In Lotus 1-2-3 Release 2 format**

Formulas that contain 3-D references

3-D references and external references to other workbooks and sheets in formulas are saved.

PivotTable and Chart reports

PivotTable and Chart reports are saved in the closest available Lotus 1-2-3 chart format.

References

References to rows beyond 8,192 wrap to the beginning of the worksheet; for example, the reference A8193 becomes the reference A1 in the converted WK3 file.

Formulas

If a formula contains a function that is not supported by Lotus 1-2-3 Release 2.x, Excel calculates the function before saving the file and replaces the formula with the resulting value.

Functions available in Excel 97 and Excel 2003

Converted to the corresponding Lotus 1-2-3 functions; for example, AVERAGEA is converted to @AVG.

Excel intersection (blank space) and union (comma) operators

Not saved.

Scenarios

Not saved.

## OLE objects and graphics

<b>Excel 2003 feature</b>	<b>In Lotus 1-2-3 Release 2 format</b>
Imported graphics and drawing objects	Not saved.
Embedded objects	Not saved.

## Workgroup and Internet features

<b>Excel 2003 feature</b>	<b>In Lotus 1-2-3 Release 2 format</b>
Comments	Not saved.
Hyperlinks	Not saved.
Data validation rules specified for cells	Not saved.

## Programmability features

<b>Excel 2003 feature</b>	<b>In Lotus 1-2-3 Release 2 format</b>
Visual Basic macros	Visual Basic code is not saved.
<a href="#">ActiveX controls</a>	Not saved.
Form controls	Not saved.

[Data saved in the ALL file.](#)

## Formatting features

<b>Excel 2003 feature</b>	<b>In Lotus 1-2-3 Release 2 format</b>
Column widths and row heights	Original column widths and row heights are saved.
Cells that contain text with different text formats	Fonts are converted according to the font substitution settings for your system. Font color is converted to the closest available color supported by Lotus 1-2-3. Font sizes are converted. Bold, italic, and underline formats are saved; accountant underline format is converted to regular underline format. Superscript, subscript, and strikethrough formats are not saved. In cells that contain text with different text formats, all text in the cell takes on the format of the first character in the cell.

Cells that contain TrueType fonts	TrueType fonts are converted to the closest available printer font. Font color is converted to the closest available color supported by Lotus 1-2-3. Font sizes are saved.
Text formatted with <b>Shrink to fit</b> option on the <b>Alignment</b> tab ( <b>Format</b> menu, <b>Cells</b> command)	Text is the original point size (before the <b>Shrink to fit</b> option was applied).
Rotated and vertically oriented text	Rotated text and vertically oriented text is changed to horizontal orientation.
Indentations within cells	Indentation within cells is removed, and the contents of cells are left-aligned.
Merged cells	Merged cells are split into their original configuration. Data is placed in the top-left cell.
Conditional formatting	Not saved, and cells are reformatted with the Normal style.
Sheet backgrounds	Not saved.
Border styles	Borders are converted to the closest available border style; for example, dotted borders are converted to single lines. Color borders are converted to black. Fill colors and patterns are converted to the closest available color and pattern supported by Lotus 1-2-3; some shading colors and patterns may be converted to black shading.
New border styles	Except for diagonal borders, borders formats are saved. Dashed border line styles are not saved.
Aligned underlining of multiple fonts	Underlining might not be aligned.
Text	Centered, right-aligned, and left-aligned formatting is saved. Top,

alignment centered, and bottom vertical alignment is saved.

Fill colors Converted to the closest available color and pattern supported by  
and patterns Lotus 1-2-3.

Euro symbol Not saved.

Negative numbers represented as -1234 in Excel are enclosed in parentheses.

Accounting format, in which currency symbols are aligned at the left of the cell, is converted to normal currency format.

Special formats for Social Security numbers, phone numbers, and ZIP Codes are not saved.

Number  
formatting Combined date and time formats (for example, 12/9/2000 2:45 PM) are saved in date-only format.

Fractional seconds formats are saved in General format.

Fractional formats (for example, 13/64) are converted to decimal fractions.

Dates represented by the first letter of the month (for example, "J" for January) are saved in General format, which causes the date to be displayed as a serial number.

## Chart features

Embedded charts are saved on a separate chart sheet if you save the workbook in WK1, ALL format.

<b>Excel 2003 feature</b>	<b>In Lotus 1-2-3 Release 2 format</b>
3-D marker shape (cylinder, pyramid, and cone)	Not saved.
Trendlines and error bars	Not saved.
Rotated text on axis and data labels	Saved as horizontally oriented text (0 [zero] degrees).
Data tables in chart sheets	Not saved.

Gradient fills, patterns, and shading in chart items	Saved as the closest available solid color and pattern.
Shading in surface charts	Saved as the closest available solid color and pattern.
Shadows on series and points	Not saved.

### [Lotus 1-2-3 Release 1.x \(WKS\)](#)

The Lotus 1-2-3 Release 1.x (WKS) format saves only text, values, and formulas of the active worksheet.

The following features of Excel 2003 are not preserved if you open and then save an Excel 2003 workbook in Lotus 1-2-3 Release 1.x.

### **Workbook properties and settings**

<b>Excel 2003 feature</b>	<b>In Lotus 1-2-3 Release 1 format</b>
Number of worksheets	Saves the active worksheet.
65,536 rows per worksheet	Rows after 2,048 are deleted.
32,767 characters per cell	Characters after 240 are deleted.
Custom views defined for a workbook	Not saved.
Attached toolbars	Not saved.
Settings specified in the <b>Page Setup</b> dialog box ( <b>File</b> menu) and manual page breaks	Not saved.

### **Formatting features**

<b>Excel 2003 feature</b>	<b>In Lotus 1-2-3 Release 1 format</b>
Column widths	Saved.
Cell and text	Not saved.

formats

Fonts           Converted to 10-point Courier font.

Conditional  
formatting   Not saved and cells are reformatted with the Normal style.

Euro  
symbol       Not saved.

Negative numbers represented as -1234 in Excel are enclosed in parentheses. Negative numbers displayed in red font color are displayed in the default font color.

Accounting format, in which currency symbols are aligned at the left of the cell, is converted to normal currency format.

Special formats for Social Security numbers, phone numbers, and ZIP Codes are not saved.

Number  
formatting   Combined date and time formats (for example, 12/9/2000 2:45 PM) are saved in date-only format.

Fractional seconds formats are saved in General format.

Fractional formats (for example, 13/64) are converted to decimal fractions.

Dates represented by the first letter of the month (for example, "J" for January) are saved in General format, which causes the date to be displayed as a serial number.

Display of  
gridlines   Turned off.

## **Chart features**

Embedded charts are not saved on the sheet if you save the workbook in WKS format.

## **Analysis, PivotTable, and data access features**

**Excel 2003**

**In Lotus 1-2-3 Release 1 format**

## **feature**

Formulas that contain 3-D references	Formulas that contain 3-D references or other references to nonadjacent ranges of cells cannot be saved in this Lotus 1-2-3 format. Formulas that contain references to another workbook are converted to their resulting values.
PivotTable reports	The data displayed in the current view of a PivotTable report is saved; all other PivotTable data is lost.
References	References to rows beyond 2,048 wrap to the beginning of the worksheet; for example, the reference A2049 becomes the reference A1 in the converted WKS file.
Formulas	Most formulas are saved. If a formula contains a function that is not supported by Lotus 1-2-3 Release 1.x, Excel calculates the function before saving the file and replaces the formula with the resulting value. For example, the A functions available in Excel 97, Excel 2000, Excel 2002, and Excel 2003 are converted to their resulting values.
Functions available in Excel 97 and Excel 2003	Converted to the corresponding Lotus 1-2-3 functions; for example, AVERAGEA is converted to @AVG.
Excel intersection (blank space) and union (comma) operators	Not saved.
Scenarios	Not saved.
Defined names of ranges	Saved.

## **OLE objects and graphics**

<b>Excel 2003 feature</b>	<b>In Lotus 1-2-3 Release 1 format</b>
Imported graphics and drawing objects	Not saved.
Embedded objects	Not saved.

## Workgroup and Internet features

Excel 2003 feature	In Lotus 1-2-3 Release 1 format
Comments	Not saved.
Hyperlinks	Not saved.
Data validation rules specified for cells	Not saved.

## Programmability features

### Excel 2003 feature In Lotus 1-2-3 Release 1 format

Visual Basic macros	Visual Basic code is not saved.
<a href="#">ActiveX controls</a>	Not saved.
Form controls	Not saved.

## Text file formats

### [Formatted Text \(Space delimited\)](#)

The Formatted Text (\*.prn) format saves only the text and values as they are displayed in cells of the active worksheet.

All rows are saved. If a row of cells contains more than 240 characters, characters beyond 240 wrap to a new line at the end of the converted file. For example, if the rows 1 through 10 all contain more than 240 characters, the remaining text in row 1 is placed in row 11, the remaining text in row 2 is placed in row 12, and so on.

Columns of data are separated by commas, and each row of data ends in a carriage return. If cells display formulas instead of formula values, the formulas are converted as text. All formatting, graphics, objects, and other worksheet contents are lost. The euro symbol will be converted to a question mark.

Before saving a worksheet in this format, make sure all data that you want converted is visible and that there is adequate spacing between the columns. Otherwise, data may be lost or not properly separated in the converted file. You may need to adjust the column widths of the worksheet.

## [Text \(Tab delimited\)](#)

The Text (\*.txt) file format saves only the text and values as they are displayed in cells of the active worksheet. All rows and all characters in each cell are saved. Columns of data are separated by tab characters, and each row of data ends in a carriage return. If a cell contains a comma, the cell contents are enclosed in double quotation marks. All formatting, graphics, objects, and other worksheet contents are lost. The euro symbol will be converted to a question mark.

If cells display formulas instead of formula values, the formulas are saved as text. To preserve the formulas if you reopen the file in Microsoft Excel, select the **Delimited** option in the Text Import Wizard, and select tab characters as the delimiters.

**Note** If your workbook contains special font characters, such as a copyright symbol (©), and you will be using the converted text file on a computer with a different operating system, save the workbook in the text file format appropriate for that system. For example, if you are using Windows and want to use the text file on a Macintosh computer, save the file in the Text (Macintosh) format. If you are using a Macintosh computer and want to use the text file on a system running Windows or Windows NT, save the file in the Text (Windows) format.

## [Text \(Unicode\)](#)

The Text (\*.txt) format saves all text and values as they appear in cells of the active worksheet.

However, if you open a file in Text (Unicode) format by using a program that does not read Unicode, such as Notepad in Microsoft Windows 95 or a Microsoft MS-DOS-based program, your data will be lost.

**Note** Notepad in Microsoft Windows NT does read files in Text (Unicode) format.

## [CSV \(Comma delimited\)](#)

The CSV (\*.csv) file format saves only the text and values as they are displayed in cells of the active worksheet. All rows and all characters in each cell are

saved. Columns of data are separated by commas, and each row of data ends in a carriage return. If a cell contains a comma, the cell contents are enclosed in double quotation marks.

If cells display formulas instead of formula values, the formulas are converted as text. All formatting, graphics, objects, and other worksheet contents are lost. The euro symbol will be converted to a question mark.

**Note** If your workbook contains special font characters such as a copyright symbol (©), and you will be using the converted text file on a computer with a different operating system, save the workbook in the text file format appropriate for that system. For example, if you are using Windows and want to use the text file on a Macintosh computer, save the file in the CSV (Macintosh) format. If you are using a Macintosh computer and want to use the text file on a system running Windows or Windows NT, save the file in the CSV (Windows) format.

## [DIF \(Data Interchange Format\)](#)

The DIF (\*.dif) format saves only the text, values, and formulas on the active worksheet.

- All rows and all characters in each cell are saved.
- If worksheet options are set to display formula results in the cells, only the formula results are saved in the converted file. To save the formulas, display the formulas on the worksheet before saving the file. To display the formulas, select the **Formulas** check box on the **View** tab of the **Options** dialog box (**Tools** menu).
- Column widths and most number formats are saved, but all other formats are lost.
- Settings specified in the **Page Setup** dialog box (**File** menu) and manual page breaks are lost.
- Cell comments, graphics, embedded charts, objects, form controls, hyperlinks, data validation settings, conditional formatting, and other worksheet features are lost.
- The data displayed in the current view of a PivotTable report is saved; all other PivotTable data is lost.
- Visual Basic code is lost.
- The euro symbol will be converted to a question mark.

## [SYLK \(Symbolic Link\)](#)

The SYLK (\*.slk) format saves only the values and formulas on the active worksheet, and limited cell formatting.

- All rows are saved; up to 255 characters are saved per cell.
- If a Microsoft Excel function is not supported in SYLK format, Microsoft Excel calculates the function before saving the file and replaces the formula with the resulting value.
- Most text formats are saved; converted text takes on the format of the first character in the cell. Rotated text, merged cells, and horizontal and vertical text alignment settings are lost. The font color might be converted to a different color if you reopen the converted SYLK sheet in Microsoft Excel. Borders are converted to single-line borders. Cell shading is converted to a dotted gray shading.
- Settings specified in the **Page Setup** dialog box (**File** menu) and manual page breaks are lost.
- Cell comments are saved; you can display the comments if you reopen the SYLK file in Microsoft Excel.
- Graphics, embedded charts, objects, form controls, hyperlinks, data validation settings, conditional formatting, and other worksheet features are lost.
- Visual Basic code is lost.
- The data displayed in the current view of a PivotTable report is saved; all other PivotTable data is lost.
- If you are converting the file for use in Microsoft Excel for the Macintosh version 1.5 or earlier, clear the **1904 date system** check box on the **Calculation** tab of the **Options** dialog box (**Tools** menu), and then make sure that all values are visible before you save the file.

**Note** You can use the SYLK (Symbolic Link) format to save workbook files for use in Microsoft Multiplan. Excel 2003 does not include file format converters for converting workbook files directly into the Multiplan format.

## **Other spreadsheet and database programs**

### [Quattro Pro for MS-DOS \(WQ1\)](#)

The WQ1 (Quattro Pro for DOS) file format saves only the text, values, and formulas on the active worksheet.

- Microsoft Excel saves only rows 1 through 8192; up to 240 characters are saved per cell.
- If a Microsoft Excel function is not supported in WQ1 format, Microsoft Excel calculates the function before saving the file and replaces the formula with the resulting value.
- Text formatting is converted to 12-point Courier font; all other text formats, such as bold and italic, are lost.
- Column widths are saved, but merged cells, rotated text, and other cell formats are lost.
- Most number formats are saved.
- Borders are converted to the closest available border style in Quattro Pro. Cell shading and color border line styles are not supported.
- Settings specified in the **Page Setup** dialog box (**File** menu) and manual page breaks are lost.
- Cell comments, graphics, embedded charts, objects, form controls, hyperlinks, data validation settings, conditional formatting, and other worksheet features are lost.
- The data displayed in the current view of a PivotTable report is saved; all other PivotTable data is lost.
- Visual Basic for Applications code is lost.
- The euro symbol will be lost.

**Quattro Pro graphs** Because Quattro Pro for Windows stores its graphs in a different way than Excel stores its charts, graphs in Quattro Pro for Windows are not imported when a Quattro Pro for Windows file is imported into Excel.

**Quattro Pro Scenario Manager** The Microsoft Excel Scenario Manager is not directly equivalent to the Quattro Pro for Windows Scenario Manager. Therefore, Excel will import only the data from the scenario that was displayed the last time the file was saved in Quattro Pro for Windows.

**External data links** Hyperlinks to external database tables or to the Data Modeling Desktop are not imported because they are not compatible with ODBC, Microsoft Query, or Microsoft Excel [PivotTable reports](#).

**OLE objects** Excel will not import embedded OLE objects from a Quattro Pro

for Windows file.

**Gradient fills** For gradient fills, the object is formatted by using the primary color from the fill.

**Macros** Excel 2003, Excel 2002, and Excel 2000 do not run Quattro Pro macros. You can rewrite any macros that you need in Visual Basic for Applications. For information about writing Excel macro code, see [Visual Basic Help](#).



### [dBASE file formats \(DBF 2, DBF 3, DBF 4\)](#)

The dBASE file formats DBF 2 (dBASE II), DBF 3 (dBASE III), and DBF 4 (dBASE IV) save only the text and values as they are displayed in cells of the active worksheet. All cell formatting, page layout settings, graphics, objects, and other Microsoft Excel features are lost. The data displayed in the current view of a PivotTable report is saved; all other PivotTable data is lost.

- All rows are saved; the following numbers of columns are saved:

<b>Format</b>	<b>Columns</b>
---------------	----------------

DBF 2 (dBASE II)	32
------------------	----

DBF 3 (dBASE III)	128
-------------------	-----

DBF 4 (dBASE IV)	255
------------------	-----

- If a range of cells is named "Database," only that range of cells is converted. If you have added new records after naming the database range, you must redefine the range to include the new records before you save the file in dBASE format. If a database range is not defined and a single cell within the range is selected, the single cell is converted. If a range of cells is selected, the cells in the [current region](#) will be converted and saved. Any blank cells, or cells containing numbers in row one of the selected range will be converted to N1, N2, and so on.
- Text values in the first row of the range are used as dBASE field names, which are limited to 10 characters; subsequent characters are truncated. If the first row contains all numbers, automatic field names (N1, N2, and so on) are inserted in the converted file.
- Data types of values in the first row of data in the converted range determine the data types of each field (column) of data. If the first row of data contains a blank value for a field, the field is converted as a text field,

even if subsequent rows contain numbers in that field; the numbers are converted as text.

- Only data visible in the worksheet cells is saved. Widen the columns in Excel, and make sure all the data is visible before you save the sheet in dBASE format.
- If cells contain decimal fractions but are formatted in Excel with the General number format, the values are rounded to the closest whole number. To preserve numbers to the right of the decimal point, format the cells with the Number format, and then specify the number of decimal places you want saved.
- If cells in the converted range contain formulas, only the resulting values of formulas are saved, even if the sheet display options are set to show formulas in the worksheet cells instead of values. To ensure that the formula values are converted correctly, click **Options** on the **Tools** menu, click the **View** tab, and clear the **Formulas** check box. Then make sure that all values are visible before you save the file. If you want to save a formula as text, insert an apostrophe (') before the formula.
- The euro symbol will be lost.

## Clipboard objects

 [Clipboard format specifics](#)

<b>Format</b>	<b>Clipboard type identifiers</b>
	Picture (Windows enhanced metafile, EMF)
Picture	<b>Note</b> If you copy a Windows metafile (WMF) picture from another program, Microsoft Excel pastes the item as an enhanced metafile format (EMF) picture.
Microsoft Excel file formats	Binary file formats for Microsoft Excel versions 3.0, 4.0, 5.0/95, Microsoft Excel 97-2000, Microsoft Excel Workbook (BIFF, BIFF3, BIFF4, BIFF5, and BIFF8)
Embedded object	Microsoft Excel objects, objects from properly registered programs that support <a href="#">OLE 2.0 (OwnerLink)</a> , and Picture or another presentation format
Linked object	OwnerLink, <a href="#">ObjectLink</a> , Link, Picture, or other format .htm

HTML  
(HyperText  
Markup  
Language)

**Note** When you copy text from another program, Microsoft Excel pastes the text in HTML format, regardless of the format of the original text.

[Show All](#)

# Lotus 1-2-3 keyboard equivalents

To print this topic, press SHIFT+TAB to select **Show All**, press ENTER, and then press CTRL+P.

## [Function key equivalents](#)

Lotus 1-2-3	Microsoft Excel
F1 (Help)	F1
F2 (Edit)	F2
F3 (Name)	F3
F4 (Absolute/relative)	F4
F5 (Go to)	F5
F6 (Next window)	CTRL+F6 Use the <b>AutoFilter</b> command ( <b>Data</b> menu) to find rows in a range or list:
F7 (Query)	Press ALT, D, F, F to filter the range or list. Use the arrow keys to select the cell that contains the column label, and then press ALT+DOWN ARROW, select a value in the AutoFilter list, and press ENTER.
F8 (Data table)	Tables recalculate automatically, unless you select the <b>Automatic except tables</b> check box on the <b>Calculation</b> tab ( <b>Tools</b> menu, <b>Options</b> command). If this option is set, you can manually recalculate data tables by pressing F9.
F9 (Calculate)	F9
F10 (Graph)	F11 or ALT+F1

## [Navigation key equivalents](#)

Lotus 1-2-3	Microsoft Excel
Up, Down	UP ARROW, DOWN ARROW

Left, Right LEFT ARROW, RIGHT ARROW  
 End, Up CTRL+UP ARROW or END+UP ARROW  
 End, Down CTRL+DOWN ARROW or END+DOWN ARROW  
 End, Left CTRL+LEFT ARROW or END+LEFT ARROW  
 End, Right CTRL+RIGHT ARROW or END+RIGHT ARROW  
 Home CTRL+HOME  
 Tab CTRL+PAGE DOWN  
 Shift+Tab CTRL+PAGE UP  
 PgUp, PgDn PAGE UP or PAGE DOWN

[Transition navigation keys](#)

These navigation keys can be used to make the transition between Lotus 1-2-3 and Microsoft Excel. To select transition navigation keys, press ALT+T and then press O (**Tools** menu, **Options** command), press CTRL+TAB to select the **Transition** tab, and then press ALT+K to select the **Transition navigation keys** check box.

<b>Press</b>	<b>To move</b>
SHIFT+TAB or CTRL+LEFT ARROW	One screen to the left
TAB or CTRL+RIGHT ARROW	One screen to the right
CTRL+PAGE DOWN	To the next sheet in a workbook
CTRL+PAGE UP	To the previous sheet in a workbook
HOME	To the first cell on the sheet (the cell in the upper-left corner)

Use the following text-alignment prefix characters to assign alignment formats as you enter data in cells.

<b>Press</b>	<b>To</b>
' (apostrophe)	Left align data in the cell
" (quotation mark)	Right align data in the cell
^ (caret)	Center data within the cell

\ (backslash)      Repeat characters across the cell

[Show All](#)

# Move around a worksheet by using Lotus 1-2-3 keystrokes

1. On the **Tools** menu, click **Options**, and then click the **Transition** tab.
2. Select the **Transition navigation keys** box.

If you want to revert to Microsoft Excel keystrokes, clear the **Transition navigation keys** box.



To quickly move across a block of nonblank cells, press the END key, and then press the arrow key for the direction you want to move.

[Show All](#)

# About converting worksheets between Excel and Lotus 1-2-3

Some of the content in this topic may not be applicable to some languages.

## [Converting files](#)

**Saving in Microsoft Excel file format** Excel stores the file format of any file you open. When you save a file, Excel uses the same format the file was in when you opened it. For example, if you open a Lotus 1-2-3 file with a .wk3 extension, Excel saves the file as a Lotus 1-2-3 file with a .wk3 extension. If you make changes to the file in Excel, you should save the file in an Excel file format to be sure all of your changes are saved. To do this, be sure to use the **Save As** command and select **Microsoft Excel Workbook** in the **Save as type** box.

**Changing the file name extension** When you save a workbook as a different type by changing the file format in the **Save as type** box, you do not have to change the file name, because Excel saves a copy of the workbook with a different file name extension. For example, a Lotus 1-2-3 Release 4.0 file has a file name extension of .wk4; Excel Workbook format uses the .xls file name extension.

Typing a new extension in the **File name** box, or renaming the file with a new extension in the folder window, is not sufficient to change the file type. You must also change the **Save as type** box to the file type you want.

**Applying formatting from associated Lotus 1-2-3 files** When you open a Lotus 1-2-3 worksheet or workbook in Excel, Excel applies the formatting in the associated .fmt, .fm3, or .all file. Make sure the associated file is stored in the same folder as the .wk? file. If you save a Lotus 1-2-3 file in Excel format, Excel saves the spreadsheet data and formatting in a single workbook file.

## [Converting formulas](#)

**Using Lotus 1-2-3 rules to calculate formulas** When you open a Lotus 1-2-3 worksheet in Microsoft Excel, the **Transition formula evaluation** check box is automatically selected for that sheet to ensure that Excel calculates the formulas according to the Lotus 1-2-3 rules.

If you save a Lotus 1-2-3 worksheet as an Excel worksheet, the **Transition formula evaluation** check box remains selected and Excel will calculate the formulas according to the Lotus 1-2-3 rules until you clear it.

**How cells are used in formulas** Once you have converted a Lotus 1-2-3 file to an Excel workbook, you can examine the relationships of the cells and formulas within the worksheet by using the worksheet audit commands.

**Some formulas may not convert** If a formula can't be converted to an Excel formula, the worksheet shows the last value calculated for the formula in Lotus 1-2-3.

[Converting macros](#)

Microsoft Excel 2000 and later versions do not run Lotus 1-2-3 macros. You can rewrite any macros that you need in Visual Basic for Applications. For information about writing Excel macro code, see [Visual Basic Help](#).

[Show All](#)

# About opening and saving files from other programs

Some of the content in this topic may not be applicable to some languages.

You can open a file created in another program, such as Lotus 1-2-3 or Quattro Pro, in Microsoft Excel the same way you would open an Excel file. You can then save the file in its original file format or as an Excel workbook using the standard Excel save commands. Files saved as Excel workbooks might not retain all of their original formatting, and features and formatting of an Excel workbook might not be available in other programs.



[Changing the default file format for saving workbooks](#)

If you work with others who use earlier versions of Excel or other spreadsheet programs, you can change the default file format used to save workbooks you create in Excel 2002 or later.



[Supported Lotus 1-2-3 and Quattro Pro versions](#)

Excel can directly open files from Lotus 1-2-3 versions up through 4.0 (\*.wk?) and Quattro Pro for Windows versions 5.0 and 7.0 by using the Quattro Pro converter. To open a file from a later Quattro Pro version in Excel, either save the file in an earlier Quattro Pro format, or save the file in another format, such as Lotus 1-2-3 (\*.wk?). Although you can open Quattro Pro for MS-DOS and Quattro Pro for Windows files, there are some limitations to opening the worksheets.

If you didn't install the converter for Quattro Pro files when you installed Excel, you must install it before you can open files in that format. You can't use the Quattro Pro file converter to save files. You will need to install the Quattro Pro converters from the Microsoft Office Web site.



[Password protected files](#)

Excel 2000 and later versions can open [password](#) protected WKS and WK1 files and files that are protected at the worksheet level. Excel 2000 and later versions cannot open WK3 or WK4 files that are protected with a file-level password. Excel 2000 and later versions cannot open Quattro Pro files that are password protected. Before you open the file in Excel, make sure you have removed any password from the file.

#### [Opening a text file in Excel](#)

If the data you want to use in Excel is in a text file with data delimited (separated) by tab characters, commas, spaces, or similar characters, you can just open the file in Excel. Excel uses the Text Import Wizard to interpret the text according to your instructions and divides the data into rows and columns on a worksheet. You can also copy delimited text data from a word-processing document or other document into a workbook and then divide the text into columns.

#### [Copying text from another program to Excel](#)

If you want to use only some of the text from a text file, you can copy that data into Excel and then separate the copied text data into columns.

[Show All](#)

# Create a formula to calculate data on a Lotus 1-2-3 worksheet

Some of the content in this topic may not be applicable to some languages.

1. Open the Lotus 1-2-3 worksheet that contains the source data.

[How?](#)

1. In your Microsoft Office program, click **File**, and then click **Open**.
2. In the **Look in**, list click the drive, folder, or Internet location that contains the file you want to open.
3. In the folder list, locate and open the folder that contains the file.

If you can't find the file, you can search for it.

[How?](#)

1. Click **Open** .
2. Click **Tools** in the **Open** dialog box, and then click **Search**.
3. Do one of the following:

[Search for a file containing specified text](#)

You can find a file containing text in its title, contents, or properties.

1. On the **Basic** tab, in the **Search text** box, type the text to search for in Microsoft Office files, Web pages, and Microsoft Outlook items.

[Tip](#)

You can use wildcards in the **Search text** box. Type a question mark (?) to match any single character, or type an

- asterisk (\*) to match any number of characters. For example, s?t finds "sat" and "set"; s\*d finds "sad" and "started."
2. To limit where to search, in the **Search in** box, select one or more drives, folders, Web sites, or Outlook mailboxes. To search everywhere, select **Everywhere**. To specify a single location, type it directly in the **Search in** box.
  3. To limit the types of search results, in the **Results should be** box, select the types of items to find. To find all types of files, Web pages, and Outlook items, select **Anything**.
  4. Click **Search**.

[Tip](#)

To view all properties of a found item, click the command button following the item, and then choose **Properties**.

[Search for a file based on one or more properties](#)

1. On the **Advanced** tab, enter one or more search criteria.

[How?](#)

1. In the **Property** box, choose a property from the list or type in a property name. The **Property** box displays the properties available in the currently open document.

[Tip](#)

You can use wildcards in the **Property** box. Type a question mark (?) to match any single character, or type an asterisk (\*) to match any number of characters. For example, s?t finds "sat" and "set"; s\*d finds "sad" and "started."

2. In the **Condition** box, choose a condition from the list, or type in a condition.
3. In the **Value** box, enter the value to associate with the condition.

4. If previous search criteria exist, click **And** to add a criterion that must be true in addition to previous criteria. Click **Or** to add a criterion that is sufficient regardless of previous criteria.
5. Click **Add** to add the search criterion.

**Note** If the value is invalid for the condition or property, the **Add** button is unavailable.

2. To limit where to search, in the **Search in** box, select one or more drives, folders, Web sites, or Outlook mailboxes. To search everywhere, select **Everywhere**. To specify a single drive, folder, or Web site, type it directly in the **Search in** box.
3. To limit the types of search results, in the **Results should be** box, select the types of files, Web pages, and Outlook items to find. To find all types of files and items, select **Anything**.
4. Click **Search**.

 [Tip](#)

To view all properties of a found item, click the command button following the item, and then choose **Properties**.

4. Click the file, and then click **Open**.

 [Open a file as a copy](#)

1. In your Office program, click **File**, and then click **Open**.
2. In the **Look in** list, click the drive, folder, or Internet location that contains the file you want to open.
3. In the folder list, locate and open the folder that contains the file.

If you can't find the file, you can search for it.

 [How?](#)

You can search the titles, contents, or properties of Microsoft Office files, Microsoft Outlook items, and Web pages.

1. On the **Standard** toolbar, click **Search** .
2. Do one of the following:

[Search for a file or Outlook item containing specified text](#)

You can find a file or Outlook item containing text in its title, contents, or properties.

1. In the **Search text** box, type the text to search for in Office files, Web pages, and Outlook items

[Tips](#)

- Type a question mark (?) to match any single character in your search text, or type an asterisk (\*) to match any number of characters. For example, s?t finds "sat" and "set"; s\*d finds "sad" and "started."
  - When searching for Outlook items, use [natural language searches](#). Natural language searching is only supported in English versions of Microsoft Office XP and later.
2. To limit where to search, in the **Search in** box, select one or more drives, folders, Web sites, or Outlook mailboxes. To search everywhere, select **Everywhere**.
  3. To limit the types of search results, in the **Results should be** box, select the types of items to find. To find all types of files, Web pages, and Outlook items, select **Anything**.
  4. Click **Search**.

[Search for a file or Outlook item based on one or more properties](#)

1. In the **Basic Search** task pane, click **Advanced Search**.
2. Enter one or more search criteria.

[How?](#)

1. In the **Property** box, choose a property from the list or

- type in a property name. The **Property** box displays the properties available in the currently open document.
2. In the **Condition** box, choose a condition from the list, or type in a condition.
  3. In the **Value** box, enter the value to associate with the condition.
  4. If previous search criteria exist, click **And** to add a criterion that must be true in addition to previous criteria. Click **Or** to add a criterion that is sufficient regardless of previous criteria.
  5. Click **Add** to add the search criterion.

**Note** If the value is invalid for the condition or property, the **Add** button is unavailable.

3. To limit where to search, in the **Search in** box, select one or more drives, folders, Web sites, or Outlook mailboxes. To search everywhere, select **Everywhere**.
4. To limit the types of search results, in the **Results should be** box, select the types of files, Web pages, and Outlook items to find. To find all types of files and items, select **Anything**.
5. Click **Search**.

In the **Search Results** task pane, you can take one or more actions on the search results.

[How?](#)

- To quickly view an item's properties, rest the mouse pointer over the item.
- To open an item in its default editor, click it.
- To open an item in an Office application, click the command button following the item, and then choose **Edit with** <application>.
- To view a Web page in a browser, click the command button following the item, and then choose **Open in Browser**.

- To create a new document based on the selected item, click the command button following the item, and then choose **New from this file**.
  - To copy a hyperlink to the selected item onto the Office Clipboard, click the command button following the item, and then choose **Copy link to clipboard**.
  - To view all properties of an item, click the command button following the item, and then choose **Properties**.
4. Select the file you want to open a copy of. Click the arrow next to the **Open** button, and then click **Open as Copy**.

**Note** When you open a file as a copy, a new copy of the file is created in the folder that contains the original file.

#### [Open a file as read-only](#)

1. In your Office program, click **File**, and then click **Open**.
2. In the **Look in** list, click the drive, folder, or Internet location that contains the file you want to open.
3. In the folder list, locate and open the folder that contains the file.

If you can't find the file, you can search for it.

#### [How?](#)

You can search the titles, contents, or properties of Microsoft Office files, Microsoft Outlook items, and Web pages.

1. On the **Standard** toolbar, click **Search** .
2. Do one of the following:

#### [Search for a file or Outlook item containing specified text](#)

You can find a file or Outlook item containing text in its title, contents, or properties.

1. In the **Search text** box, type the text to search for in Office files, Web pages, and Outlook items

#### [Tips](#)

- Type a question mark (?) to match any single character in your search text, or type an asterisk (\*) to match any number of characters. For example, s?t finds "sat" and "set"; s\*d finds "sad" and "started."
  - When searching for Outlook items, use [natural language searches](#). Natural language searching is only supported in English versions of Microsoft Office XP and later.
2. To limit where to search, in the **Search in** box, select one or more drives, folders, Web sites, or Outlook mailboxes. To search everywhere, select **Everywhere**.
  3. To limit the types of search results, in the **Results should be** box, select the types of items to find. To find all types of files, Web pages, and Outlook items, select **Anything**.
  4. Click **Search**.

#### [Search for a file or Outlook item based on one or more properties](#)

1. In the **Basic Search** task pane, click **Advanced Search**.
2. Enter one or more search criteria.

#### [How?](#)

1. In the **Property** box, choose a property from the list or type in a property name. The **Property** box displays the properties available in the currently open document.
2. In the **Condition** box, choose a condition from the list, or type in a condition.
3. In the **Value** box, enter the value to associate with the condition.
4. If previous search criteria exist, click **And** to add a criterion that must be true in addition to previous

criteria. Click **Or** to add a criterion that is sufficient regardless of previous criteria.

5. Click **Add** to add the search criterion.

**Note** If the value is invalid for the condition or property, the **Add** button is unavailable.

3. To limit where to search, in the **Search in** box, select one or more drives, folders, Web sites, or Outlook mailboxes. To search everywhere, select **Everywhere**.
4. To limit the types of search results, in the **Results should be** box, select the types of files, Web pages, and Outlook items to find. To find all types of files and items, select **Anything**.
5. Click **Search**.

In the **Search Results** task pane, you can take one or more actions on the search results.

[How?](#)

- To quickly view an item's properties, rest the mouse pointer over the item.
- To open an item in its default editor, click it.
- To open an item in an Office application, click the command button following the item, and then choose **Edit with** <application>.
- To view a Web page in a browser, click the command button following the item, and then choose **Open in Browser**.
- To create a new document based on the selected item, click the command button following the item, and then choose **New from this file**.
- To copy a hyperlink to the selected item onto the Office Clipboard, click the command button following the item, and then choose **Copy link to clipboard**.
- To view all properties of an item, click the command button

following the item, and then choose **Properties**.

4. Select the file you want to open a copy of. Click the arrow next to the **Open** button, and then click **Open as Read-Only**.

#### Tips

- You can create a shortcut to a folder on a network file server or Web server. Use **My Network Places**.
  - The **New File** [task pane](#) displays a list of the last few files that you most recently opened. Click on the file name to open it.
  - The **History** folder in the **Open** window lists the previous files and folders that you have opened.
2. On the Lotus 1-2-3 worksheet, select the cells you want to link to.
  3. Click **Copy**  on the **Standard** [toolbar](#).
  4. Switch to the Microsoft Excel workbook that will contain the link formula.
  5. Select the cell in the upper-left corner of the [paste area](#) where you want to put the linked data.

To ensure that the linked data does not replace existing data, make sure that the worksheet has no data below or to the right of the cell you click.

6. On the **Edit** menu, click **Paste Special**.
7. Click **Paste Link**.

[Show All](#)

# Differences between Microsoft Excel and Lotus 1-2-3

Some of the content in this topic may not be applicable to some languages.

## [General differences](#)

**Select first, then choose a command** In Lotus 1-2-3, you choose a command and then specify a range that the command will affect. In Excel, you select the cell, range, or object you want to work with and then choose a command to perform an action. For example, if you want to format a range of cells, select the cells and then click **Cells** on the **Format** menu.

**Keys for moving around a worksheet** The navigation keys you use to move around a worksheet differ between Excel and Lotus 1-2-3. For example, if you press the HOME key in Lotus 1-2-3, the cell in the upper-left corner of the worksheet is selected; in Excel, the first cell of the current row is selected. You can change the navigation keys in Excel to move around the worksheet in the same way as Lotus 1-2-3.

**Parsing text from one column to several** In Lotus 1-2-3, you use the **Parse** command to separate text strings in one column across several columns. When you open a text file in Excel, the Text Import Wizard will assist you in parsing the data into columns. If you need to parse data in one column across several columns on the worksheet, use the **Text to Columns** command (**Data** menu).

**Macros** Excel 2000 and later versions of Excel do not run Lotus 1-2-3 macros. If you want to rewrite Lotus 1-2-3 macros for Excel, see [Visual Basic Help](#).

## [Lotus 1-2-3 functions that have equivalent Microsoft Excel functions](#)

Many Lotus 1-2-3 functions have Microsoft Excel equivalents. However, Microsoft Excel uses different calculation rules than Lotus 1-2-3 when evaluating text in formulas, certain database [criteria](#), and the value of certain logical [operators](#).

<b>Lotus function</b>	<b>Equivalent function in Microsoft Excel</b>
@@	INDIRECT
@ABS	ABS
@ACOS	ACOS
@ASIN	ASIN
@ATAN	ATAN
@ATAN2	ATAN2
@AVG	AVERAGEA
@CELL	CELL CELL
@CELLPOINTER	When used without a second argument, the CELL worksheet function returns information about the cell containing the function.
@CHAR	CHAR
@CHOOSE	CHOOSE
@CLEAN	CLEAN
@CODE	CODE
@COLS	COLUMNS
@COS	COS
@COUNT	COUNTA NPER
@CTERM	The NPER worksheet function requires you to supply a periodic payment value instead of a future value.
@D360	
The @D360 function is available only in Lotus 1-2-3 Release 3 or later.	DAYS360
@DATE	DATE
@DAVG	DAVERAGE
@DAY	DAY

@DCOUNT	DCOUNTA
@DDB	DDB
@DGET	DGET
@DMAX	DMAX
@DMIN	DMIN
@DSTD	DSTDEVP
@DSTDS	DSTDEV
@DSUM	

The @DSTDS function is available only in Lotus 1-2-3 Release 3 or later.

	DSUM
--	------

@DVAR	DVARP
@DVAR	

The @DVAR function is available only in Lotus 1-2-3 Release 3 or later.

	DVAR
--	------

@ERR	Microsoft Excel does not have an equivalent function. You can type error values such as #N/A and #VALUE! directly into cells and formulas in Microsoft Excel.
------	---

@EXACT	EXACT
@EXP	EXP
@FALSE	FALSE
@FIND	FIND
@FV	FV
@HLOOKUP	HLOOKUP
@HOUR	HOUR
	IF

@IF	In Microsoft Excel, the last two arguments can be any value, or contain another worksheet function; they are not limited to numbers or strings, as in @IF.
-----	--

## INDEX

@INDEX

The INDEX worksheet function has two forms, one to look up a referenced cell and one to select values from an array.

@INT

TRUNC

IRR

@IRR

The list of arguments for the IRR worksheet function is in reverse order of the arguments for the @IRR function.

ISERR

@ISERR

The ISERR worksheet function detects any error value in Microsoft Excel except #N/A (#VALUE!, #REF!, #DIV/0!, #NUM!, #NAME?, or #NULL!).

@ISNA

ISNA

@ISNUMBER

ISNONTEXT

@ISRANGE

The @ISRANGE function is available only in Lotus 1-2-3 Release 3 or later.

@ISSTRING

ISTEXT

@LEFT

LEFT

@LENGTH

LEN

@LN

LN

@LOG

LOG

@LOWER

LOWER

@MAX

MAXA

@MID

MID

@MIN	MINA
@MINUTE	MINUTE
@MOD	MOD
@MONTH	MONTH
@N	N
@NA	NA
@NOW	NOW
@NPV	NPV
@PI	PI
	PMT

@PMT                      You supply the list of arguments for the PMT worksheet function in a different order than you do for the @PMT function.

@PROPER	PROPER
@PUREAVG	

The @PUREAVG function is available only AVERAGE in Lotus 1-2-3 Release 4 or later.

@PURECOUNT

The @PURECOUNT function is available only COUNT in Lotus 1-2-3 Release 4 or later

@PUREMAX

The @PUREMAX function is available only MAX in Lotus 1-2-3 Release 4 or later.

## @PUREMIN

The @PUREMIN function is available only MIN in Lotus 1-2-3 Release 4 or later.

## @PURESTD

The @PURESTD function is available only STDEVP in Lotus 1-2-3 Release 4 or later.

## @PURESTDS

The @PURESTDS function is available only STDEV in Lotus 1-2-3 Release 4 or later.

## @PUREVAR

The @PUREVAR function is available only VARP in Lotus 1-2-3 Release 4 or later.

## @PUREVARS

The @PURVARS function is available only VAR in Lotus 1-2-3 Release 4 or later.

## PV

## @PV

You supply the list of arguments for the PV worksheet function in a different order than you do for the @PV

function.

## RAND

@RAND

The RAND worksheet function calculates values randomly each time the function is recalculated. The @RAND function calculates the same values in each work session.

## RATE

@RATE

You supply the list of arguments for the RATE worksheet function in a different order than you do for the @RATE function.

@REPEAT

REPT

@REPLACE

REPLACE

@RIGHT

RIGHT

@ROUND

ROUND

@ROWS

ROWS

@S

T

@SECOND

SECOND

@SIN

SIN

@SLN

SLN

@SQRT

SQRT

@STD

STDEVPA

@STDS

STDEVA

@STRING

FIXED

@SUM

SUM

@SYD

SYD

@TAN

TAN

NPER

@TERM

You supply the list of arguments for the NPER worksheet function in a different order than you do for the @TERM function.

@TIME	TIME
@TIMEVALUE	TIMEVALUE
@TODAY	TODAY
@TRIM	TRIM
@TRUE	TRUE
@UPPER	UPPER
@VALUE	VALUE
@VAR	VARPA
@VARS	VARA
@VDB	VDB
@VLOOKUP	VLOOKUP
@YEAR	YEAR

 [Microsoft Excel functions that do not have equivalent Lotus 1-2-3 functions](#)

The following Microsoft Excel functions have no equivalents in Lotus 1-2-3 Release 3.1 or earlier, or in Lotus 1-2-3 for Windows Release 1.0. If you save a workbook in one of these formats, these functions are replaced with the resulting value of the function.

**Note** This list does not include many Microsoft Excel add-in functions and statistical functions that do not have Lotus 1-2-3 equivalents.

**Microsoft Excel function**

AREAS  
DOLLAR  
DPRODUCT  
FACT  
FREQUENCY  
GETPIVOTDATA  
GROWTH  
HYPERLINK  
INT

IPMT  
ISBLANK  
ISERROR  
ISLOGICAL  
LINEST  
LOGEST  
LOOKUP  
MATCH  
MDETERM  
MINVERSE  
MIRR  
MMULT  
PPMT  
PRODUCT  
SEARCH  
SUBSTITUTE  
TEXT  
TRANSPOSE  
TREND  
TYPE  
WEEKDAY

 [Lotus 1-2-3 terminology and Microsoft Excel equivalent terms](#)

The following table lists Lotus 1-2-3 terms and equivalent Microsoft Excel terms. The Excel term may not be an exact equivalent of the Lotus 1-2-3 term, but you can use it to look for more information in Help.

<b>Lotus 1-2-3 term</b>	<b>Microsoft Excel term or concept</b>
@Function	Function
Address	Reference
Anchor cell	Selecting a range of cells
Border	Row and column headings
CALC indicator	Status bar

Cell pointer	Active cell
Column labels	Column headings
Control panel	Menu bar, formula bar, status bar
Copy	Copy and then paste
Crosshatching	Chart patterns
Current cell	Active cell
Current worksheet	Active worksheet or chart sheet
Cursor	Insertion point
Data range	Data series
Data table 1	One-input data table
Data table 2	Two-input data table
Date format	Number format
Erase	Clear
Formula criteria	Computed criteria
Global	Workspace
Graph	Chart
Graph labels	Chart text
Graph titles	Chart titles
Highlight	Select or selection
Indicator	Status bar
Input range	List or range reference (for Analysis Tools)
Label	Text
Label/matching criteria	Comparison criteria
Label-prefix	Horizontal alignment
Logical 0	FALSE
Logical 1	TRUE
Menu pointer	Menu selection
Mode indicator	Status bar
Numbering/matching criteria	Comparison criteria
Numeric format	Number format
Output range	Extract range

Picture file	Chart, chart sheet (no separate file)
Pointer movement keys	Arrow keys
Print range	Print area
Protected cell	Locked/protected cell
Range highlight	Selected range
Repeating label	Horizontal fill alignment ( <b>Format</b> menu, <b>Cells</b> command, <b>Alignment</b> tab)
Retrieve a file	Open a file
Row numbers	Row headings
Stacked bar graph	Stacked Column chart, Stacked Bar chart, 100% Stacked Column chart, 100% Stacked Bar chart
Status indicator, status line	Status bar
String	Text
Target cell	Dependent cell
Target file	Dependent document
Time format	Number format
Titles	Split worksheet window with frozen panes
Translate utility	<b>Open</b> and <b>Save As</b> commands on the <b>File</b> menu
Value	Number
Window	Multiple windows, pane

## [Features of the Excel window](#)

Excel displays workbooks that contain worksheets in a window. By default, the menu bar, the [formula bar](#), and the **Standard** and **Formatting** toolbars are displayed at the top of the window. At the bottom of the window, the status bar displays different indicators about the current working environment.

# Move Excel files between Windows and the Macintosh

Some of the content in this topic may not be applicable to some languages.

The Macintosh must be running system software version 7.5 or later and have PC Exchange installed. The Macintosh Excel version must correspond to the Microsoft Excel for Windows version. For example, to move files from Excel 2003 to the Macintosh, you must be running Microsoft Office 2001 Macintosh Edition.

1. Save your Microsoft Windows-based Excel file to a floppy disk or network location.
2. If you saved the file on a floppy disk, insert the floppy disk in the Macintosh floppy disk drive.
3. In Excel on the Macintosh, click **Open** on the **File** menu.
4. Locate and then double-click the file you want. Because Macintosh files do not have file name extensions, you should use \*.\* to search for Macintosh files.

**Note** If you have access to a network share that is connected both to personal computers running Windows and to Macintosh computers, you can place the files on the network and then open the files from either type of computer.

[Show All](#)

# Troubleshoot converting file formats

Some of the content in this topic may not be applicable to some languages.

[I can't open my Lotus 1-2-3 file in Microsoft Excel.](#)

Excel 2000 or later versions can't open some password-protected files.

1. Open the file in Lotus 1-2-3.
2. Save the file without password protection, or save it as a WKS or WK1 file.
3. Open the file in Excel.

## Notes

- Excel can open password-protected WKS and WK1 files and prompts you for the password before the worksheet is opened.
- Excel cannot open WK3 or WK4 files that are protected with a file-level password.
- Excel can open Lotus 1-2-3 files that are protected at the worksheet level.

[I can't open a file I created in Microsoft Works.](#)

Excel 2000 or later versions cannot directly open files created in Microsoft Works version 3.0 or later. To open a Works file in Excel, first open it in Works and use the **Save As** command to convert it to one of the file formats listed below. Then close the Works file and open the converted version in Excel.

- Works for Windows 2.0/Works for DOS SS
- Excel SS
- Lotus 1-2-3

To open a Microsoft Works database file in Excel, first save the file in Microsoft Works as a dBASE file, and then open the dBASE file in Excel.

[I can't open my Quattro Pro files in Excel.](#)

Excel 2000 and later versions cannot open Quattro Pro files that are password

protected. Before you open the file in Excel, make sure you have removed any password from the file. You may need to install the Quattro Pro converter. This is available on the Microsoft Office Web site.

[My workbook is very large and takes a long time to open.](#)

When you open a workbook that was created in an earlier version of Microsoft Excel, the workbook is completely recalculated to ensure that all formulas are fully optimized for the current Excel version. After you save the workbook in the new version, the next time you open it, opening will take less time.

When you worked on the file in Lotus 1-2-3, you may have formatted entire columns. Microsoft Excel converts all formatted cells, even if they're blank, making the worksheet large and slow to open. You can correct the problem in Lotus 1-2-3 or in Excel.

[Use Lotus 1-2-3](#)

1. Open the original WK4 file in Lotus 1-2-3, and select all blank cells below the last cell in the worksheet that contains data.
2. On the **Edit** menu, click **Delete**, and then click **OK**.
3. Save and close the worksheet, and open it again in Excel.

[Use Excel](#)

1. In Excel, select all blank rows below the last cell in your worksheet that contains data.
2. On the **Edit** menu, click **Delete**.
3. Save the workbook.

[The formatting I applied in Excel is gone.](#)

You may have opened a file from another program, applied Excel formatting, then saved in the original format. This removes all of the Excel formatting.

If you changed the extension of the file to .xls but didn't select the **Microsoft Excel Workbook** format in the **Save As** dialog box, the Excel formatting is not saved.

[Values on the converted sheet don't match the values on the original sheet.](#)

Excel calculates some operators and functions in a different order from other spreadsheet programs. To calculate formulas using the same rules as Lotus 1-2-3, click **Options** on the **Tools** menu, and then click the **Transition** tab. Under **Sheet options**, select the **Transition formula evaluation** check box.

[Some formulas were changed to text or values.](#)

When Excel opens a file created in another spreadsheet program and encounters an [operator](#) or [function](#) that it cannot convert, it uses the result of the formula — not the formula itself— for the contents of the cell. You can reenter the formula on your Excel worksheet by using an equivalent operator or function.

Some Lotus 1-2-3 functions don't have equivalent Excel functions. Cells containing unconverted formulas are identified by comments and show the last values that were calculated in Lotus 1-2-3. To correct this problem, view comments, locate the unconverted formulas, and rewrite them. To display all of the comments, click **Comments** on the **View** menu.

[Dates and phone numbers from my Lotus 1-2-3 file are displayed as text.](#)

You formatted the date or phone number cells with a Text number format, and you used hyphens to separate the numbers (for example, 2-10-98 or 555-1212) in your Lotus 1-2-3 worksheet. You can correct the problem in Lotus 1-2-3 or in Excel.

[Use Lotus 1-2-3](#)

1. Open the file in Lotus 1-2-3.
2. Change dates that use a Text number format to a Date number format.
3. Replace hyphens in dates with forward slashes (/).

## [Use Excel](#)

1. Double-click the cell.
2. Delete the equal sign (=) in front of the date or phone number, and press ENTER.

Dates appear with forward-slash separators.

**Note** To display a date with hyphen separators, click the cell, and then click **Cells** on the **Format** menu. Click the **Number** tab, and click the date format you want in the **Type** box.

## [My Lotus 1-2-3 or Quattro Pro macros don't run in Microsoft Excel.](#)

Excel 2000 and later versions do not run Lotus 1-2-3 or Quattro Pro macros. You can rewrite any macros that you need in Visual Basic for Applications (VBA). For information about writing Excel macro code, see [Visual Basic Help](#).

## [All of the text in the file appears in the first column.](#)

1. Select the range of cells that contains the text values. The range can be any number of rows tall, but no more than one column wide.

**Note** There must be enough blank columns to the right of the selected column to accommodate the columns of data you want to create or the data to the right of the selected column will be overwritten.

2. On the **Data** menu, click **Text to Columns**.
3. Follow the instructions in the Convert Text to Columns Wizard to specify how you want to divide the text into columns.

## [When I save data in dBASE format, some of my data is missing.](#)

The dBASE file formats DBF 2 (dBASE II), DBF 3 (dBASE III), and DBF 4 (dBASE IV) save only the text and values as they are displayed in cells of the active worksheet. All cell formatting, page layout settings, graphics, objects, and other Excel features are lost. The data displayed in the current view of a PivotTable report is saved; all other PivotTable data is lost.

Depending on the dBase format, only the following numbers of columns in the active worksheet are saved:

<b>Format</b>	<b>Columns</b>
DBF 2 (dBASE II)	32
DBF 3 (dBASE III)	128
DBF 4 (dBASE IV)	255

**Only data in the named range or current region is saved** When you save an Excel worksheet in dBASE (DB2, DB3, or DB4) format and the worksheet contains a range named "Database," only data in the named range is saved in the dBASE file. If you add new records after naming the range, you must redefine the database range to include the new records before you save the sheet in dBASE format.

If there is no range named "Database" on the sheet, only data in the [current region](#) is converted. If the first row of data contains text, Excel uses it as the header row to define field names. If the first row contains all numbers, Microsoft Excel creates field names such as N1, N2, and so on.

**Make sure character strings are shorter than column width** When saving data in dBASE format, Excel assigns a data type to each field (column of data) that is based on the field data in the first record of the database range or current region.

If a field in the first record contains text, that field is assigned the character data type, and any numbers contained in the field in other rows become character strings. The column width of the field determines the string length; character strings longer than the column width are truncated in dBASE. To prevent losing data, select the range you want to convert in Excel, and apply a monospaced font such as Courier. To size the columns to show all the data, point to **Columns** on the **Format** menu, and then click **AutoFit Selection**. Numeric data fields cannot contain text; any text in a numeric data field becomes null.

**Use a number format other than General** If decimal numbers have the General number format, the decimal places are truncated in dBASE. Before you save the data in dBASE format, apply a different number format to all data in that field. On the **Format** menu, click **Cells**, and then click the **Number** tab. In the **Category** box, click **Number** or **Scientific**, and then specify the number of

decimal places you want.

**Change time data to text data** Fields that contain time data cannot be converted. Before you save data in dBASE format, you can change time data to text data by using the TEXT worksheet function. For example, to change the time 12:34 PM to text data, use the function =TEXT("12:34", "hh:mm AM/PM").

 [Links to other Lotus 1-2-3 worksheets aren't converted correctly or have #REF! errors.](#)

When you open a Lotus 1-2-3 worksheet in Microsoft Excel, you must click **Yes** when prompted to update the workbook with changes for Excel to convert links in the worksheet properly. When you convert a worksheet to Excel, you can maintain links to other Lotus 1-2-3 worksheets, or you can convert all the workbooks to Excel and change the links accordingly.

### **Correct the #REF! errors**

1. In Excel, close the converted worksheet without saving.
2. Open the worksheet again in Excel, but this time click **Yes** when prompted to update the workbook with changes.

### **Keep links to other Lotus 1-2-3 worksheets when you convert to Excel**

1. Make sure the linked-to Lotus 1-2-3 worksheets are closed.
2. In Excel, open the Lotus 1-2-3 worksheet that contains the links, and click **Yes** when prompted to update the workbook with changes.
3. On the **File** menu, click **Save As**, and then click **Microsoft Excel Workbook** in the **Save as type** box.

### **Change links to use converted Excel workbooks**

1. In Excel, open all the linked-to Lotus 1-2-3 worksheets.
2. Open the worksheet that contains the links.
3. For each linked-to worksheet, click **Save As** on the **File** menu, and then click **Microsoft Excel Workbook** in the **Save as type** box.
4. Save the workbook that contains the links.

[Show All](#)

# About using Excel with Lotus Notes

Microsoft Excel has several features that support its use within Lotus Notes documents, forms, and views, including support for Notes F/X field exchange and NotesFlow.

## [Excel data in Notes](#)

**Inserting workbooks in documents and forms** To exchange information between Lotus Notes and Excel, you can insert an Excel workbook as an [embedded object](#) in a Notes document or form. In documents, a workbook is inserted as an embedded object in an editable [rich text field](#). You can also insert a workbook as an embedded object when you create a Notes form. For example, if you want to create multiple Notes documents that contain the same embedded workbook, insert the embedded workbook when you create the Notes form. In this way, the embedded workbook already exists within each new Notes document or form you create from the existing form.

**Importing Excel data into a document or form** To include data from a workbook in a document or form, you can import the data. When you import Excel data into a document or form, only the data is copied into the document or form. The workbook itself is not included in the document or form, and no link is maintained with the original workbook that supplied the data.

## [Excel data with Notes field exchange](#)

**Note** If you want to use Notes field exchange in the Notes document, the document must already contain the Notes/FX fields you want to use to exchange information. You cannot insert fields in a Notes document; the fields can be inserted only in a Notes form. When you add Notes/FX fields to the form with the embedded workbook, each new Notes document or form you create from that form is ready for Notes/FX field exchange.

**Fields and properties correspond with each other** Some properties are one-way: changes made in the embedded workbook are reflected in the Notes field, but changes made to the Notes field do not appear in the embedded workbook.

For example, the Excel workbook file property **Created** is a one-way field that corresponds with the Notes DateCreated field. Changes to the **Created** property in Excel automatically appear in the DateCreated field in the Notes document; however, changing the DateCreated field in the Notes document does not affect the Excel **Created** property.

Other properties correspond to two-way fields: changes in the Excel workbook are reflected in the Notes field, and changes in the Notes field are reflected in the Excel workbook. Two-way fields are updated in the embedded workbook when you open or activate the workbook and in the Notes document when you close the workbook and return to the Notes document. For example, Title is a two-way field. When you change the Excel workbook file property **Title**, the change appears in the Title field in the Notes document. When you change the Title field in the Notes document, the changes appear in the Excel workbook file property. Fields that correspond to custom workbook file properties are also two-way fields.

**Custom file properties can be used in views** In Excel, you can create a custom file property that's linked to a named range of cells. You can then create a corresponding field in Notes, so that the contents of the named range appear in your view.



[The NotesFlow Action menu in an Excel workbook](#)

Lotus NotesFlow is a set of workflow features that allows transparent interaction between a Lotus Notes database and other programs such as Microsoft Excel, Word, and PowerPoint. You can use NotesFlow to route forms, send reminders, request and process approvals, and run scheduled batch processes.

When Excel is participating in NotesFlow, an **Action** menu appears to the left of the Excel **Window** menu. The **Action** menu displays each of the available actions as commands. The commands available on the **Action** menu depend on how the Lotus Notes form is designed. When you design a form in Lotus Notes to use the NotesFlow feature, you publish the actions you want to make available in other programs that support NotesFlow.

The Lotus NotesFlow features require Lotus Notes 4.0 or later. For more information about how to use Lotus NotesFlow, refer to your Lotus Notes documentation.

[Show All](#)

# Insert a workbook in a Lotus Notes document or form

1. In Lotus Notes, click the database you want.
2. Follow the steps for your version of Lotus Notes:

[Lotus Notes 4.x](#)

1. Open the document or form where you want to insert the workbook, and do one of the following:

**Document** On the **Create** menu, click a Lotus Notes form that includes an editable [rich text field](#). Click in the rich text field, and then click **Object** on the **Create** menu.

**Existing form** On the **View** menu, click **Design**. Under **Design** in the navigation pane, click **Forms**. Double-click the form.

**New form** On the **Create** menu, point to **Design**, and then click **Form**.

2. Do one of the following:

**Insert a new blank workbook** Click **Create a new object**, and then click **Microsoft Excel Worksheet** in the **Object type** box.

**Embed a copy of an existing workbook** Click **Create an object from a file**, and then type the name of the workbook in the **File** box, or click **Browse** to select from a list.

3. Do one of the following:

**Select the sheet to display** Double-click the Excel object, and then click a different sheet.

**Display a workbook icon** Select the **Display as icon** check box.

## [Lotus Notes 3.x](#)

1. Open the document or form where you want to insert the workbook, and do one of the following:

**Document** On the **Compose** menu, click a Lotus Notes form that includes an editable [rich text field](#), and then click in the rich text field.

**Existing form** On the **Design** menu, click **Forms**, click a form in the **Forms** box, click **Edit**, and then click where you want the workbook to appear.

**New form** On the **Design** menu, click **Forms**, click **New** (or click a form in the **Forms** box and click **New Copy**), and then click where you want the workbook to appear.

2. On the **Edit** menu, point to **Insert**, and then click **Object**.
3. In the **Object Type** box, click **Microsoft Excel Worksheet**.
4. To change how the workbook will appear, click **Display Format**, select the format you want, and then click **OK**.
5. Do one of the following:

**Insert a new blank workbook** Click **OK**.

**Embed a copy of an existing workbook** Click **Choose File**, select the workbook you want from the list, and then click **OK**.

6. To select the worksheet to display in the document, double-click the Excel object, and then click a different sheet.

[Show All](#)

# Use Excel data with Lotus Notes views and field exchange

## [Display data from a workbook in a Notes view](#)

To display data from a workbook in a Notes view, you must first to define a name for the data you want to view that corresponds to a corresponding field in Lotus notes, and you must define a custom file property that corresponds to the properties in Lotus Notes

1. Insert a Microsoft Excel workbook in a Notes document, or if you don't have a Notes document already set up with a [rich text field](#) for the workbook, create a Notes form that includes a workbook.

## [How?](#)

1. In Lotus Notes, click the database you want.
2. Follow the steps for your version of Lotus Notes:

## [Lotus Notes 4.x](#)

1. Open the document or form where you want to insert the workbook, do one of the following:

**Document** On the **Create** menu, click a Lotus Notes form that includes an editable [rich text field](#). Click in the rich text field, and then click **Object** on the **Create** menu.

**Existing form** On the **View** menu, click **Design**. Under **Design** in the navigation pane, click **Forms**. Double-click the form.

**New form** On the **Create** menu, point to **Design** , and then click **Form**.

2. Do one of the following:

**Insert a new blank workbook** Click **Create a new object**, and then click **Microsoft Excel Worksheet** in the **Object type** box.

**Embed a copy of an existing workbook** Click **Create an object from a file**, and then type the name of the workbook in the **File** box, or click **Browse** to select from a list.

3. Do one of the following:

**Select the sheet to display** Double-click the Excel object, and then click a different sheet.

**Display a workbook icon** Select the **Display as icon** check box.

[Lotus Notes 3.x](#)

1. Open the document or form where you want to insert the workbook, do one of the following:

**Document** On the **Compose** menu, click a Lotus Notes form that includes an editable [rich text field](#), and then click in the rich text field.

**Existing form** On the **Design** menu, click **Forms**, click a form in the **Forms** box, click **Edit**, and then click where you want the workbook to appear.

**New form** On the **Design** menu, click **Forms**, click **New** (or click a form in the **Forms** box and click **New Copy**), and then click where you want the workbook to appear.

2. On the **Edit** menu, point to **Insert**, and then click **Object**.
3. In the **Object Type** box, click **Microsoft Excel Worksheet**.
4. To change how the workbook will appear, click **Display Format**, select the format you want, and then click **OK**.
5. Do one of the following:

**Insert a new blank workbook** Click **OK**.

**Embed a copy of an existing workbook** Click **Choose File**, select the workbook you want from the list, and then click **OK**.

6. To select the worksheet to display in the document, double-click the Excel object, and then click a different sheet.
2. Do one of the following:

**Lotus Notes 4.x** Right-click the embedded workbook in the document or form, and then click **Open** on the shortcut menu.

**Lotus Notes 3.x** Double-click the embedded workbook in the document or form.

3. In Excel, click the worksheet or chart sheet that contains the data you want to use in Lotus Notes, and then select the data.

If any of the data cells are protected or contain formulas, the field will be updated in only one direction— from Excel to Notes. If you change the field in Notes, the change won't be reflected in Excel.

4. In the **Name** box on the [formula bar](#), type a name, and then press ENTER.
5. On the **File** menu, click **Properties**.
6. Click the **Custom** tab.
7. In the **Name** box, type a name for the custom file property.
8. Select the **Link to content** check box.
9. In the **Value** box, type the name that you defined in step 4, and then click **Add**.
10. In Notes, create the corresponding field in the Notes form. In the **Name** box, type the Excel custom file property name (not the Excel defined name).
11. Select the properties that you want to include in the view. In addition to custom file properties, you can also display many of the workbook file properties, such as the title and author of the workbook.

[Update fields that use Field Exchange](#)

1. Determine whether the fields you want to update are one-way or two-way.

The following fields are two-way: Title, Subject, Author, Keywords,

Comments, Manager, Company, Category, and custom properties. All other fields are one-way.

2. Do one of the following:

**One-way fields** Update one-way fields from workbook properties.

[How?](#)

1. Do one of the following:

**Lotus Notes 4.x** Right-click the Microsoft Excel workbook inserted as an [embedded object](#) in the Notes document or form, and then click **Open** on the shortcut menu.

**Lotus Notes 3.x** Double-click the Microsoft Excel workbook inserted as an embedded object in the Notes document or form.

2. On the **File** menu in Excel, click **Properties**.
3. Change the information in any file property fields you previously defined.
4. To update the Lotus Notes fields associated with the property fields, save and close the workbook and return to Lotus Notes.

**Two-way fields** Use the above method to update two-way fields from workbook properties; or update workbook properties from the Lotus Notes fields.

[How?](#)

1. In Lotus Notes, open the document that contains the field you want to update.
2. Select the text in the field you want to update.
3. Type the new information between the field brackets.
4. To update the properties in the workbook, double-click the [embedded](#) Excel workbook in the Notes document or form.

# Workbook file properties that correspond to Lotus Notes fields

<b>Microsoft Excel property</b>	<b>Lotus Notes field – data type</b>
Filename	Filename (always blank)
Location	Location (always blank)
*Title	Title – Text
*Subject	Subject – Text
*Author	Author – Text
*Keywords	Keywords – Text
*Comments	Comments – Text
Template	Template – Text
*Manager	Manager – Text
*Company	Company – Text
*Category	Category – Text
Created	DateCreated – Time
Modified	LastSavedDate – Time
Last Saved By	LastSavedBy – Text
Size	NumberOfBytes – Text
Revision Number	NumberOfRevisions – Number
Total Editing Time	TotalEditingTime – Number
Printed	LastPrintedDate – Time
Pages	NumberOfPages – Number
Words	NumberOfWords – Number
Characters	NumberOfCharacters – Number
Paragraphs	NumberOfParagraphs – Number
Lines	NumberOfLines – Number
Security	Security – Number
Document Class	DocumentClass – Text
Name of Application	NameOfApplication – Text

*\*Custom Property Name*    *Name of the custom property* – Text

\* Two-way field (In a two-way field, the Notes field is updated from the Microsoft Excel workbook, and vice versa. In a one-way field, the Notes field is updated from the Excel workbook, but not the other way around).

[Show All](#)

# About macros

If you perform a task repeatedly in Microsoft Excel, you can automate the task with a macro. A macro is a series of commands and [functions](#) that are stored in a Microsoft Visual Basic [module](#) and can be run whenever you need to perform the task.

For example, if you often enter long text strings in cells, you can create a macro to format those cells so that the text wraps.

**Recording macros** When you record a macro, Excel stores information about each step you take as you perform a series of commands. You then run the macro to repeat, or "play back," the commands. If you make a mistake when you record the macro, corrections you make are also recorded. [Visual Basic](#) stores each macro in a new module attached to a workbook.

**Making a macro easy to run** You can run a macro by choosing it from a list in the **Macro** dialog box. To make a macro run whenever you click a particular button or press a particular key combination, you can assign the macro to a toolbar button, a [keyboard shortcut](#), or a graphic object on a worksheet.

**Managing your macros** After you record a macro, you can view the macro code with the [Visual Basic Editor](#) to correct errors or change what the macro does. For example, if you wanted the text-wrapping macro to also make the text bold, you could record another macro to make a cell bold and then copy the instructions from that macro to the text-wrapping macro.

The Visual Basic Editor is a program designed to make writing and editing macro code easy for beginners, and provides plenty of online Help. You don't have to learn how to program or use the Visual Basic language to make simple changes to your macros. With the Visual Basic Editor, you can edit macros, copy macros from one module to another, copy macros between different workbooks, rename the modules that store the macros, or rename the macros.

**Macro security** Excel provides safeguards that help protect against [viruses](#) that can be transmitted by macros. If you share macros with others, you can certify them with a [digital signature](#) so that other users can verify that they are

from a trustworthy source. Whenever you open a workbook that contains macros, you can verify their source before you enable them.

[Show All](#)

# Create a macro

[Record a macro](#)

1. Set the security level to **Medium** or **Low**.

[How?](#)

1. On the **Tools** menu, click **Options**.
2. Click the **Security** tab.
3. Under **Macro Security**, click **Macro Security**.
4. Click the **Security Level** tab, and then select the security level you want to use.
2. On the **Tools** menu, point to **Macro**, and then click **Record New Macro**.
3. In the **Macro name** box, enter a name for the [macro](#).

## Notes

- The first character of the macro name must be a letter. Other characters can be letters, numbers, or underscore characters. Spaces are not allowed in a macro name; an underscore character works well as a word separator.
  - Do not use a macro name that is also a cell reference or you can get an error message that the macro name is not valid.
4. If you want to run the macro by pressing a keyboard [shortcut key](#), enter a letter in the **Shortcut key** box. You can use CTRL+ *letter* (for lowercase letters) or CTRL+SHIFT+ *letter* (for uppercase letters), where *letter* is any letter key on the keyboard. The shortcut key letter you use cannot be a number or special character such as @ or #.

**Note** The shortcut key will override any equivalent default Microsoft Excel shortcut keys while the workbook that contains the macro is open.

5. In the **Store macro in** box, click the location where you want to store the macro.

If you want a macro to be available whenever you use Excel, select **Personal Macro Workbook**.

6. If you want to include a description of the macro, type it in the **Description** box.
7. Click **OK**.
8. If you want the macro to run *relative* to the position of the active cell, record it using relative cell references. On the **Stop Recording** toolbar, click **Relative Reference**  so that it is selected. Excel will continue to record macros with relative references until you quit Excel or until you click **Relative Reference**  again, so that it is not selected.
9. Carry out the actions you want to record.
10. On the **Stop Recording** toolbar, click **Stop Recording** .

#### [Create a macro using Microsoft Visual Basic](#)

1. On the **Tools** menu in Microsoft Excel, point to **Macro**, and then click **Visual Basic Editor**.
2. On the **Insert** menu, click **Module**.
3. Type or copy your code into the code window of the module.
4. If you want to run the [macro](#) from the module window, press F5.
5. When you're finished writing your macro, click **Close and Return to Microsoft Excel** on the **File** menu.

#### [Create a startup macro](#)

Automatic [macros](#), such as Auto\_Activate, are designed to run when you start Microsoft Excel. For more information about these macros, see [Visual Basic Help](#).

#### [Copy part of a macro to create another macro](#)

1. Set the security level to **Medium** or **Low**.

#### [How?](#)

1. On the **Tools** menu, click **Options**.
  2. Click the **Security** tab.
  3. Under **Macro Security**, click **Macro Security**.
  4. Click the **Security Level** tab, and then select the security level you want to use.
2. Open the workbook that contains the [macro](#) you want to copy.
  3. On the **Tools** menu, point to **Macro**, and then click **Macros**.
  4. In the **Macro name** box, enter the name of the macro that you want to copy.
  5. Click **Edit**.
  6. Select the lines of the macro you want to copy.

To copy the entire macro, make sure to include the **Sub** and **End Sub** lines in the selection.

7. On the **Standard toolbar**, click **Copy** .
8. Switch to the module where you want to place the code.
9. Click **Paste** .

 **Tip**

You can view your Personal Macro Workbook file (Personal.xls) at any time by opening it in the [Visual Basic Editor](#) (Alt+F11). Because Personal.xls is a hidden workbook that is always open, you must unhide it if you want to copy a macro.

[Show All](#)

# Run a macro

## [Run a macro](#)

1. Set the security level to **Medium** or **Low**.

## [How?](#)

1. On the **Tools** menu, click **Options**.
2. Click the **Security** tab.
3. Under **Macro Security**, click **Macro Security**.
4. Click the **Security Level** tab, and then select the security level you want to use.
2. Open the workbook that contains the [macro](#).
3. On the **Tools** menu, point to **Macro**, and then click **Macros**.
4. In the **Macro name** box, enter the name of the macro you want to run.
5. Do one of the following:

### **Run a macro in a Microsoft Excel workbook**

- Click **Run**.

If you want to interrupt, press ESC.

### **Run a macro from a Microsoft Visual Basic module**

1. Click **Edit**.
2. Click **Run Sub/UserForm** .

## [Tip](#)

If you want to run a different macro while you are in the [Visual Basic Editor](#), click **Macros** on the **Tools** menu. In the **Macro name** box, enter the name of the macro you want to run, and then click **Run**.

## [Start a macro from a keyboard shortcut](#)

1. On the **Tools** menu, point to **Macro**, and then click **Macros**.
2. In the **Macro name** box, enter the name of the [macro](#) you want to assign to a keyboard [shortcut key](#).
3. Click **Options**.
4. If you want to run the macro by pressing a keyboard [shortcut key](#), enter a letter in the **Shortcut key** box. You can use CTRL+ *letter* (for lowercase letters) or CTRL+SHIFT+ *letter* (for uppercase letters), where *letter* is any letter key on the keyboard. The shortcut key letter you use cannot be a number or special character such as @ or #.

**Note** The shortcut key will override any equivalent default Microsoft Excel shortcut keys while the workbook that contains the macro is open.

5. If you want to include a description of the macro, type it in the **Description** box.
6. Click **OK**.
7. Click **Cancel**.

#### [Start a macro from a button or graphic control](#)

1. Click the button or graphic control so that [sizing handles](#) appear.
2. With the graphic object selected, right-click a sizing handle of the button or graphic object to display the [shortcut menu](#).
3. On the shortcut menu, click **Assign Macro**.
4. Do one of the following:
  - To assign an existing [macro](#) to the button or graphic object, enter the name of the macro in the **Macro name** box, and then click **OK**.
  - To record a new macro to assign to the selected graphic object, click **Record**. When you finish recording the macro, click **Stop Recording**  on the **Stop Recording** toolbar.
  - To write a new macro in the [Visual Basic Editor](#), click **New**. To edit an existing macro, click the name of the macro in the **Macro Name** box, and then click **Edit**.

**Note** If you assign a macro to a button or other object that is already in use as a [hyperlink](#), the hyperlink information is deleted. From then on, clicking the

button or object runs the macro instead.

#### [Start a macro from an area, or hotspot, on a graphic object](#)

1. Draw another object to create a hot spot for an existing object.
2. With the second graphic object selected, right-click a [sizing handle](#) of the button or graphic object to display the [shortcut menu](#).
3. On the shortcut menu, click **Assign Macro**.
4. Do one of the following:
  - To assign an existing [macro](#) to the button or graphic object, enter the name of the macro in the **Macro name** box, and then click **OK**.
  - To record a new macro to assign to the selected graphic object, click **Record**. When you finish recording the macro, click **Stop Recording**  on the **Stop Recording** toolbar.
  - To write a new macro in the [Visual Basic Editor](#), click **New**. To edit an existing macro, click the name of the macro in the **Macro Name** box, and then click **Edit**.
5. On the **Format** menu, click **AutoShape**, and then click the **Color and Lines** tab.
6. Under **Fill**, click **No Fill** in the **Color** box. Under **Line**, click **No Line** in the **Color** box.
7. Repeat these steps for each hotspot you want to create. You do not need to create a new graphic object for each hotspot.

#### [Start a macro from a toolbar button](#)

1. On the **Tools** menu, click **Customize**.
2. Do one of the following:
  - If the [toolbar](#) that contains the button is not visible, click the **Toolbars** tab, and then select the check box next to the toolbar name.
  - If the button you want to run the [macro](#) from is not on a toolbar, click the **Commands** tab, and then click **Macros** in the **Categories** list. In the **Commands** list, drag the **Custom** button onto a toolbar.
3. Right-click the toolbar button, and then click **Assign Macro** on the [shortcut menu](#).
4. Enter the name of the macro in the **Macro name** box, and then click **OK**.

[Show All](#)

# Edit a macro

Before you edit a [macro](#), you should be familiar with the [Visual Basic Editor](#). The Visual Basic Editor can be used to write and edit macros attached to Microsoft Excel workbooks.

1. Set the security level to **Medium** or **Low**.

[How?](#)

1. On the **Tools** menu, click **Options**.
  2. Click the **Security** tab.
  3. Under **Macro Security**, click **Macro Security**.
  4. Click the **Security Level** tab, and then select the security level you want to use.
2. On the **Tools** menu, point to **Macro**, and then click **Macros**.
  3. In the **Macro name** box, enter the name of the macro.
  4. Click **Edit**.
  5. For Help with the Visual Basic Editor, on the **Help** menu, click **Microsoft Visual Basic Help**.

[Show All](#)

# Delete a macro

1. Open the workbook that contains the [macro](#) you want to delete.
2. On the **Tools** menu, point to **Macro**, and then click **Macros**.
3. In the **Macros in** list, click **This Workbook**.
4. In the **Macro name** box, click the name of the macro that you want to delete.
5. Click **Delete**.

[Show All](#)

# Stop a macro

Do one of the following:

- If you want to stop a [macro](#) that's currently running, press ESC, and click **End** in the **Microsoft Visual Basic** dialog box.
- If you want to prevent automatically running a macro when you start Microsoft Excel, hold down SHIFT during startup.

[Show All](#)

# Copy a macro module to another workbook

1. Set the security level to **Medium**.

[How?](#)

1. On the **Tools** menu, click **Options**.
  2. Click the **Security** tab.
  3. Under **Macro Security**, click **Macro Security**.
  4. Click the **Security Level** tab, and then select the security level you want to use.
2. Open the workbook that contains the [module](#) you want to copy and the workbook you want to copy the module to.
  3. On the **Tools** menu, point to **Macro**, and then click **Visual Basic Editor**.
  4. On the **View** menu, click **Project Explorer** .
  5. Drag the module you want to copy to the destination workbook.

[Show All](#)

# Troubleshoot macros

[When I click the \*\*Refresh\*\* button, a message tells me that my macro changes will be lost.](#)

This message appears when you have made changes to a macro in the Visual Basic Editor and have also changed the copy of your workbook in the Microsoft Script Editor.

To save the changes to your macro, do the following:

1. Click **No**.
2. Switch to the Visual Basic Editor window.
3. Export any [modules](#) you have changed.
4. In your workbook in Microsoft Script Editor, click **Refresh**  on the **Refresh** toolbar.
5. Click **Yes**.
6. Import the modules to restore the changes to your macro.

[While recording a macro, I recorded an action I didn't want.](#)

To undo an unwanted action in a macro, you can open the macro in the Visual Basic Editor and remove any unwanted steps.

If you don't want to use the Visual Basic Editor, record the macro again without the unwanted action.

[A macro I recorded sometimes produces an error message.](#)

A macro you record may not run properly in every situation. If the macro cannot run, Microsoft Excel displays an error message. Some macros depend on certain options or settings in Excel. For example, a macro that searches for bold text won't run properly if bold text isn't displayed. If a macro you've recorded produces an error message, note the error number. You can then search for "error messages" in Visual Basic Help and find information about the message you received.

# Format cells using a different locale

The formats for **Date**, **Time**, and **Special** can be set to conform to different locales.

1. Select the cells you want to format.
2. On the **Format** menu, click **Cells**, and then click the **Number** tab.
3. In the **Category** box, click either **Date**, **Time**, or **Special**.
4. In the **Locale (location)** box, select a locale to see sample formats for that locale in the **Type** box.
5. Select the desired number format from the **Type** box.
6. Click **OK**.

[Show All](#)

# About Thai worksheets

All Thai worksheets in Excel 2002 or later share the following features:

**File compatibility** Excel 2002 or later can open worksheets created in Thai Microsoft Excel 2000 or earlier. There may be some Thai specific formulas that are not supported in Excel 2002 or later.

**Dates** Dates in cells that use default formats may be displayed differently in Excel 2002 or later than in Thai Microsoft Excel 2000 or earlier. The default calendar for Excel 2002 or later is [Gregorian](#), whereas the default calendar is Thai Buddhist for some default date formats in earlier Thai versions of Excel.

**Sorting** You might experience different sorting order results depending on the user regional setting of the Microsoft Windows operating system you are using.

**Thai function formulas** There are some Thai function formulas that were available in Thai Microsoft Excel 2000 or earlier that are not supported in Excel 2002 or later . An error message such as #VALUE! will be displayed in cells that contain non-supported Thai function formulas.

# Convert Arabic numbers to Thai text format

1. Click the cell in which you want to enter the formula.
2. Type **=BahtText(*arabic number*)**, where *arabic number* is the number you want to convert to Thai text.

# Format numbers using Thai digits

1. Select the cells that you want to display Thai numerals.
2. On the **Format** menu, click **Cells** and then click the **Number** tab.
3. Under **Category**, click **Custom**.
4. Under **Type**, do one of the following:
  - Choose a custom number format that has the Thai (t) designation— for example, t#,##0.
  - Choose a custom number format and type the letter (t) in front of the format.

**Note** It is also possible to format **Date**, **Time**, and **Special** formats using Thai digits by changing the locale selected in the **Locale (location)** box for those categories on the **Number** tab, and then selecting a number format in the **Type** box.

# Use Thai numbers and dates in headers and footers

1. On the **View** menu, click **Header and Footer**.
2. To customize your headers and footers, click the **Custom Header** or **Custom Footer** button, and change the text after the ampersand (&) and between the brackets according to the following table.

To display	Use this code
Page numbers with Thai numbers	&[หน้าที <sup>๓</sup> ]
Total page numbers with Thai numbers	&[จำนวนหน้า <sup>๓</sup> ]
Date with Thai numbers in Buddhist calendar	&[วันที่ <sup>๓</sup> ]
Time with Thai numbers in 24 hour format	&[เวลา]

# Reconvert a determined character string

Microsoft Excel allows you to reconvert a character string that has already been input and converted.

1. Select the cell that contains the character string you want to reconvert, click within that character string (the target of the reversion), and then double-click.

The highlighted string becomes the target range for the reversion.

2. Right-click the cell, and then click **Reconvert** on the shortcut menu.
3. Click the desired character, and press ENTER twice.

**Note** Some Japanese Input Method Editors might not be able to perform reconversions.

[Show All](#)

# Add a word to an Input Method Editor (IME) dictionary

The feature or some of the options described in this Help topic are only available if support for Japanese, Simplified Chinese, Traditional Chinese, or Korean is enabled through Microsoft Office Language Settings.

## [Add a word to the Japanese IME dictionary](#)

1. Click the **Language** icon  on the taskbar, and click **Show the Language bar**. On the language bar, select **Japanese**. Click the **Tools** button.
2. On the **Tools** menu, click **Dictionary Tool**.
3. On the **Edit** menu of the **Microsoft IME Dictionary Tool** dialog box, click **Add**.
4. Click on the **Add Word** tab.
5. In the **Reading** box, enter the reading of the word you want to register in hiragana or alphanumeric characters.
6. In the **Display** box, enter the display of the word you want to register.
7. Click **Register** to save the word.

## [Add a phrase to the Traditional Chinese dictionary](#)

1. Click the **Language** icon  on the taskbar, and click **Show the Language bar**. On the language bar, select **Chinese (Taiwan)**. Click the **Tools** button.
2. On the **Tools** menu, click **User phrase**.
3. On the **Edit** menu of the **Microsoft New Phonetic IME 2002 user define phrase tool** dialog box, click **Add Phrase**.
4. Type the phrase in the **Phrase** box, and then press ENTER.
5. On the **File** menu, click **Save**.

## [Add a phrase to the Simplified Chinese dictionary](#)

1. Click the **Language** icon  on the taskbar, and click **Show the Language bar**. On the language bar, select **Chinese (PRC)**. Click the **Context menu**

button.

2. On the **Context menu**, click **User-defined phrase tool**.
3. On the **Edit** menu of the **MSPY IME User-defined Phrase Tool**, click **Add Phrase**.
4. Type the phrase in the **Phrase** box, and the press ENTER.
5. On the **File** menu, click **Save**.

[Show All](#)

# About the phonetic guide function

**Show and add phonetic guides** When you display phonetic guides in the Japanese version of Microsoft Excel and enter kanji (Chinese characters that are used in the Japanese language), Excel automatically adds the phonetic symbols to the guides. When you display phonetic guides in non-Japanese versions of Excel, phonetic symbols are not added automatically when you enter kanji in cells. You can add the phonetic symbols manually by modifying the phonetic guides. You can add phonetic guides to Japanese data that has been entered in a cell. The phonetic character string that was used to enter the Japanese data is used to apply phonetic guides.

**Modify phonetic guides** If the displayed phonetic guides are incorrect, you can revise them. You can change the phonetic guides by using the same method you use to enter a character string.

**Change phonetic guide formats** You can change the font, type, and alignment of phonetic guides. The default alignment is left alignment. You can change the alignment to no alignment (all phonetic guides are combined and aligned along the left edge of the cell), center alignment, or distributed alignment.

For example, in Japanese the three types of phonetic guides available are hiragana, full-width katakana, and half-width katakana. Their default alignment is left alignment (that is, placed along the left edge of the kanji to which the phonetic guides apply). You can change the alignment to no alignment (all phonetic guides are combined and aligned along the left edge of the cell), center alignment (centered against the kanji to which the guides apply), or distributed alignment (set with equal spacing against both edges of the kanji to which the guides apply).

**Sort data by using phonetic guides** When worksheet data is sorted, data is sorted by its phonetic guides by default. For example, in Japanese, if the correct phonetic guides have been used, Japanese terms are sorted in the same order as they would occur in a Japanese dictionary. If the phonetic guides are not entered correctly, make the necessary corrections.

 [Japanese characters are sorted as follows](#)

- Hiragana and Katakana are sorted in the order of the kana syllabary.
- English letters will be sorted alphabetically. No distinction is made between uppercase and lowercase letters.
- Numbers are sorted in descending order.
- No distinction is made between half-pitch and full-pitch English characters and symbols.
- Other kanji, symbols, and so on, are sorted in the order of their Shift-JIS codes.

 [The order of the kana syllabary is as follows](#)

- Long vowel sounds (ー) are treated as the vowel of the previous syllable. For example, "データベース" is treated as "デェタベェス".
- Repetition marks ("々") are treated as the same character as the character preceding the mark. For example, "佐々木" is treated as "佐佐木".
- Voiced and unvoiced sounds are sorted in the following order: unvoiced sound, voiced-sound, semi-voiced sound.
- No distinction is made between hiragana, full-pitch katakana, and half-pitch katakana.

[Show All](#)

# Use the phonetic guide function

The feature or some of the options described in this Help topic are only available if support for Japanese, Simplified Chinese, Traditional Chinese, or Korean is enabled through Microsoft Office Language Settings.

## [Show or hide phonetic guides](#)

1. Select the cells whose phonetic guides you want to show or hide.
2. On the **Format** menu, point to **Phonetic Guide**, and then click **Show or Hide**.

When phonetic guides are displayed, the button next to **Show or Hide** is selected.

**Note** Microsoft Excel automatically adds phonetic symbols only to new data entered in the Japanese version of Excel. If you open files that were created in earlier versions of Excel or in other programs, phonetic symbols are not generated automatically.

## [Modify phonetic guides](#)

1. Double-click the cell that contains the phonetic guides you want to modify, and then click the phonetic guides.

### [Tip](#)

To use the keyboard to move the pointer to the phonetic guides, press ALT+SHIFT+UP ARROW. To return to the parent string that the phonetic guides apply to, press ALT+SHIFT+DOWN ARROW. The color of the parent character string changes while the phonetic guides are being modified.

2. Modify the phonetic guides. Do one of the following:

## [Combine phonetic guides](#)

For example, when working in Japanese, the phonetic guides for 東京都渋谷区 would normally be split into どうきょうと and しぶやく.

1. To combine these into one string of どうきょうとしぶやく, select the target parent character string 東京都渋谷区.
2. On the **Format** menu, point to **Phonetic Guide**, and then click **Edit**.

### [Divide phonetic guides](#)

For example, when working in Japanese, the parent character string 東京都渋谷区 has a combined phonetic guide of どうきょうとしぶやく.

1. To divide these into 東京都 and 渋谷区, select the target parent character string 東京都.
2. On the **Format** menu, point to **Phonetic Guide**, and then click **Edit**.

The existing (combined) phonetic guides どうきょうとしぶやく will be set as the phonetic guides for the selected character string 東京都 only, so they cannot be applied to any other character string. In this case, modify the phonetic guides for 東京都, and then add new phonetic guides to 渋谷区.

3. Do one of the following:
  - To confirm the modified phonetic guides, press ENTER twice.
  - To cancel the changes, press ESC twice.

### [Change phonetic guide font, type, or alignment](#)

1. Select the cells that contain the phonetic guides whose alignment, font, or type you want to change.
2. On the **Format** menu, point to **Phonetic Guide**, and then click **Setting**.
3. Do one or more of the following:
  - To change the font, click the **Font** tab, and then click the font you want in the **Font** box. To change the font size, click the size you want in the **Size** box.
  - To change the phonetic guide type, click the **Setting** tab, and then click

the phonetic guide type you want under **Type**.

- To change the alignment, click the **Alignment** tab, and then click the alignment you want to apply.



You can apply formatting (such as bold or italic formatting), colors, underlining, or character effects to phonetic guides from the **Font** tab.

[Show All](#)

# About the Correct Keyboard Setting feature

**Correct Keyboard Setting** is a feature that automatically corrects words that are entered in English mode but were meant to be entered in Hangul mode, and vice versa. For example, if you enter **eogksalsrnr** in English mode, it is corrected to 대한민국; and if you enter 키 탁 표 다 가 나 쇼 in Hangul mode, it is corrected to **university**. Also, [IME](#) mode is changed automatically.

Correct Keyboard Setting also automatically corrects English words that have a Hangul ending and are entered in English mode. For example, if you enter **optiondmf** in English mode, it is automatically corrected to **option**를.

Correct Keyboard Setting works even when Hangul and English are mixed. For example, if you enter **rntjddnjs**버미 탁 쇼, it is automatically corrected to 구성원 **quality**.

# Turn on Correct Keyboard Setting

To use this procedure, you must have a U.S. English version of the Windows operating system.

1. On the **Tools** menu, click **AutoCorrect Options**.
2. On the **AutoCorrect** tab, select the **Correct Keyboard Setting** check box.

[Show All](#)

# Add or delete Hanja in a custom dictionary

If you are not using the Korean language version of Microsoft Office, then this feature is only available if you have installed the Microsoft Office 2003 Multilingual User Interface Pack or Microsoft Office 2003 Proofing Tools for Korean.

## [Add Hanja to a custom dictionary](#)

1. Type the Hangul for the Hanja you want to add, and then select it.
2. Click the **Language** icon  on the taskbar, and click **Show the Language Bar**. On the language bar, select **Korean**. Click the **Hanja** icon.
3. Click **More**.
4. Click **Add new word**.
5. In the **Hanja Suggestions** box, select the appropriate Hanja, and then click **Choose**.
6. Click **Add to List** after all the characters are converted.

## [Delete Hanja from a custom dictionary](#)

1. Type the Hangul for the Hanja you want to delete, and then select it.
2. Click the **Language** icon  on the taskbar, and click **Show the Language Bar**. On the language bar, select **Korean**. Click the **Hanja** icon.
3. In the **Hanja Suggestions** box, select the Hanja you want to delete.
4. Click **More**.
5. Click **Remove word**.

[Show All](#)

# Convert Hangul and Hanja

You can convert Hangul to Hanja and vice versa. For example, convert the Hangul word "학교" to the Hanja word "學校". You can also set conversion options.



## [Convert text from Hangul to Hanja or vice versa](#)

1. Type the text you want to convert, and then select it.
2. Click the **Language** icon  on the taskbar, and click **Show the Language Bar**. On the language bar, select **Korean**. Click the **Hanja** icon.
3. In the **Hanja Suggestions** or **Hangul Suggestions** box, select the appropriate converted text.
4. Do one of the following:
  - To convert the selected word in the **Suggesting For** box to the word in the **Hanja Suggestions** or **Hangul Suggestions** box, click **Change**.
  - To skip converting the selected word, click **Ignore**. If you don't want to convert the word in the rest of the document, click **Ignore All**.



## [Set Hangul/Hanja conversion options](#)

1. Select the sentence containing Hangul or Hanja.
2. Click the **Language** icon  on the taskbar, and click **Show the Language Bar**. On the language bar, select **Korean**. Click the **Hanja** icon.
3. Click **More**, click **Options**, and then select the options you want.
  - With **Ignore Hangul ending** selected, the ending will not be converted.
  - With **Display Recently Used Items** selected, the most recently used word will be displayed at the top of the **Suggestions** list.
  - You can also set the conversion type and display type.

[Show All](#)

# About bidirectional fonts

Microsoft Excel is designed to display and print both right-to-left and [left-to-right](#) text. For best results, the program should use a font that contains both right-to-left and left-to-right language characters. Some fonts available with Office and [bidirectional](#) Windows operating systems contain both right-to-left and left-to-right characters.

If you choose a font that does not contain both right-to-left and left-to-right characters, existing text in one or both languages may be displayed using a secondary font, such as Tahoma. For further information, refer to "Unicode support" in Microsoft Office Help.

[Show All](#)

# About code page and text layout support for right-to-left HTML Web page files

Microsoft Excel supports several [code pages](#) that are used in importing, saving, and exporting HTML Web pages that contain right-to-left text.

Language	Code page
Arabic	UTF-8 (default)
	ISO-8859-6
	DOS-720
	ASMO-708
Hebrew	UTF-8 (default)
	ISO-8859-8
	DOS-862

**Note** Excel supports editing and saving of HTML Web page files in [logical text layout](#). HTML Web page files stored in [visual text layout](#) can be viewed, but not edited or saved, in logical text layout.

[Show All](#)

# About differences between right-to-left and left-to-right worksheets

Some specific differences you will notice in a right-to-left worksheet compared to a [left-to-right](#) worksheet are:

## Visual differences

- Cell A1 appears in the upper-right corner of the worksheet. Column letters progress from A on the right to IV on the left.
- Row numbers appear on the right side of the document window, and the vertical scroll bar appears on the left side.
- The fill handle appears in the lower-left corner of the cell.
- Cell comment indicators appear in the upper-left corner of the cell.
- In Outline view, outline buttons and document symbols appear at the right side of the worksheet.
- The horizontal split box appears at the left side of the spreadsheet, above the vertical scroll bar. The vertical split box appears next to the right horizontal scroll arrow.

## Functional differences

- Ranges are referred to by the name of the cell in the upper-right corner of the range and the name of cell in the lower-left corner, separated by a hyphen.
- The **AutoSum** tool looks up and to the right for cells to total.
- **AutoFormat** formats the worksheet so that row headings in a selected range appear on the right side of a table, and totals appear at the bottom and left sides of the selected range.
- You can enter button labels, text box entries, and cell comments by using right-to-left, left-to-right, or [bidirectional](#) text.

[Show All](#)

# About global text direction

[Global text direction](#) defines the starting alignment, [reading order](#), and [keyboard language](#) in edit fields. However, you can change these properties by using key combinations or other methods, such as the **Formatting** toolbar. Changing the paragraph direction in any edit field affects that field only; no other edit field in the item is affected.

Global text direction also affects:

- Reading order of text displayed in the columns of all of its Table views.
- Laying out plain text information in an item's body or content area. Because plain text does not carry a paragraph direction property in it, a message received from a plain text mail client— or item heading information pasted in the body of the item when replying or forwarding— will have a layout that depends on the global text direction.

[Show All](#)

# About printing and previewing data on right-to-left worksheets

The tabs within the **Page Setup** dialog box provide right-to-left characteristics that give you a true representation of your data.

## Margins

The page layout sample in the center of the tab reflects the current worksheet [direction](#) setting.

The sample worksheet displayed on the **Margins** tab shows the direction of the first worksheet in the workbook. There might be worksheets with both right-to-left and [left-to-right](#) directions in the same workbook.

## Worksheet

Worksheets that are too large to print on a single page are printed according to an order established by the direction of the current worksheet. Right-to-left worksheets print down or across, starting in the upper-right corner of the worksheet. The following example shows the page numbering and printing order for a worksheet that is three pages wide and requires six pages to print.

### Worksheet direction Multiple-page printing order

Left-to-right	<table border="1"><tr><td>1</td><td>2</td><td>3</td></tr><tr><td>4</td><td>5</td><td>6</td></tr></table>	1	2	3	4	5	6
1	2	3					
4	5	6					
Right-to-left	<table border="1"><tr><td>3</td><td>2</td><td>1</td></tr><tr><td>6</td><td>5</td><td>4</td></tr></table>	3	2	1	6	5	4
3	2	1					
6	5	4					

## Print Preview

The **Print Preview** button displays a right-to-left or left-to-right page direction, depending on the direction of the current worksheet.

[Show All](#)

# About right-to-left language features

When languages such as Arabic, Farsi, Hebrew, or Urdu are enabled for editing, you have several features available to you to make working in a right-to-left or [bidirectional](#) environment easier.

Excel 2002 or later provides full forward compatibility for workbooks that were saved in all previous versions of Microsoft Excel and Microsoft Excel with right-to-left support; however, workbooks that are saved in Excel 2000 or later file formats are not compatible with any previous versions of Microsoft Excel.

## [Set a worksheet direction](#)

Even though a workbook has a certain [direction](#), you can display its individual worksheets in either a right-to-left or [left-to-right](#) view.

Unlike workbooks, in which the change is not apparent until a new workbook is created, worksheets display the direction change immediately.

When you switch worksheet directions, Microsoft Excel with right-to-left features simply reorients the data from left-to-right or right-to-left. All underlying formulas and values remain intact. Cells with the [General](#) alignment attribute will left align left-to-right text and right align right-to-left text, regardless of worksheet direction.

## [Right-to-left data in worksheets](#)

- [General](#) is the default alignment, regardless of worksheet [direction](#).
- When entering right-to-left text in a worksheet, characters will appear from the right side of the **Formula** bar and move to the left.
- In addition to entering right-to-left, [left-to-right](#), or bidirectional text in a cell, you can also change the [reading order](#) and alignment of cell text.

## [Bidirectional fonts](#)

Any version of Microsoft Excel with right-to-left support is designed to display

and print both right-to-left and [left-to-right](#) text. To do this, the program should use a font that contains both right-to-left and left-to-right language characters. Most fonts available with bidirectional Microsoft Windows operating systems contain both right-to-left and left-to-right characters. If you choose a font that does not contain both right-to-left and left-to-right characters, existing text in one or both languages may be displayed incorrectly using the default secondary font, Tahoma. To correct this problem, choose a different font.

### [Checking the spelling of bidirectional text](#)

You can check the spelling of both your English and right-to-left text in cells. Simply choose a dictionary whose language corresponds to the text used.

- You must install a version of Microsoft Excel that includes a right-to-left language dictionary so that you will be able to check spelling of right-to-left text.
- When checking text with a right-to-left language dictionary, English words are ignored and not flagged as misspelled. Similarly, when checking text with an English dictionary, right-to-left language words are ignored and not flagged as misspelled.
- To change dictionaries, select the dictionaries you want on the **Spelling** tab of the **Options** dialog box (**Tools** menu).

### [Right-to-left features on Web pages](#)

Right-to-left features on Web pages are set according to a two-level hierarchy: page level and control level.

#### **Page level**

A Web page that's published from Microsoft Excel will have the same display [direction](#), either [left-to-right](#) or right-to-left, as the corresponding Excel worksheet it was created from. That direction appears as a setting of the **Dir** property of the Web page.

#### **Notes**

- Web page direction is included in the underlying HTML code of the Web page through the use of the standard HTML Direction (DIR) attribute. For

example, the code <HTML DIR=RTL>, placed at the beginning of the <HTML> element, identifies a right-to-left Web page.

- Controls that are placed on a Web page inherit the directionality of the Web page itself, depending on whether the control has right-to-left features. Controls without right-to-left features appear in a left-to-right direction.

## Control level

Controls with right-to-left features initially appear on a Web page according to the direction of the Web page. After you place a control on a Web page, you may be able to change the control display direction to give it right-to-left appearance and functionality. The property name that controls the display direction varies with the control type. The properties in the following table control directionality for Web page controls.

Control type	Description
Microsoft Office Web Component controls	<p>The Office Web Component controls are the spreadsheet, the chart, and the PivotTable list.</p> <p>For the spreadsheet and PivotTable list, set or change in a design program, such as Microsoft FrontPage or Microsoft Access data access page Design view, by using the <b>Advanced</b> section of the property toolbox for the control. No setting is available for the chart.</p> <p>The direction setting property is <b>RightToLeft</b>.</p> <p><b>Note</b> Office Web Component controls each have a property toolbox that can be used both while designing the control and working with it in the browser; however, the right-to-left setting can't be changed in the browser.</p> <p>Examples of intrinsic browser controls include Table, Label, TextBox, ComboBox, ListBox, OptionGroup, and ScrollingText.</p>
Intrinsic browser controls	<p>Set or change the direction by using an HTML editor, such as the Microsoft Script Editor, that exposes control properties in a properties window.</p>

The direction setting property is typically **Dir**.

These are other controls that are available with Microsoft Office programs or Microsoft Visual Basic .NET.

ActiveX controls Set or change the direction by using an HTML editor, such as the Microsoft Access data access page Design view or the Microsoft Script Editor, to add controls and expose control properties in a properties window.

The direction setting property is typically **RightToLeft**.

### [Import and export right-to-left worksheets in text formats](#)

Microsoft Excel stores all characters as [Unicode code page](#) values in [logical text layout](#), but can import and export worksheets saved as text files if these files contain right-to-left text stored in the appropriate Windows code page and logical text layout. For example, a text file containing Arabic text must be stored in the Arabic Windows code page 1256 to be successfully imported by Excel.

To create text files that are recognized by Excel, use ConvText, a stand-alone text-file conversion utility included with Excel. ConvText provides both logical and [visual text layout](#) options and an extensive list of supported bidirectional code pages to create a new file in a recognizable text format. Subsequently, you can choose Windows (ANSI) as the file origin setting in the Text Import Wizard when importing an appropriately formatted text file.

**Note** A worksheet in Lotus or Quattro Pro format that requires code page or text layout conversion, or both, can still be imported into Excel by saving the worksheet in text file format prior to importing it. The ability to save a worksheet in text file format is a standard feature of most database or spreadsheet products. ConvText can then be used to create a recognizable text file. When Excel imports the text file, data from the original worksheet will be fully recreated in a new Excel worksheet.

### [Right-to-left sort order](#)

Right-to-left sort order will be applied wherever possible. This applies to data

lists in table view, card view, and icon view, and to group-by lists, contact lists, folder lists, and address lists.

**Note** Some server-side views might not sort data according to right-to-left sort order because they follow supported server-side sort orders.

[Show All](#)

# Change global text direction settings

1. On the **Tools** menu, click **Options**, and then click the **International** tab.
2. Choose one of the following:
  - Click **Right-to-Left** to set edit field starting alignment to right, [reading order](#) to right-to-left, and [keyboard language](#) to the currently enabled right-to-left language.
  - Click **Left-to-Right** to set edit field starting alignment to left, reading order to [left-to-right](#), and keyboard language to the currently enabled left-to-right language.

**Note** When you change the [global text direction](#) setting, it will affect the edit fields of items that you open after you change the setting; it will not affect the text direction of the edit fields of items that are already open.

[Show All](#)

# Convert bidirectional text files to and from ANSI

The ConvText utility is available on the installation CDs for Microsoft Office language versions that offer right-to-left support. ConvText provides more support (additional [code pages](#) and [visual text layout](#) options) than the following features when converting [bidirectional](#) files to [ANSI](#) characters:

- The Microsoft Excel Text Import Wizard for converting right-to-left characters in bidirectional files to ANSI characters with [logical text layout](#).
- The Microsoft Excel **Save As** command (**File** menu) for converting ANSI characters with logical text layout to other bidirectional file formats.

The following examples illustrate how to use ConvText with Excel. Similar steps are required to use ConvText with other Microsoft Office applications such as Access.

## [Convert bidirectional text files to ANSI](#)

1. In the Program Files\Microsoft Office\Office11 folder, double-click the **ConvText.exe** icon.
2. Click **Convert To Windows ANSI Code Page**.
3. Type file names in the **Source** and **Target** boxes, or click **Browse**.
4. Do one of the following:
  - Click **Load** to retrieve a previously saved conversion specification.
  - Select the code page, text layout, file type, and any other relevant parameters that match the target text file to be created.
5. Click **Save** to retain the conversion specifications.
6. Click **Convert**.
7. Import the converted text file into Excel.

All field names and records from the original table or worksheet will be fully recreated in a new table.

## Convert bidirectional text files from ANSI

1. Save a copy of the worksheet you want to convert to a non-ANSI code page.
2. In the Program Files\Microsoft Office\Office11 folder, double-click the **ConvText.exe** icon.
3. Click **Convert From Windows ANSI Code Page**.
4. Type file names in the **Source** and **Target** boxes, or click **Browse**.
5. Do one of the following:
  - Click **Load** to retrieve a previously saved conversion specification.
  - Select the code page, text layout, file type, and any other relevant parameters that match the target text file to be created.
6. Click **Save** to retain the conversion specifications.
7. Click **Convert**.

[Show All](#)

# Create a repeating series on a right-to-left worksheet

- Do one of the following:
  - Drag the [fill handle](#) down or to the left to create a progressive series.
  - Drag the fill handle up or to the right to create a regressive series.

**Note** When you use the fill handle to create a date series, dates will appear as [Gregorian](#) or [Hijri](#). Hijri date calculations, however, only support days; they do not support month and year calculations.

# Display or hide control characters

1. On the **Tools** menu, click **Options** , and then click the **International** tab.
2. Select or clear the **Show control characters** check box.

[Show All](#)

# Format dates using alternate calendars

 [Format dates using Gregorian and Hijri calendars](#)

Do one of the following:

- Create a custom number format.
  1. On the **Format** menu, click **Cells**, and then click the **Number** tab.
  2. Select **Custom** from the list of number categories.
  3. Select a number format code as a starting point for your date format.
  4. In the **Type** box, do one of the following:
    - To display dates using the [Gregorian](#) calendar, regardless of the **Regional Options** or **Regional Settings** of the Microsoft Windows Control Panel setting, type **B1** before the date format code— for example, **B1dd/mm/yy**.
    - When Arabic editing is enabled, to display dates using the [Hijri](#) calendar, regardless of the **Regional Options** or **Regional Settings** setting, type **B2** before the date format code— for example, **B2dd/mm/yy**.

**Note** It is also possible to format the date by changing the locale selected in the **Locale (location)** box for the **Date** category on the **Number** tab and then selecting a date format in the **Type** box.

- Enter a date in a cell and have Excel interpret it as a Hijri date instead of Gregorian.

Type **A** or **a** in front of the date entry— for example, enter the short date 'a9/25/20', which will be interpreted as Hijri date 9/25/1420 (this is

Gregorian date 1/1/2000). If the cell is unformatted, it will be assigned the number format 'B2m/d/yyyy' and the value will be displayed as 9/25/1420.

## [Format dates using the Buddhist calendar](#)

Do one of the following:

- When the **Default version of Microsoft Office** is set to Thai in the **Enabled Languages** tab of Microsoft Office Language Settings, do the following:
  - Create a custom number format.
    1. On the **Format** menu, click **Cells**, and then click the **Number** tab.
    2. Select **Custom** from the list of number categories.
    3. Select a number format that uses the 'b' syntax to represent the year— for example, the syntax 'd/m/bbbb' will format the Gregorian date 1/1/2000 as Thai Buddhist date 1/1/2543.

**Note** It is also possible to format the date by changing the locale selected in the **Locale (location)** box for the **Date** category on the **Number** tab and then selecting a date format in the **Type** box. This format will work regardless of the **Default version of Microsoft Office** setting in Microsoft Office Language Settings.

- To enter a date in a cell and have Excel interpret it as a Thai Buddhist date instead of Gregorian, use the **B** or **b** prefix during date entry— for example, enter the short date '1/1/b43', which will be interpreted as Thai Buddhist date 1/1/2543. If the cell is unformatted, it will be assigned the number format 'd/m/bb' and the value will be displayed as 1/1/43.

[Show All](#)

# Enter formulas containing right-to-left text in worksheets

Understanding formula entry in Excel with right-to-left features is slightly more complex than understanding text entry, especially because you have the ability to enter both right-to-left and [left-to-right](#) text in formulas. Here are a few pointers to help you:

- Formulas appear left-aligned in the **Formula** bar and cells, with left-to-right [reading order](#), for both right-to-left and left-to-right worksheets.
- When a function is inserted in a formula (**Function** command, **Insert** menu), the arguments can contain [bidirectional](#) text.
- The reading order and alignment of formula results depend on the reading order and alignment chosen for that cell. The default settings for reading order and alignment are [Context](#) and [General](#), respectively.

# Set a column width on a right-to-left worksheet

- Do one of the following:
  - Double-click the left column border in the column header to set the column to **Best Fit**.
  - Drag the left column border in the column header to the width you want.

[Show All](#)

# Set insertion point behavior

1. On the **Tools** menu, click **Options**, and then click the **International** tab.
2. In the **Cursor Movement** option group, do one of the following:
  - Click **Logical** to have insertion point movement that moves in the [logical order](#) of [bidirectional](#) text.
  - Click **Visual** to have insertion point movement that ignores text language and [moves contiguously](#) to the right or left.

[Show All](#)

# Set the direction for worksheets and charts

## [Set the direction of the current worksheet](#)

- Do one of the following:
  - Press or release the **Sheet Right-To-Left**  button.
  - On the **Tools** menu, click **Options**, click the **International** tab, and select or clear the **View current sheet right-to-left** check box.

## [Set the direction for new workbooks and worksheets](#)

1. Click **Options** on the **Tools** menu, and then click the **International** tab.
2. Do one of the following in the **Right-to-left** option group.
  - Click **Right-To-Left** to have new objects displayed in a [direction](#) familiar to right-to-left users.
  - Click **Left-To-Right** to have new objects displayed in a direction familiar to [left-to-right](#) users.

## [Change the direction of a chart](#)

When right-to-left editing is enabled in Microsoft Excel, and the default orientation for new charts is right-to-left, charts are automatically configured with a right-to-left view. This means that the horizontal (category) axis origin and the vertical (value) axis appear to the right side of the chart, and the chart legend appears to the left of the chart.

You can manually move chart objects to a position that supports the [direction](#) you are trying to achieve—for example, to change a [left-to-right](#) chart to a right-to-left chart, do the following:

1. Click the horizontal (category) axis to select it, then right-click the axis and click **Format Axis** on the shortcut menu.
2. Click the **Scale** tab and select the **Categories In Reverse Order** option. The horizontal (category) axis origin and the vertical (value) axis appear at the right side of the chart.
3. Click the legend border to select it, then right-click the border and click **Format Legend** on the shortcut menu.
4. Click the **Placement** tab and select **Left** in the **Placement** group. The chart legend will appear to the left of the chart.

[Show All](#)

# Set the direction of a Web page or Web page controls

## [Set the direction of a Web page](#)

- Do one of the following:
  - Before publishing a new Web page, set the [direction](#) of the worksheet to match the desired direction of the Web page. A new Web page will automatically assume the direction of the worksheet on which it is based.
  - For a published Web page that is running in a browser, do one of the following:
    - Edit the HTML source directly as text. On the **View** menu, click **HTML Source**, and then modify the <HTML> element to <HTML DIR=RTL> for a right-to-left page direction, or to <HTML DIR=LTR> for a [left-to-right](#) page direction.
    - Use an HTML editor that exposes document properties in a properties window— such as the [Microsoft Script Editor](#)— to change the **Dir** property setting (**LTR** or **RTL**) of the Web page at the beginning of the <HTML> element. Click **Properties** , click the perimeter of the Web page until the document properties are displayed, click the **All** tab if available, and then change the **Dir** property setting to the Web page direction you want: either **RTL** or **LTR**.

## [Set the direction of a control on a Web page](#)

- Do one of the following:
  - Before publishing a new Web page, set the [direction](#) of the worksheet to match the desired direction of the control. A new control will automatically assume the direction of the worksheet on which it is

based.

- For a published Web page, do one of the following:
  - **For the Microsoft Office Web Component controls** You can set the direction of the control either in the browser or by opening the Web page in a design program such as FrontPage or Access [data access page](#) Design view. Click the **Command and Options** button on the toolbar to display the **Command and Options** dialog box.
    - For a Microsoft Office [PivotTable](#) control, select or clear the **Display right to left** check box in the **General Options** group on the **Behavior** tab.
    - For a Microsoft Office Spreadsheet control, select or clear the **Display right to left** check box in the **Show/Hide** group on the **Sheet** tab.
    - For a Microsoft Office Chart control, right-to-left appearance can be achieved using standard chart format options so an additional right-to-left direction setting is not available.
    - For information about activating the controls, see Help in the design program. For information about displaying the toolbar and using the **Command and Options** dialog box, see Help for the control when the control is activated in the design program or the browser.
  - **For intrinsic browser controls** For controls that are used when publishing static Web pages (that is, pages without interactivity), edit the HTML source code directly as text. Or, you can use an HTML editor, such as the [Microsoft Script Editor](#), to expose control properties in a properties window and change the **Dir** property setting (**LTR** or **RTL**) of the control.
  - **For an ActiveX control that is added separately** Edit the HTML source directly as text, or use an HTML editor— such as the Access data access page Design view or the Microsoft Script Editor— to expose control properties in a properties window and change the **RightToLeft** property setting, or equivalent (typically

**True or False).**

[Show All](#)

# Set the text direction for cells

1. Click the down arrow next to the **Text Direction**  button.
2. Do one of the following:
  - For right-to-left [reading order](#), click **Right-to-Left**.
  - For [left-to-right](#) reading order, click **Left-to-Right**.
  - For reading order that is consistent with the language of the first entered character, click **Context**.

**Note** You can also set reading order on the **Format** menu by clicking **Cells** and then using the **Text Direction** list on the **Alignment** tab.

[Show All](#)

# Switch between entering right-to-left and left-to-right text in a cell

- Click the **Language**  icon on the taskbar, then choose the desired [keyboard language](#).

The text insertion pointer will change to indicate the [direction](#) of the selected language; text can be entered in the chosen language.

**Note** Text is displayed in the default font, Arial, unless another font is chosen. You can override the default font for the selected cell (or range of cells) by using the **Cells** command (**Format** menu). Click the **Font** tab, select the appropriate font, and click **OK**.

[Show All](#)

# About Arabic sort order

Microsoft Excel sorts right-to-left worksheets by using values from [Unicode](#), not those from the Arabic [code page](#) as in some earlier versions. Opened or imported worksheets that use the Arabic code page and Arabic sort order will be converted to Unicode and [General](#) sort order.

Arabic sort order is described here by using the Arabic code page, not Unicode, because the former is more familiar to most users. The Arabic sort order table arranges the characters of the Arabic code page into a sort order. The sort order controls how data is sequentially ordered in Excel worksheets that use the Arabic code page.

The 256 characters of the Arabic code page can be organized into several categories that determine how characters are sorted.

- [Kashida](#) and [bidirectional control characters](#) (hexadecimal code points 9D, 9E, DC, FD, and FE):

Sort ignores these characters.

- Arabic [diacritics](#) (hexadecimal code points F0 through F3, F5, F6, F8, and FA):

Sort ignores Arabic diacritics except when the strings being compared are otherwise identical. In this case, unmarked characters (without diacritics) sort ahead of marked characters (with diacritics); diacritics with lower code point values sort ahead of others.

- General control characters (hexadecimal code points 00 through 1F and 7F), reserved characters (hexadecimal code points 80, 81, 8D, 8E, 8F, and 90), and punctuation:

These three categories sort ahead of alphanumeric characters in category order (that is, General control characters first) and in ascending code point order within each category (for example, 00 sorts ahead of 01).

- Arabic and [left-to-right](#) alphanumeric characters (in the Arabic sort order table):

Left-to-right text is always sorted ahead of Arabic text.

Left-to-right text sorting is not case sensitive. For example, although uppercase "A" is listed before lowercase "a", Excel treats these characters equally and does not provide any sorting preference to either character.

Unmarked left-to-right text (without diacritics) is sorted before marked left-to-right text.

[Show All](#)

# About the Arabic code page

Each [code page](#) is identified by a unique code page number. The code page (CP) for Arabic is CP 1256.

Microsoft Excel sorts right-to-left worksheets by using values from [Unicode](#), not those from the Arabic code page as in earlier versions. Opened or imported worksheets that use the Arabic code page and Arabic sort order will be converted to Unicode and [General](#) sort order.

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0		SP	0	@	P	`	p	■	ع	SP	°	À	ذ	à	°	
1		!	1	A	Q	a	q	ء	ء	ء	±	ء	ر	ل	ء	
2		"	2	B	R	b	r	,	'	¢	²	آ	ز	â	,	
3		#	3	C	S	c	s	f	"	£	³	أ	س	م	'	
4		\$	4	D	T	d	t	"	"	¤	´	ؤ	ش	ن	ô	
5		%	5	E	U	e	u	...	•	¥	µ	إ	ص	ه	ª	
6		&	6	F	V	f	v	†	-	.	¶	ئ	ض	و	,	
7		'	7	G	W	g	w	‡	-	§	.	ا	x	ç	÷	
8		(	8	H	X	h	x	^	~	"	,	ب	ط	è	"	
9		)	9	I	Y	i	y	%	™	©	¹	ة	ظ	é	ù	
A		*	:	J	Z	j	z	Š	š	ª	¿	ت	ع	ê	º	
B		+	;	K	[	k	{	<	>	«	»	ث	غ	ë	û	
C		,	<	L	\	l		Œ	œ	¬	¼	ج	ـ	ü		
D		-	=	M	]	m	}	€		-	½	ح	ف	ı	ı	
E		.	>	N	^	n	~	ž	ž	®	¾	خ	ق	İ	İ	
F		/	?	o	_	o	o	■	ÿ	—	?	د	ك	ı	ÿ	

Legend  Code point contains a non-printable control character.  Code point is unoccupied; reserved for future use.

[Show All](#)

# About Hebrew sort order

Microsoft Excel sorts right-to-left worksheets by using values from [Unicode](#), not those from the Hebrew [code page](#) as in some earlier versions. Opened or imported worksheets that use the Hebrew code page and Hebrew sort order will be converted to Unicode and [General](#) sort order.

Hebrew sort order is described here by using the Hebrew code page, not Unicode, because the former is more familiar to most users. The Hebrew sort order table arranges the characters of the Hebrew code page into a sort order. The sort order controls how data is sequentially ordered in Excel worksheets that use the Hebrew code page.

The 256 characters of the Hebrew code page can be organized into several categories that determine how characters are sorted.

- [Bidirectional control characters](#) (hexadecimal code points FD and FE):

Sort ignores these characters.

- Hebrew [diacritics](#) (hexadecimal code points C0 through CD, D1, and D2):

Sort ignores Hebrew diacritics except when the strings being compared are otherwise identical. In this case, unmarked characters (without diacritics) sort ahead of marked characters (with diacritics); diacritics with lower code point values sort ahead of others.

- General control characters (hexadecimal code points 00 through 1F and 7F), reserved characters (hexadecimal code points 80, 81, 8A, 8C through 90, 9A, 9C through 9F, CE through D0, D3 through DF, FB, FC, and FF), and punctuation:

These three categories sort ahead of alphanumeric characters in category order (that is, General control characters first) and in ascending code point order within each category (for example, 00 sorts ahead of 01).

- Hebrew and [left-to-right](#) alphanumeric characters (in the Hebrew sort order

table):

Left-to-right text is always sorted ahead of Hebrew text.

Left-to-right text sorting is not case sensitive. For example, although uppercase "A" is listed before lowercase "a", Hebrew Excel treats these characters equally and does not provide any sorting preference to either character.

Unmarked left-to-right text (without diacritics) is sorted before marked left-to-right text.

[Show All](#)

# About the Hebrew code page

Each [code page](#) is identified by a unique code page number. The code page (CP) for Hebrew is CP 1255.

Microsoft Excel sorts right-to-left worksheets using values from [Unicode](#), not those from the right-to-left code page as in earlier versions. Opened or imported worksheets that use the Hebrew code page and Hebrew sort order will be converted to Unicode and [General](#) sort order.

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0		SP	0	⊙	P	˘	p	■	■	SP	°	.	■	⊗	1	
1		!	1	A	Q	a	q	■	'	■	±	...	.	□	□	
2		·	2	B	R	b	r	,	'	¢	²	...	.	Ⓛ	Ⓛ	
3		#	3	C	S	c	s	f	"	£	³	...	■	Ⓣ	Ⓣ	
4		\$	4	D	T	d	t	"	"	¤	´	.	■	Ⓢ	Ⓢ	
5		%	5	E	U	e	u	...	▪	¥	µ	...	■	Ⓛ	Ⓛ	
6		&	6	F	V	f	v	†	-	¦	¶	...	■	Ⓡ	Ⓡ	
7		'	7	G	W	g	w	‡	—	§	.	.	■	Ⓢ	Ⓢ	
8		(	8	H	X	h	x	^	~	¨	.	.	■	Ⓢ	Ⓢ	
9		)	9	I	Y	i	y	‰	™	©	±	.	■	Ⓢ	Ⓢ	
A		*	:	J	Z	j	z	■	■	ª	°	■	■	Ⓡ	Ⓡ	
B		+	;	K	I	k	{	<	>	«	»	...	■	Ⓡ	Ⓡ	
C		,	<	L	\	l		■	■	-	¼	.	■	Ⓡ	Ⓡ	
D		-	=	M	]	m	}	■	■	-	½	.	■	Ⓢ	Ⓢ	
E		.	>	N	^	n	~	■	■	©	¾	■	■	Ⓢ	Ⓢ	
F		/	?	O	_	o		■	■	-	■	■	■	Ⓢ	Ⓢ	

## Legend

-  Code point contains a non-printable control character.
-  Code point is unoccupied; reserved for future use.

# About Vietnamese worksheets

All Vietnamese worksheets in Excel 2002 or later share the following features:

**File compatibility** Excel 2002 or later can open worksheets created in versions of Vietnamese Excel 2000 or earlier. There may be some Vietnamese-specific formulas that are not supported in Excel 2002 or later. If you open and convert a file from Vietnamese Excel 2000 or earlier, saving it within Excel 2002 or later may adversely affect some text and number formatting.

**Sorting** You might experience different sort order results depending on the **Regional Settings** or **Regional Options** setting of the Microsoft Windows operating system you are using.

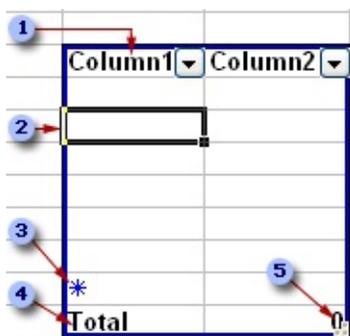


# List functionality

## [What's new home](#)

In Microsoft Office Excel 2003, you can create lists in your worksheet to group and act upon related data. You can create a list on existing data or create a list from an empty range. When you specify a range as a list, you can easily manage and analyze the data independent of other data outside of the list. Additionally, information contained within a list can be shared with others through integration with Microsoft Windows SharePoint Services.

A new user interface and a corresponding set of functionality are exposed for ranges that are designated as a list.



- 1 Every column in the list has AutoFilter enabled by default in the header row which allows you to quickly filter or sort your data.
- 2 The dark blue list border clearly outlines the range of cells that compose your list.
- 3 The row in the list frame that contains an asterisk is called the insert row. Typing information in this row will automatically add data to the list.
- 4 A total row can be added to your list. When you click on a cell within the total row, you can pick from a drop-down list of aggregate functions.
- 5 You can modify the size of your list by dragging the resize handle found on the bottom right corner of the list border.

## **Integration with Windows SharePoint Services**

Excel lists allow you to collaborate the information contained within a list with seamless integration with Windows SharePoint Services. You can create a SharePoint list based on your Excel list on a SharePoint site by publishing the list. If you choose to link the list to the SharePoint site, any changes you make to the list in Excel will be reflected on the SharePoint site when you synchronize the list.

You can also use Excel to edit existing Windows SharePoint Services lists. You can modify the list offline and then synchronize your changes later to update the SharePoint list.



# Improved statistical functions

## [What's new home](#)

Aspects of the following statistical functions, including rounding results, and precision have been enhanced:

BINOMDIST  
CHIINV  
CONFIDENCE  
CRITBINOM  
DSTDEV  
DSTDEVP  
DVAR  
DVARP  
FINV  
FORECAST  
GAMMAINV  
GROWTH  
HYPGEOMDIST  
INTERCEPT  
LINEST  
LOGEST  
LOGINV  
LOGNORMDIST  
NEGBINOMDIST  
NORMDIST  
NORMINV  
NORMSDIST  
NORMSINV  
PEARSON  
POISSON  
RAND  
RSQ  
SLOPE  
STDEV  
STDEVA

STDEVP  
STDEVPA  
STEYX  
TINV  
TREND  
VAR  
VARA  
VARP  
VARPA  
ZTEST

**Note** The result of the preceding functions may be different than in previous versions of Microsoft Excel.



# XML support

## [What's new home](#)

Industry-standard XML support in Microsoft Office Word 2003, Microsoft Office Excel 2003, and Microsoft Office Access 2003 streamlines the process of accessing and capturing information between PCs and back-end systems, unlocking information, and allowing for the creation of integrated business solutions across the organization and between business partners.

With XML support in Excel, your data can be exposed to external processes, in a business-centric XML vocabulary.

XML enables you to organize and work with workbooks and data in ways that were previously impossible or very difficult. By using your XML schemas, you can now identify and extract specific pieces of business data from ordinary business documents.

You can attach a custom XML schema to any workbook. Then, you use the **XML Source** task pane to map cells to elements of the schema. Once you have mapped the XML elements to your worksheet, you can seamlessly import and export XML data into and out of the mapped cells.



# Smart documents

## [What's new home](#)

Smart documents are documents that are programmed to extend the functionality of your workbook by dynamically responding to the context of your actions.

Several types of workbooks, such as forms and templates, work well as smart documents. Smart documents work especially well for workbooks that are part of a process. For example, your company may have a process for filling out annual employee expense forms, and you may already use a Microsoft Office Excel 2003 template for this purpose. If that template is turned into a smart document, it can be connected to a database that automatically fills in some of the required information, such as your name, employee number, manager's name, and so on. When you complete the expense report, the smart document can display a button that allows you to send it on to the next step in the process. Because the smart document knows who your manager is, it can automatically route itself to that person. And, no matter who has it, the smart document knows where it is in the expense review process and what needs to happen next.

Smart documents can help you reuse existing content. For example, accountants can use existing boilerplate when creating billing statements.

Smart documents can make it easier to share information. They can interact with a variety of databases and use BizTalk for tracking workflow. They can even interact with other Microsoft Office applications. For example, you can use smart documents to send e-mail messages through Microsoft Outlook, all without leaving the workbook or starting Outlook.



# Document Workspaces

## [What's new home](#)

Use Document Workspaces to simplify the process of co-authoring, editing, and reviewing documents with others in real-time through Microsoft Office Word 2003, Microsoft Office Excel 2003, Microsoft Office PowerPoint 2003, or Microsoft Office Visio 2003. A Document Workspace site is a Microsoft Windows SharePoint Services site that is centered around one or more documents. People can easily work together on the document— either by working directly on the Document Workspace copy or by working on their own copy, which they can update periodically with changes that have been saved to the copy on the Document Workspace site.

Typically, you create a Document Workspace when you use e-mail to send a document as a shared attachment. As the sender of the shared attachment, you become the administrator of the Document Workspace, and all the recipients become members of the Document Workspace, where they are granted permission to contribute to the site. Another common way to create a Document Workspace is to use the **Shared Workspace** task pane (**Tools** menu) in a Microsoft Office 2003 program.

When you use Word, Excel, PowerPoint, or Visio to open a local copy of the document on which the Document Workspace is based, the Office program periodically gets updates from the Document Workspace and makes them available to you. If the changes to the workspace copy conflict with changes you've made to your copy, you can choose which copy to keep. When you are finished editing your copy, you can save your changes to the Document Workspace, where they are available for other members to incorporate into their copy of the document.

[Show All](#)



# Information Rights Management

## [What's new home](#)

Today, sensitive information can only be controlled by limiting access to the networks or computers where the information is stored. Once access is given to users, however, there are no restrictions on what can be done with the content or to whom it can be sent. This distribution of content easily allows sensitive information to reach people who were never intended to receive it. Microsoft Office 2003 offers a new feature, Information Rights Management (IRM), which helps you prevent sensitive information from getting into the hands of the wrong people, whether by accident or carelessness.

Authors use the **Permission** dialog box (**File | Permission | Do Not Distribute** or **Permission**  on the **Standard toolbar**) to give users Read and Change access, as well as to set expiration dates for content. Authors can remove restricted permission from a document, workbook, or presentation by simply clicking **Unrestricted Access** on the **Permission** submenu or by clicking **Permission**  again on the **Standard toolbar**.

Additionally, administrators for companies can create permission policies that are available in Microsoft Office Word 2003, Microsoft Office Excel 2003, and Microsoft Office PowerPoint 2003 on the **Permission** submenu and define who can access information and what level of editing or Office capabilities users have for a document, workbook, or presentation.

Users who receive content with restricted permission simply need to open the document, workbook, or presentation just as they would with content that doesn't have restricted permission. If users don't have Office 2003 or later installed on their computer, they can download a program that allows them to view this content.

**Note** You can create content with restricted permission using Information Rights Management only in Microsoft Office Professional Edition 2003, Microsoft Office Word 2003, Microsoft Office Excel 2003, and Microsoft Office PowerPoint 2003.



# Compare workbooks side by side

## [What's new home](#)

Using one workbook to view changes made by multiple users can be difficult, but a new approach to comparing workbooks is now available— comparing workbooks side by side. Comparing workbooks side by side (using the **Compare Side by Side with** command on the **Window** menu) allows you to see the differences between two workbooks more easily, without having to merge all changes into one workbook. You can scroll through both workbooks at the same time to identify differences between the two workbooks.



## More new features

### [What's new home](#)

**New look for Office** Microsoft Office 2003 has a new look that's open and energetic. Additionally, new and improved task panes are available to you. New task panes include Getting Started, Help, Search Results, Shared Workspace, Document Updates, and Research.

**Tablet PC support** On a Tablet PC, you can quickly provide input using your own handwriting directly into Office documents as you would using a pen and a printout. Additionally, you can now view task panes horizontally to help you do your work on the Tablet PC the way you want to do your work.

**Research task pane** The new **Research** task pane offers a wide variety of reference information and expanded resources if you have an Internet connection. You can conduct research on topics using an encyclopedia, Web search, or by accessing third-party content.

**Microsoft Office Online** Microsoft Office Online is better integrated in all Microsoft Office programs so that you can take full advantage of what the site has to offer while you work. You can visit Microsoft Office Online directly from within your Web browser or use the links provided in various task panes and menus in your Office program to access articles, tips, clip art, templates, online training, downloads, and services to enhance how you work with Office programs. The site is updated regularly with new content based on direct feedback and specific requests from you and others who use Office.

**Improving quality for the customer** Microsoft strives to improve quality, reliability, and performance of Microsoft software and services. The Customer Experience Improvement Program allows Microsoft to collect information about your hardware configuration and how you use Microsoft Office programs and services to identify trends and usage patterns. Participation is optional, and data collection is completely anonymous. Additionally, error reporting and error messages have been improved so that you are provided with the easiest approach to reporting errors and the most helpful information about alerts at the time you encounter a problem. Finally, with an Internet connection, you can give Microsoft customer feedback about an Office program, help content, or

Microsoft Office Online content. Microsoft is continually adding and improving content based on your feedback.

[Show All](#)

# INDEX

## [See Also](#)

Returns the value of an element in a table or an [array](#), selected by the row and column number indexes.

The INDEX function has two syntax forms: array and reference. The array form always returns a value or array of values; the reference form always returns a reference. Use the array form if the first argument to INDEX is an array constant.

## Syntax 1

Array form

**INDEX(array,row\_num,column\_num)**

Array is a range of cells or an array constant.

- If array contains only one row or column, the corresponding row\_num or column\_num argument is optional.
- If array has more than one row and more than one column, and only row\_num or column\_num is used, INDEX returns an array of the entire row or column in array.

Row\_num selects the row in array from which to return a value. If row\_num is omitted, column\_num is required.

Column\_num selects the column in array from which to return a value. If column\_num is omitted, row\_num is required.

## Remarks

- If both the row\_num and column\_num arguments are used, INDEX returns

the value in the cell at the intersection of row\_num and column\_num.

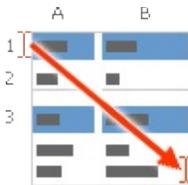
- If you set row\_num or column\_num to 0 (zero), INDEX returns the array of values for the entire column or row, respectively. To use values returned as an array, enter the INDEX function as an [array formula](#) in a horizontal range of cells for a row, and in a vertical range of cells for a column. To enter an array formula, press CTRL+SHIFT+ENTER.
- Row\_num and column\_num must point to a cell within array; otherwise, INDEX returns the #REF! error value.

### Example 1

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Data</b>	<b>Data</b>
	Apples	Lemons
	Bananas	Pears
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>		

3 =INDEX(A2:B3,2,2) Value at the intersection of the second row and second column in the range (Pears)

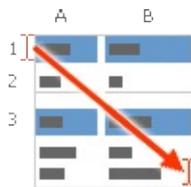
=INDEX(A2:B3,2,1) Value at the intersection of the second row and first column in the range (Bananas)

## Example 2

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	A	B
	Formula	Description (Result)
1		
2	=INDEX({1,2;3,4},0,2)	Value in the first row, second column in the array constant (2)
3		Value in the second row, second column in the array constant (4)

**Note** The formula in the example must be entered as an array formula. After copying the example to a blank worksheet, select the range A2:A3 starting with the formula cell. Press F2, and then press CTRL+SHIFT+ENTER. If the formula

is not entered as an array formula, the single result is 2.

[Show All](#)

# INDEX

## [See Also](#)

Returns the reference of the cell at the intersection of a particular row and column. If the reference is made up of nonadjacent selections, you can pick the selection to look in.

The INDEX function has two syntax forms: [array](#) and reference. The array form always returns a value or an array of values; the reference form always returns a reference.

## Syntax 2

Reference form

**INDEX(reference,row\_num,column\_num,area\_num)**

Reference is a reference to one or more cell ranges.

- If you are entering a nonadjacent range for the reference, enclose reference in parentheses.
- If each area in reference contains only one row or column, the row\_num or column\_num argument, respectively, is optional. For example, for a single row reference, use INDEX(reference,,column\_num).

Row\_num is the number of the row in reference from which to return a reference.

Column\_num is the number of the column in reference from which to return a reference.

Area\_num selects a range in reference from which to return the intersection of row\_num and column\_num. The first area selected or entered is numbered 1, the second is 2, and so on. If area\_num is omitted, INDEX uses area 1.

- For example, if reference describes the cells (A1:B4,D1:E4,G1:H4), then area\_num 1 is the range A1:B4, area\_num 2 is the range D1:E4, and area\_num 3 is the range G1:H4.

## Remarks

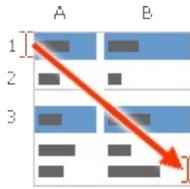
- After reference and area\_num have selected a particular range, row\_num and column\_num select a particular cell: row\_num 1 is the first row in the range, column\_num 1 is the first column, and so on. The reference returned by INDEX is the intersection of row\_num and column\_num.
- If you set row\_num or column\_num to 0 (zero), INDEX returns the reference for the entire column or row, respectively.
- Row\_num, column\_num, and area\_num must point to a cell within reference; otherwise, INDEX returns the #REF! error value. If row\_num and column\_num are omitted, INDEX returns the area in reference specified by area\_num.
- The result of the INDEX function is a reference and is interpreted as such by other formulas. Depending on the formula, the return value of INDEX may be used as a reference or as a value. For example, the formula CELL("width",INDEX(A1:B2,1,2)) is equivalent to CELL("width",B1). The CELL function uses the return value of INDEX as a cell reference. On the other hand, a formula such as 2\*INDEX(A1:B2,1,2) translates the return value of INDEX into the number in cell B1.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>	<b>C</b>
	<b>Fruit</b>	<b>Price</b>	<b>Count</b>
	Apples	0.69	40
	Bananas	0.34	38
	Lemons	0.55	15
	Oranges	0.25	25
	Pears	0.59	40
	Almonds	2.80	10
<b>1</b>	Cashews	3.55	16
<b>2</b>	Peanuts	1.25	20
<b>3</b>	Walnuts	1.75	12
<b>4</b>	<b>Formula</b>	<b>Description (Result)</b>	
<b>5</b>		The intersection of the second row and third column in the range A2:C6, which is the content of cell C3. (38)	
<b>6</b>	=INDEX(A2:C6,2,3)		
<b>7</b>			
<b>8</b>		The intersection of the second row and second column in the second area of A8:C11, which is the content of cell B9. (3.55)	
<b>9</b>			
<b>10</b>	=INDEX((A1:C6,A8:C11),2,2,2)		
<b>11</b>			
	=SUM(INDEX(A1:C11,0,3,1))	The sum of the third column in the first area of the range A1:C11, which is the sum of C1:C6. (216)	

=SUM(B2:INDEX(A2:C6,5,2))

The sum of the range starting at B2, and ending at the intersection of the fifth row and the second column of the range A2:A6, which is the sum of B2:B6. (2.42)

[Show All](#)

# LOOKUP

## [See Also](#)

The LOOKUP function has two syntax forms: vector and [array](#).

A vector is a range of only one row or one column. The vector form of LOOKUP looks in a one-row or one-column range (known as a vector) for a value and returns a value from the same position in a second one-row or one-column range. Use this form of the LOOKUP function when you want to specify the range that contains the values you want to match. The other form of LOOKUP automatically looks in the first column or row.

## Syntax 1

Vector form

**LOOKUP(lookup\_value,lookup\_vector,result\_vector)**

Lookup\_value is a value that LOOKUP searches for in the first vector. Lookup\_value can be a number, text, a logical value, or a name or reference that refers to a value.

Lookup\_vector is a range that contains only one row or one column. The values in lookup\_vector can be text, numbers, or logical values.

**Important** The values in lookup\_vector must be placed in ascending order: ..., -2, -1, 0, 1, 2, ..., A-Z, FALSE, TRUE; otherwise, LOOKUP may not give the correct value. Uppercase and lowercase text are equivalent.

Result\_vector is a range that contains only one row or column. It must be the same size as lookup\_vector.

## Remarks

- If LOOKUP can't find the lookup\_value, it matches the largest value in

lookup\_vector that is less than or equal to lookup\_value.

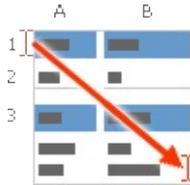
- If lookup\_value is smaller than the smallest value in lookup\_vector, LOOKUP gives the #N/A error value.

## Example

The example may be easier to understand if you copy it to a blank worksheet.

[How?](#)

1. Create a blank workbook or worksheet.
2. Select the example in the Help topic. Do not select the row or column headers.



Selecting an example from Help

3. Press CTRL+C.
4. In the worksheet, select cell A1, and press CTRL+V.
5. To switch between viewing the results and viewing the formulas that return the results, press CTRL+` (grave accent), or on the **Tools** menu, point to **Formula Auditing**, and then click **Formula Auditing Mode**.

	<b>A</b>	<b>B</b>
	<b>Frequency</b>	<b>Color</b>
	4.14	red
	4.19	orange
	5.17	yellow
	5.77	green
	6.39	blue
<b>1</b>	<b>Formula</b>	<b>Description (Result)</b>
<b>2</b>		Looks up 4.19 in column A, and returns the
<b>3</b>	=LOOKUP(4.91,A2:A6,B2:B6)	value from column B that's in the same row (orange)

- 4 Looks up 5.00 in column A, and returns the
- 5 =LOOKUP(5.00,A2:A6,B2:B6) value from column B that's in the same row  
(orange)
- 6 Looks up 7.66 in column A, matches the  
next smallest value (6.39), and returns the  
value from column B that's in the same row  
(blue)
- =LOOKUP(7.66,A2:A6,B2:B6)
- =LOOKUP(0,A2:A6,B2:B6) Looks up 0 in column A, and returns an  
error because 0 is less than the smallest  
value in the lookup\_vector A2:A7 (#N/A)

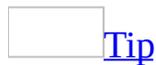
[Show All](#)

# LOOKUP

## [See Also](#)

The LOOKUP function has two syntax forms: vector and [array](#).

The array form of LOOKUP looks in the first row or column of an array for the specified value and returns a value from the same position in the last row or column of the array. Use this form of LOOKUP when the values you want to match are in the first row or column of the array. Use the other form of LOOKUP when you want to specify the location of the column or row.



In general, it's best to use the HLOOKUP or VLOOKUP function instead of the array form of LOOKUP. This form of LOOKUP is provided for compatibility with other spreadsheet programs.

## Syntax 2

Array form

### **LOOKUP(lookup\_value,array)**

Lookup\_value is a value that LOOKUP searches for in an array. Lookup\_value can be a number, text, a logical value, or a name or reference that refers to a value.

- If LOOKUP can't find the lookup\_value, it uses the largest value in the array that is less than or equal to lookup\_value.
- If lookup\_value is smaller than the smallest value in the first row or column (depending on the array dimensions), LOOKUP returns the #N/A error value.

Array is a range of cells that contains text, numbers, or logical values that you want to compare with lookup\_value.

The array form of LOOKUP is very similar to the HLOOKUP and VLOOKUP functions. The difference is that HLOOKUP searches for lookup\_value in the first row, VLOOKUP searches in the first column, and LOOKUP searches according to the dimensions of array.

- If array covers an area that is wider than it is tall (more columns than rows), LOOKUP searches for lookup\_value in the first row.
- If array is square or is taller than it is wide (more rows than columns), LOOKUP searches in the first column.
- With HLOOKUP and VLOOKUP, you can index down or across, but LOOKUP always selects the last value in the row or column.

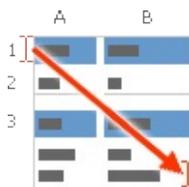
**Important** The values in array must be placed in ascending order: ..., -2, -1, 0, 1, 2, ..., A-Z, FALSE, TRUE; otherwise, LOOKUP may not give the correct value. Uppercase and lowercase text are equivalent.

## Example

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[How?](#)

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	<b>A</b>	<b>B</b>
	<b>Formula</b>	<b>Description (Result)</b>
<b>1</b>	=LOOKUP("C",	Looks up "C" in first row of the array and returns the value in the last row that's in the same column (3)
<b>2</b>	{"a","b","c","d";1,2,3,4})	
<b>3</b>	=LOOKUP("bump",	Looks up "bump" in first row of the array and returns the value in the last column that's in the same row (2)
	{"a",1;"b",2;"c",3})	