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Fundamentals of computer

Introduction to Excel

Microsoft Excel is a software product that falls into the general category of spreadsheets. Excel is one of several spreadsheet products that you can run on your PC.

You might have heard the terms "spreadsheet" and "worksheet". People generally use them interchangeably. To remain consistent with Microsoft and other publishers the term *worksheet* refers to the row-and-column matrix sheet on which you work upon and the term *spreadsheet* refers to this type of computer application. In addition, the term *workbook* will refer to the book of pages that is the standard Excel document. The workbook can contain worksheets, chart sheets, or macro modules.

Basic features of MS Excel

This guide teaches Microsoft Excel basics. Although knowledge of how to navigate in a Windows environment is helpful, this course was created for the computer novice. To begin, open Microsoft Excel. The screen shown here will appear.
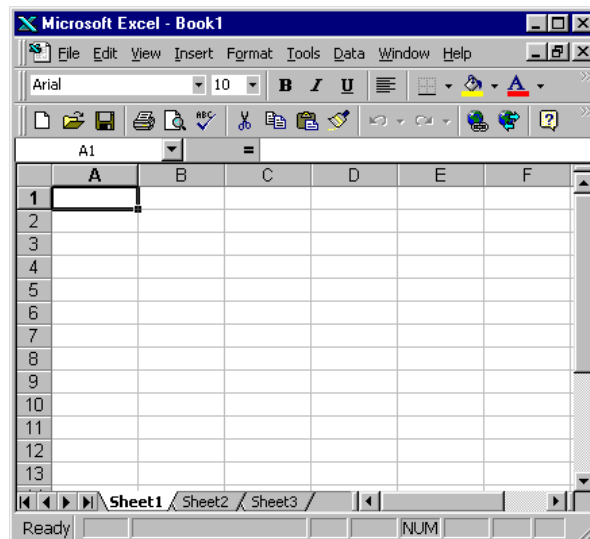

We will identify the most important parts in the Microsoft Excel screen: Title bar, Menu bar, Toolbars, Worksheet, Formula bar, and Status bar.

The Title Bar   -- is located at the very top of the screen. On the Title bar, Microsoft Excel displays the name of the workbook you are currently using. At the top of your screen, you should see "Microsoft Excel - Book1" or a similar name.

The Title Bar

The Menu Bar -- is directly below the Title bar and displays the menu. The menu begins with the word File and continues with the following: Edit, View, Insert, Format, Tools, Data, Window, and Help. You use the menu to give instructions to the software. Point with your mouse to a menu option and click the left mouse button. A drop-down menu will appear. You can now use the left and right arrow keys on your keyboard to move left and right across the Menu bar options. You can use the up and down arrow keys to move up and down the drop-down menu. To select an option, highlight the item on the drop-down menu and press Enter. An ellipse after a menu item signifies additional options; if you select that option, a dialog box will appear.
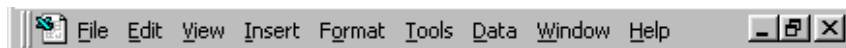
The Menu Bar

The Toolbars -- provide shortcuts to menu commands. Toolbars are generally located just below the Menu bar. The basic toolbars – Standard and Formatting – are available as the Microsoft Excel is opened. If not, follow the steps outlined below:
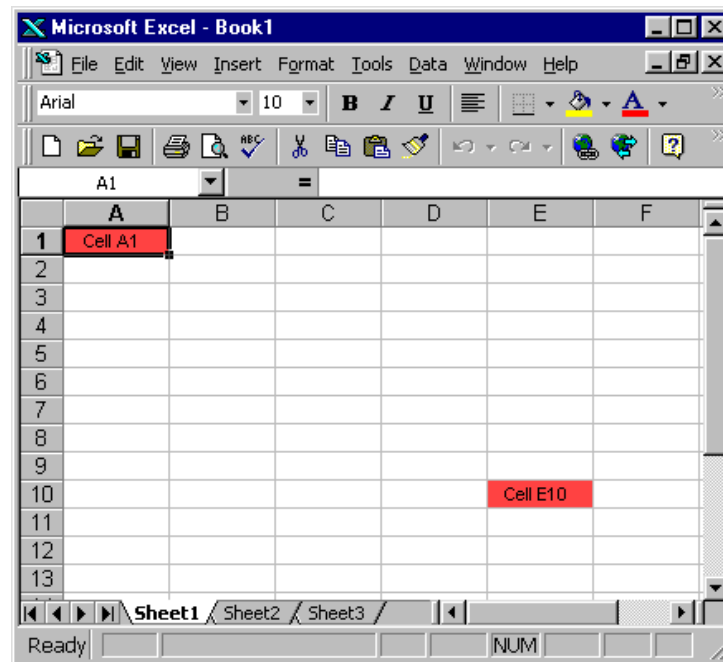
The Standard Toolbar

The Formatting Toolbar

1. Point to View, which is located on the Menu bar.
2. Click the left mouse button.
3. Press the down arrow key until Toolbars is highlighted.
4. Press Enter. Both Standard and Formatting should have a checkmark next to them. If both have a checkmark next to them, press Esc three times to close the menu. If either does not have a checkmark, press the down arrow key until Customize is highlighted.
5. Press Enter.
6. Point to the box or boxes next to the unchecked word or words, Standard and/or Formatting, and click the left mouse button. A checkmark should appear.
7. **Note:** You turn the checkmark on and off by clicking the left mouse button.
8. Point to Close and click the left mouse button to close the dialog box.

Worksheets – Microsoft Excel consists of worksheets. Each worksheet contains columns and rows. The columns are lettered A to IV; the rows are numbered 1 to 65536. The combination of column and row coordinates make up a cell address. For example, the cell located in the upper left corner of the worksheet is cell A1, meaning column A, row 1. Cell E10 is located under column E on row 10. You enter your data into the cells on the worksheet.

Empty Excel Worksheet

The Formula Bar -- If the Formula bar is turned on, the cell address displays on the left side of the Formula bar. Cell entries display on the right side of the Formula bar. Before proceeding, make sure the Formula bar is turned on.

The Formula Bar

1. Point to View, which is located on the Menu bar.
2. Click the left mouse button. A drop-down menu will appear.
3. On the drop-down menu, if Formula Bar has a checkmark next to it, the Formula bar is turned on. Press the Esc key twice to close the drop-down menu.
4. If Formula Bar does not have a checkmark next to it, press the down arrow key until Formula Bar is highlighted and press Enter. The Formula bar should appear below the toolbars.
5. Note that the current cell address displays on the left side of the Formula bar.

The Status Bar -- If the Status bar is turned on, it appears at the very bottom of the screen as shown below. Before proceeding, make sure the Status bar is turned on. The following steps will activate the Status bar:

1. Point to View, which is located on the Menu bar.
2. Click the left mouse button. A drop-down menu will appear.
3. On the drop-down menu, if Status Bar has a checkmark next to it, it is turned on. Press the Esc key twice to close the drop-down menu.
4. If Status Bar does not have a checkmark next to it, press the down arrow key until Status Bar is highlighted and press Enter. The Status bar should appear at the bottom of the screen.

Notice the word "Ready" on the Status bar at the lower left side of the screen. The word "Ready" tells you that Excel is in the Ready mode and awaiting your next command. Other indicators (e.g. toggle keys) appear on the Status bar in the lower right corner of the screen. Here are some examples:

- The Num Lock key is a toggle key. Pressing it turns the numeric keypad on and off. You can use the numeric keypad to enter numbers as if you were using a calculator. The letters "NUM" on the Status bar in the lower right corner of the screen indicate that the numeric keypad is on. Press the Num Lock key several times and note how the indicator on the Status bar changes.

- The Caps Lock key is also a toggle key.   Pressing it turns the caps function on and off. When the caps function is on, your entry will appear in capital letters. Press the Cap Lock key several times and note how the indicator on the Status bar changes.

- Scroll Lock is another toggle key that appears on the Status bar.   Pressing this key toggles the function between on and off. Scroll Lock causes the pointer movement key to move the window but not the cell pointer.

- End key allows you to jump around the screen. Pressing the End key toggles the function between on and off.

Complete the following exercise on navigating Excel. In performing this exercise make sure the Scroll Lock and End indicators are off.

1. **The Down Arrow Key** -- You can use the down arrow key to move downward on the screen one cell at a time.

    1. Press the down arrow key several times.
    2. Note that the cursor moves downward one cell at a time.

2. **The Up Arrow Key --** You can use the Up Arrow key to move upward on the screen one cell at a time.

    1. Press the up arrow key several times.

2. Note that the cursor moves upward one cell at a time.

3. **The Right and Left Arrow Keys** -- You can use the right and left arrow keys to move right or left one cell at a time.

   1. Press the right arrow key several times.
   2. Note that the cursor moves to the right.
   3. Press the left arrow key several times.
   4. Note that the cursor moves to the left.

4. **Page Up and Page Down** -- The Page Up and Page Down keys move the cursor up and down one page at a time.

   1. Press the Page Down key.
   2. Note that the cursor moves down one page.
   3. Press the Page Up key.
   4. Note that the cursor moves up one page.

5. **The End Key** -- The End key, used in conjunction with the arrow keys, causes the cursor to move to the far end of the spreadsheet in the direction of the arrow.

The Status Bar showing End Key

   1. Press the End key.
   2. Note that "END" appears on the Status bar in the lower right corner of the screen.
   3. Press the right arrow key.
   4. Note that the cursor moves to the farthest right area of the screen.
   5. Press the END key again.
   6. Press the down arrow key. Note that the cursor moves to the bottom of the screen.
   7. Press the End key again.
   8. Press the left arrow key. Note that the cursor moves to the farthest left area of the screen.
   9. Press the End key again.
   10. Press the up arrow key. Note that the cursor moves to the top of the screen.

Note: If you have entered data into the worksheet, the End key moves you to the end of the data area.

6. **The Home Key** -- The Home key, used in conjunction with the End key, moves you to cell A1 -- or to the beginning of the data area if you have entered data.

   1. Move the cursor to column J.
   2. Stay in column J and move the cursor to row 20.
   3. Press the End key.
   4. Press Home.
   5. You should now be in cell A1.

7. **Scroll Lock** -- Scroll Lock moves the window, but not the cell pointer.

The Status Bar showing Scroll Lock

1. Press the Page Down key.
2. Press Scroll Lock. Note "SCRL" appears on the Status bar in the lower right corner of the screen.
3. Press the up arrow key several times. Note that the cursor stays in the same position and the window moves upward.
4. Press the down arrow key several times. Note that the cursor stays in the same position and the window moves downward.
5. Press Scroll Lock to turn the scroll lock function off.
6. Press End.
7. Press Home. You should be in cell A1.

Working with Cells and Ranges

A cell is a single element in a worksheet that can hold a value, text, or a formula. A cell is identified by its *address*, which consists of its column letter and row number. For example, cell D12 is the cell in the fourth column and the twelfth row. A group of cells is called a *range*. You designate a range address by specifying its upper-left cell address and its lower-right cell address, separated by a colon. Here are some examples of range addresses:

A1:B1	Two cells that occupy one row and two columns
C24	A range that consists of a single cell
A1:A100	100 cells in column A
A1:D416	Cells (four rows by four columns)
C1:C65536	An entire column of cells; this range also can be expressed as C:C
A6:IV6	An entire row of cells

Selecting Ranges: To perform an operation on a range of cells in a worksheet, you must select the range of cells first. For example, if you want to make the text bold for a range of cells, you must select the range and then click the Bold button on the Formatting toolbar (or, use any of several other methods to make the text bold). When you select a range, the cells appear highlighted in light blue-gray. The exception is the active cell, which remains its normal color. The figure below shows an example of a selected range in a worksheet.

	A	B	C	D	E
1					
2		Year	Benefit	Cost	
3		0	0	1000	
4		1	200	300	
5		2	800	300	
6		3	1000	300	
7		4	1000	300	
8		5	1000	300	
9		6	1000	300	
10		7	800	300	
11		8	800	300	
12		9	800	300	
13		10	800	300	
14					

Example of a selected range in a worksheet.

You can select a range in several ways:
- Use the mouse to drag, highlighting the range. If you drag to the end of the screen, the worksheet will scroll.
- Press the Shift key while you use the direction keys to select a range.
- Press F8 and then move the cell pointer with the direction keys to highlight the range. Press F8 again to return the direction keys to normal movement.
- Use the Edit →Go To command (or press F5) and enter a range's address manually into the Go To dialog box. When you click OK, Excel selects the cells in the range that you specified.

Selecting Complete Rows and Columns: You can select entire rows and columns in much the same manner as you select ranges, as follows:
- Click the row or column border to select a single row or column.
- To select multiple adjacent rows or columns, click a row or column border and drag to highlight additional rows or columns.
- To select multiple (nonadjacent) rows or columns, press Ctrl while you click the rows or columns that you want.
- Press Ctrl+spacebar to select a column. The column of the active cell (or columns of the selected cells) will be highlighted.
- Press Shift+spacebar to select a row. The row of the active cell (or rows of the selected cells) will be highlighted.
- Click the Select All button (or Ctrl+Shift+spacebar) to select all rows.
- Selecting all rows is the same as selecting all columns, which is the same as selecting all cells.

Selecting Noncontiguous Ranges: Most of the time, the ranges that you select will be *contiguous* -- a single rectangle of cells. Excel also enables you to work with *noncontiguous ranges*, which consist of two or more ranges (or single cells) that are not necessarily next to each other. This is also known as a *multiple selection*. If you want to apply the same formatting to cells in different areas of your worksheet, one approach is to make a multiple selection. When

the appropriate cells or ranges are selected, the formatting that you select is applied to them all. A noncontiguous range selected in a worksheet is shown below:

	A	B	C	D
1	Year	Benefit	Cost	
2	0	0	1000	
3	1	200	300	
4	2	800	300	
5	3	1000	300	
6	4	1000	300	
7	5	1000	300	
8	6	1000	300	
9	7	800	300	
10	8	800	300	
11	9	800	300	
12	10	800	300	
13				

Example of selected cells in noncontiguous ranges.

You can select a noncontiguous range in several ways:
- Hold down Ctrl while you drag the mouse to highlight the individual cells or ranges.
- From the keyboard, select a range as described previously (using F8 or the Shift key). Then, press Shift+F8 to select another range without canceling the previous range selections.
- Select Edit → Go To and then enter a range's address manually into the Go To dialog box. Separate the different ranges with a comma. When you click OK, Excel selects the cells in the ranges that you specified (see Figure above).

Selecting Multisheet Ranges: The discussion so far has focused on ranges on a single worksheet. However, an Excel workbook can contain more than one worksheet. As expected, ranges can extend across multiple worksheets. Suppose that you have a workbook that is set up to track expenses by study of a large project. A common approach is to use a separate worksheet for each study, making it easy to organize the data. The figure below shows a workbook that has four sheets, named Total, Study1, Study2, and Study3. The sheets are laid out identically. The only difference is the values. The Total sheet contains formulas that compute the sum of the corresponding items in the three study worksheets.

Project Expenses Summary

	A	B	C	D	E
1		Quarter 1	Quarter 2	Quarter 3	Quarter 4
2	Salaries	2300	2300	2300	2300
3	Travel	2800	2800	2800	2800
4	Supplies	1400	1400	1400	1400
5	Total	6500	6500	6500	6500
6					
7					

Total / Study1 / Study2 / Study3

A sample workbook that uses multiple worksheets.

The worksheets in the Project Expenses Summary workbook aren't formatted in any way. Since the sheets are laid out identically, you can number formats in all the sheets simultaneously. The following is a step-by-step example of multisheet formatting:

1. Activate the Total worksheet.
2. Select the range B2:E5.
3. Press Shift and click the sheet tab labeled Study3. This selects all worksheets between the active worksheet (Totals) and the sheet tab that you click (see Figure below). Notice that the workbook window's title bar displays [Group]. This is a reminder that you've selected a group of sheets and that you're in Group edit mode.

A sample workbook with multiple worksheets selected

4. Click the Comma Style button on the Formatting toolbar. This applies comma formatting to the selected cells.
5. Click one of the other sheet tabs. This selects the sheet and also cancels Group mode; [Group] is no longer displayed in the title bar. All the worksheets in the workbook are formatted with Comma Style number format.

A sample workbook with all worksheets formatted simultaneously.

Annotating a Cell: Excel's cell-comment feature enables you to attach a comment to a cell. This feature is useful when you need to document a particular value. It's also useful to help you remember what a formula does.

To add a comment to a cell, select the cell and then choose Insert➔Comment (or Shift+F2). Excel inserts a comment that points to the active cell, as shown in the figure below. Initially, the comment consists of your name (i.e., name of your computer). Enter the text for the cell comment and then click anywhere in the worksheet to hide the comment. Cells that have a comment attached display a small red triangle in the upper-right corner. When you move the mouse pointer over a cell that contains a comment, the comment becomes visible.

	A	B	C	D	E	F
1	Assumptions					
2	Discount rate	10%	%			
3	Cost of labor	120	P/man-day			
4	Price of fertilizer	800	P/bag			
5						
6						

Private:
Change this figure to do sensitivity analysis on discount rate

A sample of a cell with annotation or comments.

To edit a comment, activate the cell, right-click, and then choose Edit Comment from the shortcut menu. To delete a cell comment, activate the cell that contains the comment, right-click, and then choose Delete Comment from the shortcut menu.

Filling Cells Automatically

You can use Microsoft Excel to automatically fill cells with information that occur in a series. For example, you can have word automatically fill in times, the days of the week or months of the year, years, and other types of series. The following demonstrates:

1. Type the following into the worksheet as shown.

	A	B	C	D	E	F	G
1	1:00	Sun	Sunday	Jan	January	2000	Type 1

2. Place the cursor in cell A1.
3. Press F8. This will anchor the cursor.
4. Press the right arrow key six times to highlight cells A1 through G1.
5. Find the small black square in the lower right corner of the highlighted area. This is called the Fill Handle.
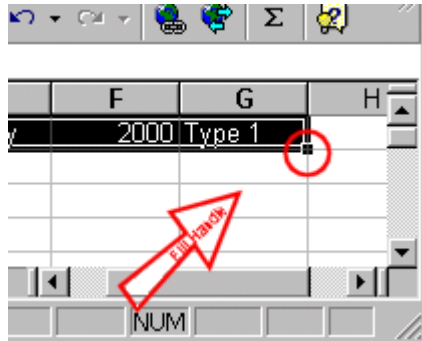
6. Grab the Fill Handle and drag with your mouse to highlight cells A1 to G24.
7. Note how each cell fills.
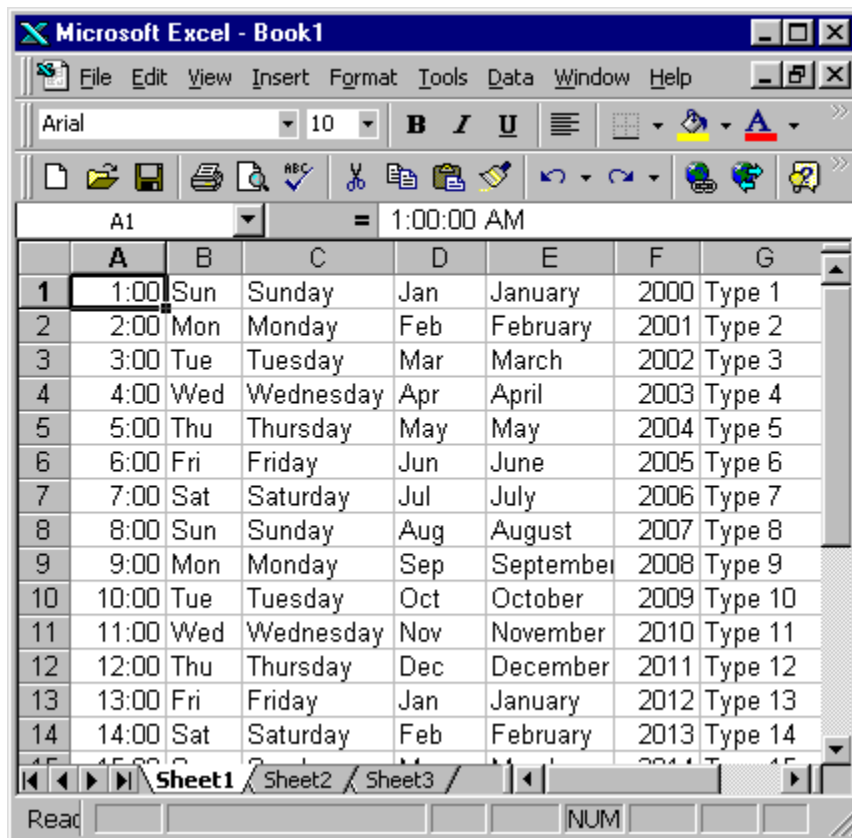
2. Press Esc and then click anywhere on the worksheet to remove the highlighting.

Deleting Cell Contents: To erase the contents of a cell or range, select the cell or range and press Delete. Or, you can select Edit →Clear→All. Another method is to select the cell or range of cells, right click mouse button and then select Clear Contents.

Copying, Cutting and Pasting

Copying the contents of a cell is a very common operation. You can do any of the following:

- Copy a cell to another cell.
- Copy a cell to a range of cells. The source cell is copied to every cell in the destination range.
- Copy a range to another range. Both ranges must be the same size.

Copying a cell normally copies the cell contents, any formatting that is applied to the original cell (including conditional formatting and data validation), and the cell comment (if it has one). When you copy a cell that contains a formula, the cell references in the copied formulas are changed automatically to be relative to their new destination.

Copying consists of two steps although shortcut methods exist:
1. Select the cell or range to copy (the source range) and copy it to the Clipboard.
2. Move the cell pointer to the range that will hold the copy (the destination range) and paste the Clipboard contents.

If you find that pasting overwrote some essential cells, choose Edit→Undo (or press Ctrl+Z). Because copying is used so often, Excel provides many different methods as follows:

Copying by using toolbar buttons: The Standard toolbar has two buttons that are relevant to copying: the Copy icon ( ) and the Paste icon ( ). Follow the steps below to copy a cell or range of cells by using toolbar buttons:

1. Highlight cell or range of cells to be copied, say A7 to B9. To do this, place the cursor in cell A7. Press F8. Press the down arrow key twice. Press the right arrow key once. A7 to B9 should be highlighted. Or highlight cell range A7 to B9 by clicking the mouse on cell A7. While holding the left mouse button at cell A7 drag it down to A9 and then to the right at B9.
2. Click on the Copy icon, which is located on the Formatting toolbar. Use the arrow key or mouse to move the cursor to cell C7.
3. Click on the Paste icon, which is located on the Formatting toolbar
4. Press Esc to exit the Copy mode.

Copying by using menu commands: You can use the following menu commands for copying and pasting:
- Highlight cell or range of cells to be copied. Then click Edit →Copy **--** Copies the selected cells to the Windows Clipboard and the Office Clipboard
- Click Edit → Paste: Pastes the Windows Clipboard contents to the selected cell or range

Copying by using shortcut menus: Select the cell or range to copy (A2:B4), right-click, and then choose Copy from the shortcut menu. Then, select the cell (D2) in which you want the copy to appear, right-click, and choose Paste from the shortcut menu (see figure below).
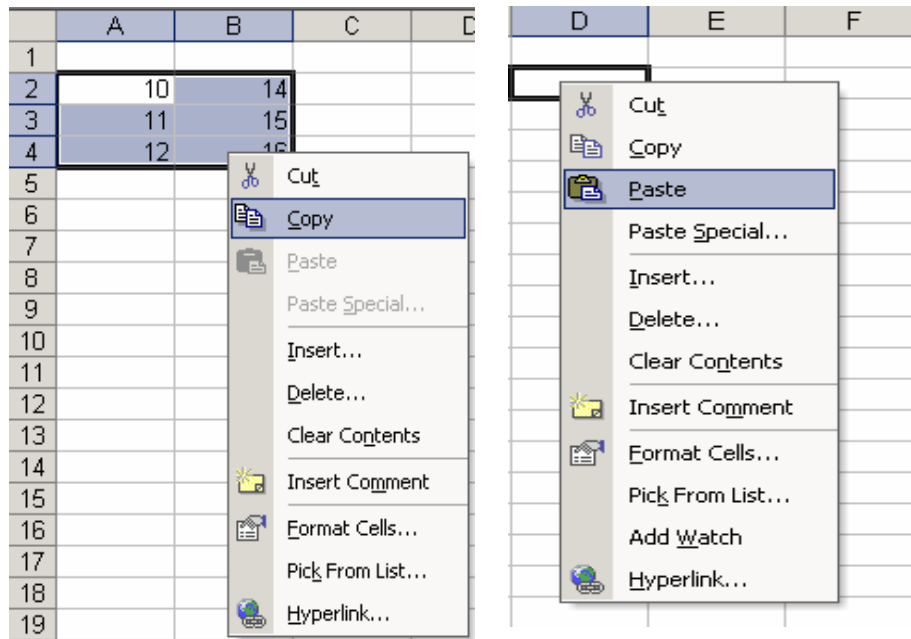
Example showing copy and paste shortcut menus

Copying by using shortcut keys: The copy and paste operations also have shortcut keys associated with them:

- **Ctrl+C:** Copies the selected cells to the Clipboard
- **Ctrl+V:** Pastes the Clipboard contents to the selected cell or range

Copying to adjacent cells: Often, you'll find that you need to copy a cell to an adjacent cell or range. This type of copying is quite common when working with formulas. For example, if you're working on a budget, you might create a formula to add the values in column B. You can use the same formula to add the values in the other columns. Rather than reenter the formula, you'll want to copy it to the adjacent cells.

Excel provides some additional options on its Edit menu for copying to adjacent cells. To use these commands, select the cell that you're copying and the cells that you are copying to (see figure below). Then, issue the appropriate command from the following list for one-step copying:
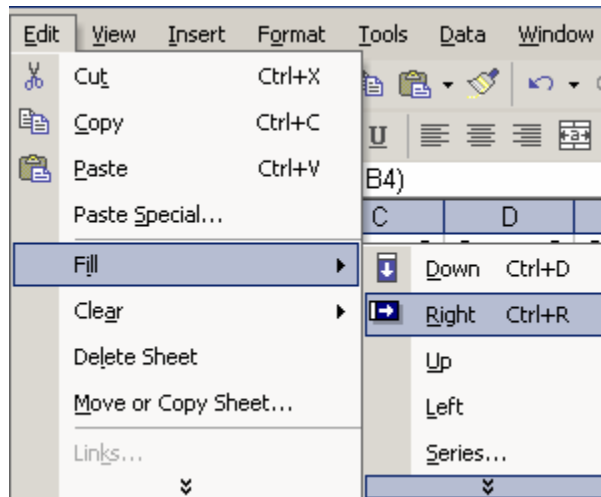
Edit→Fill→Down (or Ctrl+D): Copies the cell to the selected range below

Edit→Fill→Right (or Ctrl+R): Copies the cell to the selected range to the right

Edit→Fill→Up: Copies the cell to the selected range above

Edit→Fill→Left: Copies the cell to the selected range to the left

	A	B	C	D	E
1		Quarter 1	Quarter 2	Quarter 3	Quarter 4
2	Salaries	1,000.00	1,000.00	1,000.00	1,000.00
3	Travel	800.00	800.00	800.00	800.00
4	Supplies	500.00	500.00	500.00	500.00
5	Total	2,300.00			

Edit	View	Insert	Format	Tools	Data	Window
✂ Cut		Ctrl+X				
📋 Copy		Ctrl+C				
📋 Paste		Ctrl+V	B4)			
Paste Special...			C	D		
Fill		▶	⬇ Down	Ctrl+D		
Clear		▶	➡ Right	Ctrl+R		
Delete Sheet			Up			
Move or Copy Sheet...			Left			
Links...			Series...			

To copy to adjacent cells, start by selecting the cell to copy
plus the cells in which you want the copy to appear.

You also can use AutoFill to copy to adjacent cells by dragging the selection's fill handle. Excel copies the original selection to the cells that you highlight while dragging.

Copying a range to other sheets: The copy procedures described previously also work to copy a cell or range to another worksheet, even if the worksheet is in a different workbook. Activate the other worksheet first before you select the location to which you want to copy. Follow the steps below:

- Start by selecting the range to copy. Then, press Ctrl and click the sheet tabs for the worksheets to which you want to copy the information (Excel displays [Group] in the workbook's title bar).
- Select Edit→Fill→Across Worksheets, and a dialog box appears that asks what you want to copy (All, Contents, or Formats).
- Make your choice and then click OK. Excel copies the selected range to the selected worksheets; the new copy will occupy the same cells in the selected worksheets as the original occupies in the initial worksheet.

Moving a cell or range: Copying a cell or range doesn't modify the cell or range that you copied. If you want to relocate a cell or range to another location, use the Edit→Cut command. This is similar to Edit→Copy command except that it also removes the contents of the selection from its original location.

To move a cell or range, therefore, requires two steps:
1. Select the cell or range to cut (the source range) and "cut" it to both of the Clipboards.

2. Select the cell that will hold the moved cell or range (the destination range) and paste the contents of one of the Clipboards. The destination range can be on the same worksheet or in a different worksheet—or in a different workbook.

Note that you also can move a cell or range by dragging it. Select the cell or range that you want to move and then slide the mouse pointer to any of the selection's four borders. The mouse pointer turns into an arrow pointing up and to the left. Drag the selection to its new location and release the mouse button.

Copy and Paste Special: Excel contains two more versatile ways to paste information. You can use the Office Clipboard to copy and paste multiple items, or you can use the Paste Special dialog box to paste information in distinctive ways.

- The Edit→Paste Special command is a much more versatile version of the Edit→Paste command.
- For the Paste Special command to be available, you need to copy a cell or range to the Clipboards (using Edit→Cut won't work).
- Then, select the cell in which you want to paste, and choose Edit→Paste Special. You see the dialog box as shown below.
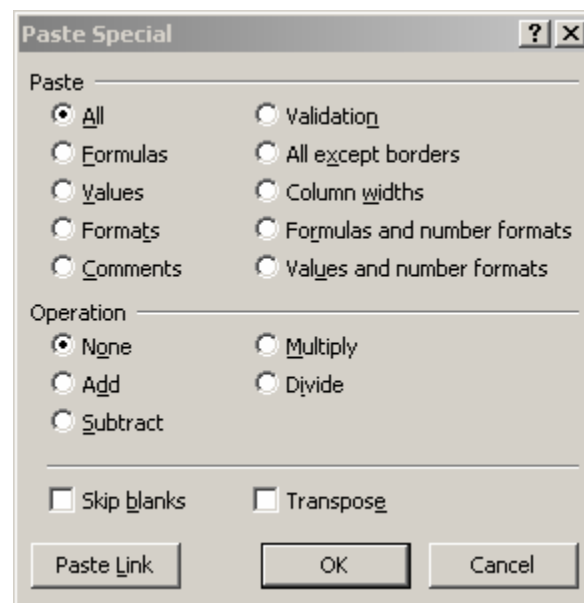
Paste Special Dialog box.

- The several options under Paste Special dialog box are as follows:
  o Pasting all – selecting this option is equivalent to using the Edit→Paste command. It copies the cell's contents, format, and data validation
  o Pasting formulas – copies the formula of selected cell
  o Pasting formulas as values – normally, when you copy a range that contains formulas, Excel copies the formulas and automatically adjust the cell references. The Value option enables you to copy the results of formulas.

- Pasting cell formats only – copy only the formatting applied in the selected cell or range to the destination cell or range.
- Pasting cell comments – copy only the cell comments from a cell or range; doesn't copy cell contents or formatting
- Pasting validation criteria – copy the data validation command created in the selected cell or range to another cell or range
- Skipping borders when pasting – this is to avoid pasting the border of selected cell or range
- Pasting column widths – copy column width information from one column to another
- Performing mathematical operations without formulas – perform an arithmetic operation without using formulas. For example, you can copy a range to another range and select the multiply operation. Excel multiplies the corresponding values in the source range and the destination range and replaces the destination range with the new values.
- Skipping blanks when pasting – this prevents Excel from overwriting cell contents in your paste area with blank cells from the copied range.
- Transposing a range – changes the orientation of the copied range. For instance, rows become column and columns become rows. Any formulas in the copied range are adjusted so that they work properly when transposed.

Elementary Formulae

All formulas in Excel must begin with an equal sign (=). When a formula is entered into a cell, the formula itself is displayed in the formula bar when that cell is highlighted, and the result of the formula is displayed in the actual cell. When you are typing in formulas, do not type spaces; Excel will delete them.

In Microsoft Excel, you can enter numbers and mathematical formulas into cells. When a number is entered into a cell, you can perform mathematical calculations such as addition, subtraction, multiplication, and division. Use the following to indicate the type of calculation you wish to perform:
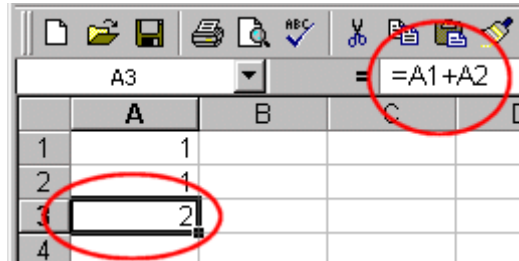
+	Addition
-	Subtraction
*	Multiplication
/	Division
^	Exponential

The following exercises demonstrate how to create formula and perform mathematical calculations.

Addition (+)

1. Move the cursor to cell A1.
2. Type **1**.
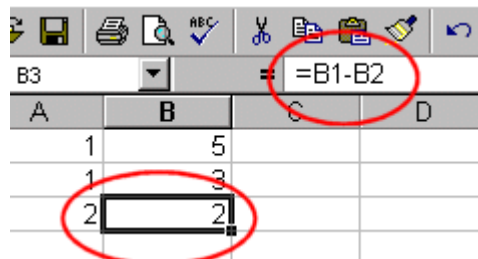3. Press Enter.
4. Type **1** in cell A2.

5. Press Enter.
6. Type **=A1+A2** in cell A3.
7. Press Enter.
8. Note that cell A1 has been added to cell A2 and the result is shown in cell A3.

Place the cursor in cell A3 and look at the Formula bar.

Subtraction (-)

1. Press F5. The Go To dialog box will appear.
2. Type **B1**.
3. Press Enter.
4. The cursor should move to cell B1.
5. Type **5** in cell B1.
6. Press Enter.
7. Type **3** in cell B2.
8. Press Enter.
9. Type **=+B1-B2** in cell B3.
10. Press Enter.
11. Note that cell B1 has been subtracted from B2 and the result is shown in cell B3.

Place the cursor in cell B3 and look at the Formula bar.

Multiplication (*)

1. Hold down the Ctrl key while you press "g" (Ctrl-g). The Go To dialog box will appear.
2. Type **C1**.
3. Press Enter. You should now be in cell C1.
4. Type **2** in cell C1.
5. Press Enter.
6. Type **3** in cell C2.
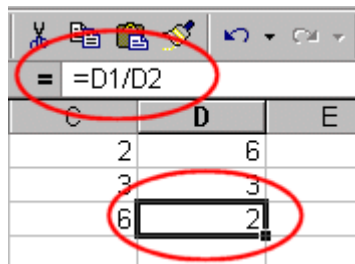7. Press Enter.
8. Type **=C1*C2** in cell C3.

9. Press Enter.
10. Note that C1 is multiplied by C2 and the answer is displayed in C3.
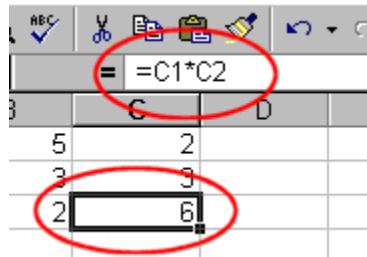
Place the cursor in cell C3 and look at the Formula bar.

Division (/)

1. Press F5.
2. Type **D1**.
3. Press Enter. You should now be in cell D1.
4. Type **6** in cell D1.
5. Press Enter.
6. Type **3** in cell D2.
7. Press Enter.
8. Type **=D1/D2** in cell D3.
9. Press Enter.
10. Note that D1 is divided by D2 and the answer is displayed in cell D3.

Place the cursor in cell D3 and look at the Formula bar.

Exponential (^)

1. Type **2** in cell B2.
2. Press Enter.
3. Type **3** in cell B3.
4. Press Enter.
5. Type **=B2^B3** in cell B4.
6. Press Enter.
7. Note that B2 is raised to the power by B3 and the answer is displayed in cell B4.
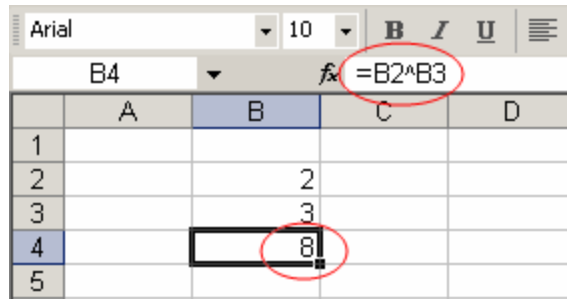
Place the cursor in cell B4 and look at the Formula bar.

Other Excel operations

A formula entered into a cell can consist of any of the following elements:

- Operators such as + (for addition) and * (for multiplication)
- Cell references (including named cells and ranges)
- Values or text
- Worksheet functions (such as SUM or AVERAGE)

A formula can consist of up to 1,024 characters. After you enter a formula into a cell, the cell displays the result of the formula. Here are other few examples of formulas:

=150*.05	Multiplies 150 times .05. This formula uses only values and isn't all that useful.
=A1+A2	Adds the values in cells A1 and A2.
=Income–Expenses	Subtracts the cell named Expenses from the cell named Income.
=SUM(A1:A12)	Adds the values in the range A1:A12.
=A1=C12	Compares cell A1 with cell C12. If they are identical, the formula returns TRUE; otherwise, it returns FALSE.

Other operators used in formulas: Excel uses variety of operators in formula. Below is the list of remaining operators used in formulas:

Operator	Name
&	Concatenation or join cell contents
=	Logical comparison (equal to)
>	Logical comparison (greater than)
<	Logical comparison (less than)
>=	Logical comparison (greater than or equal to)
<=	Logical comparison (less than or equal to)
<>	Logical comparison (not equal to)

Operator precedence: In an earlier example, parentheses are used in the formula, to control the order in which the calculations occur. The formula without parentheses looks like this:

=Income-Expenses*TaxRate

If you enter the formula without the parentheses, Excel computes the wrong answer. To understand why this occurs, you need to understand a concept called *operator precedence,* which basically is the set of rules that Excel uses to perform its calculations. Below is the list of Excels' operator precedence.

Symbol	Operator	Precedence
^	Exponentiation	1
*	Multiplication	2
/	Division	2
+	Addition	3
-	Subtraction	3
&	Concatenation	4
=	Equal	5
<	Less than	5
>	Greater than	5

You use parentheses to override Excel's built-in order of precedence. Returning to the previous example, the formula that follows doesn't use parentheses and, therefore, is evaluated using Excel's standard operator precedence. Because multiplication has a higher precedence, the Expense cell is multiplied by the TaxRate cell. Then, this result is subtracted from Income. This isn't what was intended.

The correct formula, which follows, uses parentheses to control the order of operations. Expressions within parentheses are always evaluated first. In this case, Expenses is subtracted from Income and the result is multiplied by TaxRate.

=(Income-Expenses)*TaxRate

You can also *nest* parentheses in formulas, which means putting parentheses inside of parentheses. If you do so, Excel evaluates the most deeply nested expressions first and works its way out. The figure below shows an example of a formula that uses nested parentheses.

A formula with a nested parenthesis

a cell that has a named reference in its formula, the copied formula contains a reference to the original name.

Excel Functions

Microsoft Excel has a set of prewritten formulas called *functions*. Functions differ from regular formulas in that you supply the value but not the operators, such as +, -, *, or /. The SUM function is used to calculate sums. When using a function, remember the following: (i) Use an equals sign to begin a formula; (ii) Specify the function name; (iii) Enclose arguments within parentheses; and (iv) Use a comma to separate arguments

Here is an example of a function:

=SUM(2,13,10,67)

In this function:

- The equals sign begins the function,
- SUM is the name of the function
- 2, 13, 10 and 67 are the arguments
- Parentheses enclose the arguments
- A comma separates each of the arguments

In the exercises that follow, we will look at various functions.

Calculating Sum (Typing the function)

1. Type **12** in cell B1.
2. Press Enter.
3. Type **27** in cell B2.
4. Press Enter.
5. Type **24** in cell B3.
6. Press Enter.
7. Type **=SUM(B1:B3)** in cell A4. Microsoft Excel sums cells B1 to B3. Alternatively, type = sum(, highlight the range B1:B3, type) and press Enter

Calculating Sum (Entering a Function by Using the Menu)

1. Type **20** in cell C1.
2. Press Enter.
3. Type **30** in cell C2.
4. Press Enter.
5. Type **50** in cell C3.
6. Press Enter. Your cursor should be in cell C4.
7. Click on Insert, which is located on the Menu bar.
8. Press the down arrow key until Function is highlighted.

9. Press Enter.
10. Click on Math & Trig in the Function Category box.
11. Click on Sum in the Function Name box.
12. Click on OK.
13. Type **C1:C3** in the Number1 entry field, if it does not automatically appear.
14. Click on OK.
15. Move to cell A4.
16. Type the word **Sum**.
17. Press Enter.

Calculating an Average

You can use the AVERAGE function to calculate an average from a series of numbers. Using the series of numbers used in calculating sum, do the following:

1. Move the cursor to cell A5.
2. Type **Average**.
3. Press the right arrow key.
4. Type **=AVERAGE(B1:B3)**.
5. Press Enter. The average should appear.

Calculating Min

You can use the MIN function to find the lowest number in a series of numbers.

1. Move the cursor the cell A6.
2. Type **Min**.
3. Press the right arrow key.
4. Type = **MIN(B1:B3)**.
5. Press Enter. The lowest number in the series, which is 12, should appear.

Calculating Max

You can use the MAX function to find the highest number in a series of numbers.

1. Move the cursor the cell A7.
2. Type **Max**.
3. Press the right arrow key.
4. Type = **MAX(B1:B3)**.
5. Press Enter. The highest number in the series, which is 27, should appear.

- **Formatting Text and Numbers in Excel**

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 (see figure below). Thus, to boldface all text in a cell click the desired

cell and then click the Bold button. (If you had wanted to boldface only a portion of the text in a cell… Double-click to edit the cell. Then highlight the text which is to be boldfaced and click the Bold button).


Excel Formatting Toolbar
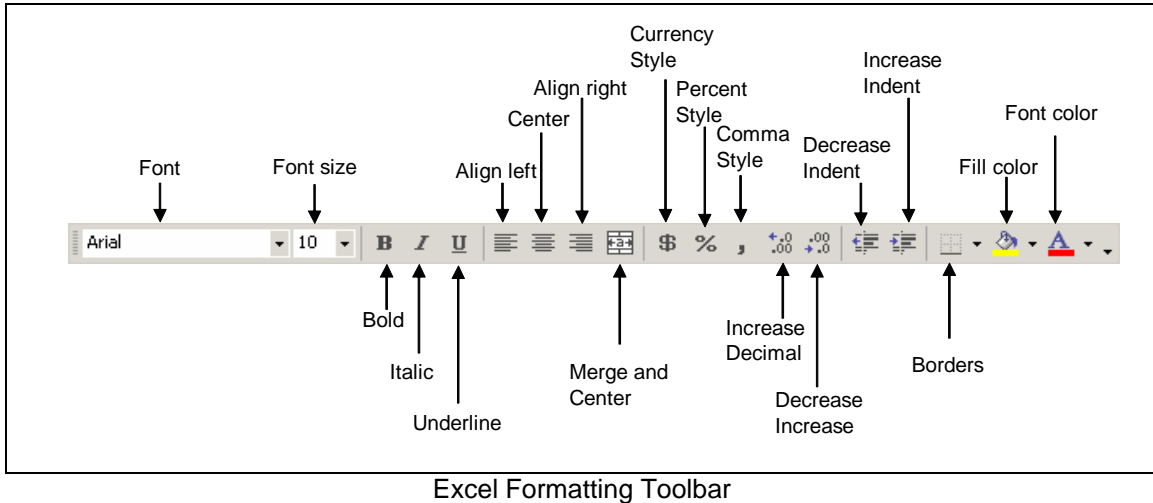
For example, to bold the text in cell A1, click A1 then click Bold button. The resulting text is shown below. The same procedure will be followed for changing font size, type of fonts, cell alignment (e.g., align left, center, align right), applying italic, underline fonts, and centering text or number in a cell. To merge two more cells, highlight the cells to be merged first before clicking on the merge and center icon in the formatting toolbar.
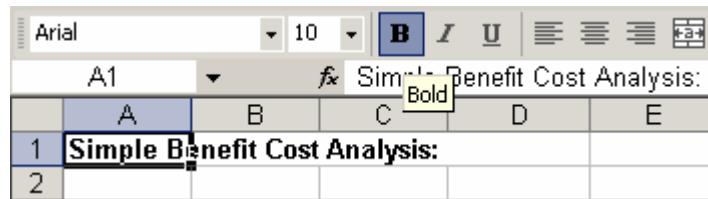
Text applied with bold attribute.

Alternatively, text formatting can also be done through the menu: Format → Cells then various tabs (see figure below) are available for the operation you want to make. The following are the steps for some formatting operations:
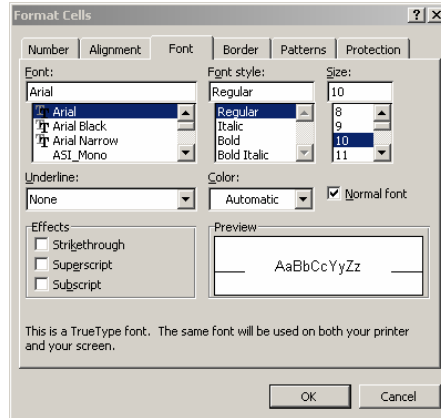
Formatting cells menu

To change basic text attributes:
- Click on the name of the font you wish to use
- Click on the name of font style you want
- Click on the font size you want use

Applying cell borders:
- Select the cells to receive the new border formatting.
- From the format menu, press cells.
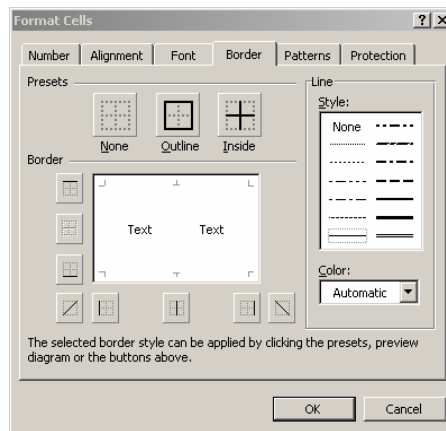- Choose on the borders tab

Table Border Formatting Tool

- To add a basic border outside the selected range, click on the outline button
- To add borders between cells within the selected cell range, click on the Inside button
- Click OK

Number formatting: Excel permits numbers to be formatted in many different ways. Without changing the value of the number in a cell, number formats allow numbers to be represented so that they can be used in many different kinds of projects. The steps in applying number formats through the Format → Cell menu.
- Select the cells containing your number(s)
- From the format menu, choose cells
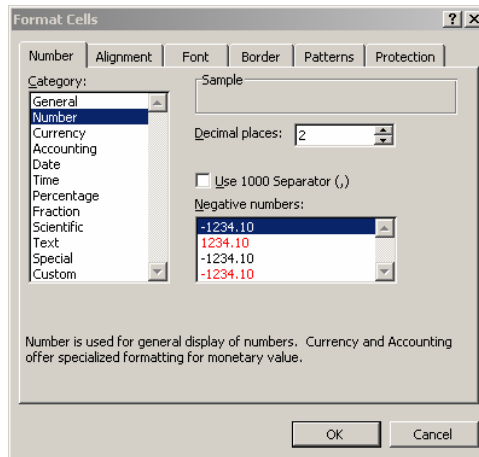
- Click on the number tab
- From the list of categories, select the number format that is best suited to your project. Use the sample box to decide whether the format you chose best represents your number.