Using an Excel worksheet - Basic Formula terminology

What is a Formula ?

A formula is basically a simple mathematical calculation similar that you want to be evaluated. All formulas must start with an **equal sign (=)** .

The simple formulas contain mathematical operators which are just symbols to denote the mathematical operations.

The most common operators are addition, subtraction, multiplication and division.

Formulas are cell entries that perform calculations and return a result.

Using formulas can be useful if you want to perform calculations on values in other cells.

This can be very useful especially if the values in other cells are likely to change.

You can either use the Formula Bar, which is located above the column headings or you could use the mouse to select the various cells.

Using the Formula Bar

This is located below the toolbars and contains a Name box and Formula bar.
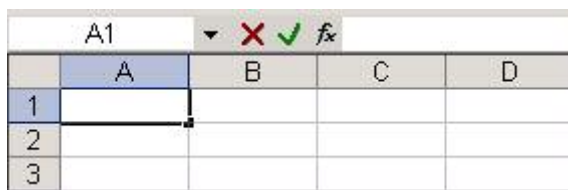
The Formula bar is the area where you can enter text, numbers, dates, formulas etc.

✗ Cancel - Cancels the immediate changes made to the active cell.

✓ Enter - Enters the number, text or formula into the active cell.

The Name box displays the name of the active cell or selected cells and can be used to apply a name to a particular cell range.

As you type your formula the text will appear in both the cell and the formula bar.

Inserting a Formula

Rather than entering your formulas through the Formula Bar you can just enter them directly into the cells. This is the preferred method.

In this very simple example a formula is used in cell D2 to calculate the total of the values in cell B2 and C2. The advantage of using a formula is that it is updated automatically, when the cells that it refers to change.

All the formulas contain basic operations such as addition, subtraction, multiplication and division.

To represent these operations you use what are called **Operators** in between your numbers. When you create a formula you need to include at least one operator.

Use the **=** sign for all formulas. In D2 type the = sign, then click on B2 and then input the **+** (operator) and finally click on C2 and hit Enter.

Once you have finished any formula, always press Enter to confirm. After you have pressed Enter the cell will display the result of the formula as opposed to the actual formula which cells and operator(s) in the formula bar as indicated in the pictures below.

If you change the value in cell B2 to 9, the formula is re-calculated automatically and the correct result is displayed.

What are Operators ?

Operators are just symbols that represent mathematical operations.

There is a strict order of precedence among the operators which means that certain operations are performed before others, assuming that parentheses are not used. Operators that have a high precedence are evaluated first. If you are not sure about the order in which operations are carried out then use parentheses to define the order.

Operation	Symbol	Operation	Symbol
Addition	**+**	Percentage	**%**
Subtraction	**-**	Exponentiatio	**^**
Multiplication	*****	Less Than	**<**
Divisio	**/**	Greater Than	**>**
Equal To	**=**	Less Than or Equal To	**<=**
Not Equal To	**<>**	Greater Than or Equal To	**>=**

Using Parentheses

Parentheses are basically brackets. Using brackets in your formulas is a good habit to get into even when they are not strictly needed because they help to clarify the order and make the formula easier to understand.

Your parentheses must balance. For every open parentheses there must be a corresponding close parentheses. If you try to submit a formula which does not contain the same number of open and close parentheses, Excel will prompt you and tell you that the formula you have entered is incorrect. Excel will make a suggestion as to what it thinks the formula should be. You can accept the recommendation or press "No" to edit the formula yourself.

Things to Remember

- All formulas must start with an **equal sign (=)**. If you type an equal sign into a cell, Excel assumes that you are about to enter a formula. If you do not enter an equal sign then Excel will assume you want to enter a text string.
- Formulas can contain simple mathematical operators, values, cell references and functions.
- There is a strictly order of precedence among the operators which means that certain operations are performed before others.
- Any expression in a formula that is enclosed within a parentheses is calculated first.
- When copying formulas Relative cell references is the default.
- Workbooks that contain a large number of formulas require a large amount of memory and hence take longer to open.
- Formulas that contain links (especially to other workbooks) can often cause a real headache.

Relative and Absolute Cell References

Excel uses two types of cell references to create formulas. Each has its own purpose. You need to know which type of cell reference to use for your formula.

Relative Cell References

This is the most widely used type of cell reference in formulas. Relative cell references are basic cell references that adjust and change when copied or when using AutoFill.

Example:
=SUM(B5:B8), as shown below, changes to =SUM(C5:C8) when copied across to the next cell.

Absolute Cell References

Situations arise in which the cell reference must remain the same when copied or when using AutoFill. Dollar signs are used to hold a column and/or row reference constant.

Example:

In the example below, when calculating commissions for sales staff, you would not want cell B10 to change when copying the formula down. You want both the column and the row to remain the same to refer to that exact cell. By using B10 in the formula, neither changes when copied.

Now, you might be thinking, why not just use 10% and 15% in the actual formulas? Wouldn't that be easier? Yes, if you are sure the discount percentages will never change - which is highly unlikely. It's more likely that eventually those percentages will need to be adjusted. Absolute Cell Reference - You tell Excel to use one specific cell, and never move to another relative location in the calculations by using "absolute cell reference." To specify the cell, place a dollar sign before the column letter and before the row number. Thus, B10 says always use cell B10.

Summary of absolute cell reference uses:

$A1	Allows the row reference to change, but not the column reference.
A$1	Allows the column reference to change, but not the row reference.
A1	Allows neither the column nor the row reference to change.

There is a shortcut for placing absolute cell references in your formulas!

When you are typing your formula, after you type a cell reference - press the **F4** key. Excel automatically makes the cell reference absolute! By continuing to press **F4**, Excel will cycle through all of the absolute reference possibilities. For example, in the first absolute cell reference formula in the above example, =B4*B10, I could have typed, =B4*B10, then pressed the **F4** key to change B10 to B10. Continuing to press **F4** would have resulted in B$10, then $B10, and finally B10. Pressing **F4** changes only the cell reference directly to the left of your insertion point.

Commonly used keyboard combinations

To use one of these combinations Hold the Ctrl or Alt key down and strike the letter key

Ctrl+N	Open a new workbook quickly.	**Ctrl+X**	Cut- Removes the selection from the active document and places it on the clipboard.
Ctrl+O	Opens a previously saved document.	**Ctrl+C**	Copies the selection to the clipboard
Ctrl+W	Closes the active window, but does not Exit Excel.	**Ctrl+V**	Paste - Inserts the contents of the clipboard at the insertion point (cursor) or whatever is selected.
Ctrl+S	Saves the active document with its current file name, location and format.	**Ctrl+A**	Selects all on the active worksheet.
Ctrl+P	Prints the active file, also gives the opportunity to change print options	**Ctrl+F**	Find - Searches for specified text in the active document
Alt+F4	Exit - Closes Microsoft Excel.	**Ctrl+B**	Bold - Formats selected text; make text bold, or remove bold formatting
Ctrl+Z	Undo the last action. This selection can be repeated several times.	**Ctrl+I**	Italic - Formats selected text; make text italic or remove italic
Ctrl+Y	Redo - After an action has been undone, it can be reinstated in the document.	**Ctrl+U**	Underline - Formats selected text; make text underlined or remove underline