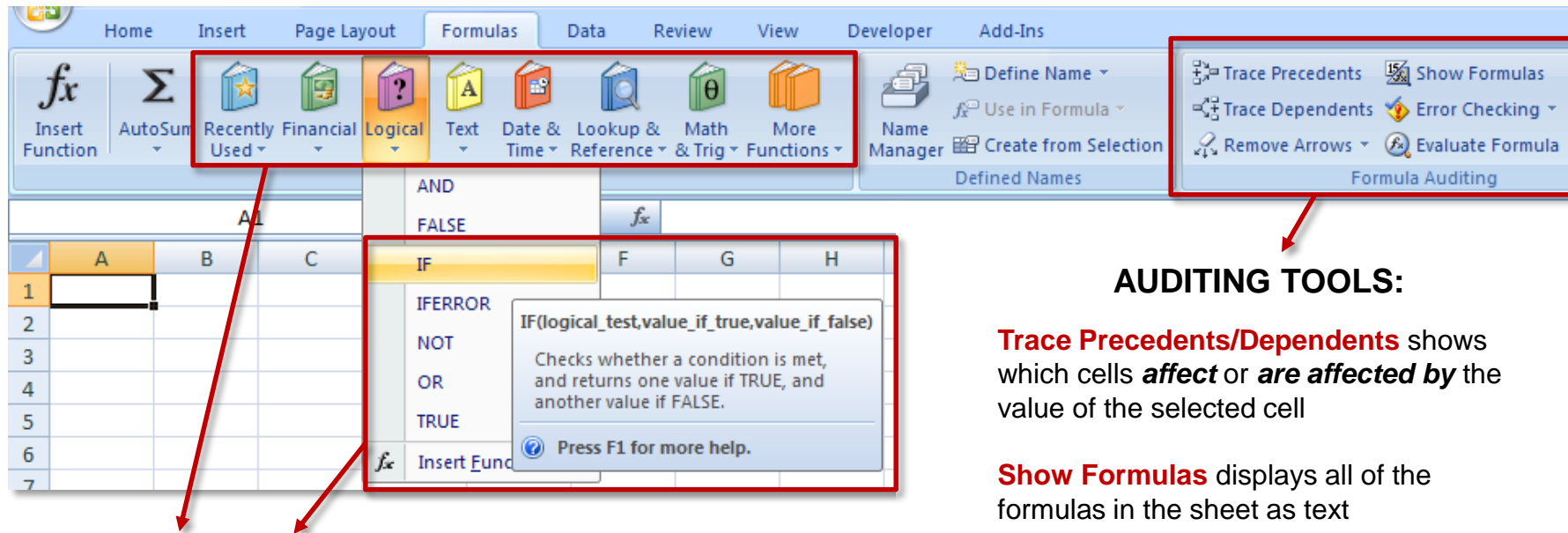


# Formulas Tab/Auditing Tools



## FORMULA LIBRARY:

Includes a list of all common formulas, component parts, and brief descriptions of how each formula works

## AUDITING TOOLS:

**Trace Precedents/Dependents** shows which cells **affect** or **are affected by** the value of the selected cell

**Show Formulas** displays all of the formulas in the sheet as text

**Evaluate Formula** allows you to step into a formula and determine the output of each component

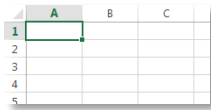


All Excel formulas start with a “=” and can either be selected from the formula library or typed directly into the formula bar

As you begin to type a formula, a pop-up will appear to guide you through each step, shown in **bold**

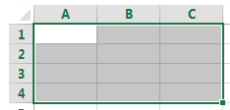
**A1**

**Single-cell references** describe a cell's location within a worksheet, in terms of the intersection between a column (A through XFD), and a row (1 through 1,048,576)



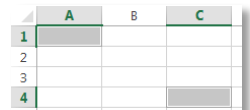
**A1:C4**

**Array references** describe a contiguous group of cells based on the location of the top-left (A1) and the bottom-right (C4) cells, separated by a “:”



**A1,C4**

**Non-contiguous references** describe selections of individual cells that do not share a common border, separated by a “,”



## Hold the phone, how come some cell references include a “\$”?

These are used to create **Fixed, Relative, or Mixed References**; the \$ basically locks a specific cell range or reference so that it does not change if you apply the formula to other cells

*For Example:*

**\$A\$1** = Fixed column, Fixed row

**A\$1** = Relative column, Fixed row

**\$A1** = Fixed column, Relative row

**A1** = Relative column, Relative row

	A	B	C
1	\$A\$1		
2			
3			
4			\$A\$1

	A	B	C
1	A\$1		
2			
3			
4			C\$1

	A	B	C
1	\$A1		
2			
3			
4			\$A4

	A	B	C
1	A1		
2			
3			
4			C4



### PRO TIP:

*Select part of your formula with the cursor and use “F4” to quickly scroll through reference types. ALWAYS THINK ABOUT YOUR REFERENCES*

Error Type	What it means	How to fix it
<b>#####</b>	<i>Column isn't wide enough to display values</i>	<i>Drag or double-click column border to increase width, or right-click to set custom column width</i>
<b>#NAME?</b>	<i>Excel does not recognize text in a formula</i>	<i>Make sure that function names are correct, references are valid and spelled properly, and quotation marks and colons are in place</i>
<b>#VALUE!</b>	<i>Formula has the wrong type of argument</i>	<i>Check that your formula isn't trying to perform an arithmetic operation on text strings or cells formatted as text</i>
<b>#DIV/0!</b>	<i>Formula is dividing by zero or an empty cell</i>	<i>Check the value of your divisor; if 0 is correct, use an IF statement to display an alternate value if you choose</i>
<b>#REF!</b>	<i>Formula refers to a cell that it not valid</i>	<i>Make sure that you didn't move, delete, or replace cells that are referenced in your formula</i>

The **IFERROR** statement is an excellent tool to eliminate annoying error messages (**#N/A**, **#DIV/0!**, **#REF!**, etc.), which is particularly useful for front-end formatting

**=IFERROR(value, value\_if\_error)**

Formula or value (which may or may not result in an error)

Value returned in the case of an error

*In this case we're replacing an error caused by the A1/B1 formula with "Invalid Formula", and an error caused by a VLOOKUP function with "-"*

**=IFERROR(A1/B1,"Invalid Formula")**  
**=IFERROR(VLOOKUP(A1,D1:E4,2,0), "-")**



### PRO TIP:

***If you're writing a formula that may trigger an error (i.e. a VLOOKUP where not all values have a match), WRITE THE FULL FORMULA FIRST then wrap it in an IFERROR statement***

The **F4** function is used for two helpful shortcuts:

1) Adding or modifying cell reference types

*With your cursor selecting any cell reference or array within a formula, the **F4** key will cycle through fixed, relative, and absolute reference types*



2) Repeating your last command or action

***F4** will also repeat the last user action, such as inserting/deleting rows or columns, changing cell format or style, etc. (**Note:** **F4** will not repeat entered values or formulas)*

The **F2** function displays the cell ranges that are tied to a given formula



**PRO TIP:**

*Use **F2** to help diagnose formula errors or make quick adjustments to cell references and arrays*

The **CTRL** function can be combined with a variety of keys, such as:

## 1) CTRL- ARROW

*Jumps to the left, right, top, or bottom edge (i.e. last non-blank cell) of a contiguous data array*

## 2) CTRL-SHIFT-ARROW

*Extends a selection to the left, right, top, or bottom edge (i.e. last non-blank cell) of a data array*

## 3) CTRL-PAGE UP/DOWN

*Jumps between tabs of a workbook*

**CTRL-SHIFT-LEFT ARROW**

	A	B	C	D	E	F	G	H
1	77	847	482	847	916	329	796	
2	183	852	286	275	177	476	224	
3	252	117	134	865	242	822	705	
4	711	507	125	910	348	529	491	
5	842	12	837	491	221	595	369	
6	782	39	906	245	286	753	964	
7	820	678	473	777	172	655	984	
8	321	164	803	461	225	560	652	
9	374	447	395	232	742	101	916	
10	891	966	861	898	719	757	141	
11	718	775	635	817	550	703	602	
12								

**CTRL-SHIFT-RIGHT ARROW**

	A	B	C	D	E	F	G	H
1	77	847	482	847	916	329	796	
2	183	852	286	275	177	476	224	
3	252	117	134	865	242	822	705	
4	711	507	125	910	348	529	491	
5	842	12	837	491	221	595	369	
6	782	39	906	245	286	753	964	
7	820	678	473	777	172	655	984	
8	321	164	803	461	225	560	652	
9	374	447	395	232	742	101	916	
10	891	966	861	898	719	757	141	
11	718	775	635	817	550	703	602	
12								

**CTRL-SHIFT-DOWN ARROW**

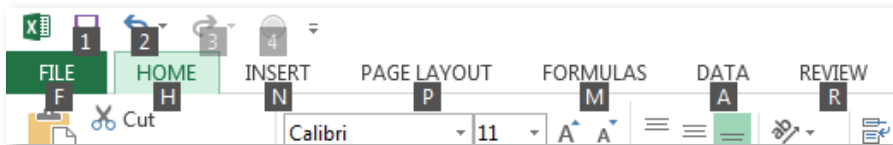
	A	B	C	D	E	F	G	H
1	77	847	482	847	916	329	796	
2	183	852	286	275	177	476	224	
3	252	117	134	865	242	822	705	
4	711	507	125	910	348	529	491	
5	842	12	837	491	221	595	369	
6	782	39	906	245	286	753	964	
7	820	678	473	777	172	655	984	
8	321	164	803	461	225	560	652	
9	374	447	395	232	742	101	916	
10	891	966	861	898	719	757	141	
11	718	775	635	817	550	703	602	
12								

**FULL LIST:**

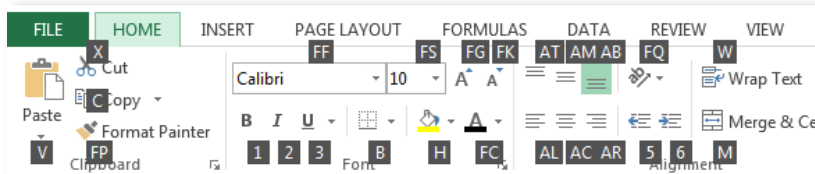
<http://office.microsoft.com/en-us/excel-help/excel-shortcut-and-function-keys-HP010073848.aspx>

The **ALT** function enables **Key Tips**, which allow you to access any function in the ribbon using keyboard shortcuts (*Note: you do not need to hold down ALT*)

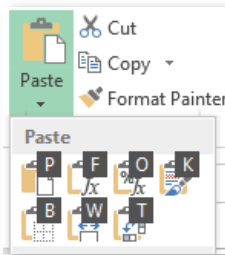
1) Press **ALT** to reveal tab-level shortcuts:



2) Press the key for the tab you want (i.e. **H**) to reveal additional shortcuts:



3) Continue to press shortcut keys (i.e. **V**) to drill into specific functions:



### PRO TIP:

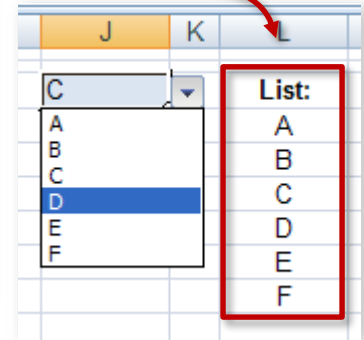
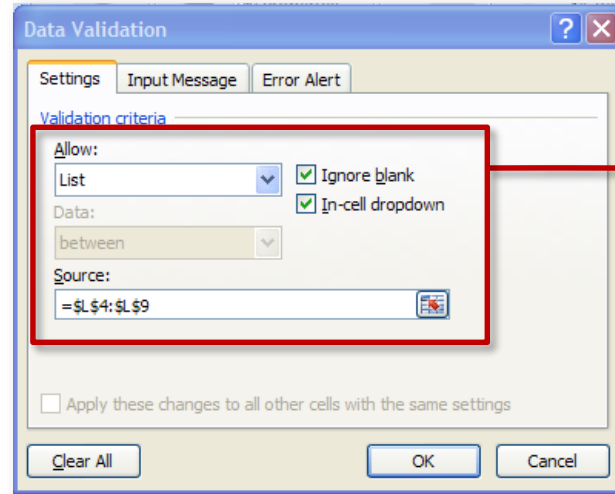
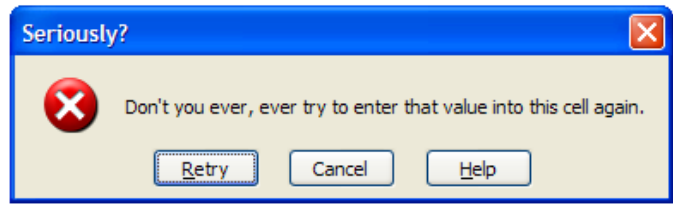
Use **ALT-H-V-V** to paste as values  
or **ALT-H-V-F** to paste as formulas



**Data Validation** allows you to specify exactly what types of values a cell can contain (i.e. whole numbers, positive integers, values from a list, etc.)

One of the most useful forms of data validation is **LIST**, which creates a drop-down menu of options based on a source list that you specify:

*(but the best part is that you can write your own hilarious error messages) See, Excel can be fun!*



**Volatile Functions** are functions or formulas in Excel that change every time the workbook recalculates (i.e. any time you enter data anywhere in any open workbook)



**Handle with Care:** Common volatile functions include **NOW()**, **TODAY()**, **RAND()**, **OFFSET()** & **INDIRECT()**



## PRO TIP:

*To control when Excel recalculates, change the Calculation Options to "Manual" in the Formulas tab (just don't forget you changed it!)*

