



On working efficiently in Excel

A Quick Review of Excel Essentials



Excel Review
Excel 97
1999-2000

*This handout is meant to serve as a
quick review of some of the principal features of Excel.
It's not meant to cover all Excel's features
or to treat them in any depth.*

*This guide may jog your memory
about a feature or two you might have used and then forgotten
or introduce you to something new
in Excel that you'd like to explore further.*

*If you're not already familiar with a feature described here
and you think it might be useful to you, I hope you'll
consult Excel's online help or a good reference guide
for a complete description.*

Examples are drawn from Excel 97.

Contents

	Page
I. Workbook Organization	
The workspace	1
The document window	2
Toolbars.....	3
Worksheet tabs: adding, deleting, naming, reordering.....	4
Copying and moving worksheets	5
Configuring the Excel environment to suit you	6
II. Data Entry & Edit	
Determining the Enter key order of movement	7
The formula bar.....	8
Formats and when to apply them	9
Fill and Extend	10
Why name cells & ranges?.....	12
Validation.....	13
Special copying	14
Transposition.....	15
III. Getting Basic Information	
The status bar	16
The title bar	17
Online help	18
Go to particular objects or types.....	19
IV. Arranging & Viewing the Worksheet	
Adding & deleting rows & columns	20
One- and two-way splits.....	21
Viewing multiple windows (& moving between them)	22
Moving & selecting: power keyboard techniques.....	23
Zoom.....	24
Custom views.....	25
Combining views & scenarios: the Report Manager	26

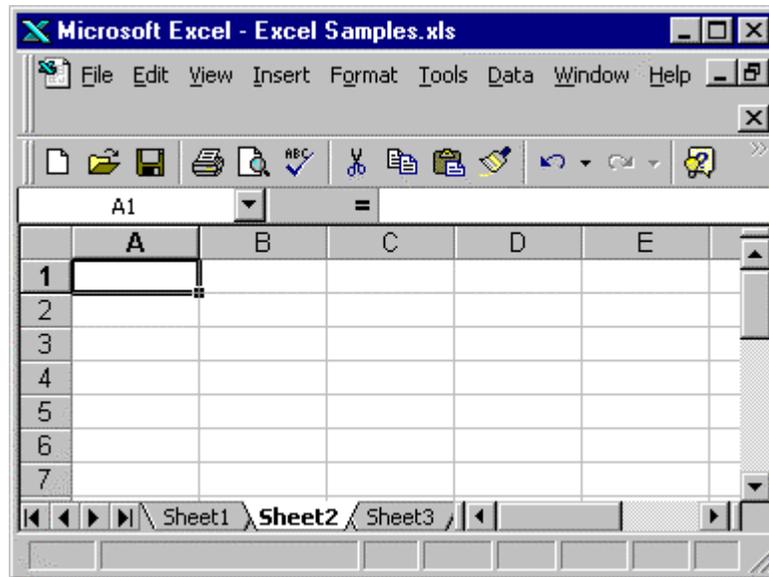
V. Calculations	
Recommendations	27
Copying formulas: Relative & absolute addressing	28
Using built-in functions	31
Analysis Toolbox	33
Referencing across sheets or books	35
VI. Debugging	
Testing your model (with small numbers).....	37
Audit features.....	38
Handling error values	39
VII. Data Management Essentials	
Sort	40
AutoFilter.....	41
Subtotal.....	42
Outline.....	43
Data Table.....	44
Pivot Table	46
VIII. Documenting	
Adding comments to cells	49
IX. Format Tips	
Row & column autofit.....	51
Autoformat	52
The formatting toolbar: highlights	54
Conditional	56
The drawing toolbar	57
Styles: changing & creating (within a workbook)	58
X. Charting Basics.....	59

XI. Printing Basics	
Fit to page.....	63
Headers & footers.....	64
Printing part of a worksheet.....	65
XII. Other Resources.....	66

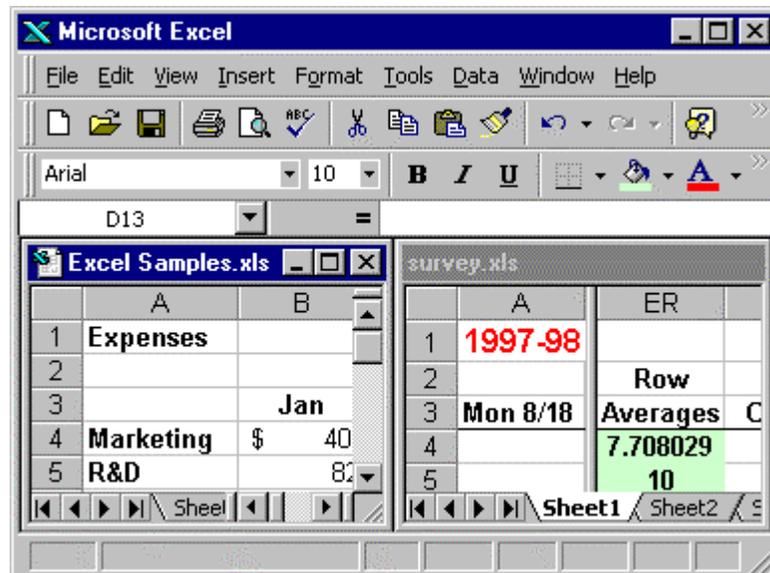
I. Workbook Organization

The Workspace

Excel's workspace is the window that holds the Excel menus, toolbars, status area, and workbook documents.



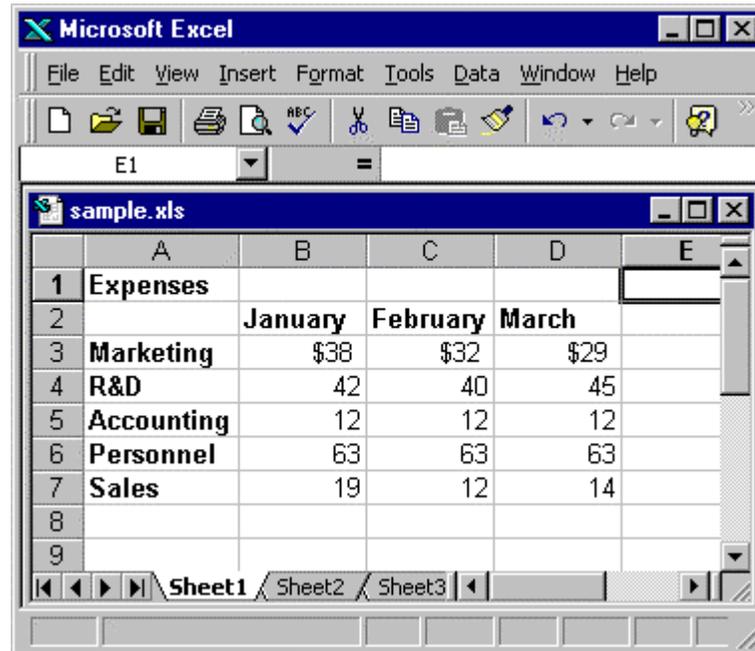
You can have more than one workbook open at the same time. You can have more than one view of the same worksheet document visible at the same time. Use *Window, New Window* to get a second worksheet view.



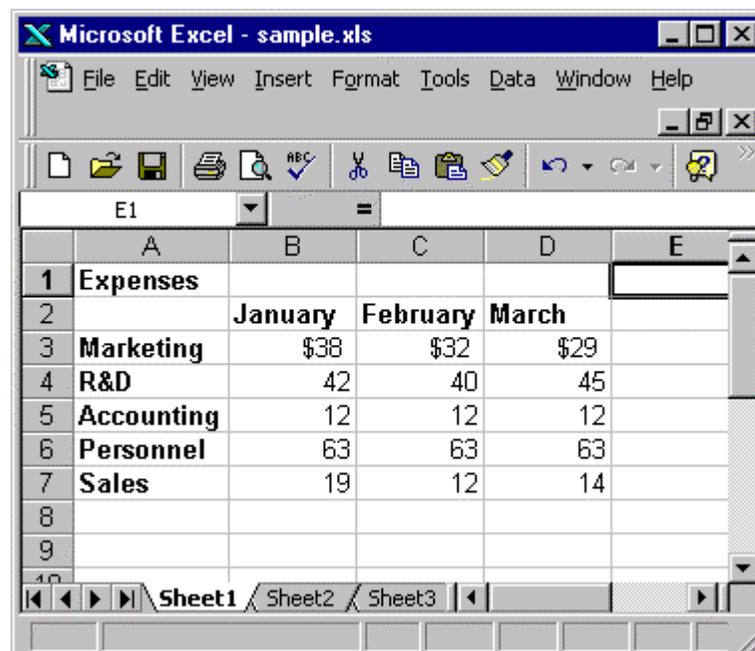
Use *Window, Arrange, Tile* to see multiple sheets or books at the same time.

The Document Window

A workbook may be displayed in a document window within the Excel workspace. A document window is distinct from the workspace window, as in the illustration below. Here, both the workspace window and the document window have their own unique title bar.

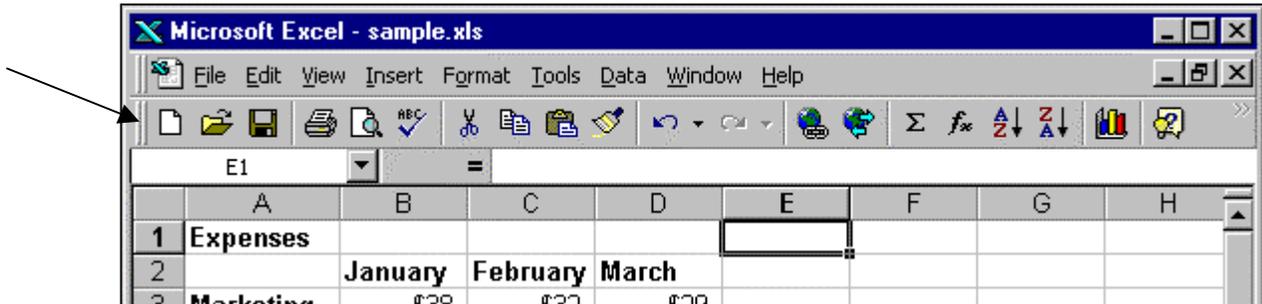


Clicking the expand button at the upper-right-hand corner of the document window merges the document window with the workspace window. With this arrangement, they share title bars. You get a little more screen space as a result.



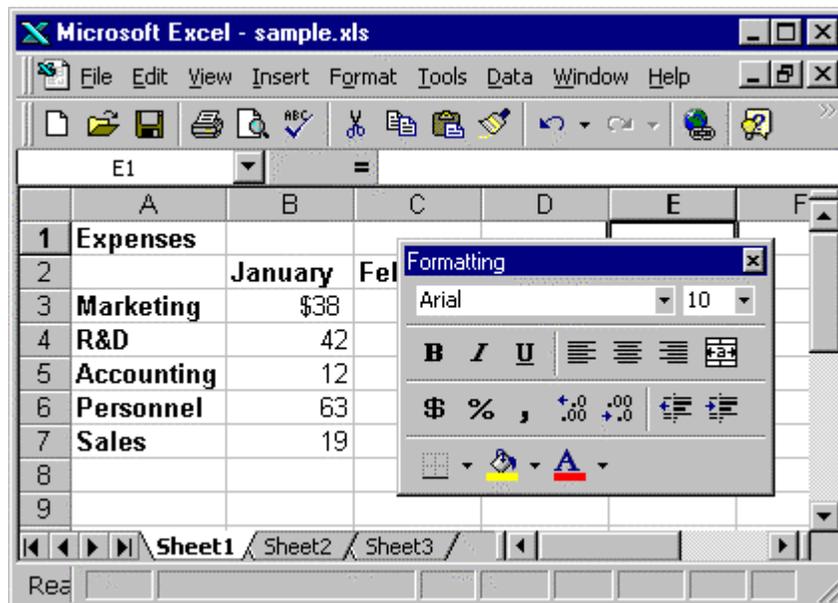
Toolbars

Excel has thirteen preconfigured toolbars. You can customize any toolbar or construct your own. Toolbar buttons are shortcuts to commands also on the menus. Excel usually opens with at least the Standard toolbar visible right below the menus.



View, Toolbars displays a list of the preconfigured toolbars. Click to toggle them on and off.

Toolbars normally “dock” at the top or bottom of the display. But if you prefer you can drag and shape any toolbar to make it float in the workspace. In the illustration below the Formatting toolbar is floating over the displayed worksheet.



A quick way to turn toolbars on and off is to right-click any open toolbar in a grey area (not on a button). When you do this Excel shows a pop-up list of toolbars. Open toolbars have a check-mark next to their name. Turn the check mark on or off to toggle the toolbar on or off.

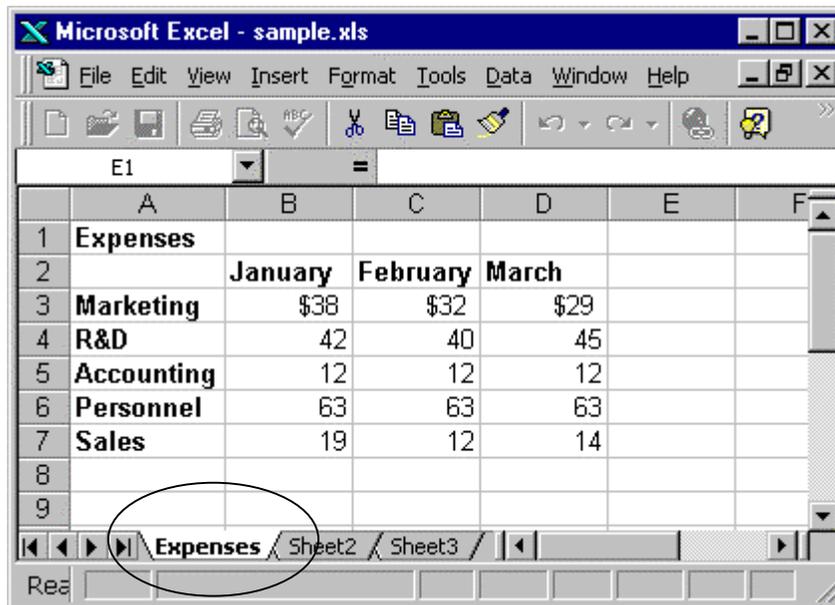
Worksheet tabs: adding, deleting, naming, reordering

When you open a new workbook Excel automatically provides you with one or more worksheets. Each worksheet is on its own tab. The number of tabs depends on how you have your Excel configured (*Tools, Options, General, Sheets in new workbook*).

Add a new worksheet tab with *Insert, Worksheet*.

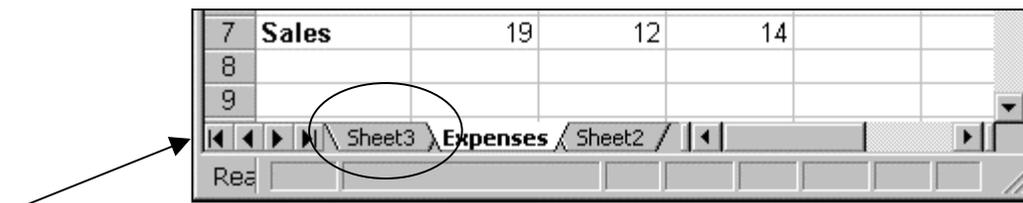
Delete a worksheet tab by making that worksheet current and clicking *Edit, Delete Worksheet*.

Name a worksheet tab with *Format, Sheet, Rename*. (Or, right-click the tab name.) The tab name appears in reverse video; enter a new name to replace the old one.



Reorder the sheets in your workbook with drag and drop. For example, to move "Sheet 3" to the left of the "Expenses Sheet" in the illustration above, point to the "Sheet 3" tab name, hold down the left mouse button, and drag to the left of the "Expenses Sheet" tab. Release the mouse button.

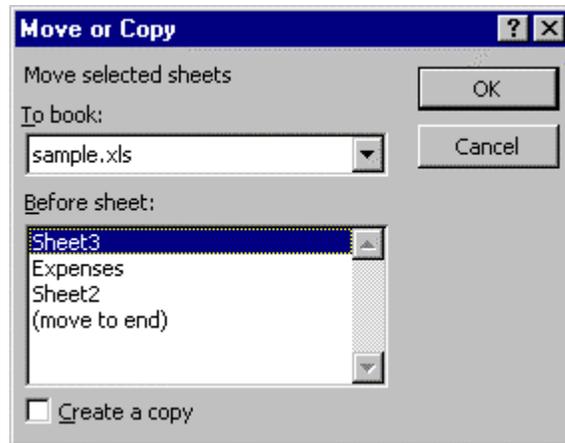
Use the left- and right-facing triangles to the left of the tabs to move through a view of all the worksheet tab names.



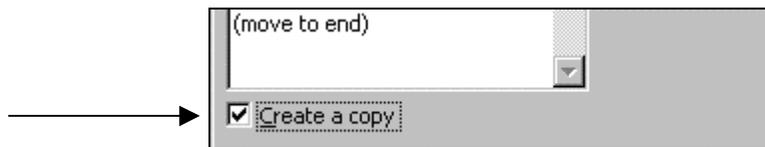
Copying and moving worksheets

Make the worksheet you want to move or copy the current worksheet. If you'll be dealing with more than one workbook (e.g., moving or copying from one workbook to another), make sure all workbooks are open.

From the menus select *Edit, Move or Copy Sheet* to open the "Move or Copy" dialog.



The default is to move the current worksheet. Click the "Create a copy" box at the bottom left of the dialog if you want to copy instead of move.

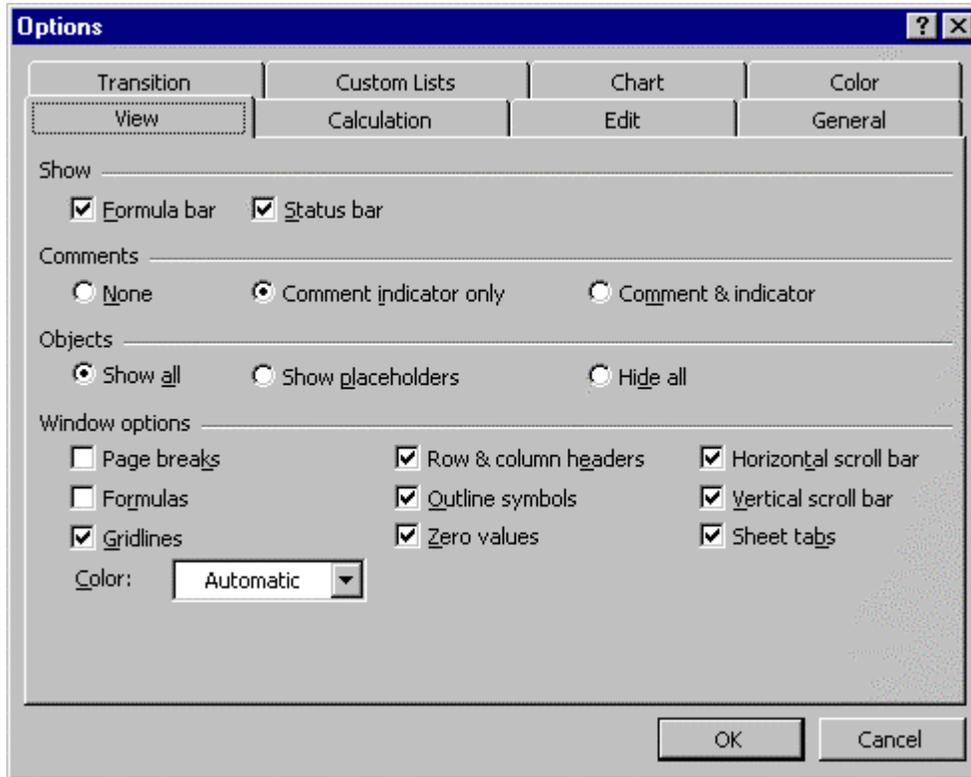


The default is to remain in the current workbook. Use the drop-down arrow to the right of the "To book" option to select another workbook as the target for the operation.

With "Before sheet" you can specify the location of the moved or copied worksheet relative to the other worksheets in the target workbook.

Configuring the Excel environment to suit you

Most of Excel's user preference information is stored in a big, multi-tabbed "Options" dialog box. Select *Tools, Options* to open this dialog.



Examples of some of the options you might want to set:

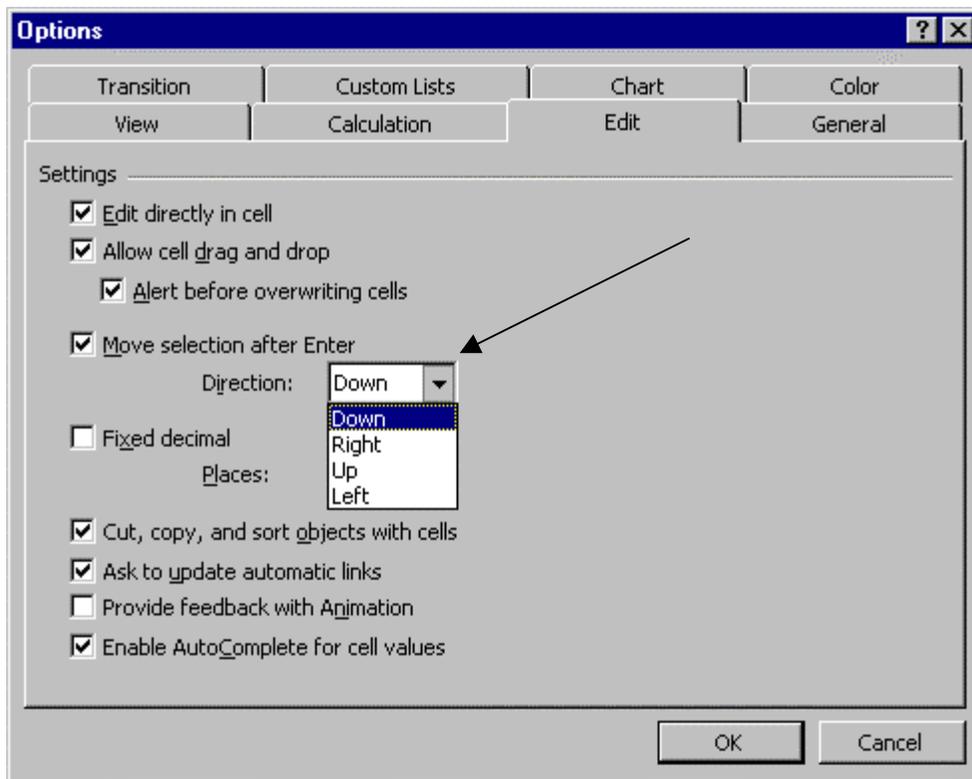
- | | |
|-------------|--|
| General | Number of sheets in a new workbook
Standard font and font size
User name (used on comments, change tracking, etc.) |
| Edit | Allow cell drag & drop
Allow editing directly in cells |
| View | How to view comments
Whether to display gridlines, row/col headers, zero values, etc. |
| Calculation | Manual or automatic workbook calculation
Number of iterations in a goal seek operation |
| Color | Chart marker fill colors |

II. Data Entry & Edit

Determining the Enter key order of movement

One user-configurable option in Excel is where the next current cell will be located after you hit the enter key. The default after you hit the enter key is for Excel to move down one cell, but you can instead choose to have Excel move one cell up, one cell right, or one cell left instead.

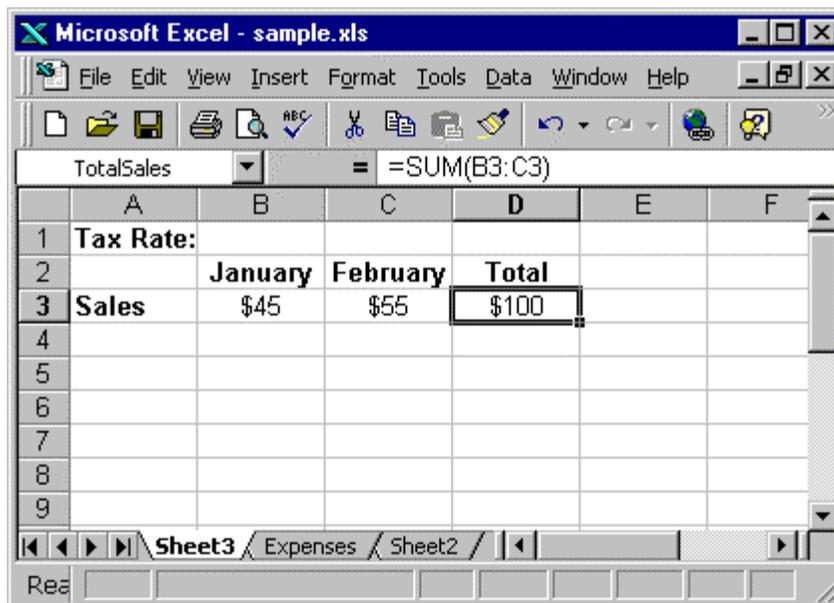
Set this option by selecting *Tools, Options, Edit* and choosing from the drop-down list in “Move selection after Enter, Direction”.



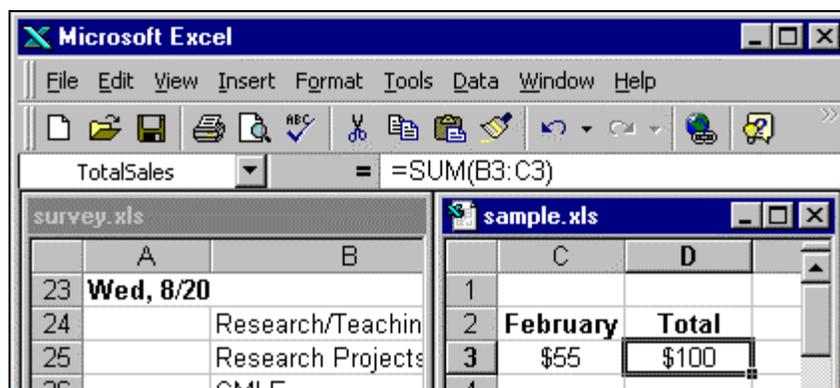
The Formula bar

Excel's Formula bar is located directly above the worksheet document window. It does three things:

1. At right, displays the contents of the current cell. For a cell holding a formula, it shows the formula, not the evaluated value the worksheet itself displays. In the example below, Cell D3.
2. At left in the "name box", displays the cell reference or name of the current cell or range. In the example Cell D3 is named TotalSales.
3. At the time you're entering a formula displays a red X mark and a green check mark to help you conveniently confirm or cancel the operation.



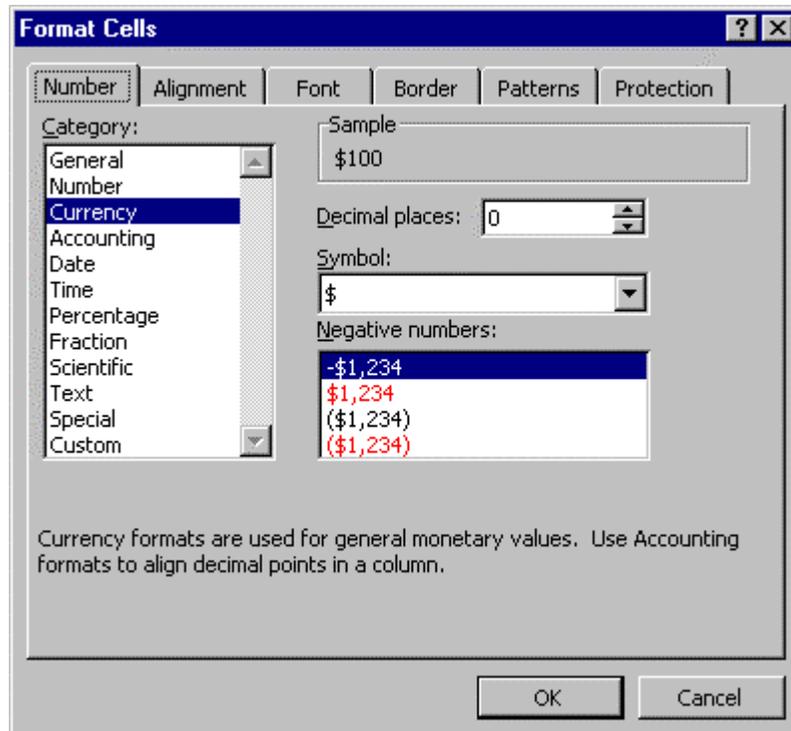
Even if you have several worksheets visible in the Excel workspace at one time, there's only one Formula bar. It applies to whichever worksheet has the focus.¹



¹ You can tell which worksheet has the focus because its title bar is emphasized. Move the focus from one sheet to another by clicking anywhere within the sheet you want to move focus to.

Formats and when to apply them

The “Format Cells” tabbed dialog includes all Excel’s formatting options. Open this dialog with the *Format, Cells* commands.



Many of the options in this dialog are also available more conveniently on the Formatting toolbar, a portion of which is shown here.



Excel permits you to format data as you enter it, or afterward. You can also “pre-format” empty cells in anticipation of adding data later.

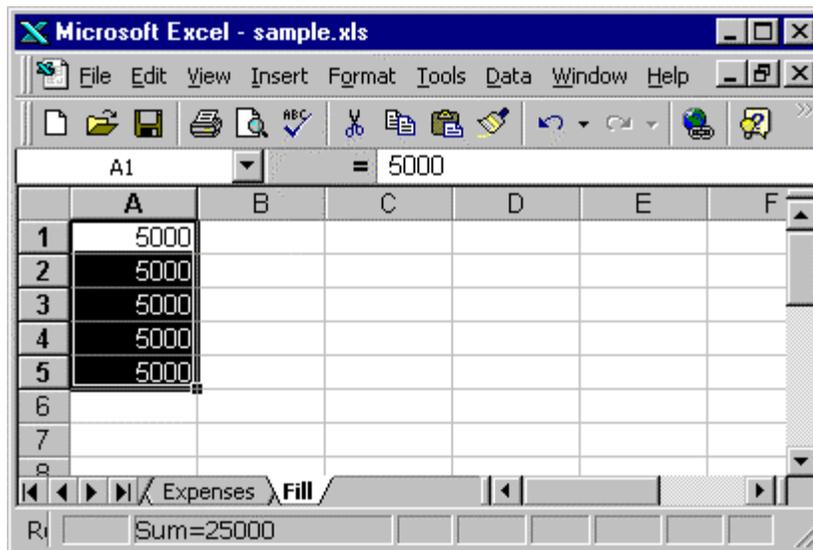


The “Format Painter” is a formatting tool so useful that it’s located on the Standard toolbar instead of the Formatting toolbar. Use it to quickly copy an existing format to other data.

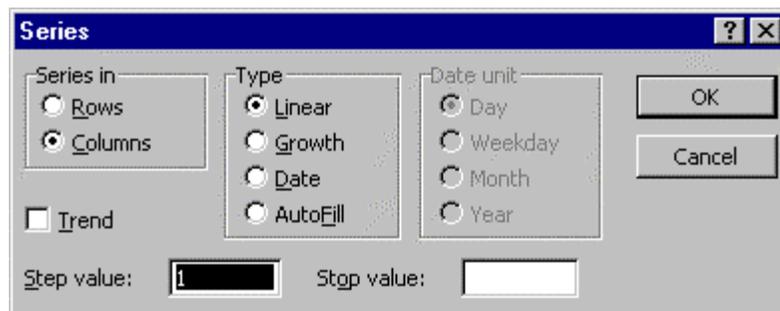
For example, if you’ve elaborately formatted a range with a special typeface, font size, border, alignment, and background color, you could transfer that format to data elsewhere in your spreadsheet using the Format Painter button. Click once anywhere in the range that includes the format-to-copy. Click the Format Painter button. Then drag over the new range you want to apply that format to.

Fill and Extend

Excel makes it easy to copy data quickly. In the example below, we enter the value 5000 in Cell A1, then drag the “fill box” (the small black box that appears in the lower-right-hand corner of the current cell) down to Cells A2:A5 to fill these cells with the same value. Highlighting the value to copy and the range to copy to and selecting *Edit, Fill, Down* accomplishes the same result.



The *Edit, Fill, Series* command allows for more than a simple copy.



Two *Edit, Fill, Series* examples:

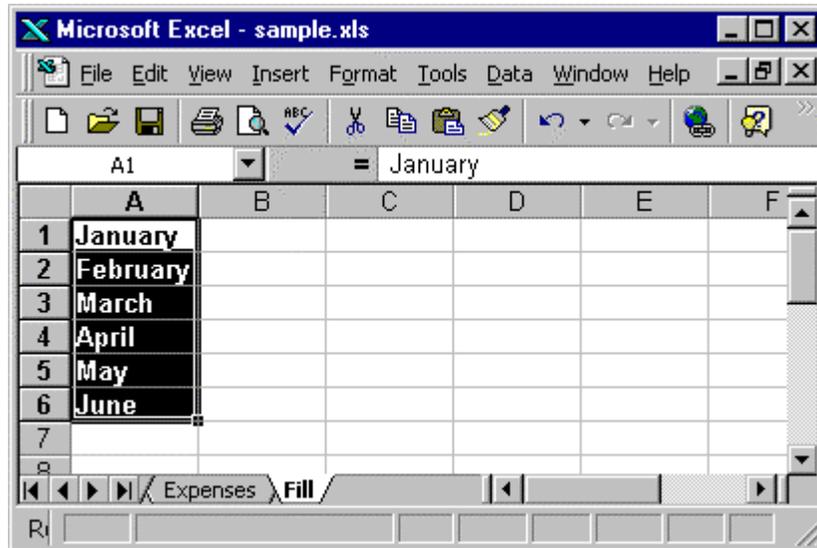
	A	B
1	10/6/97	
2	10/6/98	
3	10/6/99	
4	10/6/00	
5	10/6/01	
6		

Date, incremented by year.

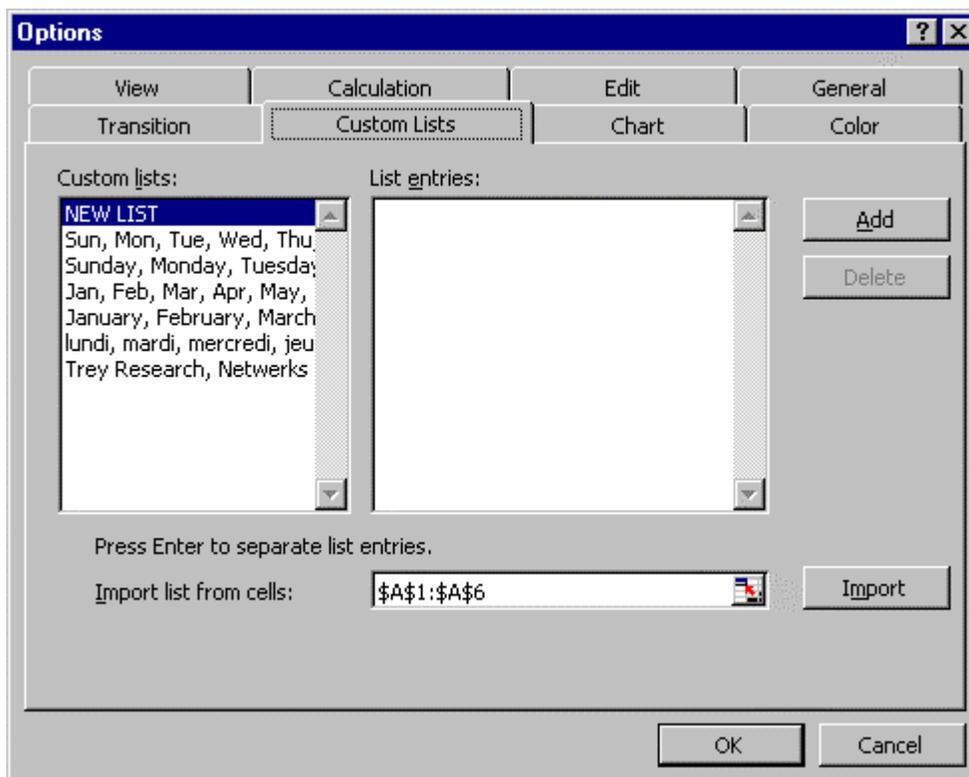
	A	B
1	3.41	
2	18.755	
3	103.1525	
4	567.3388	
5	3120.363	
6		

Growth with a step value of 5.5.

Extend is similar to fill, but isn't confined to numbers. There are a number of built-in extension lists and you can "teach" Excel how to use the extend feature for any list. For example, entering the value January in Cell A1 and dragging the Cell A1 fill box down through Cell A6 results in a list of months of the year. Excel has the months of the year stored as an extensible list.

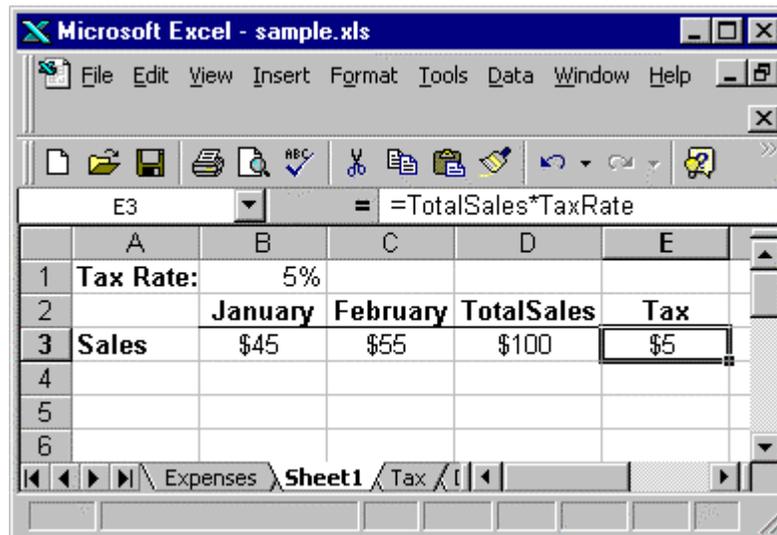


Lists are stored in the Options dialog (*Tools, Options, Custom Lists*). Days of the week and months of the year are standard. Any list of your own that you add to this dialog is available to any worksheet you open.



Why name cells & ranges?

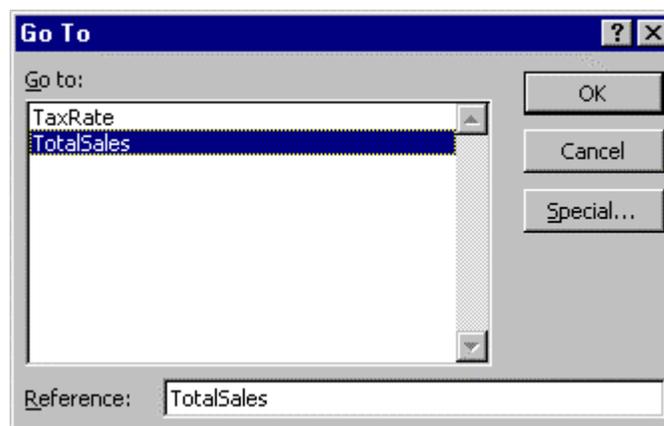
Naming key cells makes your worksheet easier to read. Excel will use names in place of cell references in formulas. In the example below, the formula bar displays the formula in Cell E3 as `=TotalSales*TaxRate`. Without cell names, the formula would be less comprehensible, as `=D3*B1`.



If you assign names to cells *after* having used those cells in calculations, Excel doesn't automatically replace cell references in the calculations with the new cell names. However, you can over-ride this default with the command *Insert, Name, Apply*.

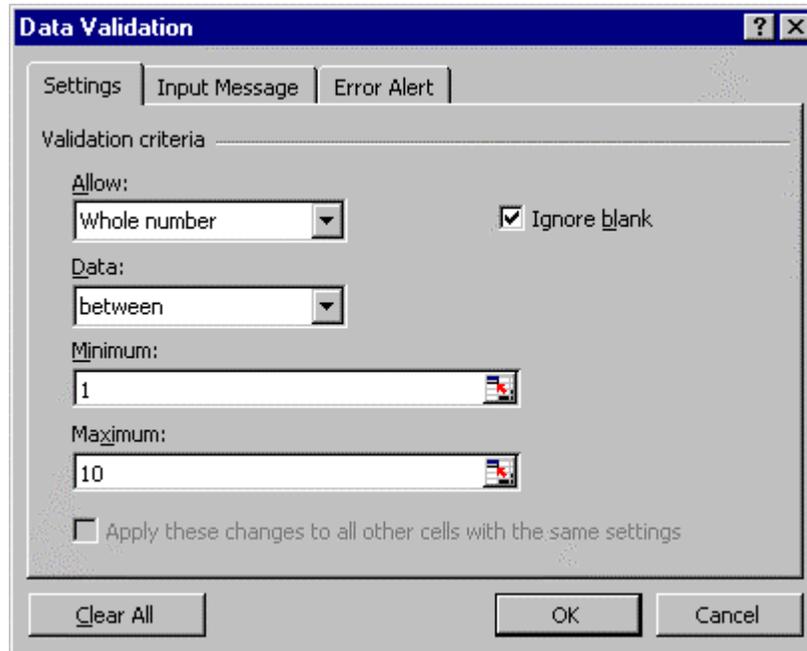
Quickly name a cell or range by selecting it and entering the name in the "Name Box" at the left of the formula bar. The Name Box displays the current cell or range reference or the current cell or range name, if one is assigned.

Name a cell or range to be able to go to it quickly using the F5 "Go To" key. Hitting F5 opens the *Go To* dialog box.

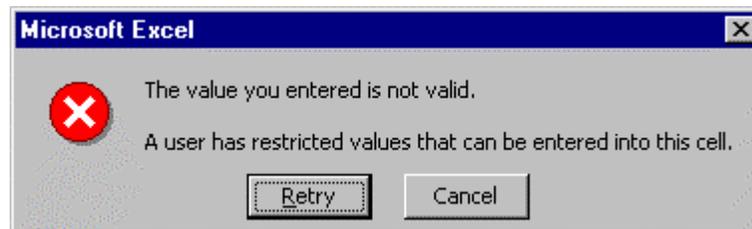


Validation

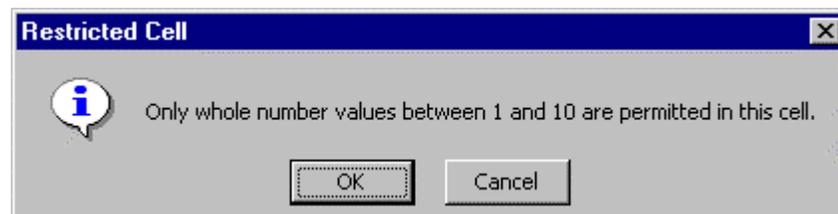
You may want to control the data entered in a worksheet. To do so, highlight the range you want validation to apply to and select the *Data, Validation* command. Complete the validation options on the *Settings* tab of this dialog.



In the example above, only whole numbers between 1 and 10 are permitted in the range. A user who enters an invalid value sees this message:

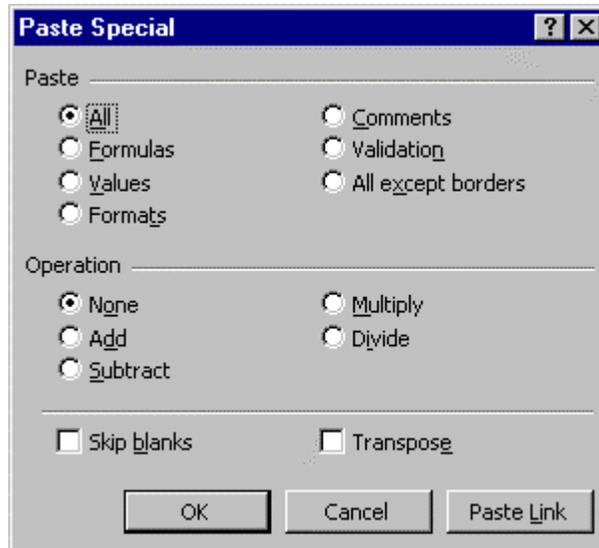


Customize the error message using the *Data Validation* dialog's *Input Message* and *Error Alert* tabs. For example, this customized message provides information but doesn't inhibit data entry:

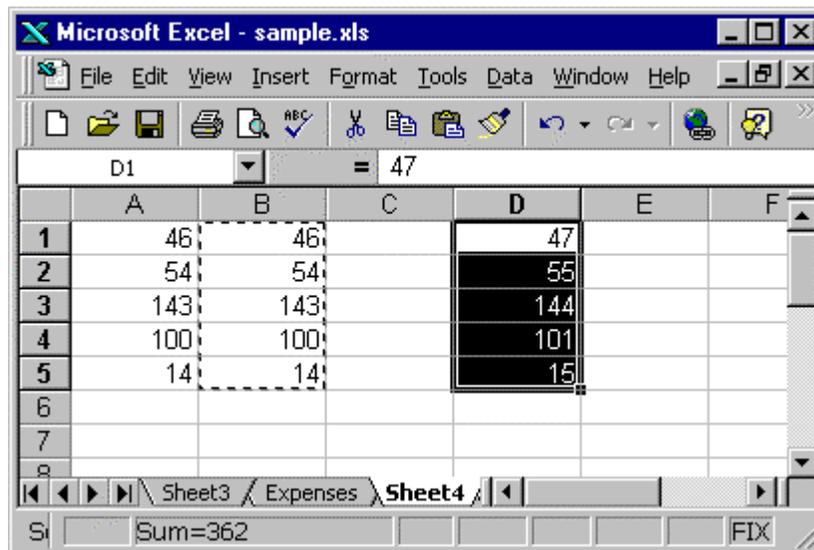


Special Copying

The standard Windows *Edit*, *Copy* and *Edit*, *Paste* commands are available in Excel. Excel's *Paste Special* command extends the options.



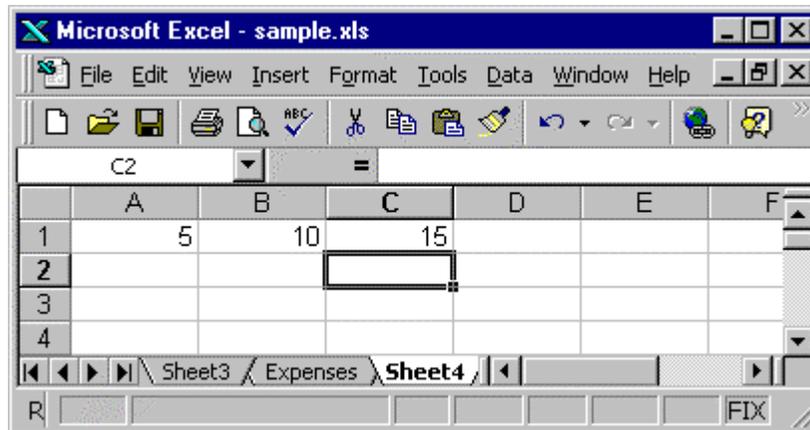
An often-used option under the Paste category is to paste *Values*. For example, the values that display in Column A below are all formulas. In Column B, they're actual numbers not formulas, because they've been copied with *Paste Special, Values*.



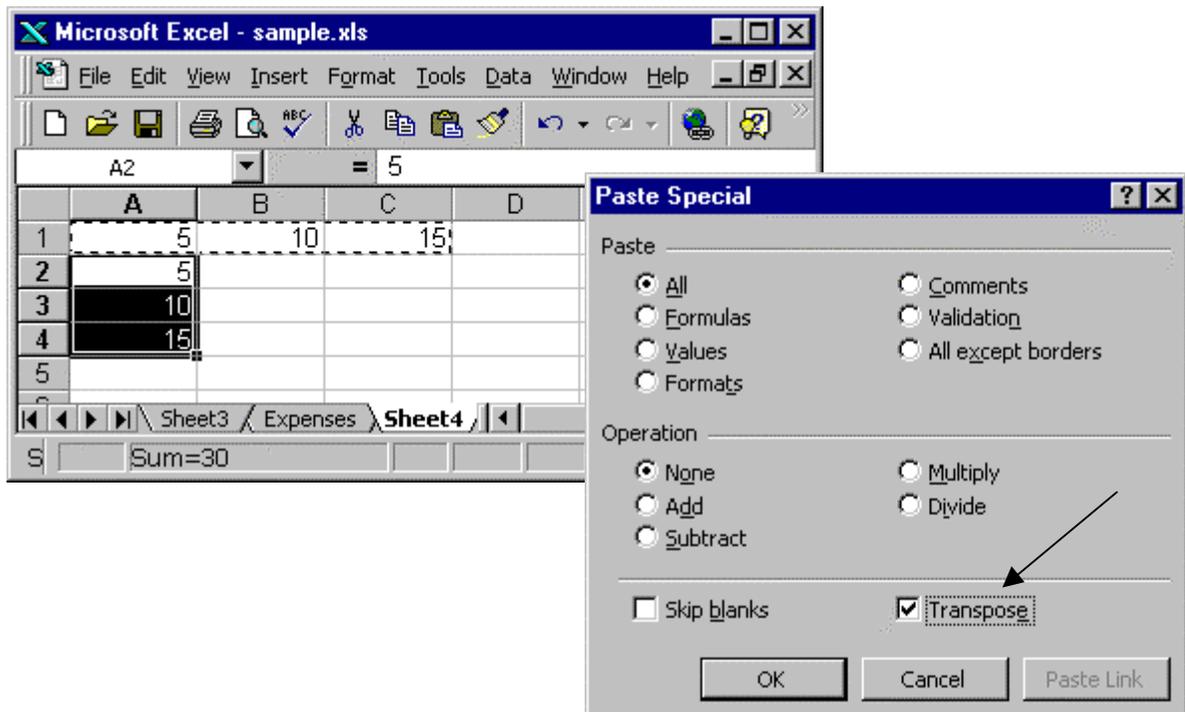
Another very useful ability of *Paste Special* is calculations, available in the *Operation* segment of the dialog. In the example above, each cell in the range D1:D5 contained 1 before copying from B1:B5 and using the *Paste Special, Add* option.

Transposition

You may have data entered in a spreadsheet that you want to transpose. In the example below, three values are entered in Row 1.



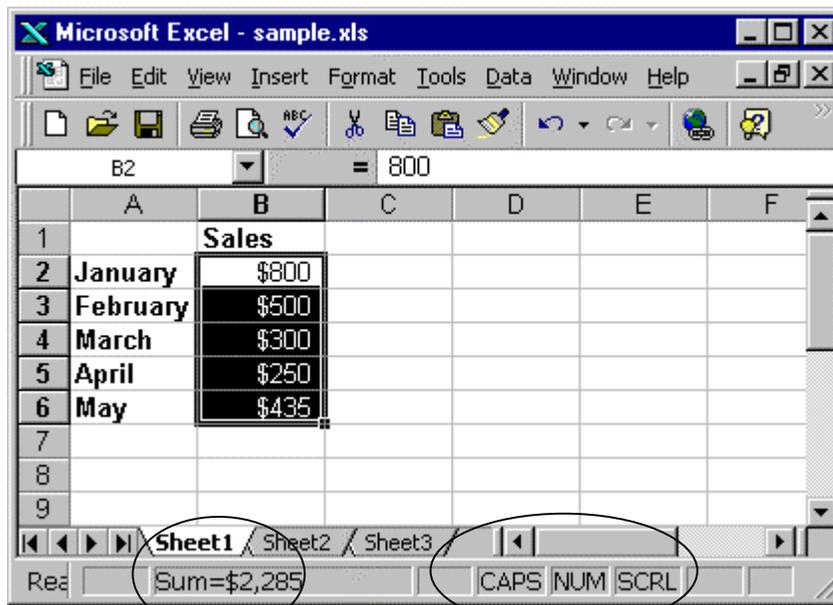
To copy these values and transpose them to column format put the values on the Windows Clipboard with the *Copy* command. Select the columnar range you want the copy to fill. Then select *Edit, Paste Special* and in the *Paste Special* dialog click the *Transpose* box.



III. Getting Basic Information

The Status Bar

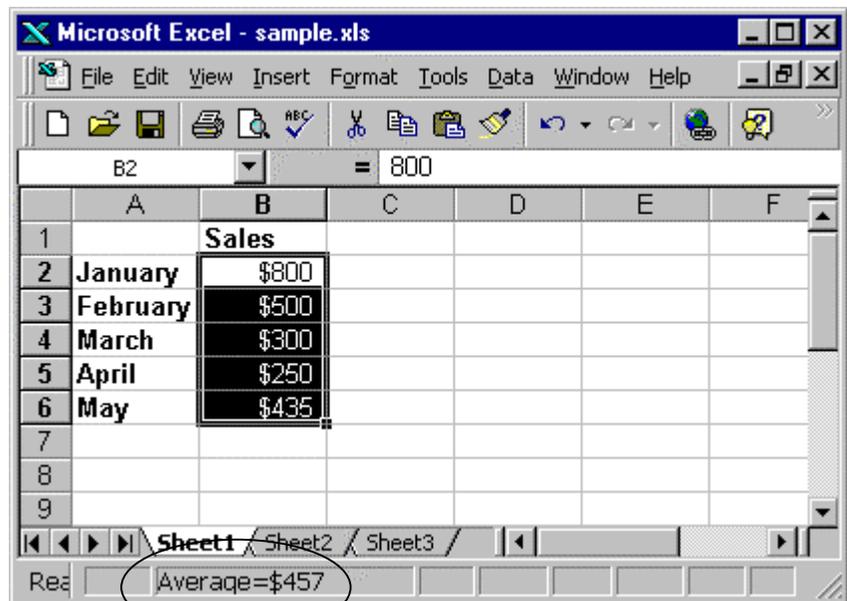
Located across the bottom of the Excel workspace, the Status Bar provides information about the current work environment. In the illustration below, the status bar shows CAPS, NUM, and SCRL to indicate that the Caps Lock, Num Lock, and Scroll Lock keys are on.



In addition, the Status Bar can provide “on-the-fly” information about data in your spreadsheet.

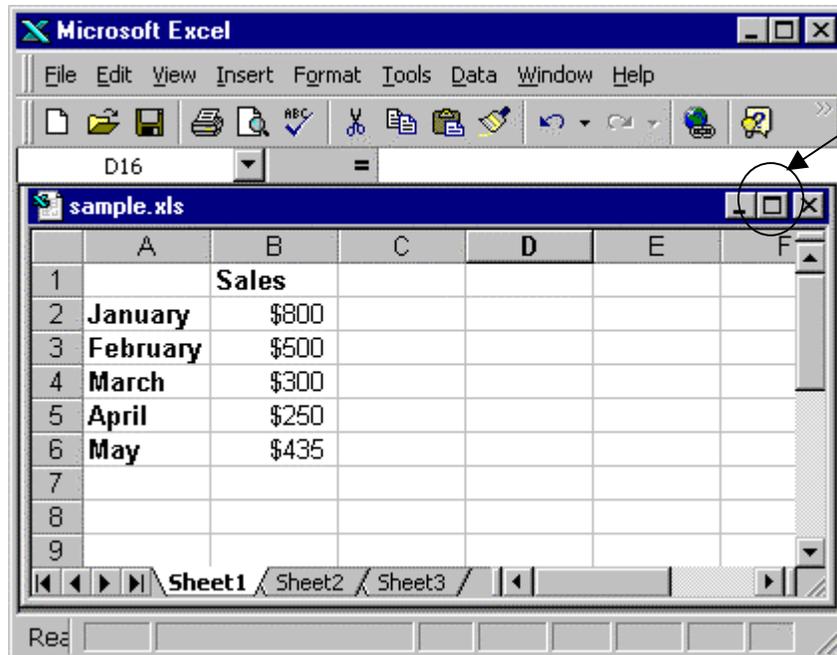
For example, if you highlight a range of numbers the Status Bar reports the sum of those numbers.

Right-clicking the sum report on the Status Bar displays a drop-down list of other calculation options: Average, Count, Count Nums, Max, and Min.



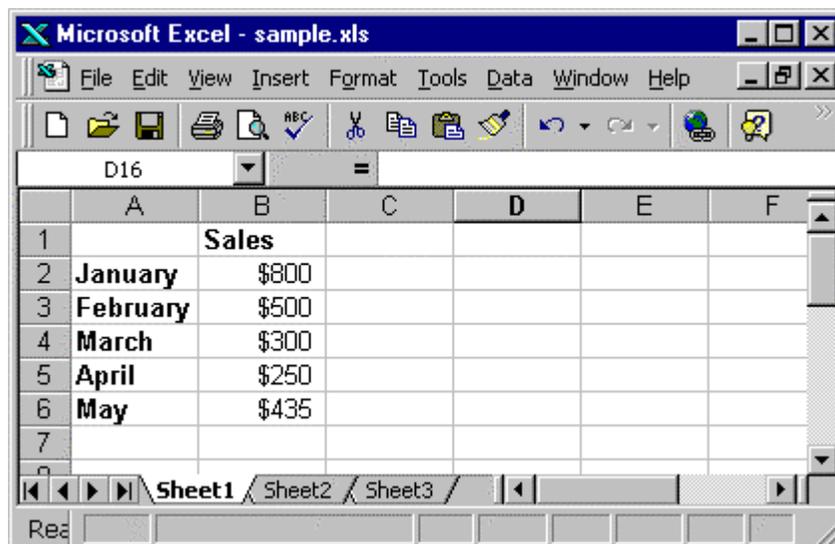
The Title Bar

The Excel workspace has a title bar and each workbook document you open also has a title bar. You can display them separately or together.



In the illustration above, the workbook is displayed in its own document window within the Excel workspace. The workbook has a title bar with the title sample.xls. The workspace has its own title bar with the title Microsoft Excel.

Clicking the middle "expand" button at the upper-right-hand corner of the spreadsheet expands the sample.xls document so it shares a title bar with the Excel workspace. If you're working with a single worksheet visible at a time, this option gives you more viewing space. The combined title bars look like this:



Online Help

Excel has extensive online help with a variety of access methods. You can get online help from within dialog boxes, via the menus, or courtesy of the Office Assistant.

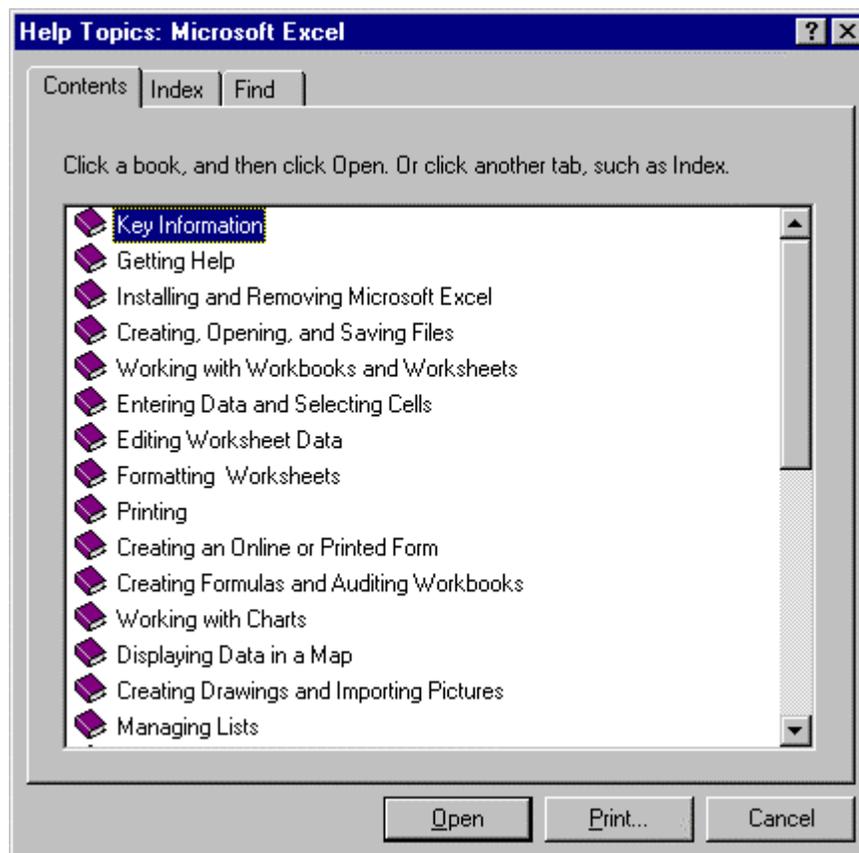


Click the Help Button on the Standard Toolbar (or hit F1) to “open” the Office Assistant, who appears in a small window of his own. Click the Office Assistant to open a space in which to type a question or term you want help with. Depending on the state of your spreadsheet when you invoke the Office Assistant, the Assistant may suggest some help topics.



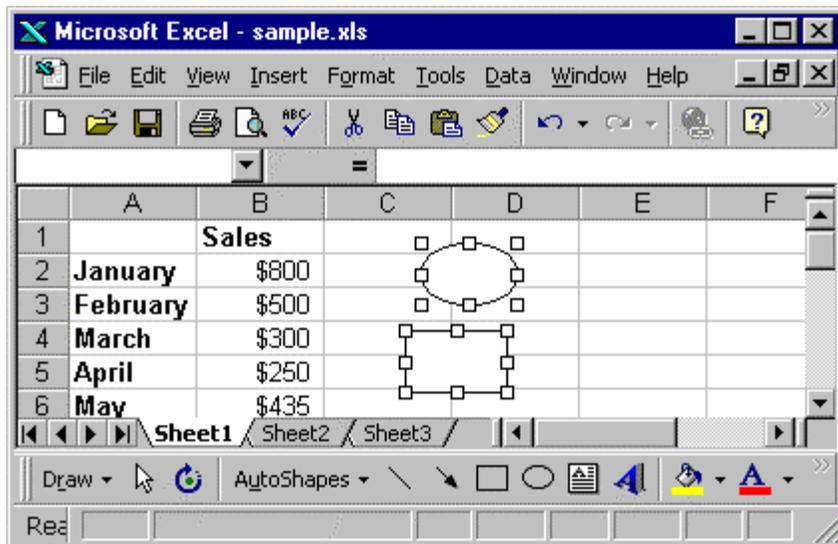
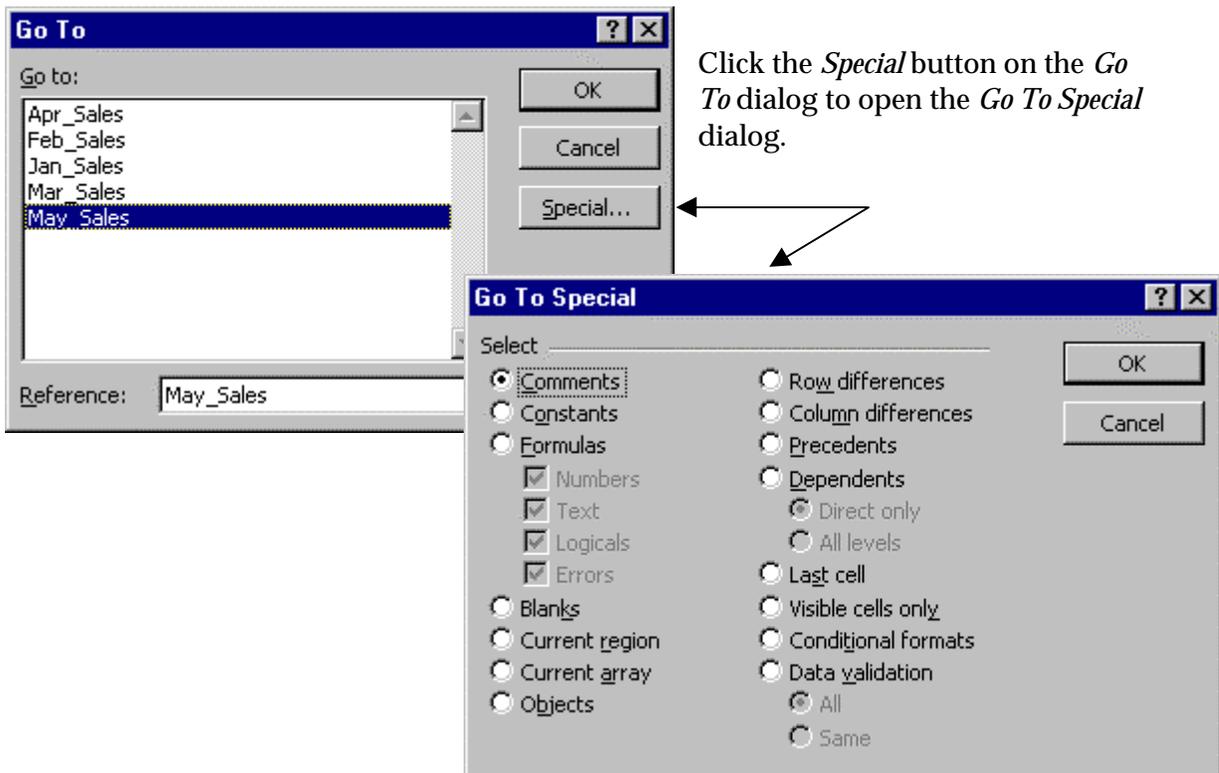
Clicking *Help* on the menu and selecting *What's This?* (or hitting Shift+F1) turns the mouse pointer into an arrow with a question mark. Point to whatever object in the workspace you want more information about to get a pop-up description of that object.

Clicking *Help* on the menu and selecting *Contents and Index* opens the most ‘heavy-duty’ help option. The dialog below has 3 tabs: Contents, Index, and Find. Each provides a different way to access the online help system.



Go to particular objects or types

Excel's *Go To* feature provides a quick way to move to a certain location in a worksheet as well as a way to quickly select a cell or range. An advanced option of this feature provides for identifying particular objects or types in the worksheet. Click *Edit, Go To* or hit F5 to open the *Go To* dialog.



For example, in the illustration at left there are two drawn objects on the worksheet: a square and a circle.

Edit, Go To, Special, Objects, OK directs Excel to select all the objects on the open worksheet.

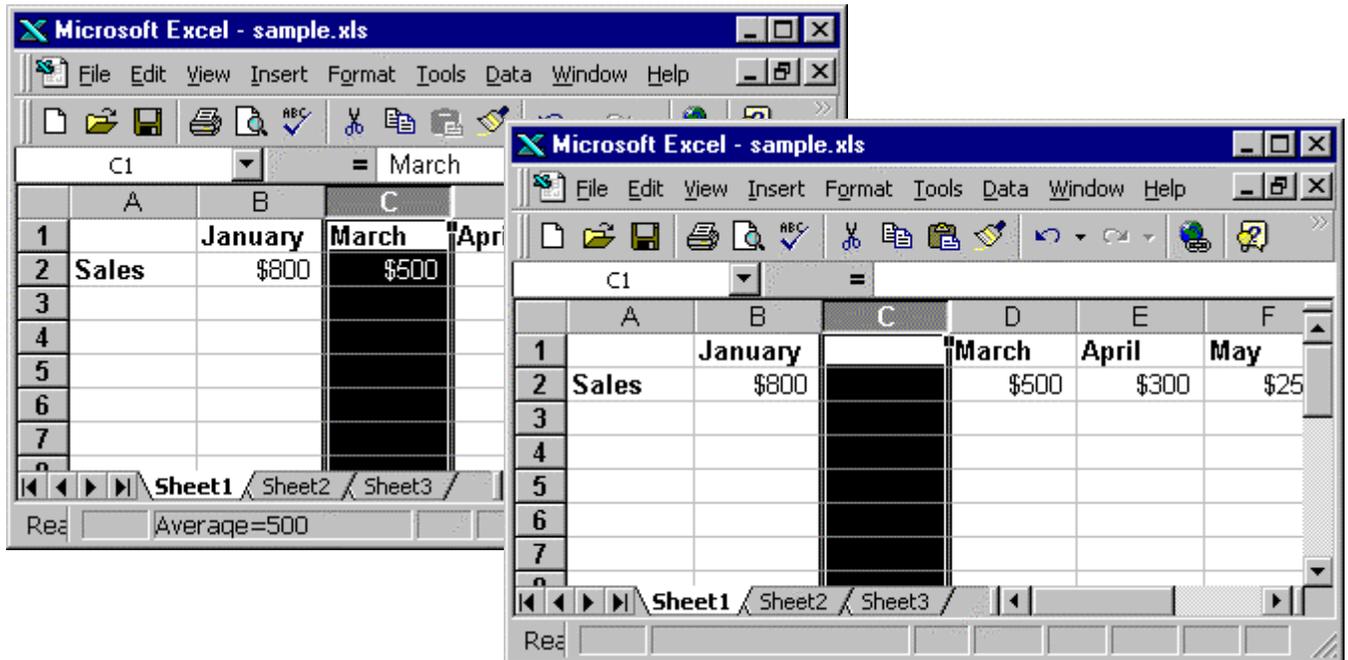
Selection is indicated by the empty selection boxes appearing at the sides and corners of each object.

IV. Arranging & Viewing the Worksheet

Adding & deleting rows and columns

Excel makes it easy to rearrange a worksheet. Along with dragging data ranges to move them, you can add or delete rows and columns.

In the illustration below, add a column for February data by clicking the Column C header to select it (the entire column appears in reverse video) and selecting *Insert, Column* from the menus. Excel inserts a new, empty column to the left.



Inserting a row works in a similar fashion. The new row is inserted above the row whose header you selected.

Delete a row or column by selecting its header and choosing *Edit, Delete* from the menus.

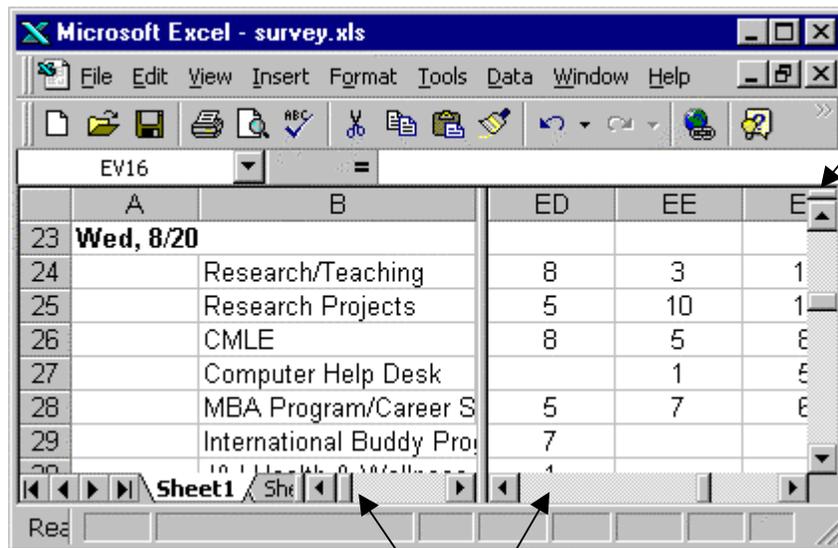
Add multiple rows or columns at the same time by selecting more than one row or column header before choosing *Insert, Row* or *Insert, Column*.

Delete multiple rows or or multiple columns at the same time by selecting their headers before choosing *Edit, Delete*. If your selections aren't contiguous, hold down the Control key as you select them. Because you can't delete overlapping selections you must delete rows and columns in separate operations.

One- and two-way splits

A common situation is to have a large amount of data in a worksheet and to lose the view of the data headers when scrolling down or across the data. Excel provides a way for you to “fix” headers in place so they always remain visible.

In the illustration below, headers to the left of a spreadsheet survey data have been fixed in place. This is accomplished by using the mouse to drag the vertical “split box” into place. A horizontal split box is also available and works the same way.



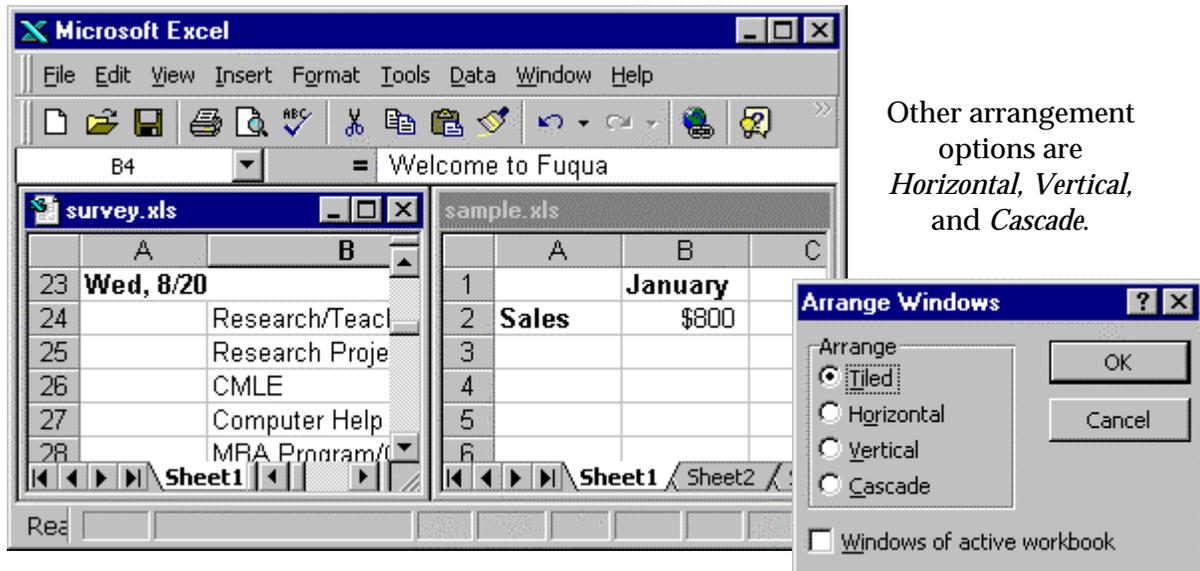
If you choose, you can have both the vertical and horizontal splits in operation at the same time. (The menu commands *Window, Split* also turn on a vertical and horizontal split.) Double-click a split to return it to its docked position in the document window.

Note that in the illustration above there are now two horizontal scroll bars at the bottom of the document window, one for each side of the split. Adding a horizontal split would result in the display of two vertical scroll bars. A double split would result in four scroll bars, two horizontal and two vertical.

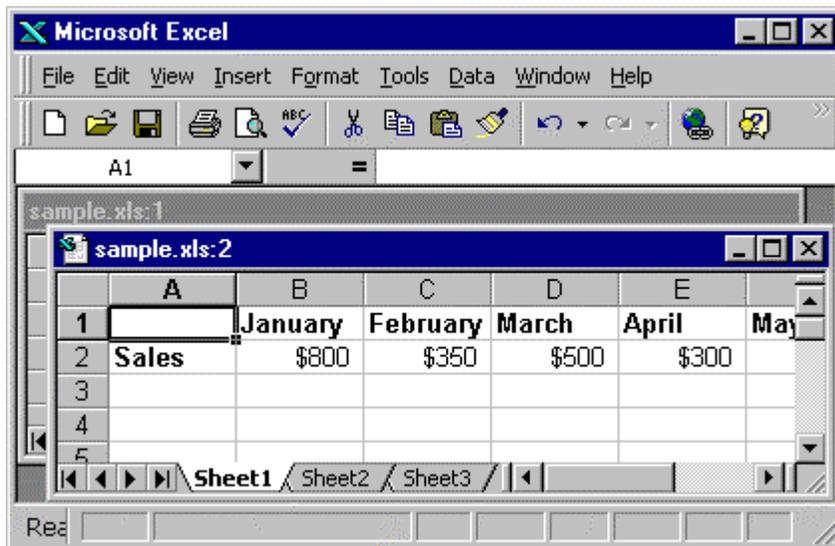
Viewing multiple windows (and moving between them)

You can open multiple window views of the same worksheet or open and view sheets from several different workbooks at the same time.

The illustration below shows two separate workbooks both open and visible at the same time in the Excel workspace. Accomplish this with the commands *Window, Arrange, Tiled*.



Use the command *Window, New Window* to open multiple views of the same worksheet. Then use the *Window, Arrange* command to position them in the workspace.



Click anywhere in a window view to make that window current. You can tell which window is current because its title bar is highlighted and it has the scroll bars.

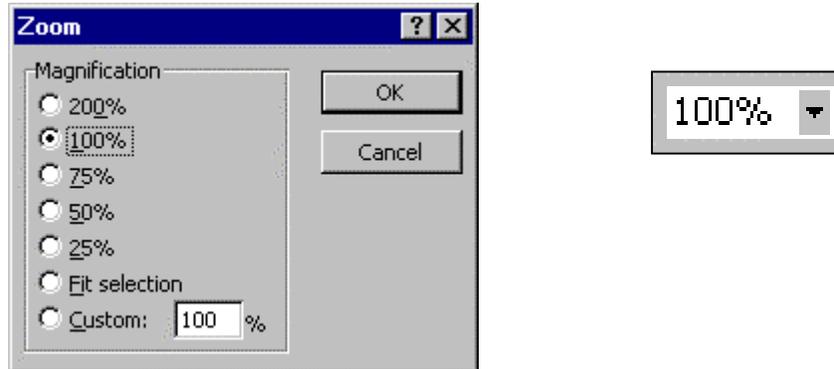
Moving & selecting: power keyboard techniques

Although you can use the mouse to move anywhere and select anything in a worksheet it's often more efficient to leave your hands on the keyboard rather than switching back and forth between the keyboard and the mouse. Here are some of the most useful keyboard options for moving and selecting.

To accomplish this	Use these keys
Return to the upper left-hand cell of the worksheet (A1).	Control+Home
Move to the edge of the current data region.	Control+ arrow key
Move to the beginning of a row.	Home
Move to the last cell on the worksheet (at the intersection of the right-most used column and the bottom-most used row in the lower-right corner).	Control+End
Move up/down/left/or right one screen.	Page up/down/left/or right
Move to the last nonblank cell in the same column or row as the active cell.	End + arrow key
Select and extend the selection to the last nonblank cell in the same column or row as the active cell.	Control+Shift+ arrow key
Select the entire column.	Control+Spacebar
Select the entire row.	Shift+Spacebar
Select the entire worksheet.	Control+a
If you have more than one workbook open at the same time, switch to a view of the next workbook document.	Control+F6

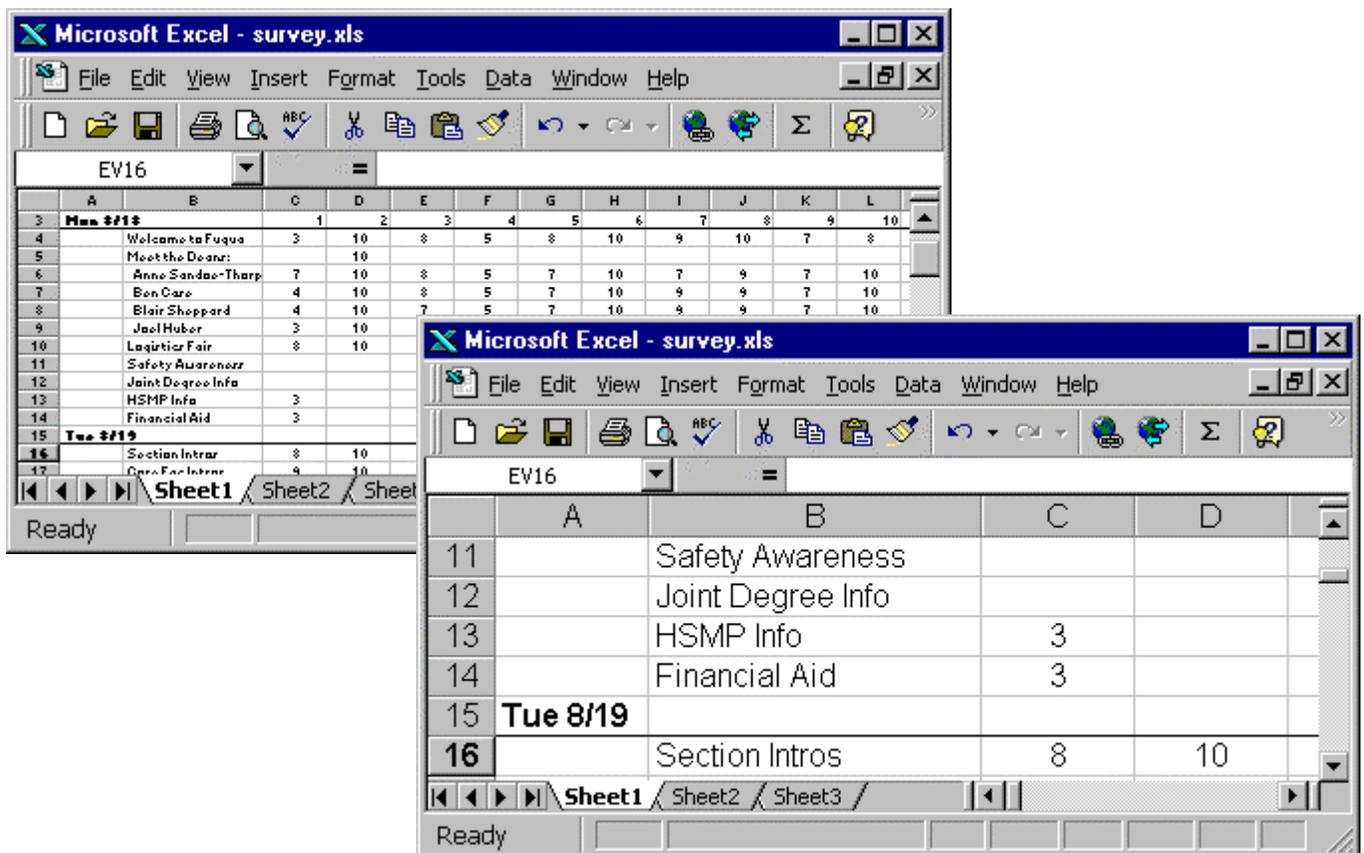
Zoom

Excel's zoom option lets you adjust your view of the worksheet in or out. Adjust either with the menu *View, Zoom* or by clicking the Zoom tool on the Standard Toolbar.



The default is 100%.

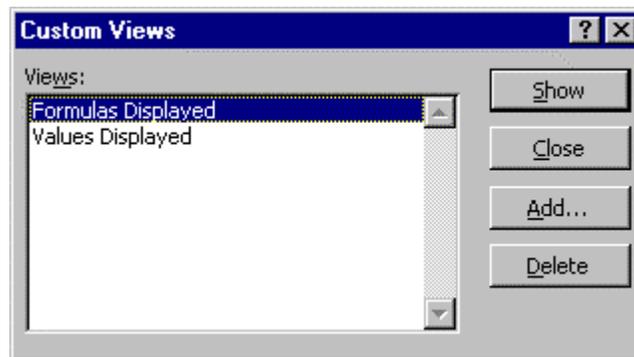
Zoom out to get a good overview of a worksheet's layout. Zoom in when your eyes are tired or you're working with graphical objects or an exacting layout.



Custom views

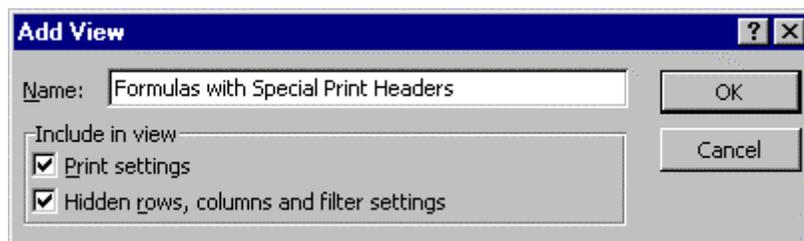
Excel lets you save the current appearance of a worksheet or workbook in a special “view” so you need not change the layout and print settings every time you view or print the sheet or book.

To create a view, start by setting up the worksheet or entire workbook to appear the way you want to view and print it. Then select *View, Custom Views* from the menus to open the *Custom Views* dialog box.



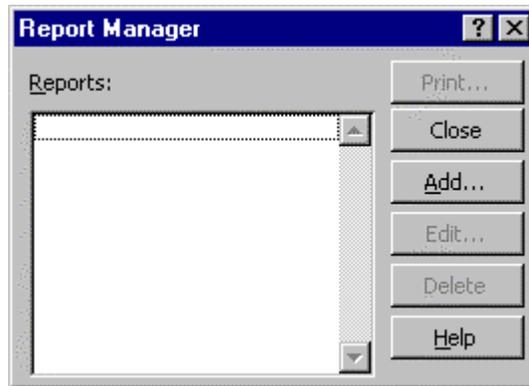
Any views already created are listed in the *Views* box. Select a view in the list and click the *Show* button to have Excel display that saved view.

To add a new view to the workbook, click the *Add* button and complete the *Add View* dialog.

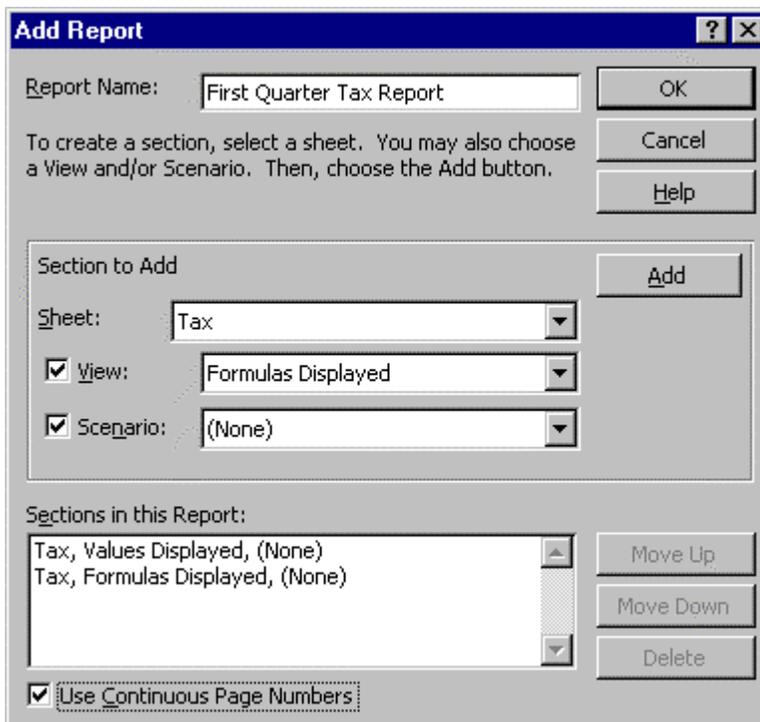


Combining views & scenarios: The Report Manager

Excel's Report Manager lets you combine any combination of saved views and modeling scenarios into a report that you can print. Access the Report Manager by choosing *View, Report Manager²* from the menus.



To add a new report click the *Add* button and enter a name for the report in the *Report Name* box that displays. Click *Add*.



In the Sheet box, click the sheet you want for the first report section.

In the View box, click the view (if any) you want for the first report section.

In the Scenario box, click the scenario (if any) you want for the first report section.

To add another section to the report click *Add*.

Repeat until you've created all of the sections you want in the report.

Excel prints the sections of a report in the order in which they're listed.

² If the Report Manager isn't available, select *Tools, Add-ins* and add it as an option to your Excel configuration.

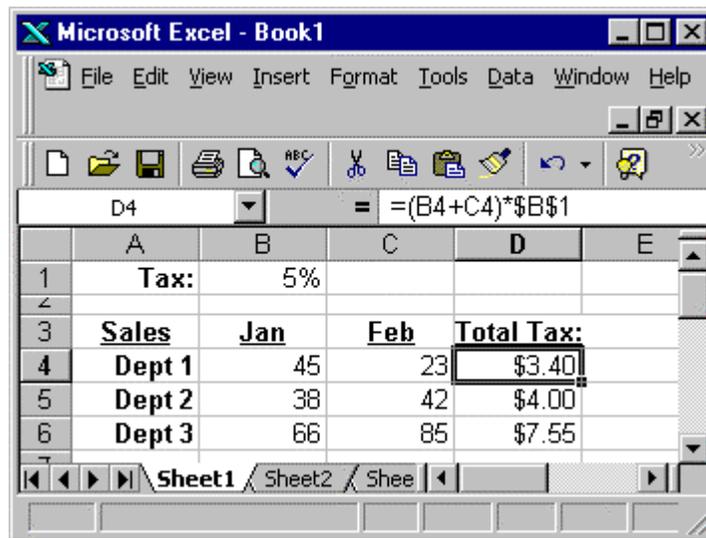
V. Calculations

Recommendations

Calculations express relationships between values, both known and variable. Avoid using numbers (actual data) in Excel formulas. Instead use cell references that point to cells that hold the data. By keeping each data item in a unique location in the worksheet you can much more easily change an item if necessary and have the change be reflected wherever the item is used throughout the worksheet.

In the illustration below a tax rate value is stored in Cell B1. The calculations in Column D all use that tax rate value. Instead of including the actual value of 5% in the formulas, a reference to that cell is made. The formulas in Column D are:

$$=(B4+C4)*\$B\$1$$
$$=(B5+C5)*\$B\$1$$
$$=(B6+C6)*\$B\$1$$



Should the tax rate change from 5% to 6% only the value in the tax rate cell, B1, must change. The formulas that use the tax rate refer to the cell, so they need not be changed.

Copying formulas: relative and absolute addressing

You may often want to use the same formula in one or more places in a worksheet. It's most efficient to build the formula one time and then copy it to the other locations where you need it. If you copy a formula, you must understand Excel's relative and absolute addressing.

For copied formulas Excel uses relative addressing as the default. That is, Excel adjusts the cell references in your source formula when the formula is copied to a new location.

In the illustration at left below, the formula in Cell D4 is used to calculate the total sales in January and February for Dept 1: $=B4+C4$. We need the same basic formula in Cells D5 and D6 for Depts 2 and 3. Although we could enter two new formulas, it's easier to copy the formula in D4 to these locations.

The top screenshot shows a Microsoft Excel window titled "Microsoft Excel - Book1". The active cell is D4, containing the formula $=B4+C4$. The worksheet data is as follows:

	A	B	C	D
1	Tax:	5%		
3	Sales	Jan	Feb	Total Sales:
4	Dept 1	45	23	\$68.00
5	Dept 2	38	42	
6	Dept 3	66	85	

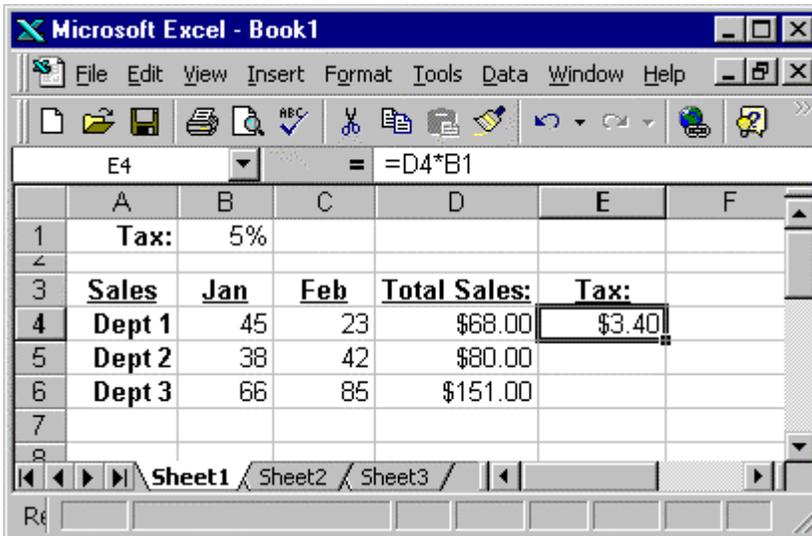
The bottom screenshot shows the same Excel window, but with the formula copied to cells D5 and D6. The resulting formulas are $=B5+C5$ and $=B6+C6$ respectively. The total sales for Dept 1 is now \$299.00.

	A	B	C	D	E
1	Tax:	0.05			
3	Sales	Jan	Feb	Total Sales:	
4	Dept 1	45	23	$=B4+C4$	
5	Dept 2	38	42	$=B5+C5$	
6	Dept 3	66	85	$=B6+C6$	
7					
8					
Row				Sum	=\$299.00

Point with the mouse to the "fill box" at the lower right-hand corner of Cell D4 and drag down through Cells D5 and D6 to copy the formula.

For each copied formula, Excel automatically adjusted the cell references to refer to the data in the correct row. This is Excel's default mode when copying formulas. It's known as relative addressing.

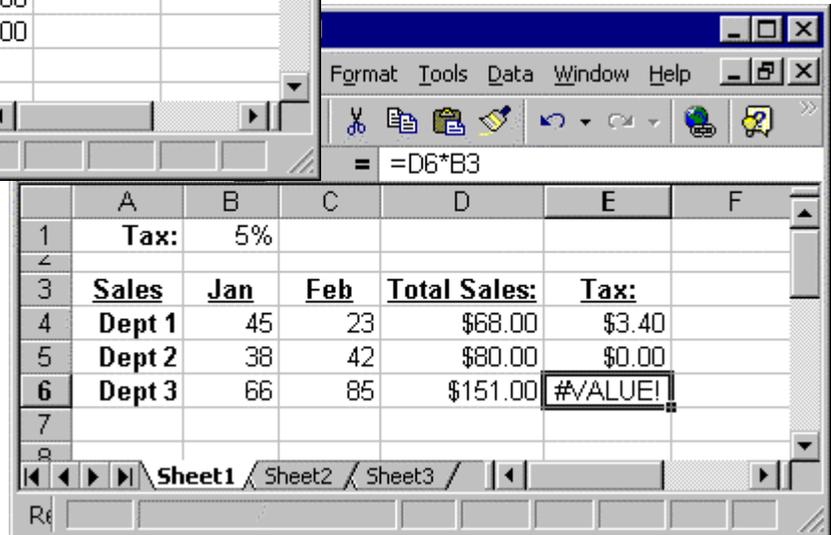
There may be occasions when you want to override Excel's relative addressing default. In the example below, the formula in Cell E4 (in the Tax column) multiplies the Dept 1 Total Sales value (Cell D4) and the 5% value (Cell B1). The result is correct for this row.



However, if we copy the formula in E4 down to E5 and E6 for Depts 2 and 3, the result for those rows is *not* correct.

In the absence of any other instruction, Excel has again used relative addressing in the formula copy. The formulas in Cells E5 and E6 read as follows:

=D5*B2
=D6*B3

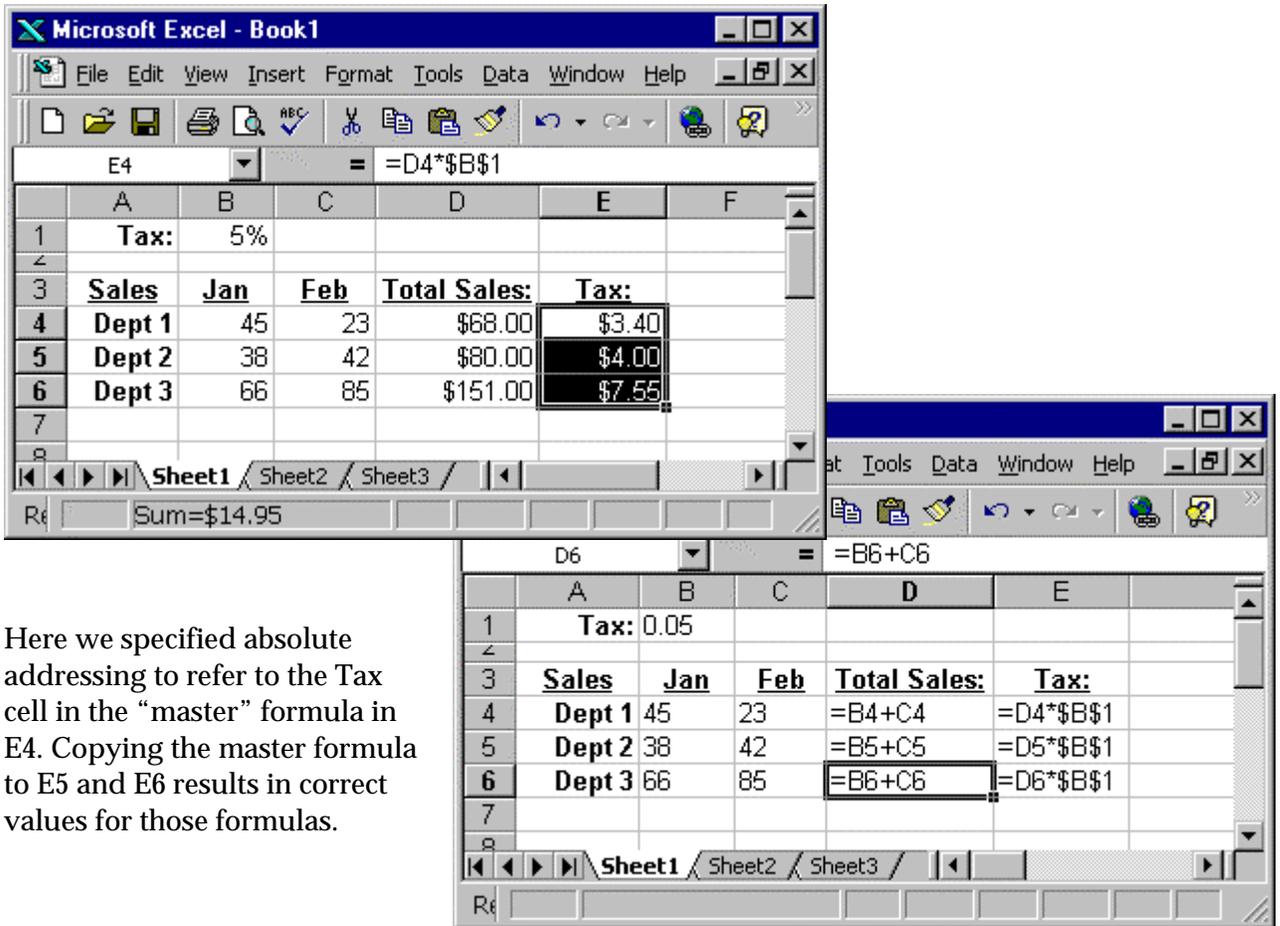


The first reference in each of these formulas is OK. We *do* want the copied formulas to refer to the Total Sales values for their respective rows (Cells D5 and D6). The problem is with the reference to Tax in Cell B1. The master formula in Cell E4 correctly reads **=D4*B1**. But the copied formula in E5 refers to Cell B2 (an empty cell), resulting in a calculation of \$0.00. And the copied formula in E6 refers to Cell B3 (which holds the text value "Jan"), resulting in a #VALUE! error statement.

To make sure the copied formulas in this case refer to the correct Tax cell we need to use absolute addressing for the reference to Tax. Absolute addressing in a formula fixes the reference to a cell no matter where the formula is copied. Absolute addressing can apply to a single cell, a range of cells, or to one, several, all, or none of the cells referred to in a formula.

Specify absolute addressing with a dollar sign (an arbitrarily selected symbol) before the row reference and the column reference. For example, a relative reference in a formula to the Tax value in Cell B1 is written as **B1**. An absolute

reference in a formula to the Tax value is written as **\$B\$1**. (It's also possible to "fix" just the row but not the column by writing **B\$1** or just the column and not the row by writing **\$B1**.)

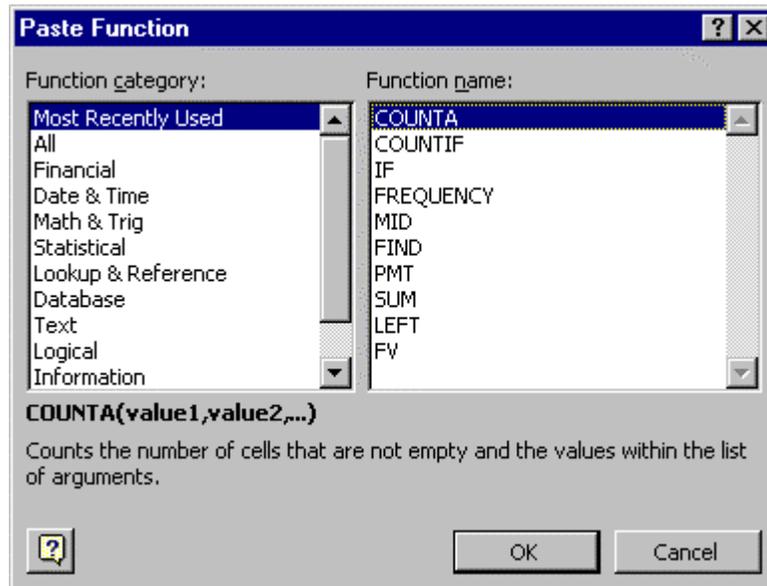


Here we specified absolute addressing to refer to the Tax cell in the "master" formula in E4. Copying the master formula to E5 and E6 results in correct values for those formulas.

Tip: When positioned over a cell or range reference on the formula bar, the F4 key cycles through the four addressing options: completely relative, completely absolute, absolute row but not column, and absolute column but not row. That is: **B1**, **\$B\$1**, **B\$1**, and **\$B1**.

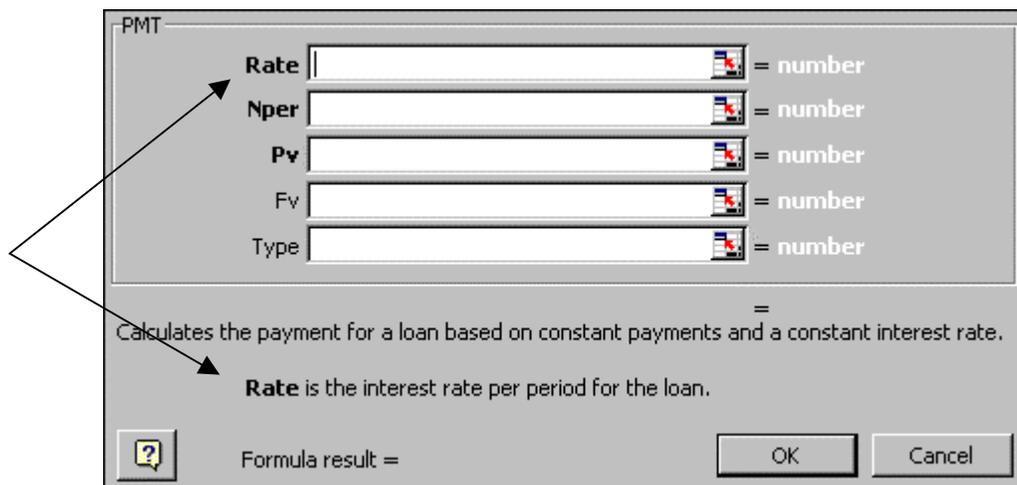
Using built-in functions

Excel includes a large number of built-in formulas, called functions. If you already know a function you can enter it directly in your worksheet. Otherwise, click the *Function* button on the Standard Toolbar or choose *Insert, Function* from Excel's menus to open the *Paste Function* dialog.



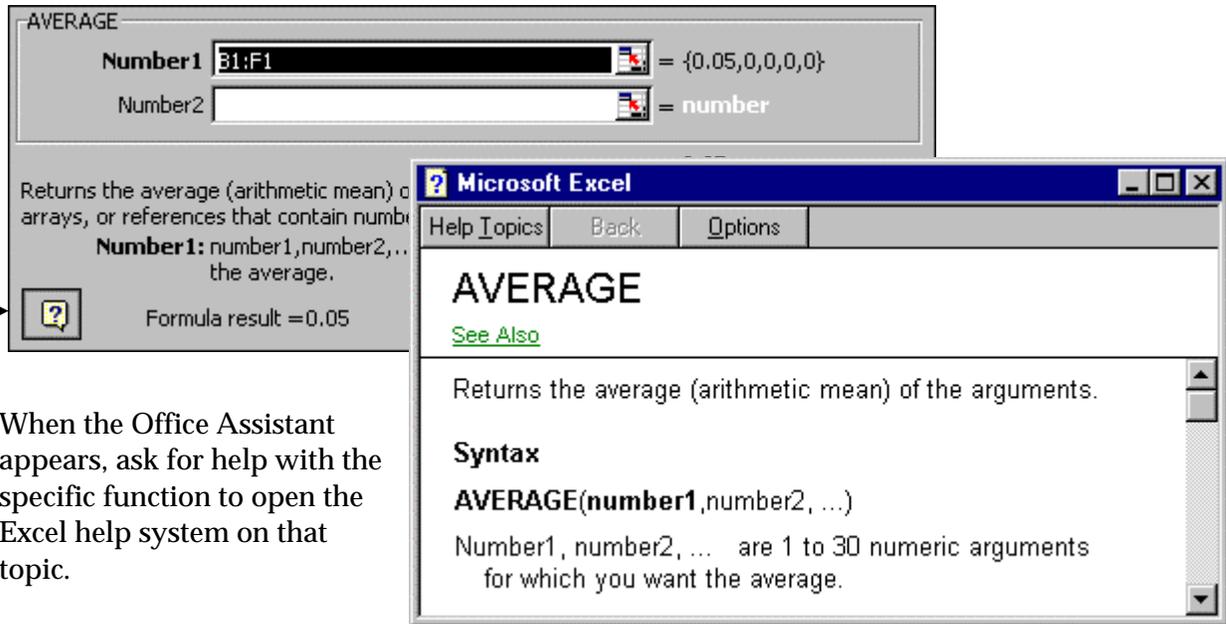
The left-hand side of the dialog displays the various categories of functions. Click a category to see the list of functions in that category in the list at right. Click a particular function in the list at right and click the *OK* button to open a dialog that will help you complete that particular function.

For example, selecting the Financial category and the PMT function opens this dialog. For whatever box your insertion point is in, a description is displayed.



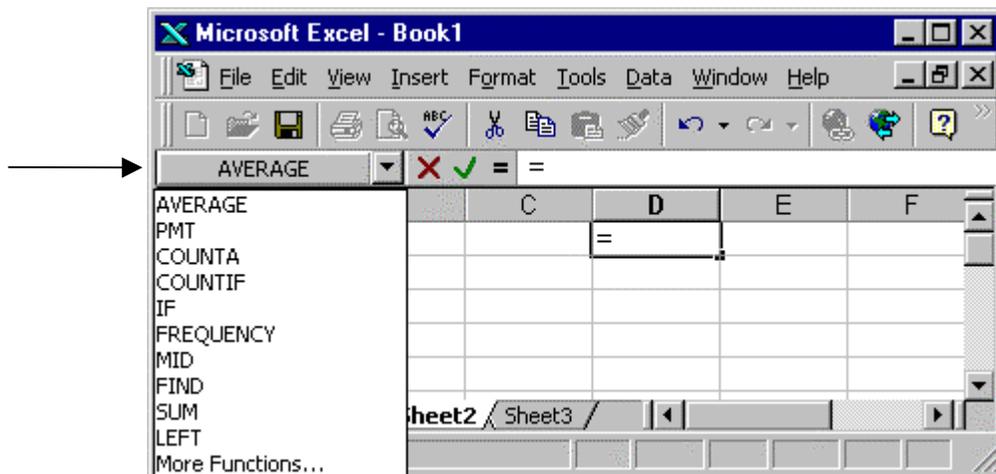
Excel remembers the functions you last used and groups them in a category named *Most Recently Used*. If you're not sure what category a function you want might be in, select the *All* category. All the functions will be listed in the box at right in alphabetical order.

When you're working with the dialog for a specific function you can get more help about that function by clicking the online help box at the lower left-hand corner of the dialog.



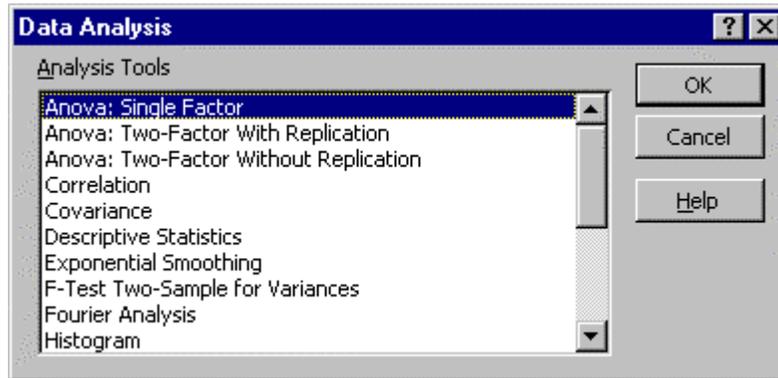
When the Office Assistant appears, ask for help with the specific function to open the Excel help system on that topic.

Tip: Another way to access Excel's functions is to start entering a formula by typing an equals sign and then using the drop-down list of functions that appears in the Name Box on the Formula bar.



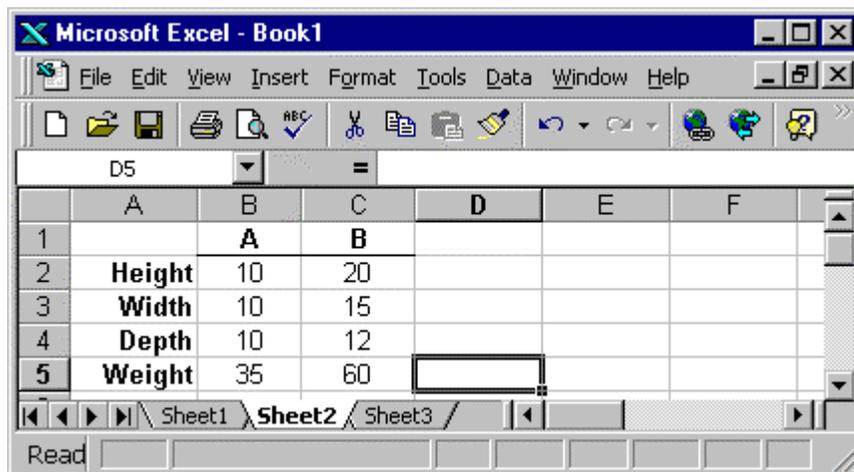
Analysis Toolbox

Excel includes a set of data analysis tools called the Analysis ToolPak that you can use to save steps when you develop complex statistical analyses. The commands *Tools, Data Analysis*³ open the *Data Analysis* dialog that displays the list of statistical tools.



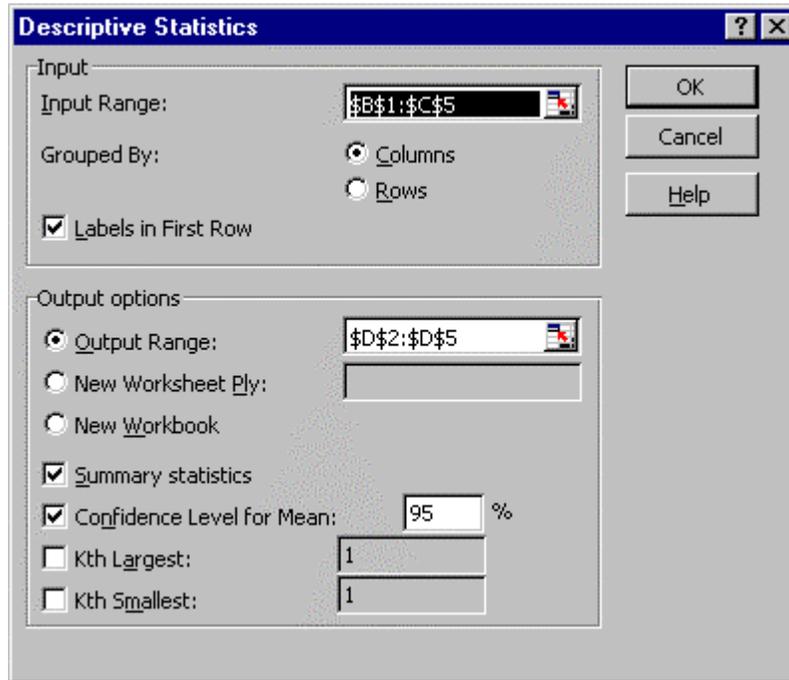
Select a tool from the list and then provide the data and parameters (if necessary) for the analysis. The tool displays the results in an output table. Some tools generate charts in addition to output tables.

For example, to use the *Descriptive Statistics* tool, first assemble the data to analyze on your worksheet.



³ Excel's Analysis Tools are an add-in. If they're not available in your installation of Excel, click *Tools, Add-Ins* and select *Analysis Toolpak*. If the Analysis Toolpak isn't an option, rerun Excel's setup program.

Invoke the *Descriptive Statistics* tool from the Analysis Toolpak. A dialog specific to that tool opens.



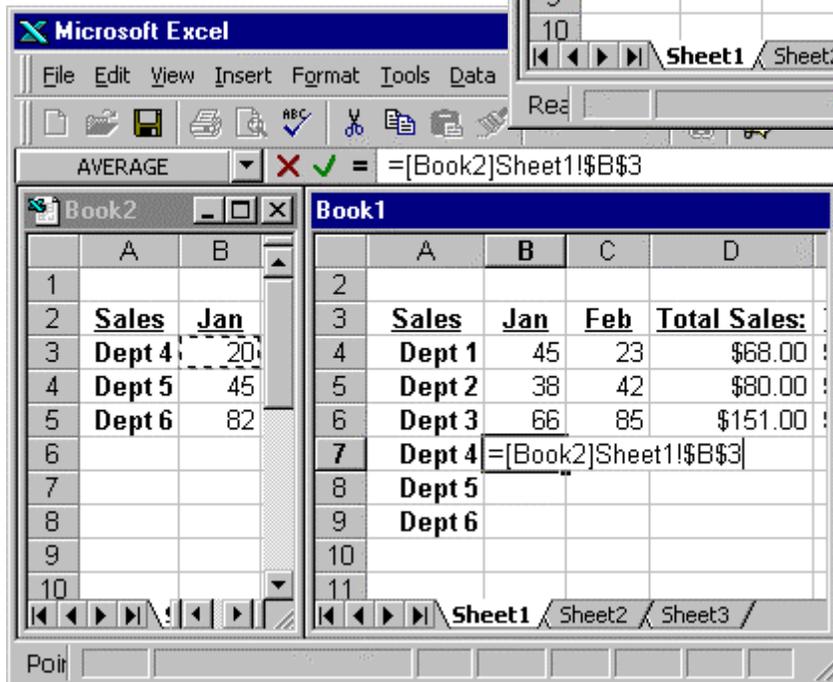
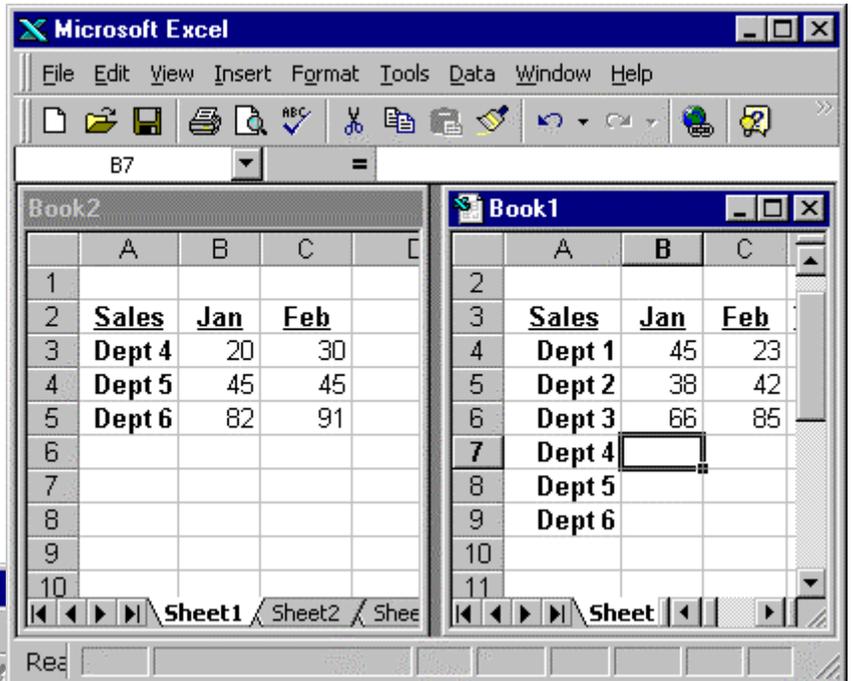
Complete the dialog and click *OK* to let the tool generate results. In the illustration above, we specified an output range in the same worksheet for the results data.

	D	E	F	G
2	A		B	
3				
4	Mean	16.25	Mean	26.75
5	Standard Error	6.25	Standard Error	11.20547
6	Median	10	Median	17.5
7	Mode	10	Mode	#N/A
8	Standard Deviation	12.5	Standard Deviation	22.41093
9	Sample Variance	156.25	Sample Variance	502.25
10	Kurtosis	4	Kurtosis	3.556005
11	Skewness	2	Skewness	1.872864
12	Range	25	Range	48
13	Minimum	10	Minimum	17

Referencing across sheets or books

When you work on a model you may have occasion to want to refer to a cell or range that's located in another worksheet or even in another workbook. Excel provides a means of doing this.

In this illustration two related but separate workbooks are open. The one at right holds sales data for Departments 1-3. The one at left holds sales data for Departments 4-6.



To copy the data for Dept 4 January sales from Book 2 into Book 1:

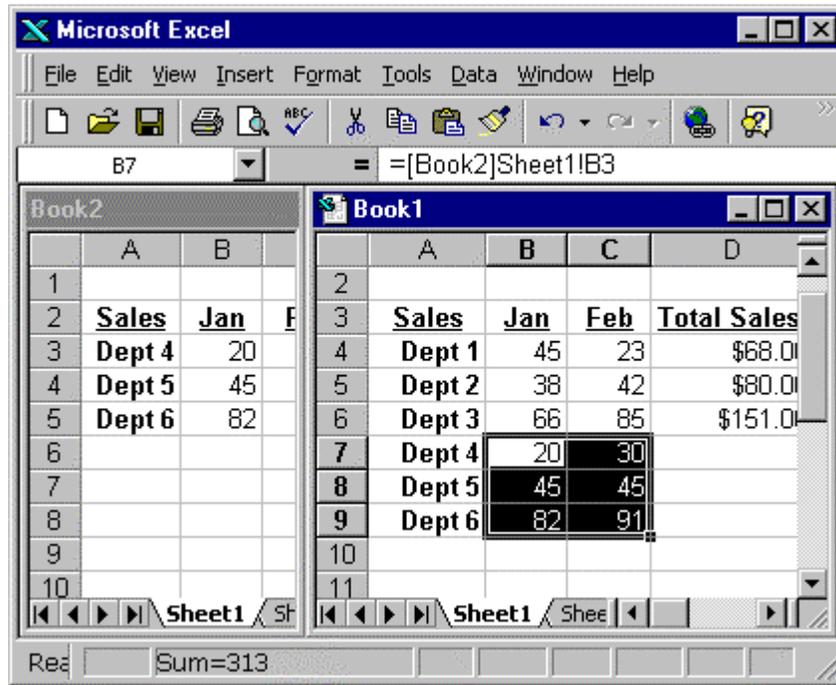
1. Open both books and arrange them side by side.
2. Click in Cell B7 in Book 1 and enter an equals sign to begin a formula.
3. Click the cell whose data you want (B3) in Book 2.
4. Hit the enter key.

A reference to a cell or range in another workbook (an “external reference”) has this format:

= [WorkbookName]SheetName!CellReference

With the method above you point at the cell you want in the other workbook and let Excel build the external reference for you. If you prefer, you can enter the reference yourself. And the other workbook need not be open.

Note that if you make the reference to another workbook cell a *relative* reference (not an absolute reference), you can copy the external reference to adjacent cells. The copies in the adjacent will also be external references, but relative.



In the example above, we wrote a formula to make Cell B7 in Book1 an external reference to Cell B3 in Book 2. The contents of Cell B7 is `= [Book2]Sheet1!B3`. Then we used the Cell B7's fill box to drag and fill the rest of the Jan/Feb Dept 4-6 data ranges. Each cell in the range is an external reference to a cell in Book2, relative to the location of the first copied cell, Cell B3.

A reference to another sheet in the *same* workbook has this format:

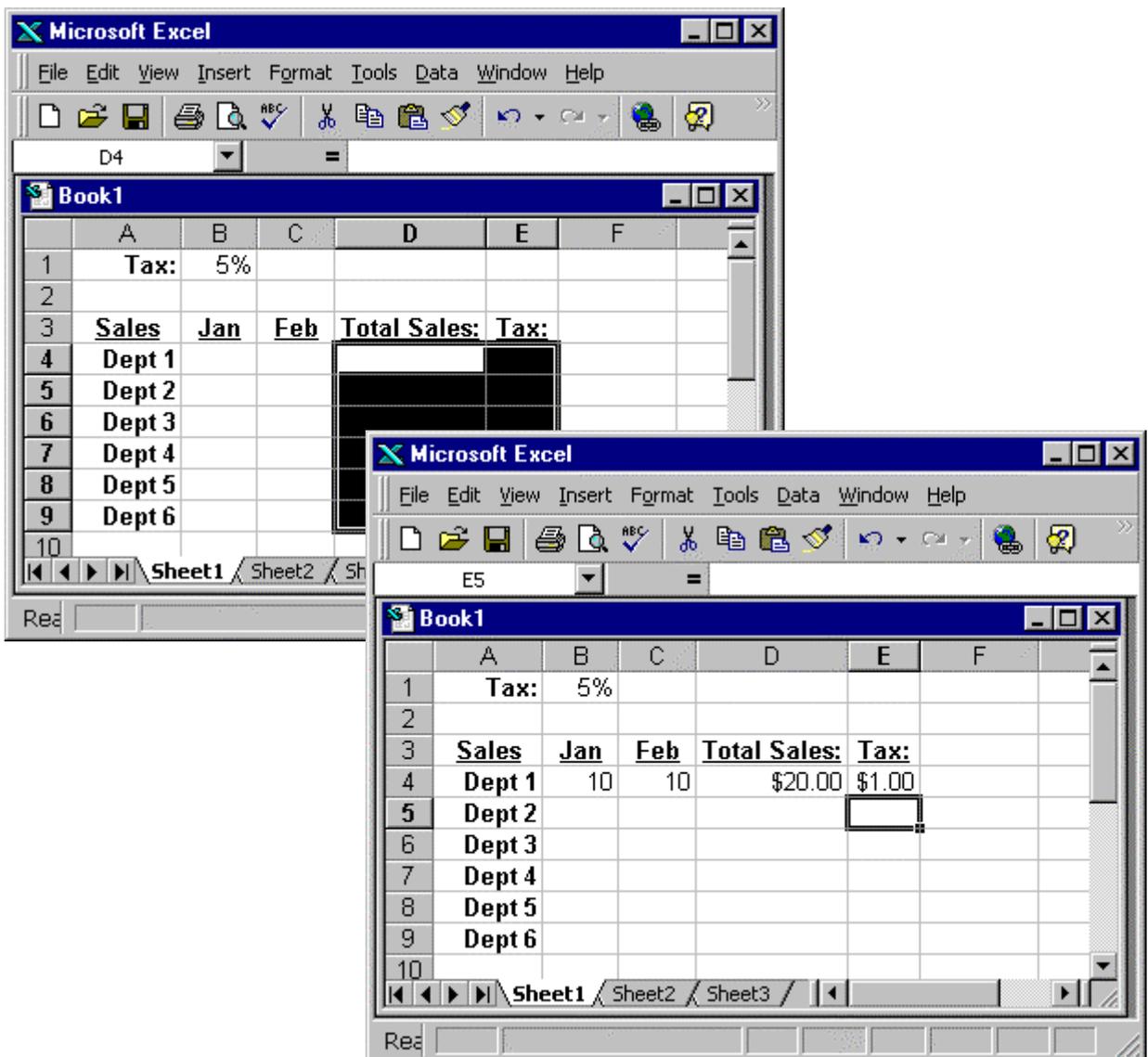
=SheetName!CellReference

VI. Debugging

Testing your model (with small numbers)

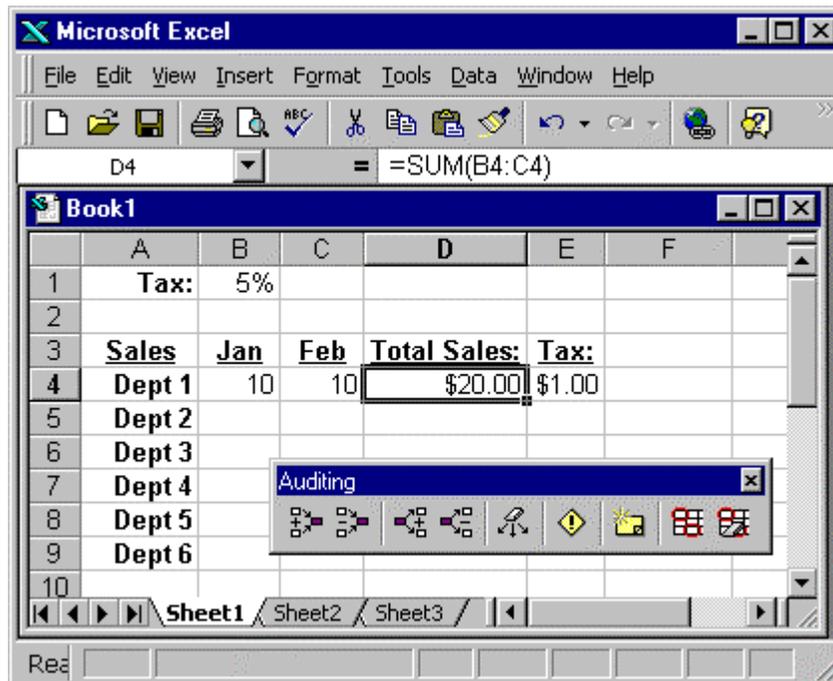
During the process of building a spreadsheet model get in the habit of testing it. It's easiest to spot possible errors if you use small numbers and numbers (say multiples of 10) that are relatively easy to spot check.

For example, enter a few small, simple values in the model below makes it easy to spot any errors in formulas. Then replace the test values with actual values.



Audit features

Excel includes an Auditing Toolbar to help you track how values in your worksheet are related. Turn on the Auditing Toolbar with *Tools, Auditing, Show Auditing Toolbar*.



The four auditing features accessible from the toolbar are trace precedents, trace dependents, trace error, and circle invalid data.

This screenshot shows a trace of precedents for Cell E4. Blue arrows point from the cells containing the values 5% (B1) and \$20.00 (D4) to the cell containing \$1.00 (E4).

	A	B	C	D	E	F
1	Tax:	5%				
2						
3	Sales	Jan	Feb	Total Sales:	Tax:	
4	Dept 1	10	10	\$20.00	\$1.00	
5	Dept 2					

The example above shows a trace of precedents for Cell E4.

This screenshot shows an error trace for Cell E6. Blue arrows point from the cells containing the values 10 (B3), 10 (C3), \$20.00 (D4), and \$20.00 (D5) to the cell containing the error message #VALUE! (E6).

	A	B	C	D	E	F
1	Tax:	5%				
2						
3	Sales	Jan	Feb	Total Sales:	Tax:	
4	Dept 1	10	10	\$20.00	\$1.00	
5	Dept 2	10	10	\$20.00	\$0.00	
6	Dept 3	10	10	\$20.00	#VALUE!	
7	Dept 4					

The example above shows an error trace for Cell E6.

Handling error values

If a formula can't properly evaluate a result, Excel will display an error value. An error value can be the result of using text where a formula expects a numeric value, deleting a cell that's referenced by a formula, or using a cell that's not wide enough to display the result. An error value might not necessarily be caused by the formula in the cell in which the error value displays. For example, if a formula shows #N/A or #VALUE!, a cell referenced by the formula may actually be the source of the error.

Error values and their explanations:

#####

The numeric value or result of the formula entered into a cell is too wide to display within the cell. Resize the column by dragging the boundary between the column headings. This error also displays if you use date arithmetic that results in a negative value. Dates and times in Excel must be positive values.

#VALUE!

Displays when the wrong type of argument or operand is used. For example, if a formula references a text value instead of a number.

#DIV/0!

When a formula divides by zero.

#NAME?

When a formula contains unrecognized text. For example, if a formula references a named cell but the name has been deleted.

#N/A

When a value isn't available to a function or a formula. If certain cells on your worksheet will contain data that isn't yet available, enter #N/A in those cells. Formulas that refer to those cells will then return #N/A instead of attempting to calculate a value.

#REF!

Displays when a cell reference isn't valid. For example, if you delete a cell that a formula refers to the #REF! error message displays.

#NUM!

Displays when a problem occurs with a number in a formula or function. For example, if you use an unacceptable argument in a function that requires a numeric argument, the #NUM! error message displays.

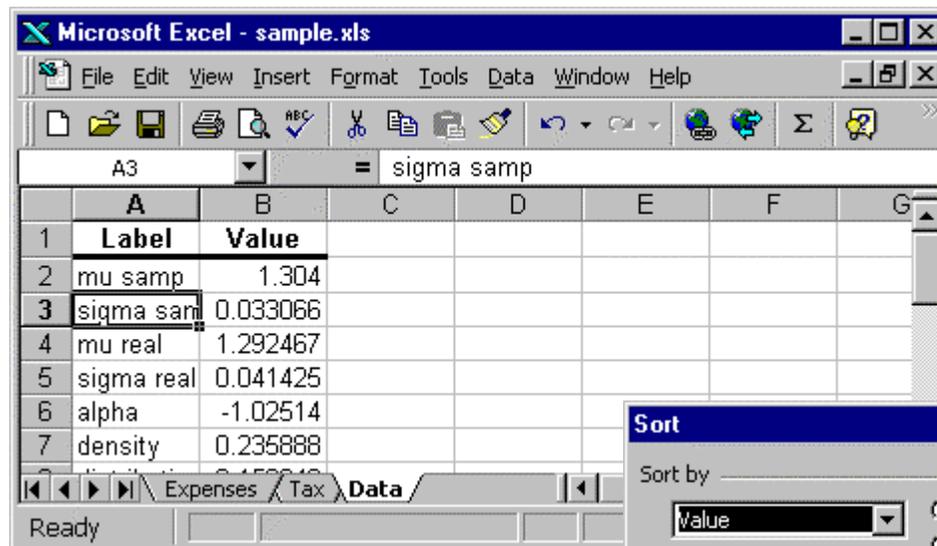
#NULL!

Displays when you specify an intersection of two areas that do not intersect. For example, if you specify a range incorrectly or attempt to use a cell reference to a cell that doesn't exist the #NULL! error message displays.

VII. Data Management Essentials

Sort

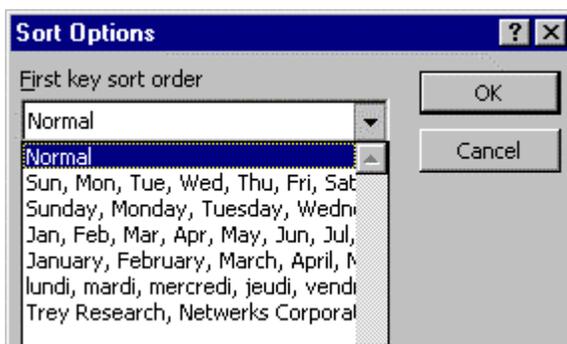
Excel recognizes a list or data set if the data in the list is contiguous, bordered by blank cells or an edge of the worksheet, and has labels that are differentiated in some way from the data. In the example below, the labels are bolded and have a border. To sort a list like this, click any cell in the list and choose *Data, Sort*.



Excel opens the *Sort* dialog that permits a sort on up to three levels at a time, with an *Ascending* or *Descending* specification for each.

If your list has headers, Excel uses those header names to ask how you want the data sorted.

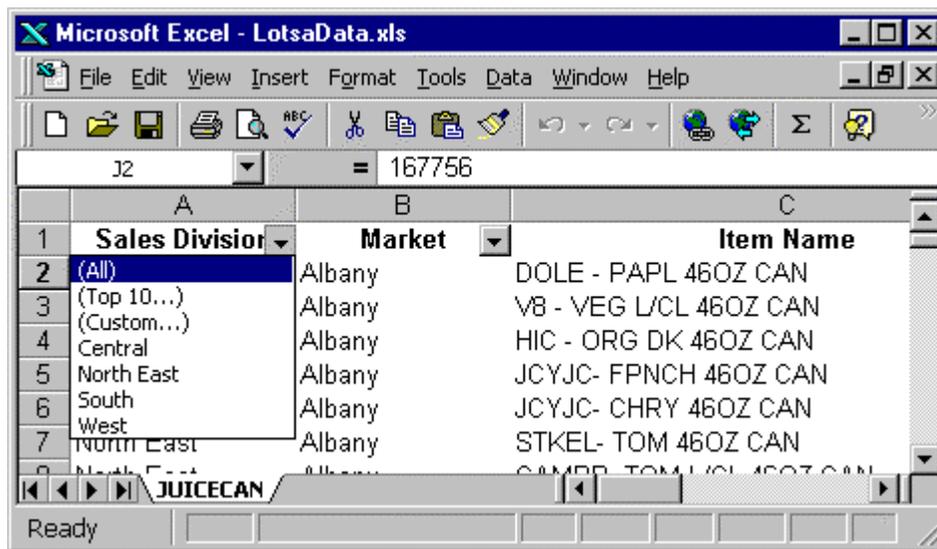
The *Options* button opens the *Sort Options* dialog that lets you specify a particular sort order other than Excel's default. (See *Tools, Options, Custom Lists* to specify your own sort order.)



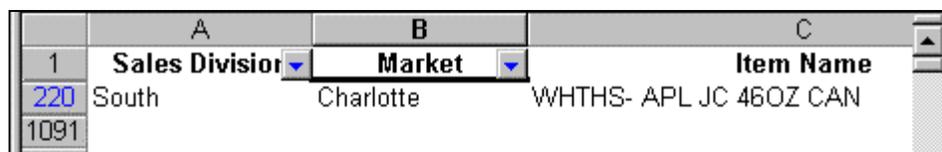
In the *Sort Options* dialog you can also specify whether you want Excel to consider case when sorting your data and whether you want a left-right sort instead of the default top-to-bottom sort.

Autofilter

Excel's Autofilter makes it easy to make on-the-fly groupings of list data. Click any cell in the list and choose *Data, Filter, Autofilter* to turn on the Autofilter. The Autofilter establishes drop-down arrows to the right of each header in your list. In the illustration below, drop-down arrows are displayed to the right of the column list headers **Sales Division**, **Market**, and **Item Name**. You can see from the drop-down list for **Sales Division** that the four different entries in that column are available (Central, North East, South, and West) plus a couple of other options ((All), (Top 10), and (Custom)). Selecting "South", for example, will restrict the display of data to only records where Sales Division is South.



With the Autofilter, **Market** and **Item Name** can also be restricted in a similar fashion to see a very focussed view of the data in the list. Here, for example, only one record in the list passes the filter where Sales Division is South, Market is Charlotte, and Item Name is WHTHS- APL JC 46 OZ CAN.



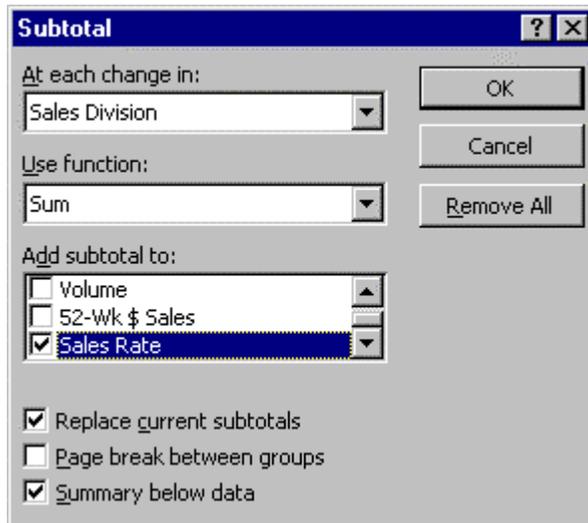
	A	B	C
1	Sales Division	Market	Item Name
220	South	Charlotte	WHTHS- APL JC 46OZ CAN
1091			

The Autofilter provides a *view* of the data only; it doesn't affect the underlying data itself in any way.

Toggle off the Autofilter with the same commands used to turn on the Autofilter: *Data, Filter, Autofilter*.

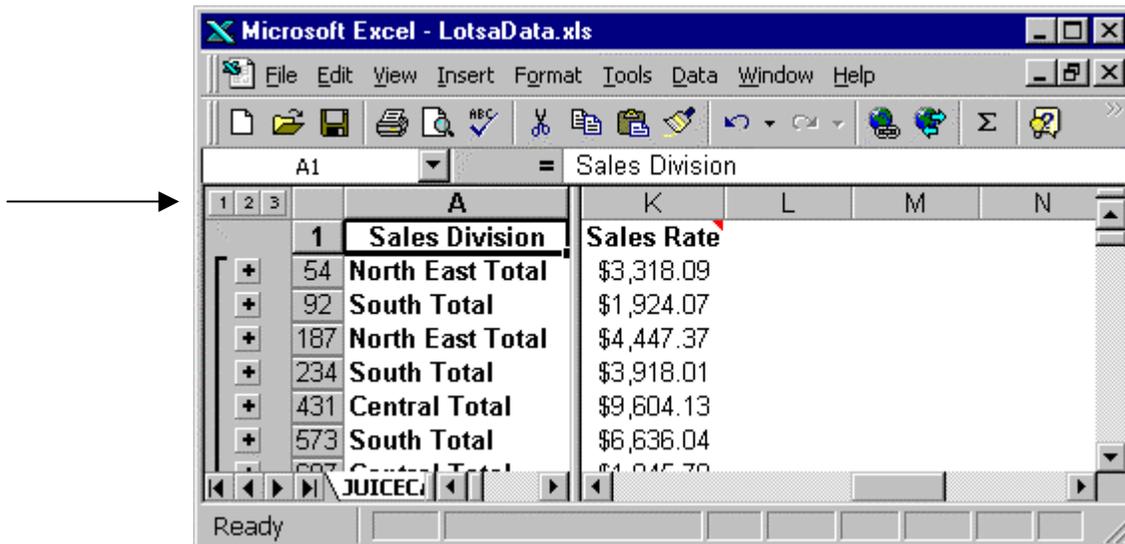
Subtotal

Like the other list management features in Excel, Subtotal recognizes a list and will operate on that list if you click on any cell in the list before getting started. Choosing the commands *Data, Subtotal* opens the *Subtotal* dialog box.



The default subtotal function is sum. Other functions available include Count, Average, Max, Min, Product, Count Nums, StdDev, StdDevp, Var, and Varp.

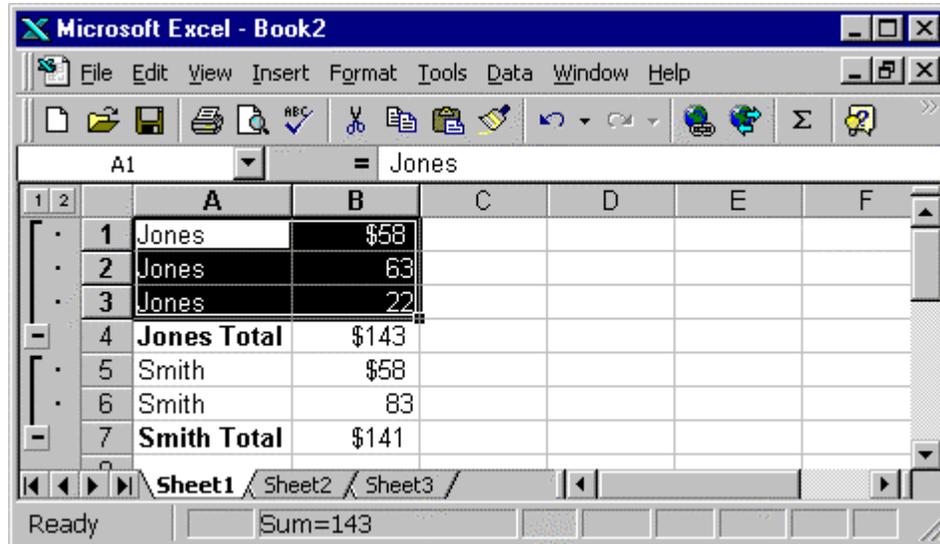
The dialog allows you to determine how the subtotal will be organized. Excel creates subtotals and puts them in an outline format so they can be easily collapsed for a summary view. In the example below, the spreadsheet window is split to see the Sales Division column at left and the Sales Rate totals by division. Selecting the “level 2” outline button shows a summary format without the data.



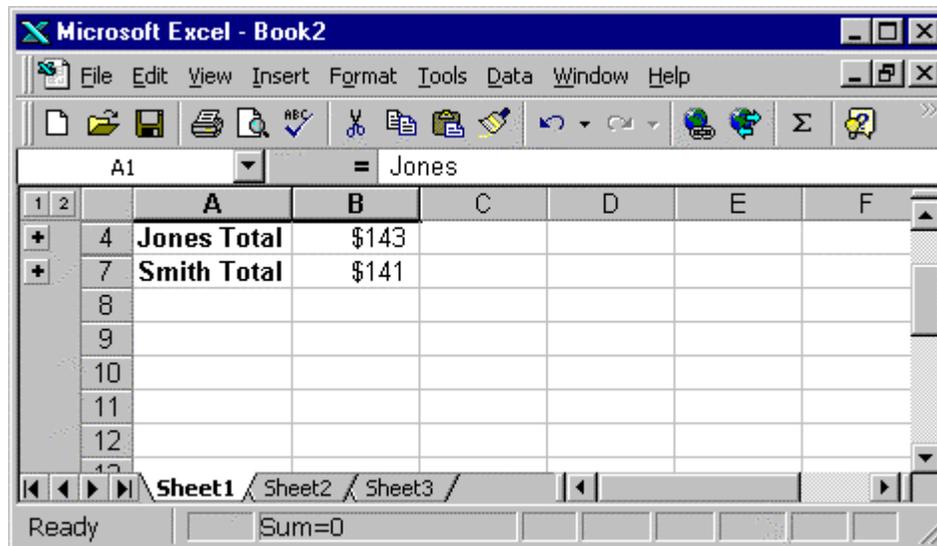
Remove subtotals with *Data, Subtotals, Remove All*.

Outline

Excel provides a convenient outline feature that facilitates showing your data in summary or detail fashion. You can create an outline automatically (*Data, Group and Outline, Auto Outline*) or by hand. To create an outline manually, select the data to outline and choose *Data, Group and Outline, Group*. In the example below, selecting the range A1:B3 and applying outlining has put Jones' figures in one outline group, indicated by the outline symbols at the left of the row headers. Smith's figures have also been outlined.



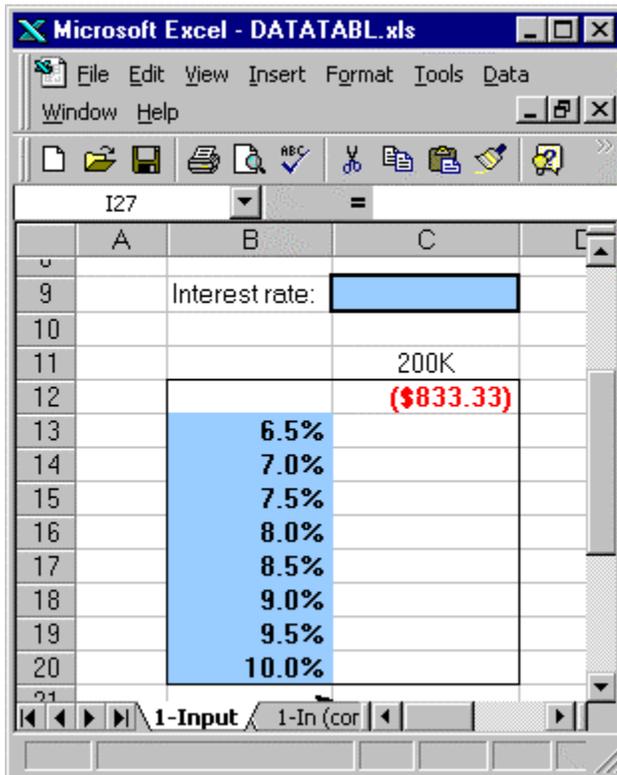
Clicking the outline “1” symbol at upper-left collapses the outline so only the summary total figures display. Clicking the outline “2” symbol redisplay the detail data.



An outline can encompass up to eight levels of detail. *Data, Group and Outline, Clear Outline* removes outlining from the spreadsheet.

Data Table

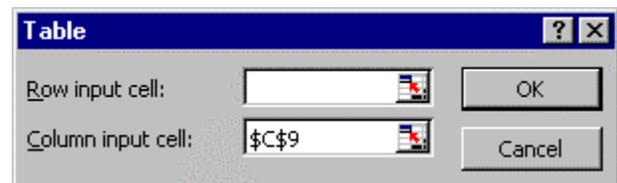
A data table allows you to quickly generate values for a what-if analysis and view the results together in a condensed format. Excel provides for both one-input and two-input data tables. A data table is simple to use if you know how to set it up and execute it properly.



The illustration at left shows the setup for a one-input data table. When executed, this table will show the monthly payments on a \$200K loan at interest rates ranging from 6.5% to 10%.

Cell C12 holds a PMT function. The PMT function refers to Cell C9, interest rate, which is a blank cell. Cells B13:B20 hold input values. These values will be substituted one at a time into Cell C9 when the data table is executed.

To execute the data table, highlight the range encompassing the formula, the cells beneath it, and the input cells at left. Then choose *Data, Table* to open the *Table* dialog. Our example data table is in columnar format, so we use the *Column input cell text box* to identify the “dummy” input cell: C9. This is the cell our formula refers to. Click *OK* to execute the data table.

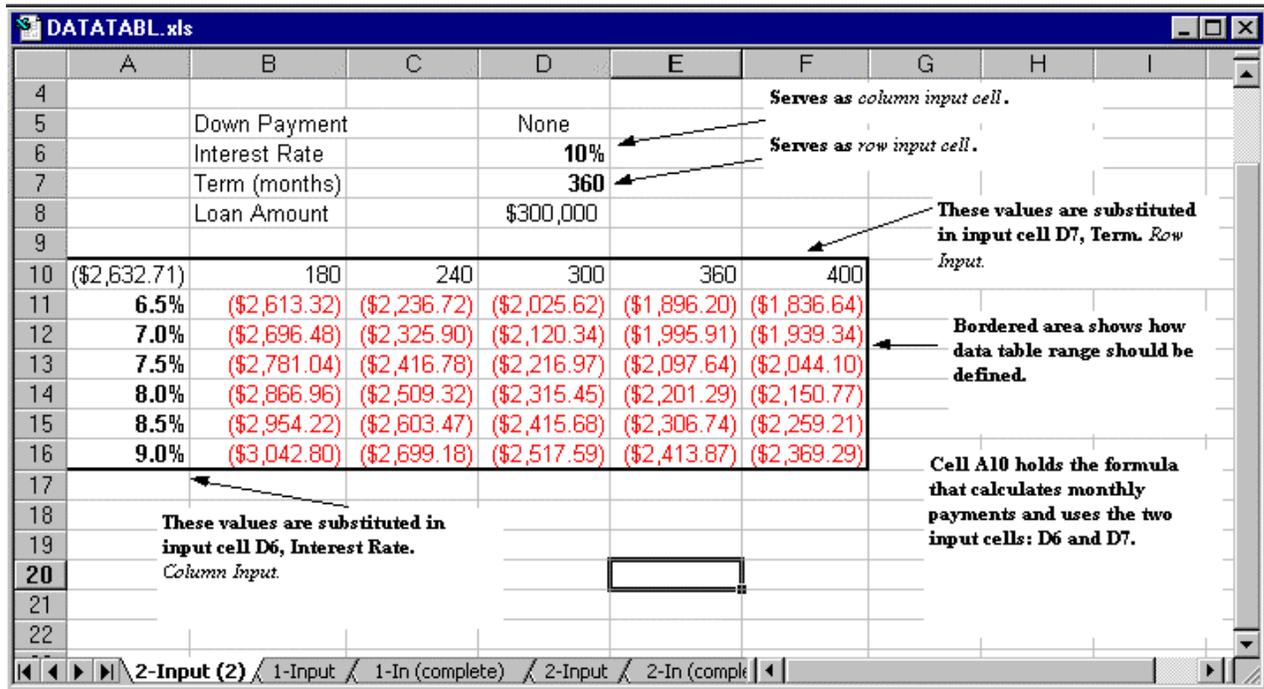


	(\$833.33)
6.5%	(\$1,896.20)
7.0%	(\$1,995.91)
7.5%	(\$2,097.64)
8.0%	(\$2,201.29)
8.5%	(\$2,306.74)
9.0%	(\$2,413.87)
9.5%	(\$2,522.56)
10.0%	(\$2,632.71)

Excel executes the formula once for every input value in the data table and puts the results in the column beneath the formula.

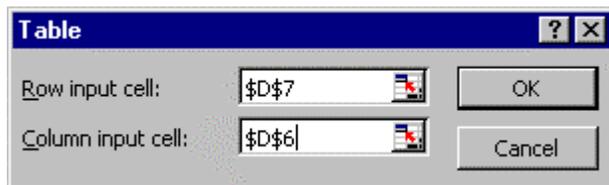
This data table is in column format. Alternatively, you can arrange a data table in row format.

Excel's two-input data table has a different layout. As the name implies, it can take two inputs to its formula instead of one. One of the inputs goes down the left-hand column of the data table range and the other extends across the top row of the range. The formula that references both column and row values is positioned at the upper left hand corner of the range.



In the two-input data table example above, the formula is located in cell A10. This is again a PMT function. The formula references both Interest Rate (Cell D6) and Term (Cell D7). Values to be substituted into the formula for Interest Rate when the data table is executed are located in Column A. Values to be substituted into the formula for Term when the data table is executed are located in Row 10.

As for the one-input data table, start execution by highlighting the entire data table range (in the example above, A10:F16). Choose *Data, Table* and complete the *Table* dialog.

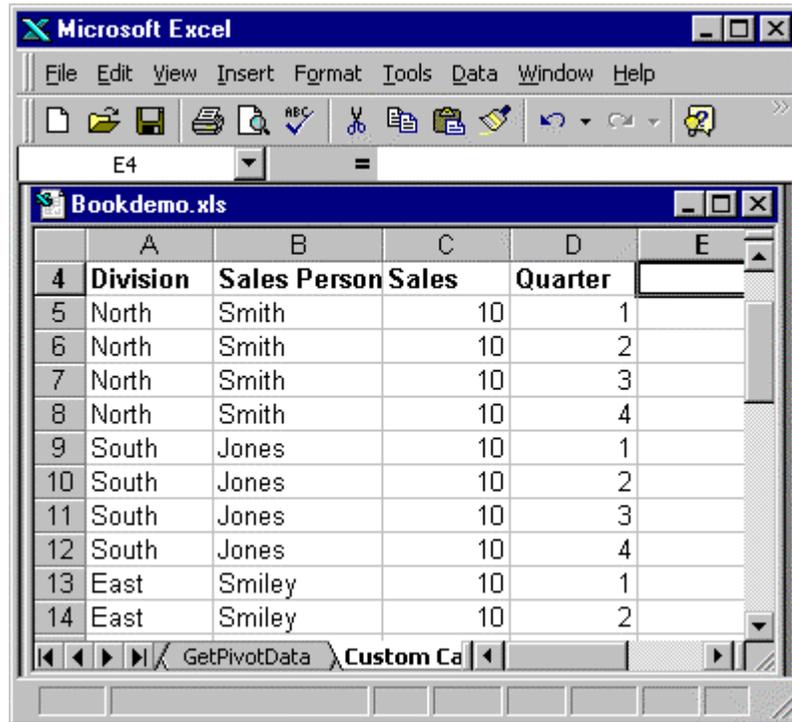


In the two-input data table case, both the *Row input cell* and the *Column input cell* must be identified.

Click *OK* to execute the data table. Excel executes the PMT function formula multiple times to fill in the values for every cell in the data table matrix.

Pivot Table

An Excel pivot table allows you to view an Excel list in crosstab format and to manipulate the data within that format for whatever view you need. Along with providing ways to view the data, the pivot table also provides methods for creating summary calculations about the data.



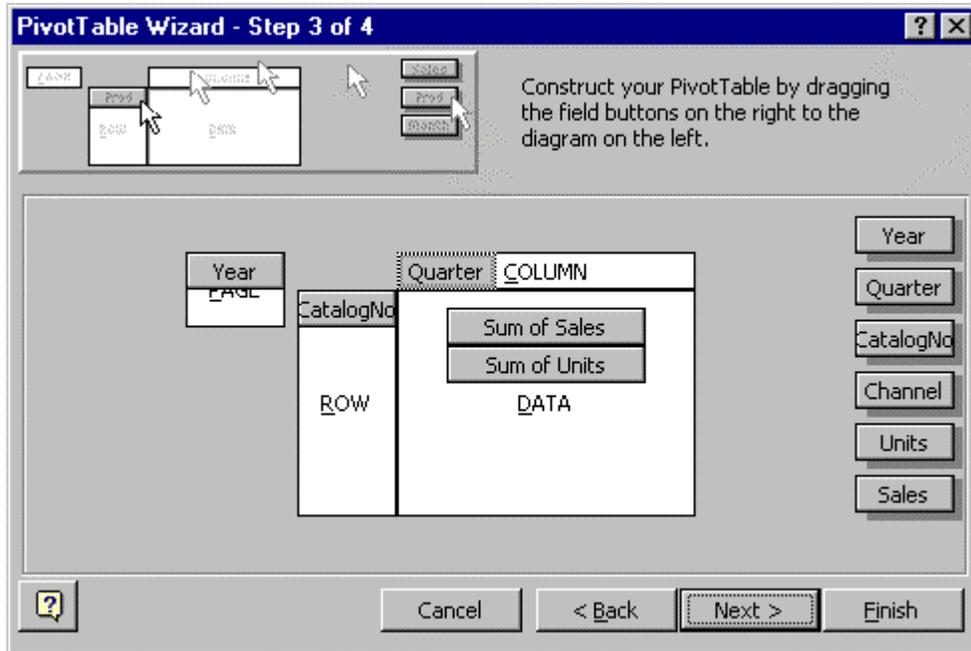
Sometimes data in list format isn't easy to interpret. To view this data in pivot table format, click anywhere in the list and choose the commands *Data, Pivot Table Report*.

The 4-step Pivot Table Wizard opens to walk you through creating the pivot table from this data.

Step 1 lets you specify where your data comes from. In most cases your data will reside in Excel.

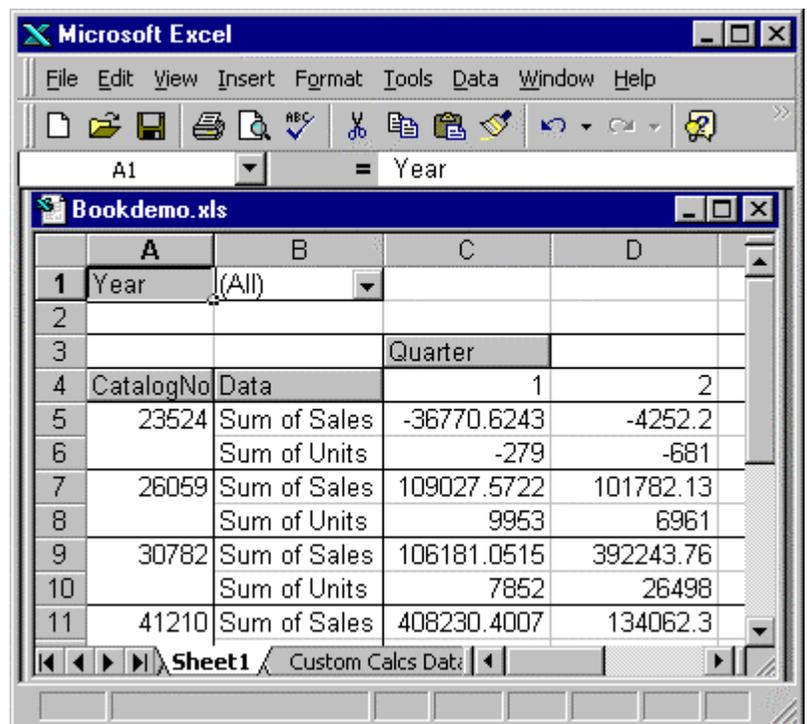
Step 2 lets you specify the range of your list. If you start the Wizard with one of the list cells current the Wizard will automatically select the range that constitutes your list and surround it with a blinking marquee.

The key step is Step 3, which is where you lay out the format of your pivot table. You can return to this dialog at any time after your pivot table is created to modify the layout.

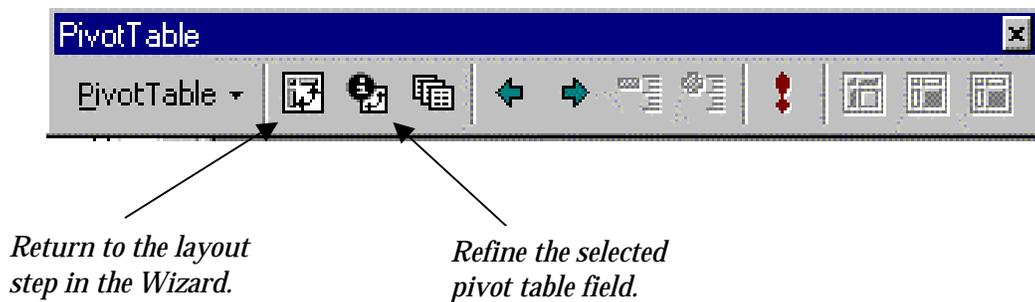


Each of the variables in your list are displayed as “field buttons” at the right of the dialog. Drag any field button onto the pivot table structure that’s pictured. Fields you drag into the data area are summarized with sum as the default operation. Fields you drag to the row and column areas provide the headers for your pivot table. The page area allows a 3-dimensional pivot table by whatever field you select as the page.

The final pivot table step, step 4, lets you specify where to put the pivot table view. On a new worksheet is a good choice.

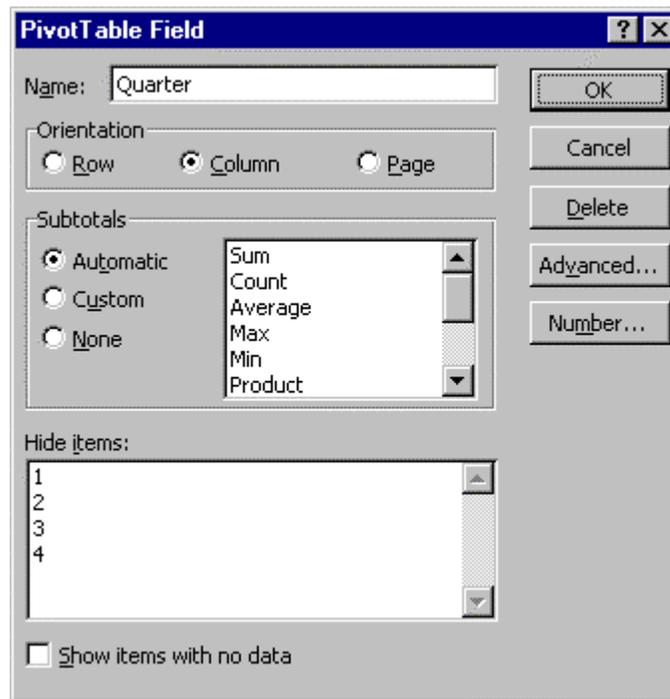


When you have a pivot table open the pivot table toolbar displays. The toolbar makes it easy to return to the layout step in the Wizard as well as to refine the specifications for particular pivot table fields.



You need not return to the layout step of the Wizard to change the pivot table layout. Instead, you can use the mouse to drag the field headers off the pivot table or change their locations.

Open the *Pivot Table Field* dialog by selecting a pivot table field and clicking the field button. Use the options in this dialog and in the advanced dialog associated with it to refine the specifications for a pivot table field.



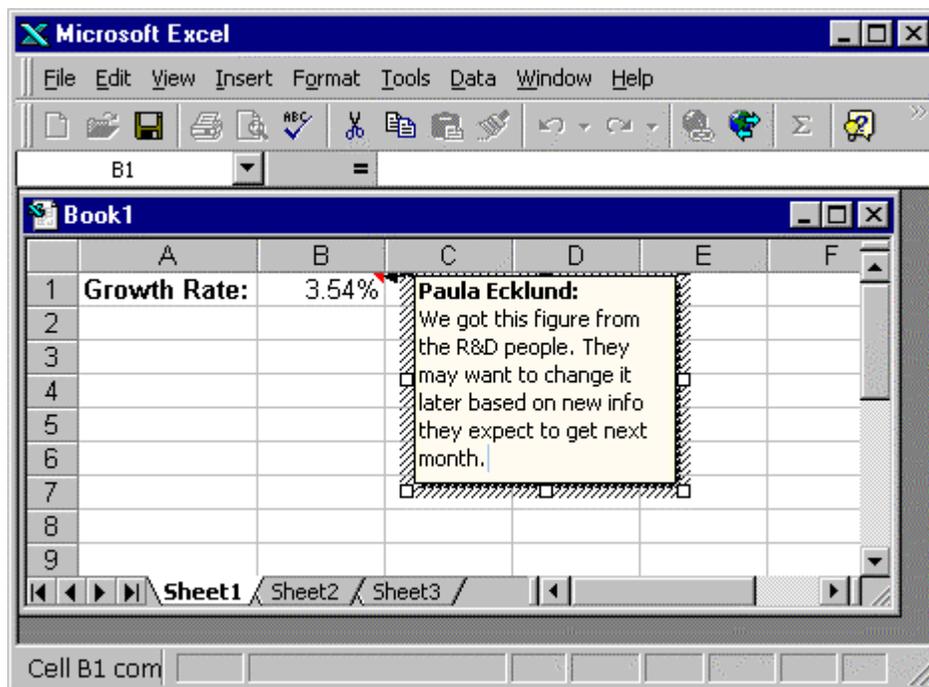
See Excel's online help or a good reference guide for more information on taking advantage of this useful tool.

VIII. Documenting

Adding comments to cells

Documenting your worksheets makes them easier to use. Appropriate cell labels, list headers, cell and range names, and even entire pages of explanation can be useful. In addition to these more obvious ways of documenting a spreadsheet, Excel also offers cell comments. A cell comment is a segment of text that's associated with a particular cell and can be displayed with the spreadsheet or made visible just when the user wants to see it.

To add a comment to a cell, click the cell and choose *Insert, Comment*. Excel provides a text box that floats on top of the worksheet in which to enter your comment. Note that whatever you've entered in *Tools, Options, User Name* automatically appears at the top of the comment text box as the author. You can erase this author designator from the text box entry if you choose.



To remove a comment from a cell, click the cell and choose *Edit, Clear, Comments*. To remove all comments from a worksheet at the same time, choose *Edit, Go To*, click *Special*, and then click *Comments*. Then select *Clear* and *Comments* on the edit menu.

You have a number of choices in how comments are displayed in your worksheet. By default, a cell with a comment will have a small red triangle in its upper right-hand corner and when you move the mouse pointer over the cell the comment will display.

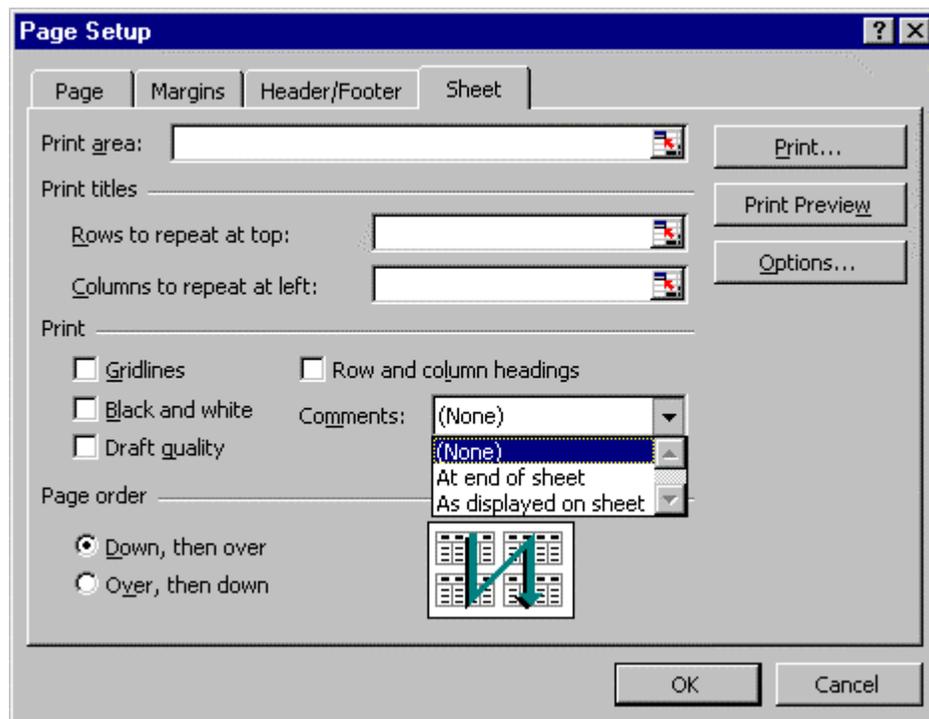
To reset the comment display options choose *Tools, Options* and select the *View* tab. To hide comments, even when you rest the pointer over the cells that contain them, and also to clear the comment indicators from the upper-right corners of the cells with comments, choose *None*.

To display comments when you rest the pointer over cells that contain them, and also to show the comment indicators, choose *Comment indicator only*.

To display both comments and indicators regardless of the mouse pointer position, click *Comments & indicator*.

Hide an individual comment by right-clicking the cell that contains it and then choosing *Hide Comment*. To display all individually hidden comments, double-click the *Comments* entry on Excel's *View* menu.

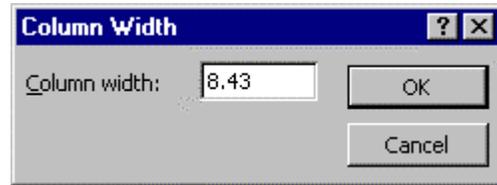
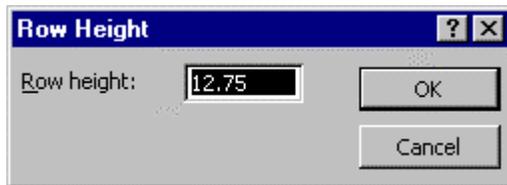
File, Page Setup opens the dialog box below where on the *Sheet* tab you can choose how you want any spreadsheet comments to print. The default is not to print comments but you can choose to have them printed as they appear on the sheet (which might obscure parts of your spreadsheet) or at the end of the spreadsheet printout, similar to end notes.



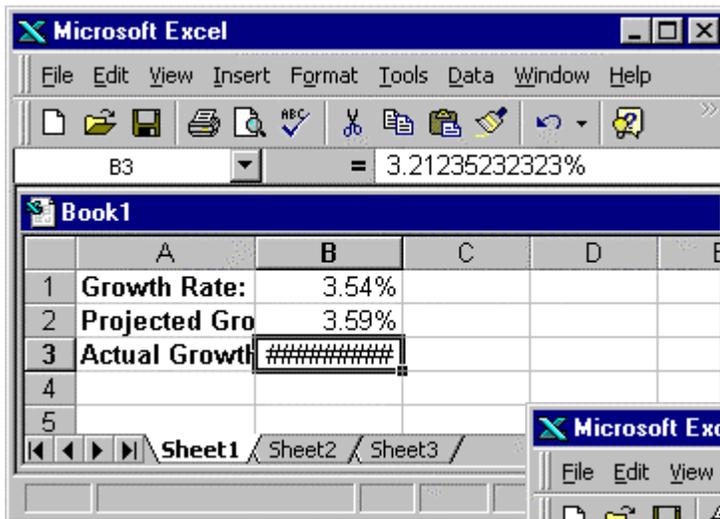
IX. Format Tips

Row & column autofit

Excel rows and columns have a standard height and width. You can check on the height of any row and the width of any column by clicking its header (or any cell) to select it and choosing *Format, Row, Height* or *Format, Column, Width*.

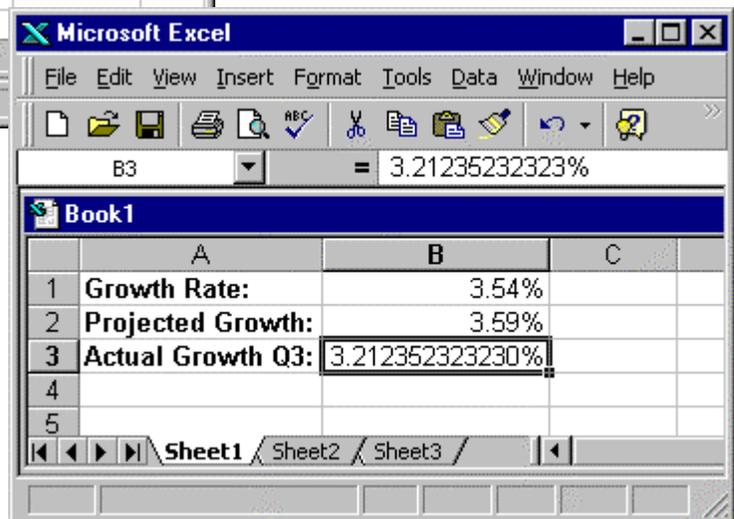


To change the height of a row or the width of a column, enter a different value (zero to 409 for a row or zero through 255 for a column). For a row, this number represents the row height in points. If you set the row height to zero, the row is hidden. For a column, this number represents the number of characters that can be displayed in a cell formatted with the standard font. If you set the column width to zero, the column is hidden. You can also change row height and column width by dragging the borders of the row and column headers.



Or use the auto-adjusting feature in Excel. For example, the illustration at left shows truncated labels in Column A and a truncated value in Cell B3. To quickly adjust column widths to accommodate the widest value in that column, double click on the divider between column headers.

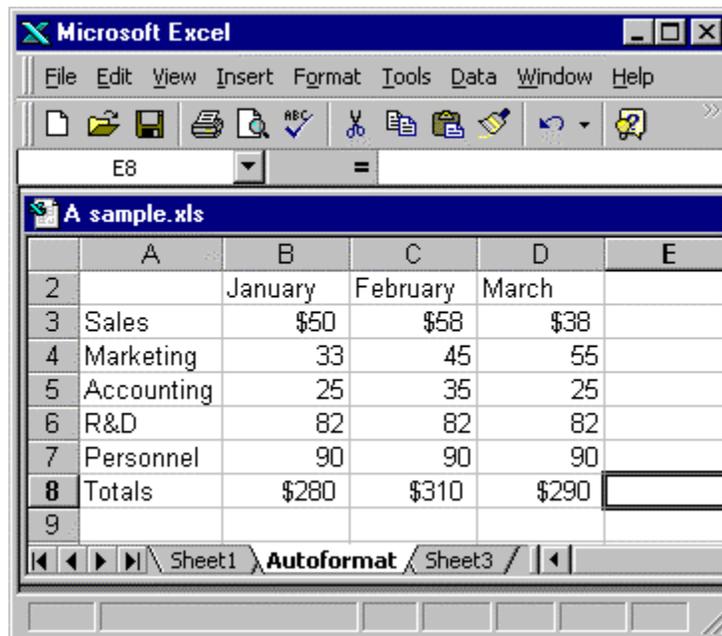
For example, double-clicking the divider between the Column A and B headers auto expands the width of Column A so all labels display properly. Double-clicking between B and C auto expands the width of Column B so Cell B3's value displays.



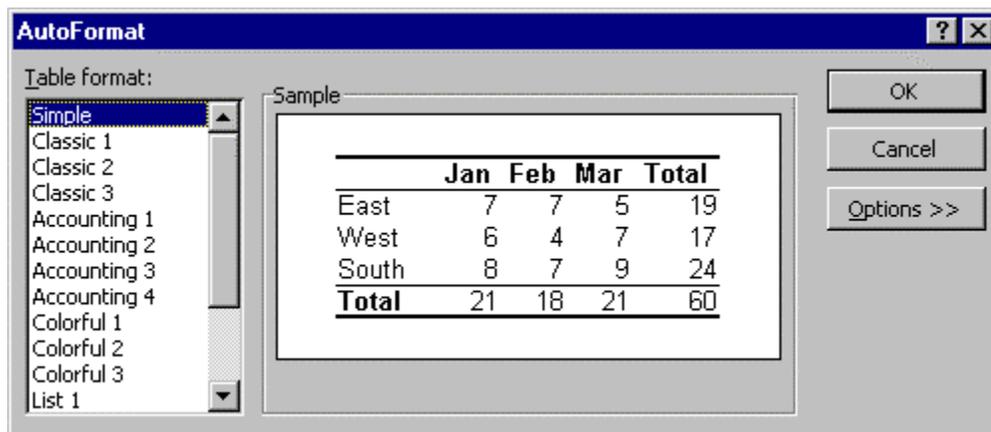
Autoformat

There are lots of manual formatting options you can apply to your spreadsheet, but Excel also offers an autoformat option. This option works best if your spreadsheet has a pretty standard layout with header rows and columns and data in a matrix sort of format. You can select a range to which to apply an Excel autoformat or you can autoformat an entire spreadsheet at once. If you don't like an autoformat you've applied, you can use Excel's undo option to remove it.

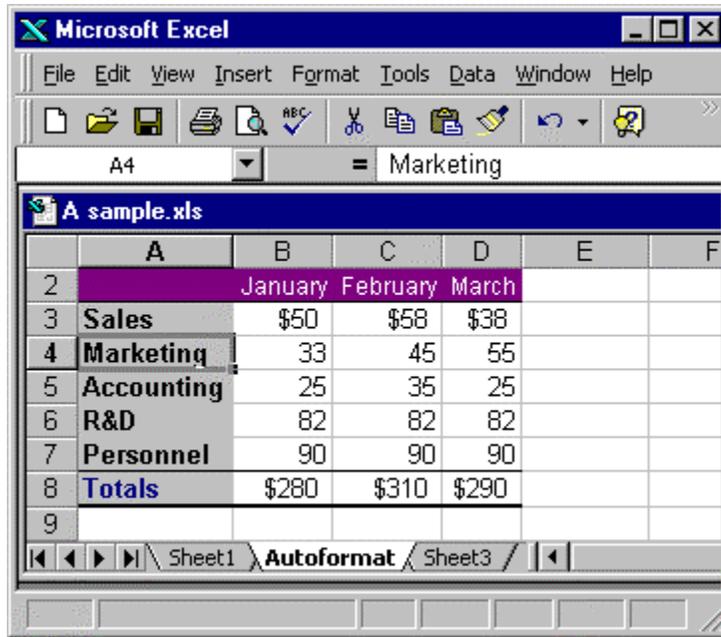
A simple spreadsheet like the one below would be suitable for application of an autoformat.



Choose *Format, Autoformat* to open the *Autoformat* dialog.

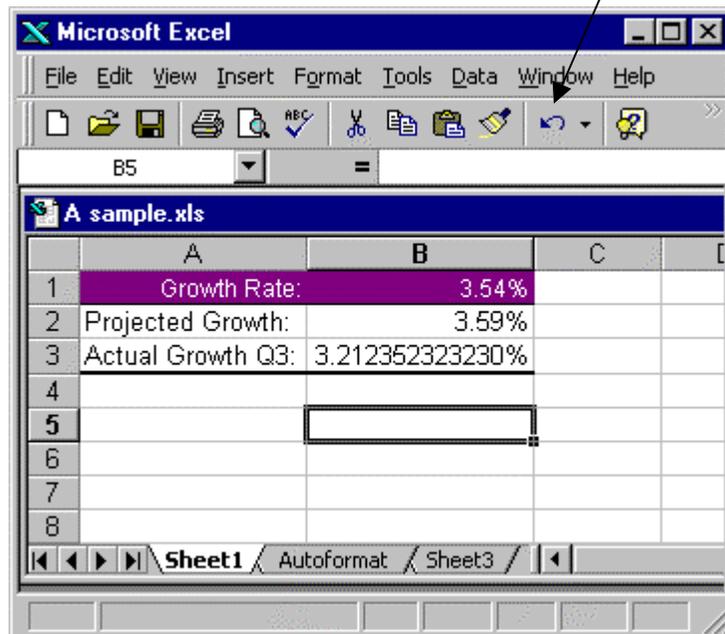


Clicking any one of the *Table format* options displays a "sketch" of that option in the *Sample* area at the right of the dialog.



The autoformat applied to this illustration is the *Classic 2* format.

As a caution, here's the *Classic 2* autoformat applied to data that's unsuitable for an autoformat. Excel makes its best guess as to what should be formatted as a header and what's data. As you can see, it's not a very good guess. Click the undo button on the standard toolbar to remove this format. A manual format would be better for this data.

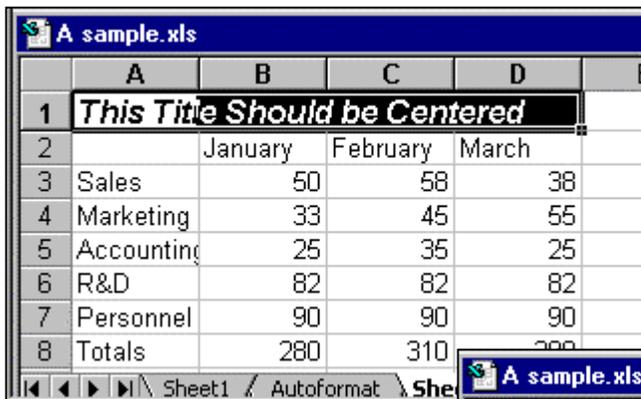


The formatting toolbar: highlights

Turn on Excel's formatting toolbar for easy access to the most useful format options. Use *View, Toolbars* to see a drop-down list of toolbars and click the *Formatting* option to display the formatting toolbar.

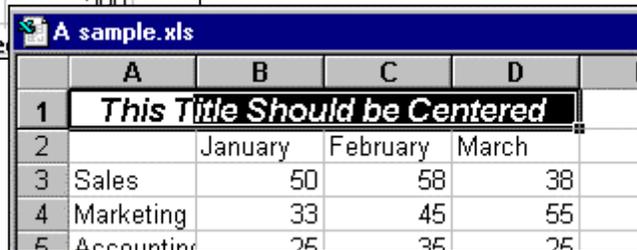


At the left-hand side of the formatting toolbar are options that control the look of your text: Font face and size; bolding, italicizing, and underlining; justification; and the very useful “center across selection”.



	A	B	C	D
1	This Title Should be Centered			
2		January	February	March
3	Sales	50	58	38
4	Marketing	33	45	55
5	Accounting	25	35	25
6	R&D	82	82	82
7	Personnel	90	90	90
8	Totals	280	310	200

In the illustration at left, the easiest way to center the title over the data beneath it is to drag over the cell with the title and the cells to the right of it in which you want the title centered and to click on the “center across selection” button. Excel handles centering for you.

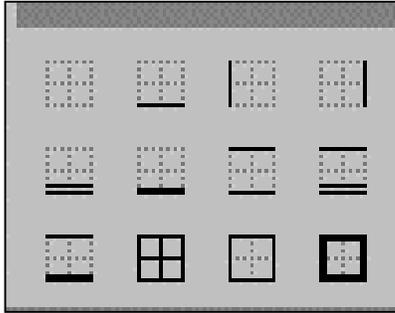


	A	B	C	D
1	This Title Should be Centered			
2		January	February	March
3	Sales	50	58	38
4	Marketing	33	45	55
5	Accounting	25	35	25

At the right side of the formatting toolbar are buttons to control the format of numbers, indentation, cell borders, fill color, and text color.



Clicking the border button, for example, displays a drop-down graphic of the cell bordering options that are available.

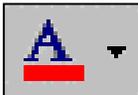


The border option you select is applied to whatever cell or range you have currently selected.



The fill color button lets you select a background for whatever cell or range you've selected from a palette of 40 colors.

	A	B	C	D
1	<i>This Title Should be Centered</i>			
2		January	February	March
3	Sales	50	58	38
4	Marketing	33	45	55
5	Accounting	25	35	25
6	R&D	82	82	82
7	Personnel	90	90	90
8	Totals	280	310	290
9				



The font color button lets you select a color for the entries in whatever cell or range you've selected from the same palette of 40 colors.



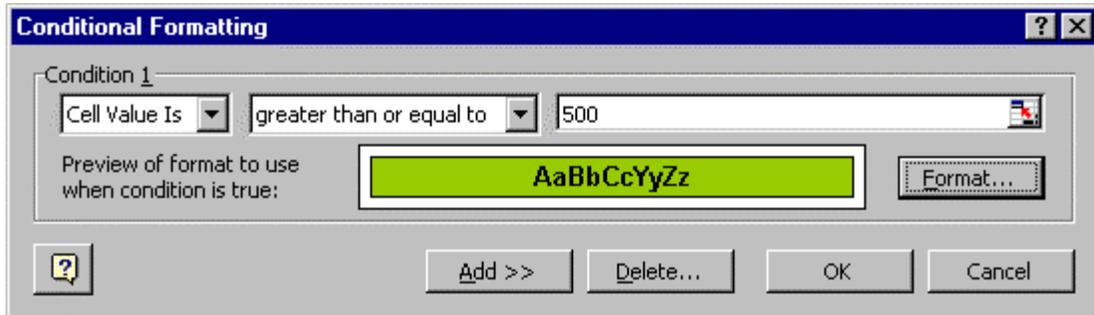
Don't forget the format painter button, which appears by default on Excel's standard toolbar instead of the formatting toolbar. If you want to copy an existing format, make the cells with that master format current and click the format painter button. Then click any cell or drag over any range of cells you want to apply that format to. If you want to copy a format from a master cell to several non-contiguous cells or ranges, double-click the format painter button to "capture" the format. Then any cell or range you select will have a copy of the master format applied. Hit the escape key to turn off the format painter.

Create your own toolbars (or add or delete items from any existing toolbar) with *View, Toolbars, Customize*.

Conditional

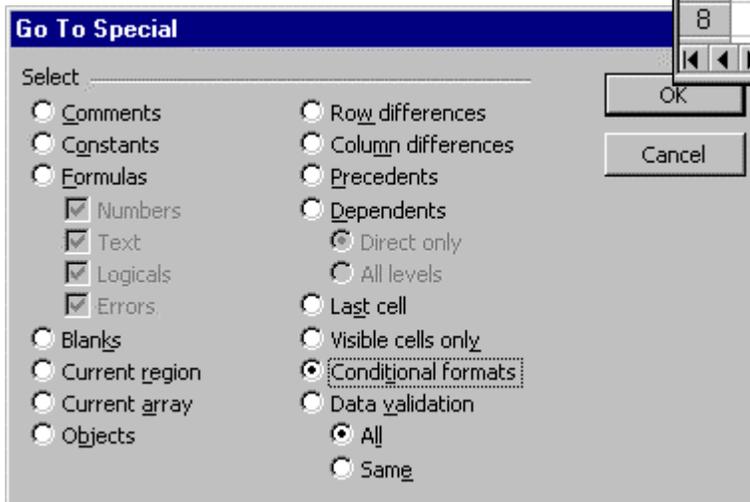
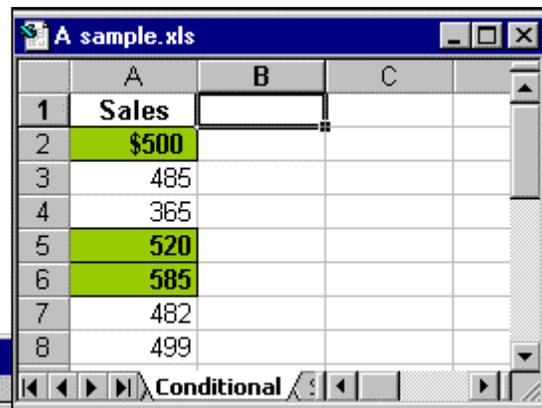
Excel permits you to add conditional formatting to cells. This allows you to set up a special format that will be applied only if the content of a cell meets the formatting requirement.

To turn on conditional formatting, select the cell or range you want the formatting to be applied to and choose *Format, Conditional Formatting*.



The dialog that displays allows you to format by cell value or by formula, to set the condition you want to test for, and then to select the cell format you want to apply when the condition is met. Clicking the *Add* button on this dialog expands the dialog so you can set additional conditions and formats.

In the illustration at right a bold, shaded, bordered format was pre-applied to format any cell in the A column with content greater than or equal to 500.

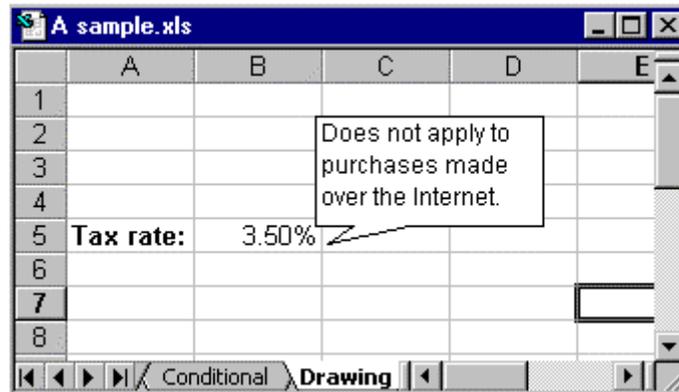


To find any cells on the worksheet that have conditional formats, choose *Edit, Go To*. Select the *Special* button and click *Conditional formats*.

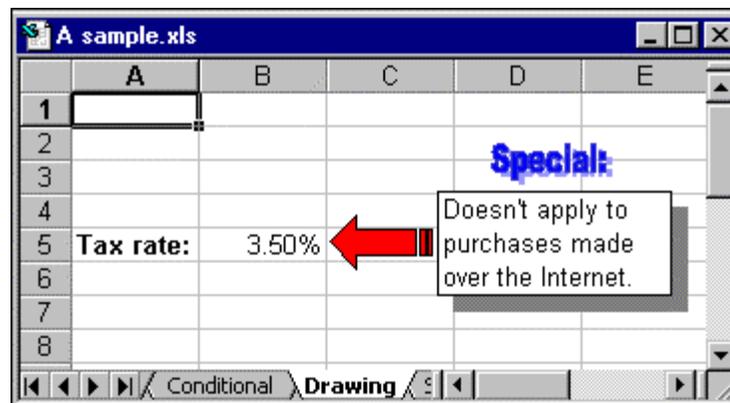
The drawing toolbar

You may want to add special graphical effects to your spreadsheets such as arrows, shapes, or callouts. These options are collected on Excel's drawing toolbar.

The example below shows one of the many "callout" shapes available for adding comments to a cell or range.



In this variation, a shadowed text box contains the text, with an arrow shape taken from the drawing toolbar's *Autoshapes* button. WordArt is also included.



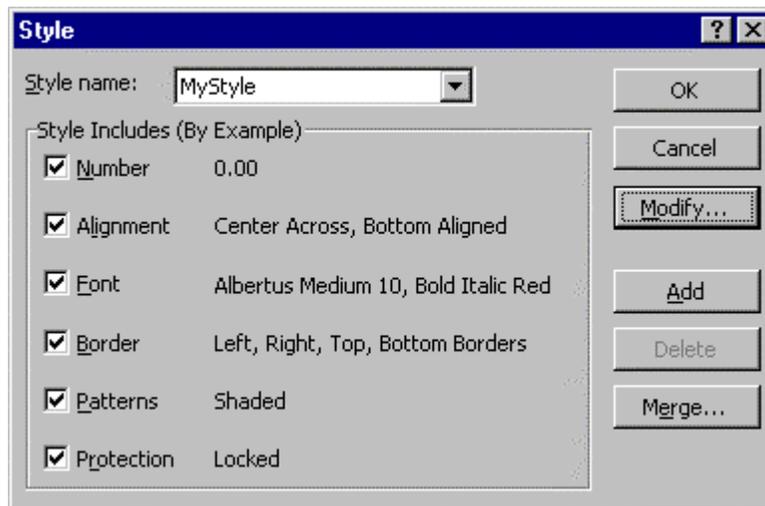
The graphical objects you can create using the drawing toolbar generally "float" over the surface of your spreadsheet. Use the *Draw*, *Order* commands (available from the drawing toolbar) to control the primacy of overlapping images.

Along with drawing basic shapes and selecting shapes from Excel's autoshapes archive, you can also copy and paste images from other applications or use Excel's *Insert*, *Picture* menu options.

Styles: changing and creating (within a workbook)

A formatting style helps you apply several formats in a single step. A style can also help ensure that cells have consistent formatting. Excel provides styles such as the number styles you can use to format numbers as currency, percentages, or with commas separating thousands. You can create your own styles to apply features such as a font and font size, a number format, and a cell border and shading.

To create a new style choose *Format, Style*.



In the *Style name* box, enter a name for the new style you're defining. To change the format elements for the style (number, alignment, font, etc.), click a format element and click the *Modify* button. The *Format Cells* dialog opens to let you select how you want to define that element.

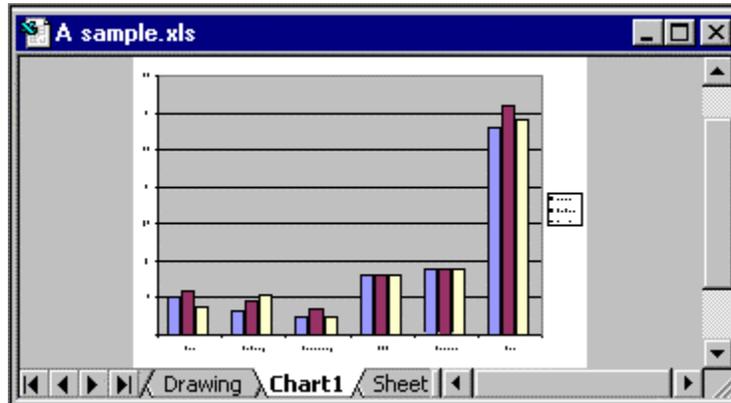
For example, in the illustration above the font specified for the style is *Albertus Medium 10, Bold Italic Red*. Clear the check box for any format element that you don't want the style to include. Click *OK* to complete defining the style and applying the style to the selected cell or range. To define the style without applying it, click *Add* and then *Close*.

To modify an existing style, open the *Style* dialog, select an existing style, and modify any format element as described above.

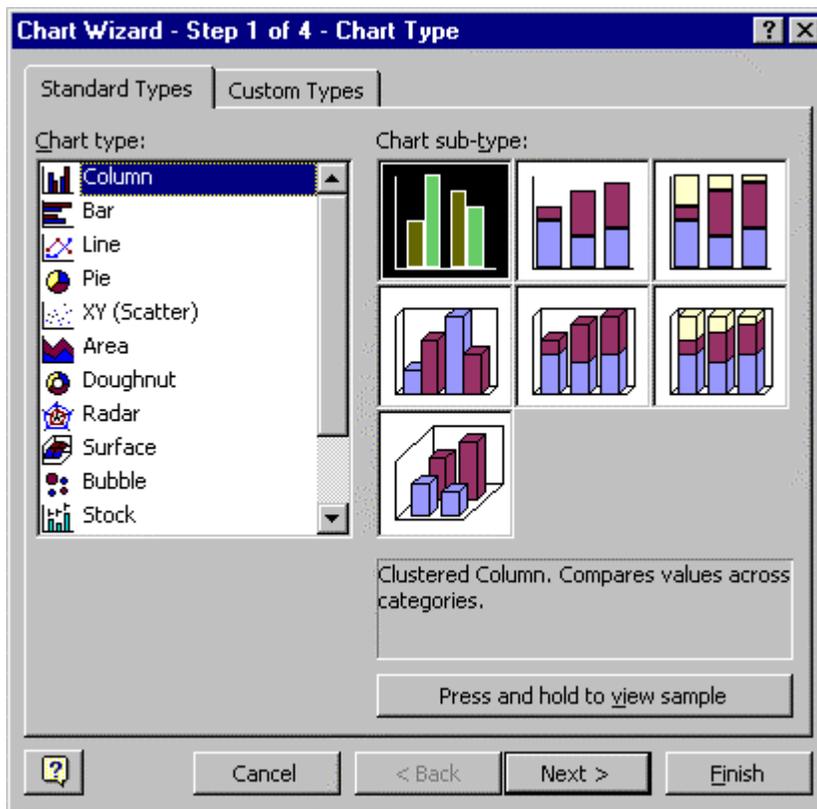
To apply a style to the selected cell or range, choose *Format, Style* to open the *Style* dialog. Click the down arrow at the right of the *Style name* box to see the available styles. Choose the style you want from the drop-down list and click *OK*.

X. Charting basics

Providing a graphical look at the data in your spreadsheet can often tell a story that's not so obvious by just looking at numbers and text. The fastest way to create a chart in Excel is to highlight the data to chart and hit the F11 key. Excel creates its default column chart and puts it on a new page in your workbook. You can then go on to edit the chart as you like.

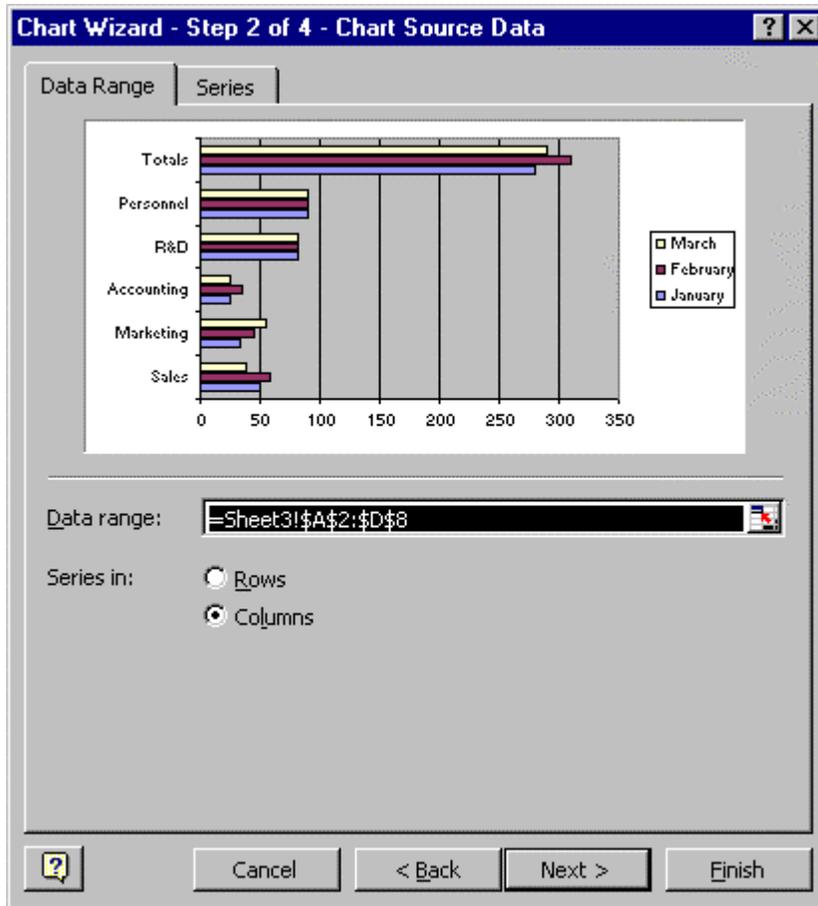


If the data you want to chart isn't contiguous, hold down the Control key as you select each data range.



To create a chart and have more control over the process during creation (instead of creating and then editing), use Excel's Chart Wizard. You can invoke the Chart Wizard with the menu commands *Insert, Chart* or by clicking the Chart Wizard button on the standard toolbar.

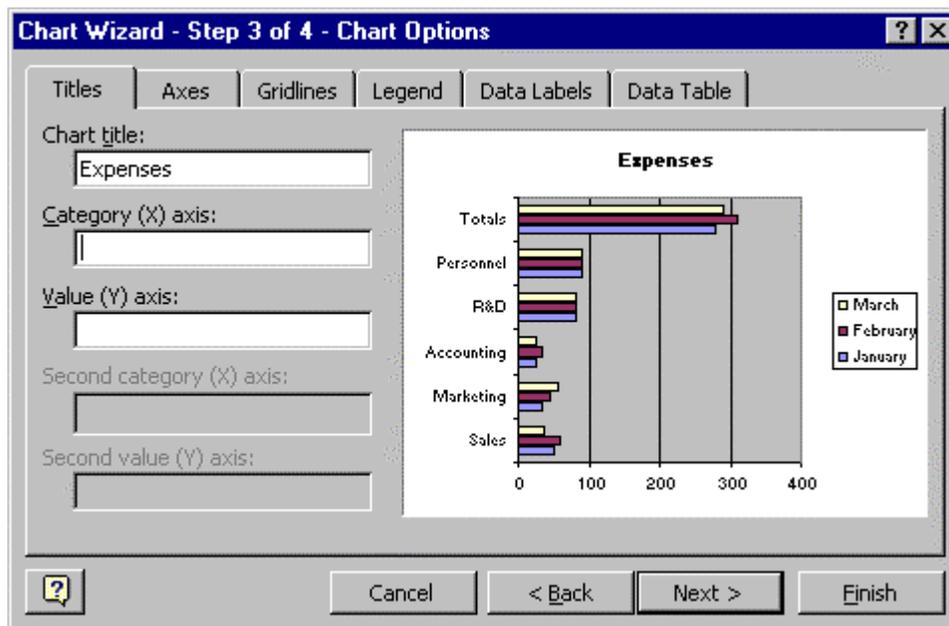
The Chart Wizard divides chart creation into four steps and walks you through each one. In the first step you select the type of chart you want. There are lots of "sub-types" within each type.

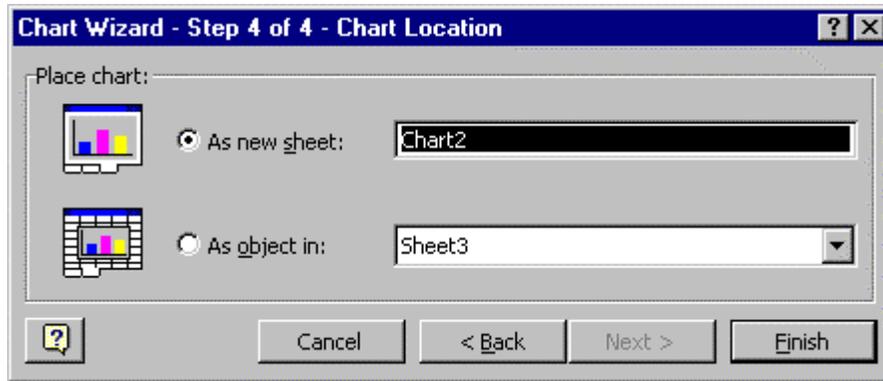


Step 2 lets you select (or confirm) the data to chart. If you've already highlighted the data to chart before invoking the Chart Wizard, that information will appear automatically in the *Data range* box.

Excel makes its best guess about how to arrange the data series: row-wise or column-wise. If you don't like the choice Excel has made, click the alternative option. The thumbnail sketch of the chart that appears in the dialog will change to reflect your choice.

Step 3 is where you can make the most changes to your chart. Note the six different tabs in this dialog that control chart titles, axes and their labels, gridlines, the chart legend, allow you to add data labels, and for some chart types allow you to generate an additional tabular view of the data that displays below the chart called a data table.

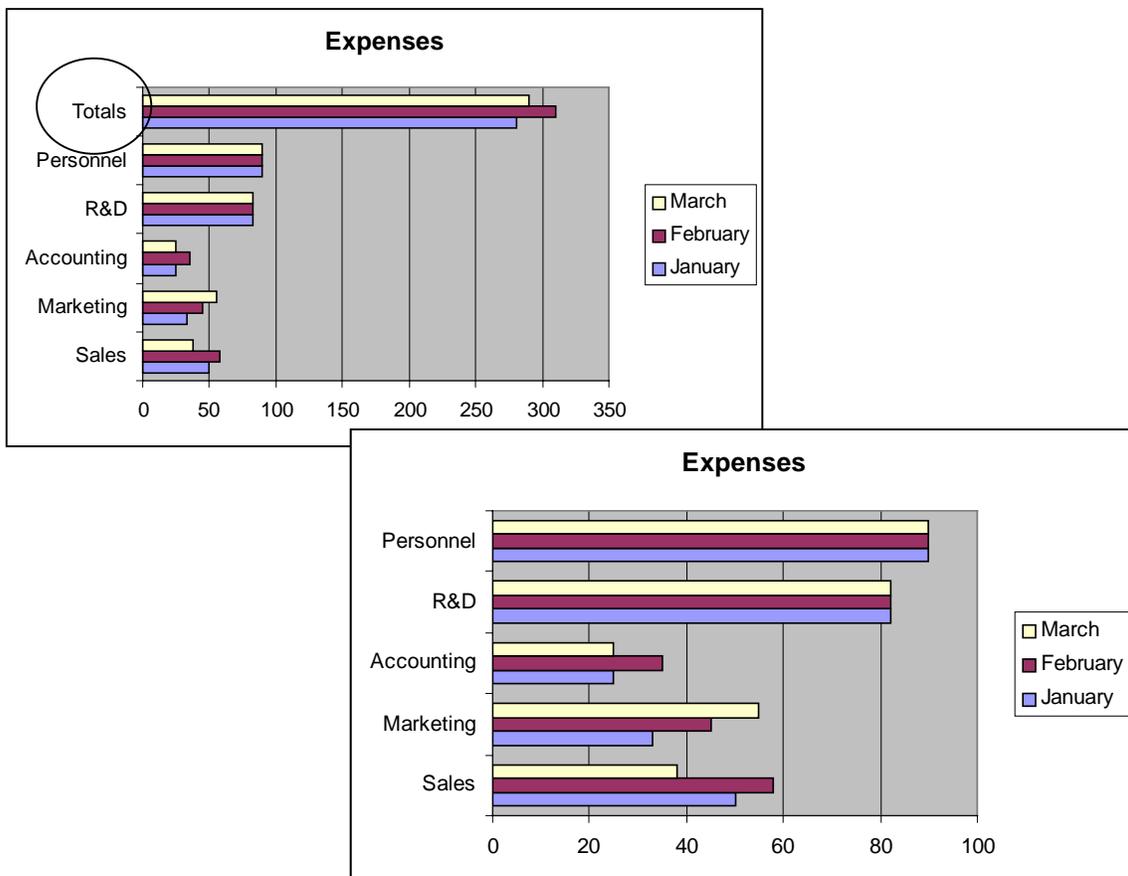




The final step lets you select where Excel should generate the chart: On a new worksheet or in whatever sheet you select.

Once your chart is created you can return to the Chart Wizard at any time to make changes you your chart. Click the chart to select it and then click the Chart Wizard button on the standard toolbar.

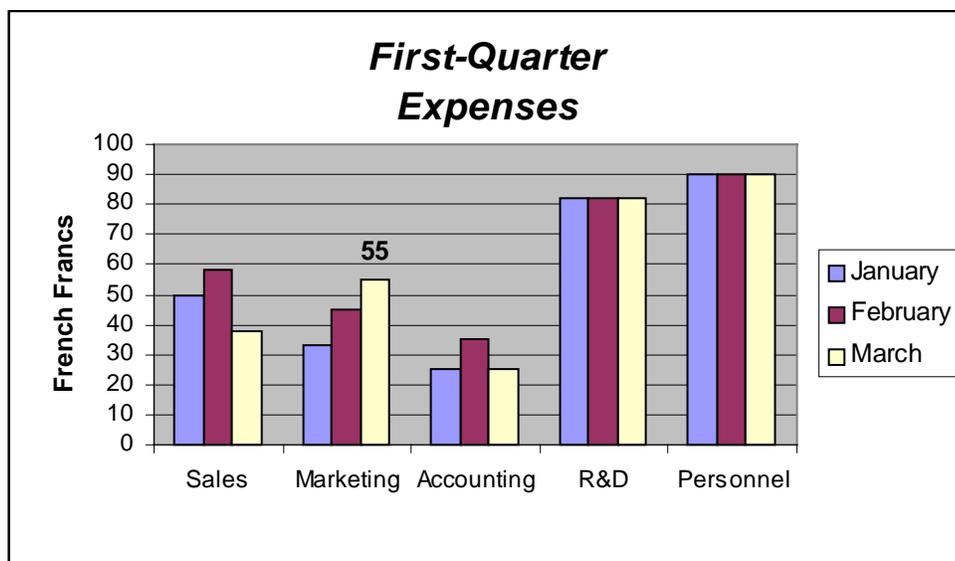
Most editing changes you can easily make without returning to the Chart Wizard. For example, the chart below mistakenly includes the **Totals** row of data. To remove the Totals data series from the chart, click the plot area to select it, right click, and select *Source Data* from the drop-down list. Then redefine the range of data to chart, this time excluding the Totals row of data.



Any time you have the chart selected, Excel's menu bar changes to show only chart-relevant menu items. Select options from the menus or select items within the chart, right-click, and select the option you want from the drop-down menu that displays.

Common changes you might make to a chart are to:

- ◆ Add a title, an x-axis label, or a y-axis label
- ◆ Change the formatting of the titles and labels
- ◆ Change the chart type to better display your data
- ◆ Add a data label to a critical data value
- ◆ Change the data series marker colors and patterns
- ◆ Change the gridlines in the plot area (behind the data series)



If your chart is on the same spreadsheet with your data you can move and size the chart by dragging with the mouse.

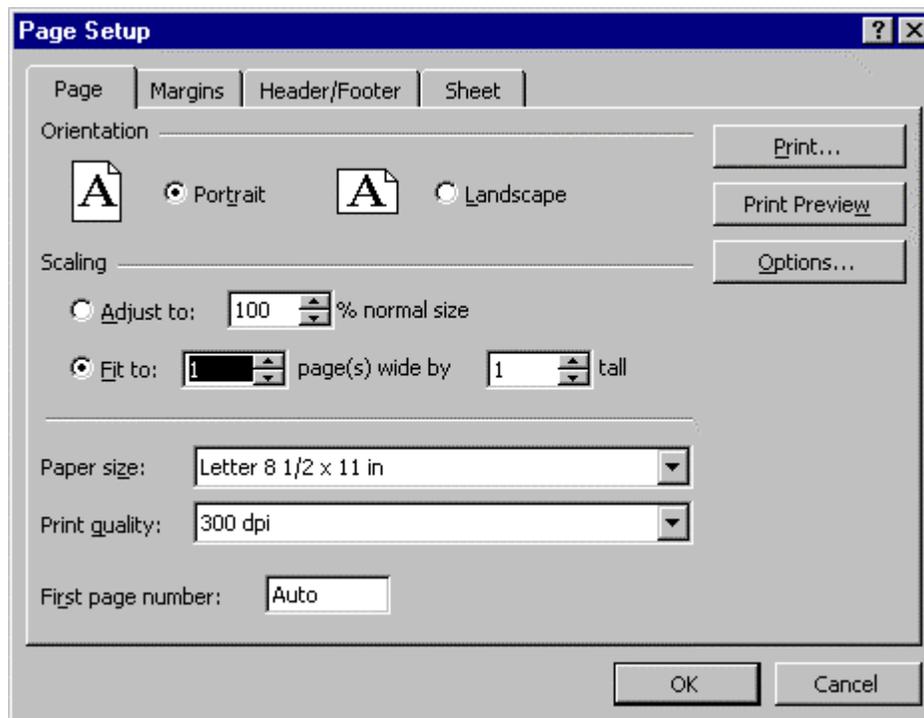
To delete a chart on a spreadsheet with data, select the chart and hit the delete key. To delete a chart on a sheet by itself, delete the sheet (make it current and select *Edit, Delete Sheet*).

XI. Printing basics

Fit to page

If you click the print button on Excel's standard toolbar or choose *File, Print* from the menus, Excel will make all printing choices for you and print the active worksheet using its printing defaults. In the common situation where you have *just* a little more than a single page to print, Excel will print to two pages unless you direct it otherwise.

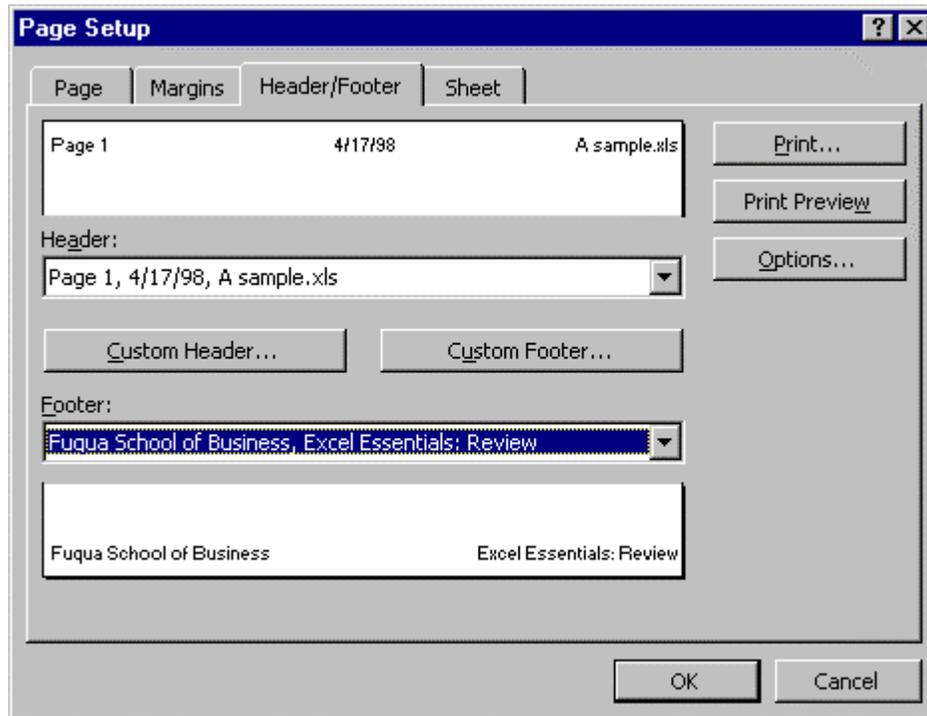
Choosing the command *File, Page Setup* opens the *Page Setup* dialog box. The *Page* tab includes the *Fit to page* option. In our example, you can direct Excel to print the entire spreadsheet to a single page and Excel will reduce everything in size just enough to fit it on a single page. For whatever your print situation, you can specify x page(s) wide by x page(s) tall and have Excel make the appropriate sizing adjustments for you automatically.



Note that this tab also lets you control printing in portrait or landscape mode.

Headers and footers

Also available from the *File, Page Setup* menu options on the *Page Setup* dialog is a means to control the headers and footers that you can print on all your spreadsheet pages. Headers and footers are good places to include your name, the file name, the page number, the date, company name, and any other information that you want to have appear on every page of printout.

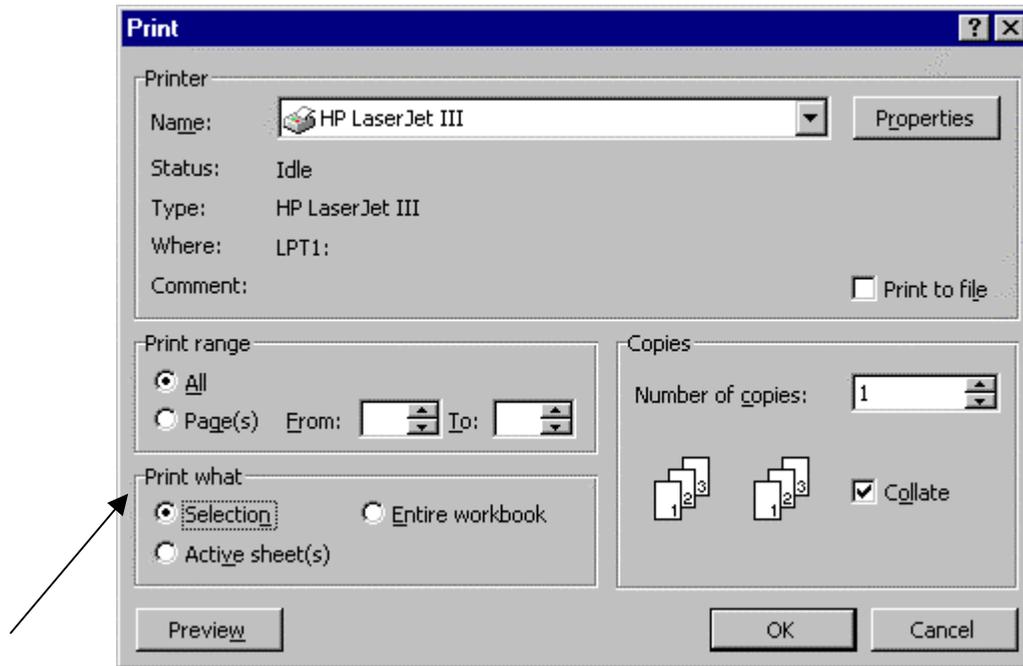


To create a custom header click the *Custom Header* button on this tab and follow the prompts that display. Click *OK* to return to the *Header/Footer* tab pictured above and to see a sample of how your header will print. Create a custom footer by clicking the *Custom Footer* button, following the prompts, and returning to the *Header/Footer* tab.

Then click the *Print Preview* button on this dialog to get a better preview of your print options, or click the *Print* button to go to the *Print* dialog.

Printing part of a worksheet

You may want to print just part of a worksheet and not the entire sheet. To do so, select the (contiguous) range you want to print and choose *File, Print* from the menus. The *Print* dialog opens.



In the *Print what* section of the dialog click *Selection* and then click the *OK* button. Excel prints just the range you selected.

XII. Other resources

Many excellent guides to Excel are available. If you're a frequent user of the program you'll want to have at least one comprehensive reference on hand. Reference guides I've found useful include:

Running Microsoft Excel 97
Microsoft Press
Dodge, Kinata, and Stinson

Using Microsoft Excel 97, Special Edition
Que
Person

Those looking for a more tutorial approach to learning Excel might want to check out:

Microsoft Excel 97 Step-by-Step
Microsoft Press
The Catapult Group

If you like to learn via video or CD, there are many offerings of this type now available. For example:

LearnKey, Inc. – video and CD-based training materials
Telephone 800/865-0165

Microsoft® Word 97/ Excel 97 In-Depth Training Starts Here
Microsoft Press, interactive CD-based guide
The Catapult Group

You can obtain many of these and similar materials at your local bookstore or by contacting the vendor. Or check these web-based sources:

Microsoft Press online: <http://mspress.microsoft.com/>

Amazon bookstore: <http://www.amazon.com>

FatBrain (technical bookstore) online: <http://www.fatbrain.com/>

Barnes & Noble online: <http://metacentric.com/npub/bntraps.htm>