Arithmetical Symbols and Order of Operations

When a numerical (a formula) involves two or more operations [ex: 4 + 6 * (8 + 2) - 3 = ?], there is a specific order in which these operations must be performed:

Operation	Symbol	Example	Order
Addition	+	=5+5	4th
Subtraction	-	=3-1	4th
Multiplication	*	=4*6	3rd
Division	/	=8/2	3rd
Exponents	^	=4^3 (4 cubed)	2nd
Parentheses	( )	=(4+2)*8	1st

Type a formula into Excel

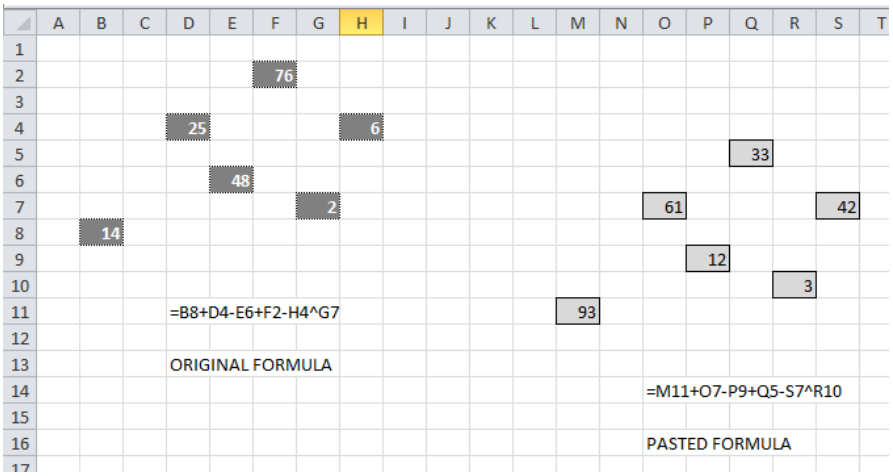
Always type formulas (and functions) in the cells where you want their answers to be displayed.

1. ***FIRST***: type the equals sign (=)! This tells Excel that what comes after is a formula or function.
2. Type the first cell reference OR click on the first cell in the formula ("Point and Shoot")
3. Type the arithmetical operator (+, -, *, /, ^)
4. Type the next cell reference or click on the next cell in the formula.
5. When done, click the check mark on the Formula Bar ( - only visible while typing in a cell). The cell now displays the answer, while the Formula Bar shows the formula.

Note: As you type, cell references and their corresponding cells are color-coded.

Relative Cell Referencing

You can copy and paste formulas in Excel, either by using the Ribbon buttons or by using the Fill Handle. The pasted formula will perform the same calculations as the original formula, but on different cells. The cells it uses are cells that are in the same places *relative to* the formula cell as the cells used in the original formula were (see below). This is called *Relative Cell Referencing*.

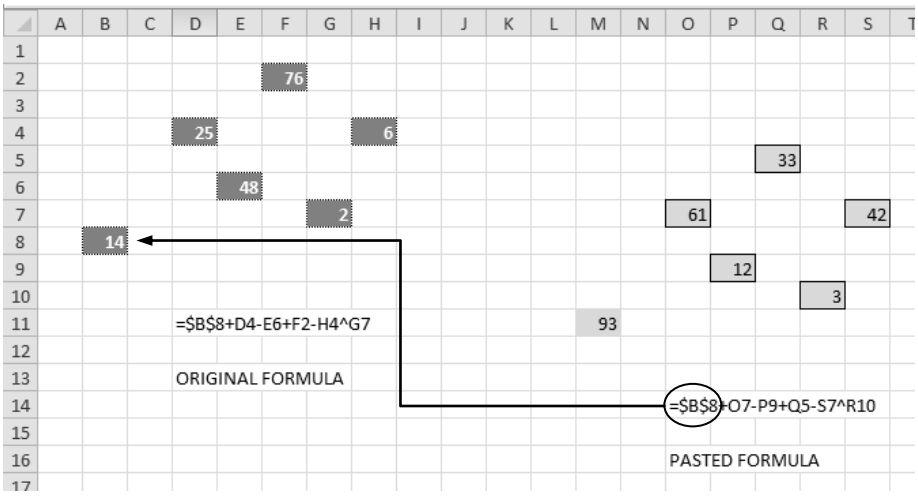


Prevent relative cell referencing from changing particular cell references when copying and pasting formulas

When typing the formula, use dollar signs to block off relative cell references:

- Place a dollar sign in front of a column letter (ex: $D3) to prevent the column letter from changing
- Place a dollar sign in front of a row number (ex: D$3) to prevent the row number from changing
- Place a dollar sign in front of both the row number and the column letter (ex: D3) to prevent the entire cell reference from changing.

This is called *Absolute Cell Referencing*.



Cut a formula and paste it into a new location

Click the cell containing the formula, click the Cut icon (, on the Home Ribbon, in the *Clipboard* group), click the destination cell, and click the Paste icon (on the Home Ribbon, in the *Clipboard* group).

The formula will be removed from its original location and placed in the new one. With this command, relative cell referencing *does not apply*, and the formula still refers to the *original cells*.

Function Basics

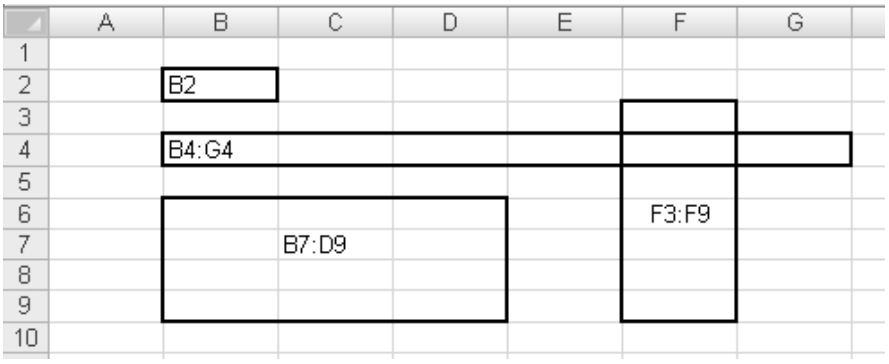
- Functions are "prefabricated" calculations such as sums, averages, rounding, etc.
- Like formulas, functions start with the equals sign.
- Functions use **cell ranges** to refer to groups of cells. For example, A1:A4 stands for "The cells from A1 through A4". (See examples below.)
- The basic syntax of all functions is: =Function Name(Cell Range); for example, =SUM(A1:A4), which is the same as =A1+A2+A3+A4. Type functions in the cells where you want the answers to appear.

Common Functions

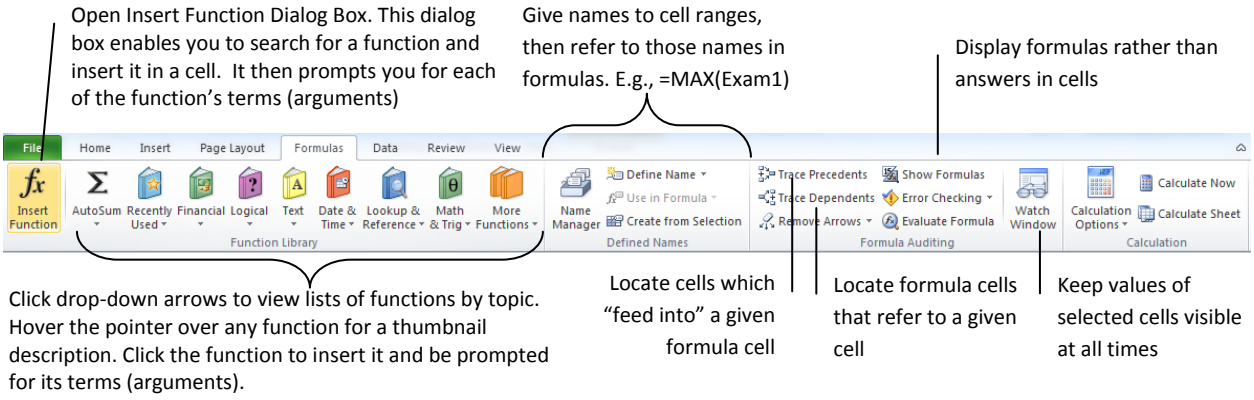
Name and Syntax	Description
=SUM(A1:A3)	Gives the sum of all cells found within the given range.
=AVERAGE(A1:A3)	Gives the average of all cells found within the given range.
=MAX(A1:A3)	Gives the maximum value found within the given range.
=MIN(A1:A3)	Gives the minimum value found within the given range.
=COUNT(A1:A3)	Counts the cells within the range which contain numerical values
=COUNTA(A1:A3)	Counts the cells within the range which contain any data

Cell Ranges

- A single cell (B2)
- A row (B4:G4)
- A column (F3:F9)
- A block (B7:D9)
- Combination – any of the above types, separated by commas (B7:D9,B34,A4:A8)



Formulas Ribbon



Use AutoSum to Quickly Insert the Sum Function (and other common functions)

1. Click the cell where you want the sum to appear.
2. Click Formulas to view the Formulas Ribbon, then click the AutoSum icon (∑) in the *Function Library* group.
3. Excel will paste the sum function into the cell, and choose a likely cell range (the range will be surrounded by "marching ants"). If AutoSum does not select the correct range, type or drag to enter your own range.
4. Choose other common functions by clicking the drop-down arrow beside AutoSum.

Practice Exercises

1. Open the household budget workbook you created after Class 1.
    a. Click in cell N1 and type Annual Total.
    b. In cell N2, use the Sum function to add up the payments you have typed in Row 2. [This will probably turn out to be =SUM(B2:M2)]
    c. Use the Fill Handle to copy the function to each cell in the Annual Total column.
    d. In cell O1, type Average Monthly Payment.
    e. In Cell O2, use the Average function to calculate the average of the payments in Row 2. (Make sure not to include the Annual Total in your average.)
    f. Use the Fill Handle to copy this function to each cell in the Average Monthly Payment column.
    g. In column A, click the cell below your last category name. Type Monthly Totals.
    h. One cell over in column B, use the AutoSum button to create a function that will add up all the January payments. Use the Fill Handle to copy the function to each cell in the Monthly Totals row.
    i. Save your workbook; we'll come back to it after the next class.

2. Create a commission report: type a spreadsheet with the data at the right:
    a. The salesman gets 7 percent commission on each sale. Type a formula to calculate that amount in the top cell of the Commission column. (Excel understands percentages, so you can use the symbol: 7%.)
    b. Use the fill handle to copy the formula to each cell in the Commission column.
    c. *Leave a blank row below your data table*, and in the first cell below that type "Total Commission". Use the AutoSum button to calculate the total of the commissions. (The total should appear below the last commission.)
    d. Insert two rows (not cells!) in your spreadsheet in the middle of the list of names. Type the data at the right in the appropriate columns:
    e. Use the fill handle to fill in the commission formula for the two new job names.
    f. Sort the list into alphabetical order by Job Name.

Job Name	Job Cost	Commission
Taylor	425	
Edison	1250	
Hannah	789	
Gordon	129	
Lieber	720	
Zia-Ebrahimi	652	

Smith	95
Andrews	550