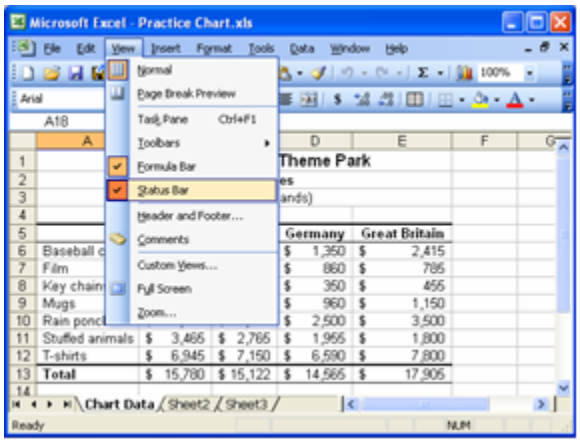
MICHIGAN
ROSS SCHOOL OF BUSINESS

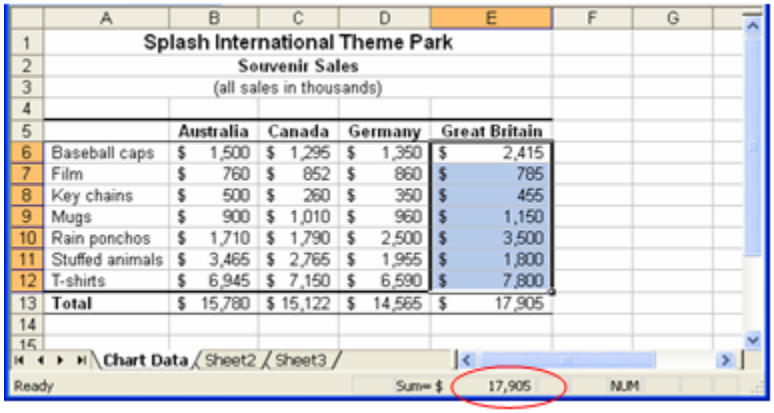
Excel Formulas

Performing Simple Calculations Using the Status Bar

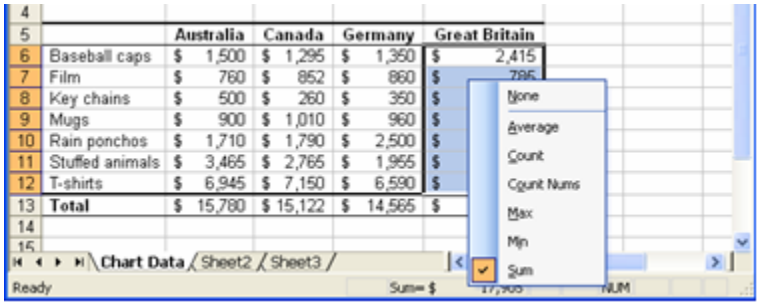
If you need to see a simple calculation, such as a total, but do not need it to be a part of your spreadsheet, all you need is your Status Bar. To open the Status Bar, make sure there is a checkmark next to the Status Bar option in the View menu.



Highlight the cells you wish to calculate and you will see the sum of the cells in the Status Bar at the bottom of the screen.



If you want something other than the sum, right-click the formula in the Status Bar and choose a different calculation.



Order of Math Operations

When working with functions, it is important to understand how Excel will process the equation. The way the function is entered will determine the outcome. Remember this mnemonic device from algebra?

Please **E**xcuse **M**y **D**ear **A**unt **S**ally

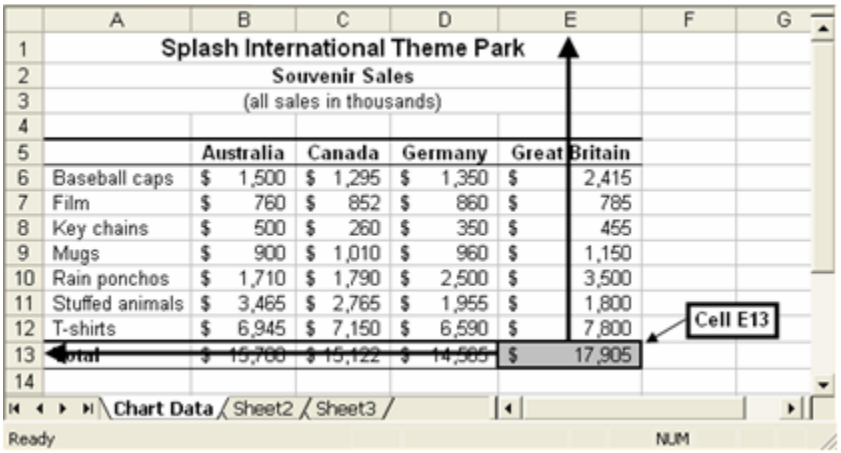
which stands for

Parentheses **E**xponents **M**ultiplication **D**ivision **A**ddition **S**ubtraction

For example, 4 + 3 × 2 will equal 10, while (4 + 3) × 2 will equal 14.

Using Cell References

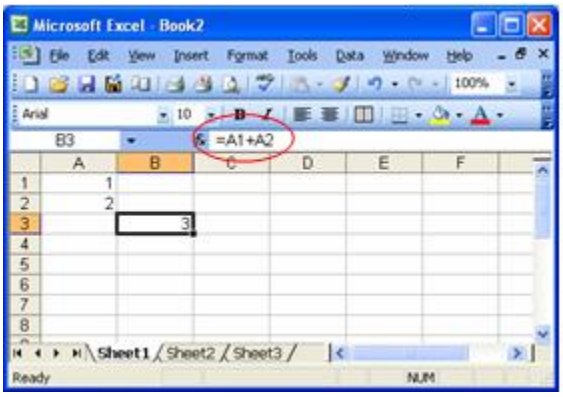
The cell reference is how Excel understands where a piece of data is located. The default cell reference is the cell's column and row.

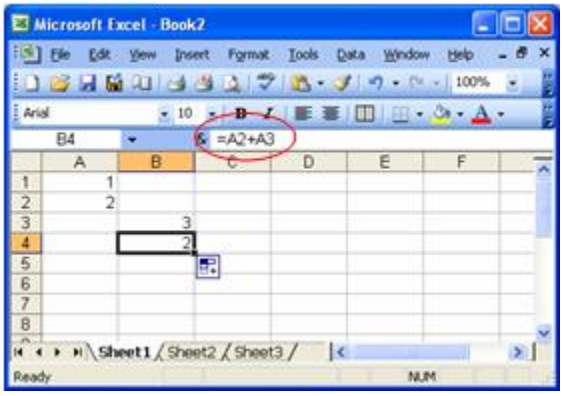


Relative versus Absolute References

Relative references

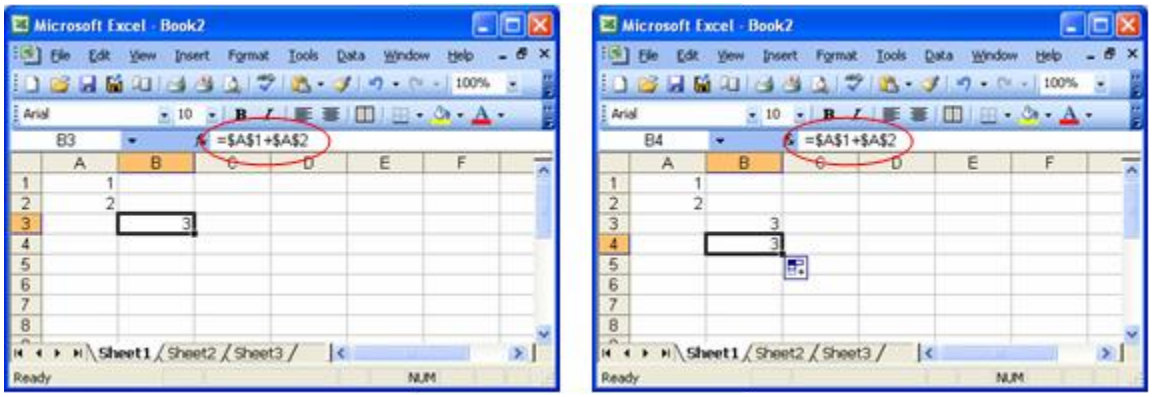
A relative cell reference in a formula, such as A1, is based on the relative position of the cell that contains the formula and the cell the reference refers to. If the position of the cell that contains the formula changes, the reference is changed. If you copy the formula across rows or down columns, the reference automatically adjusts.





Absolute references

An absolute cell reference in a formula, such as A1, always refer to a cell in a specific location. If the position of the cell that contains the formula changes, the absolute reference remains the same. If you copy the formula across rows or down columns, the absolute reference does not adjust.



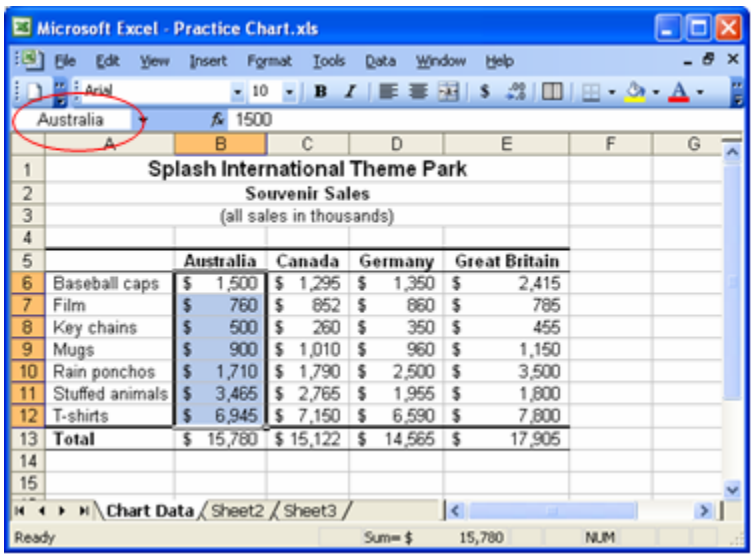
Mixed references

A mixed reference has either an absolute column and relative row, or absolute row and relative column. An absolute column reference takes the form $A1, $B1, and so on. An absolute row reference takes the form A$1, B$1, and so on. If the position of the cell that contains the formula changes, the relative reference is changed, and the absolute reference does not change. If you copy the formula across rows or down columns, the relative reference automatically adjusts, and the absolute reference does not adjust.

Naming Data Ranges

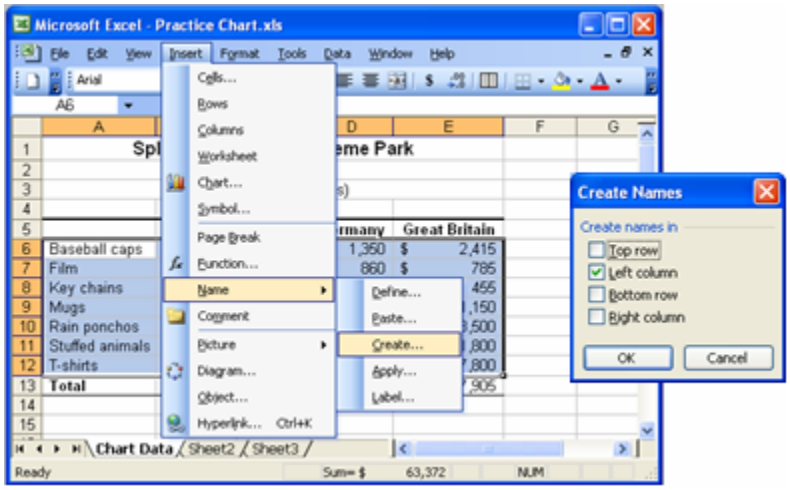
Naming groups of cells can make formulas easier to create, especially if you will be using those ranges of cells more than once or in calculations on different sheets of the workbook.

To name a group of cells, highlight the cells and type a name for them in the name box to the left of the formula bar.



		Australia	Canada	Germany	Great Britain
6	Baseball caps	$ 1,500	$ 1,295	$ 1,350	$ 2,415
7	Film	$ 760	$ 852	$ 860	$ 785
8	Key chains	$ 500	$ 260	$ 350	$ 455
9	Mugs	$ 900	$ 1,010	$ 960	$ 1,150
10	Rain ponchos	$ 1,710	$ 1,790	$ 2,500	$ 3,500
11	Stuffed animals	$ 3,465	$ 2,765	$ 1,955	$ 1,800
12	T-shirts	$ 6,945	$ 7,150	$ 6,590	$ 7,800
13	Total	$ 15,780	$ 15,122	$ 14,565	$ 17,905

To create named ranges semi-automatically, highlight the range of cells, including the labels you want to use to name the cells, and go to Insert… Names… Create… on the menu bar. Select the location or locations of the names and Excel will create the names for you.

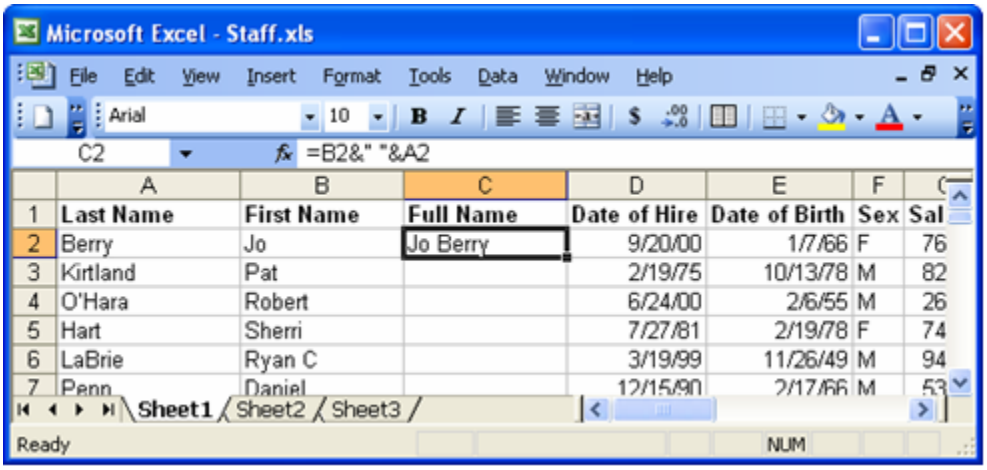


Entering Formulas

Formulas always begin with an equal sign (=). Any text used in a formula must be enclosed in quotation marks (“ ”).

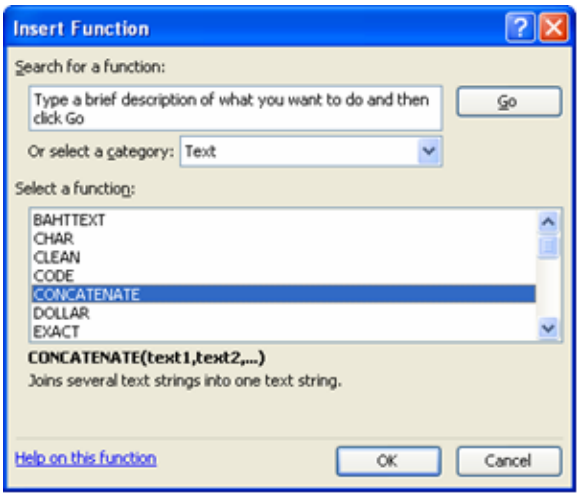
Formulas Using Text

One useful formula working with text is concatenation, combining the contents of two or more cells into one. To enter the formula manually, surround spaces, punctuation and text with quotation marks and separate the elements of the formula with an ampersand (&).

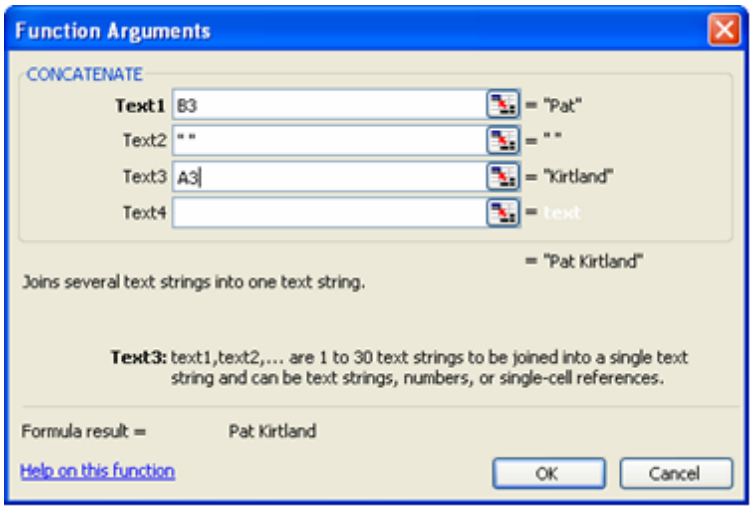


	A	B	C	D	E	F	G
1	Last Name	First Name	Full Name	Date of Hire	Date of Birth	Sex	Sal
2	Berry	Jo	Jo Berry	9/20/00	1/7/66	F	76
3	Kirtland	Pat		2/19/75	10/13/78	M	82
4	O'Hara	Robert		6/24/00	2/6/55	M	26
5	Hart	Sherri		7/27/81	2/19/78	F	74
6	LaBrie	Ryan C		3/19/99	11/26/49	M	94
7	Penn	Daniel		12/15/90	2/17/66	M	53

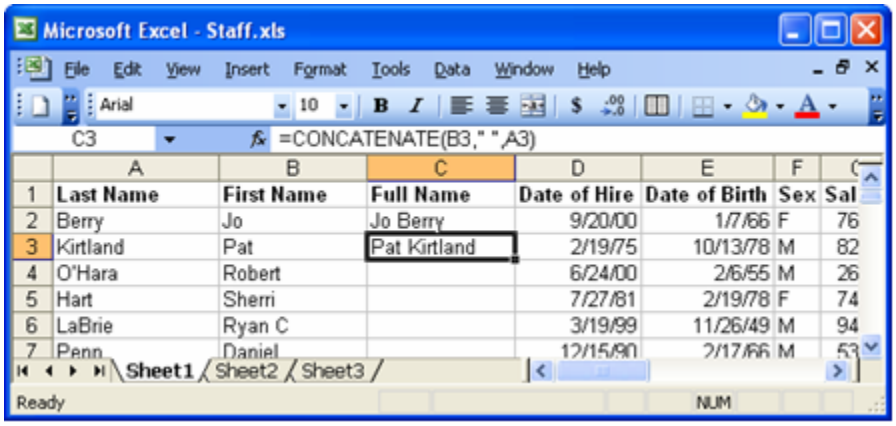
Excel has a built in formula for concatenation. Click the Insert Function button ( ) and choose Concatenate from the Text category list.



Enter the cell references and any additional text, such as spaces and punctuation, in the cells.

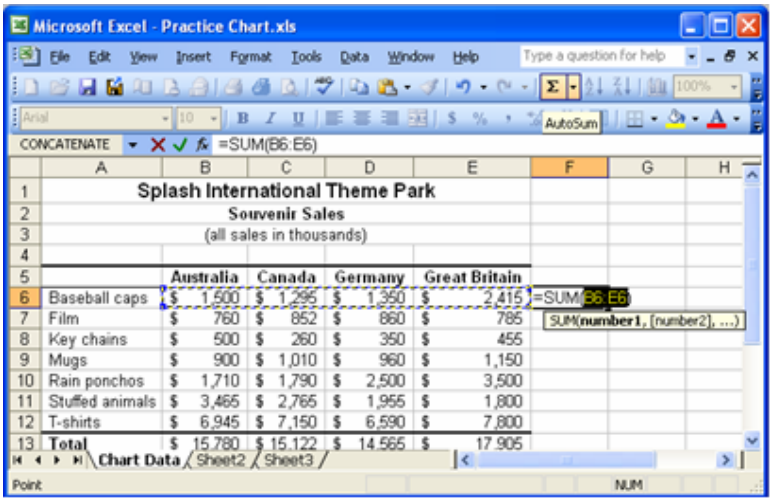


Once you click OK, you will see that the resulting value is the same as manually entering the formula as we did above.



AutoSum

The most commonly used functions, such as Sum and Average, can be accessed through a single button on the toolbar. First select the cell you want the function in, then click the AutoSum button for a total or choose one of the other functions by clicking the pull-down arrow. Excel will automatically create the formula based on the nearest range of cells to the left of or above the selected cell.



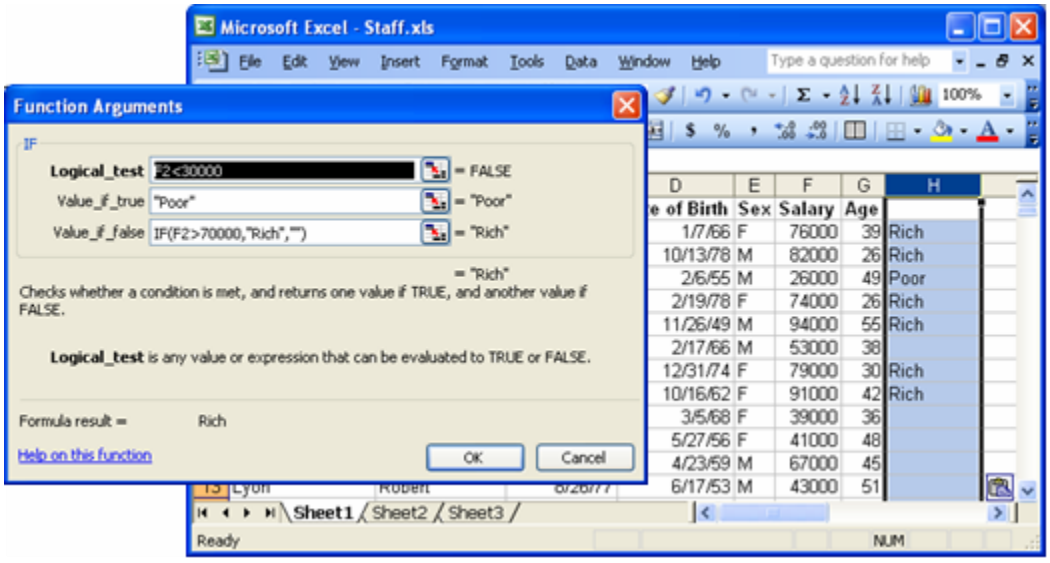
Count Functions

There are a variety of Count functions. Count will count cells containing numerical values, CountA counts cells with text values, CountBlank counts how many cells are empty, and CountIf will count cells that meet a certain criteria.

If Functions

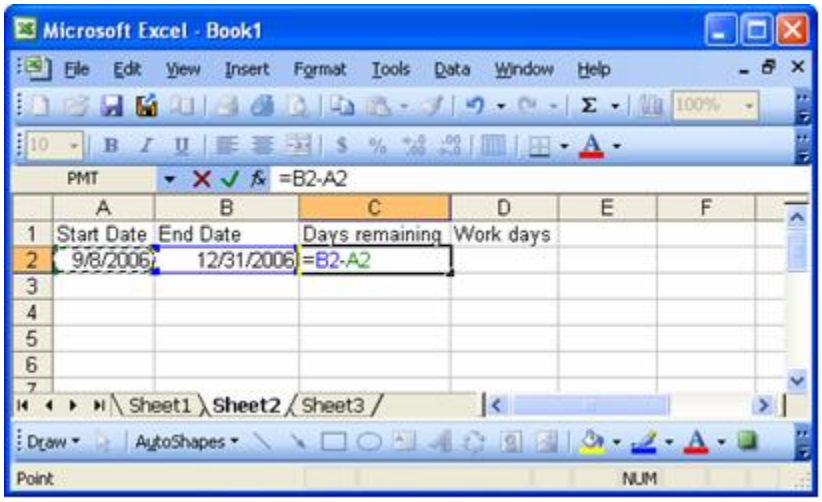
If functions evaluate an expression and return a True or False value. You can set the return value or even nest another If function to further evaluate the expression.

The syntax for the If function is If(*expression*, *value if true*, *value if false*). Here is an example of an If function that evaluates salaries. Using a nested If statement, it will return either “poor”, “rich”, or an empty cell.

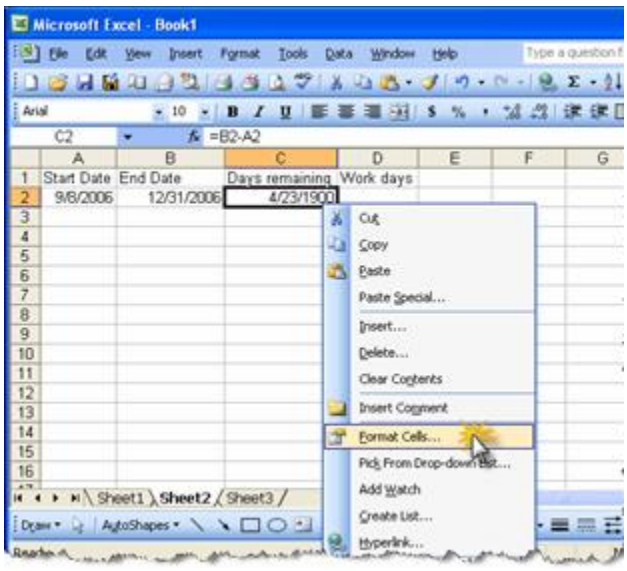


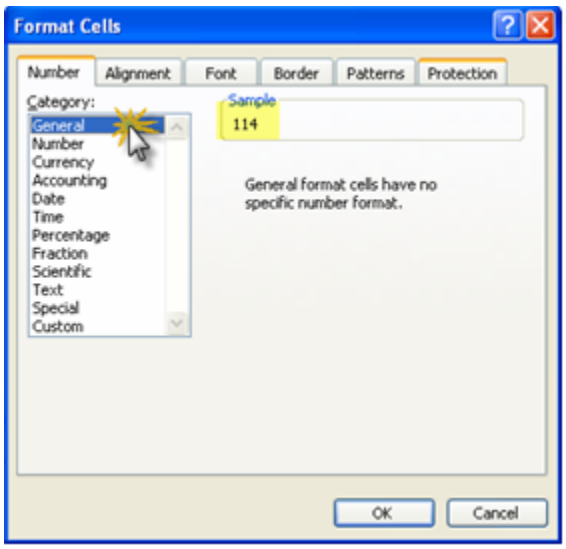
Date Functions

One simple Date formula you can do is determining the number of days between two dates. This is just a matter of subtracting one date from the other.

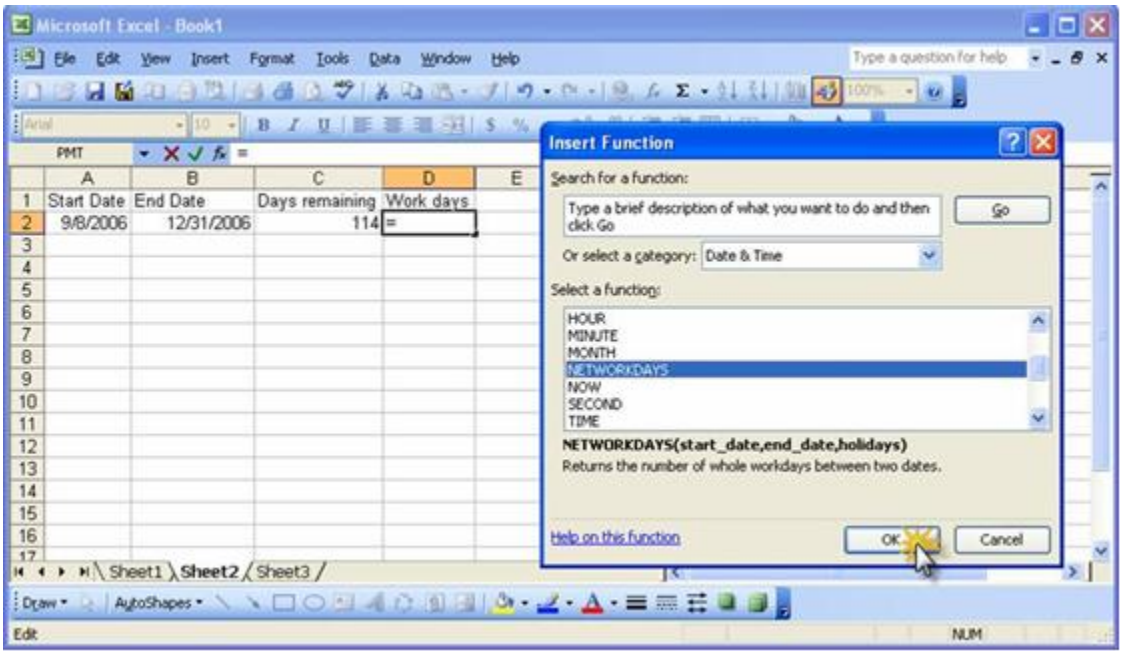


The result may be viewed as a date code by Excel. To reformat the cell to show the result as a number instead of a date, right-click the cell or go to the Format menu and choose Format Cells. On the Number tab, choose General.

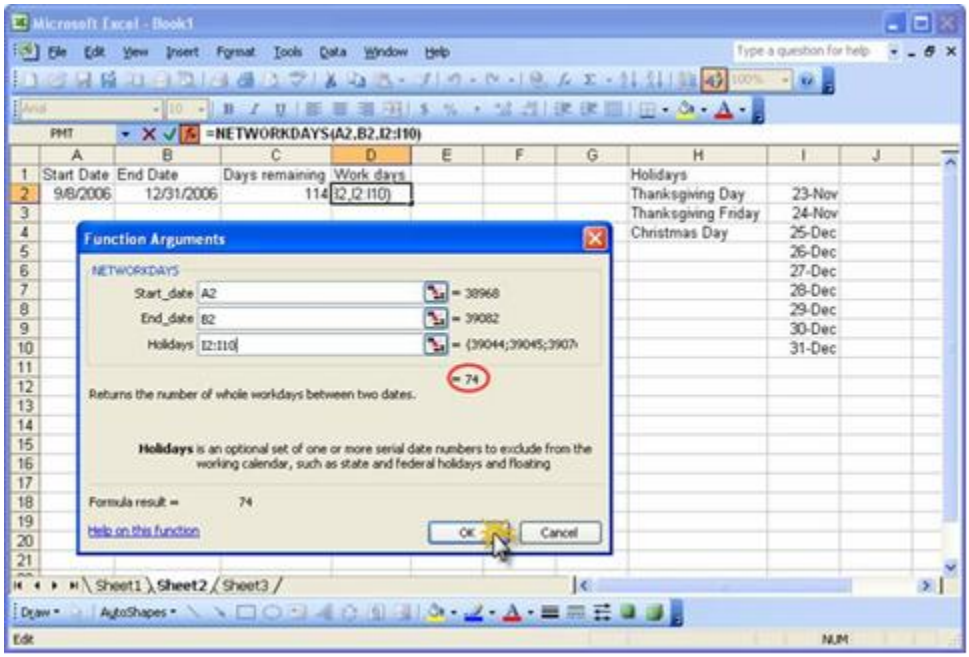




There are a number of Date functions available in the Insert Function Wizard. One interesting example is the NETWORKDAYS function, with finds the number of workdays between two dates.

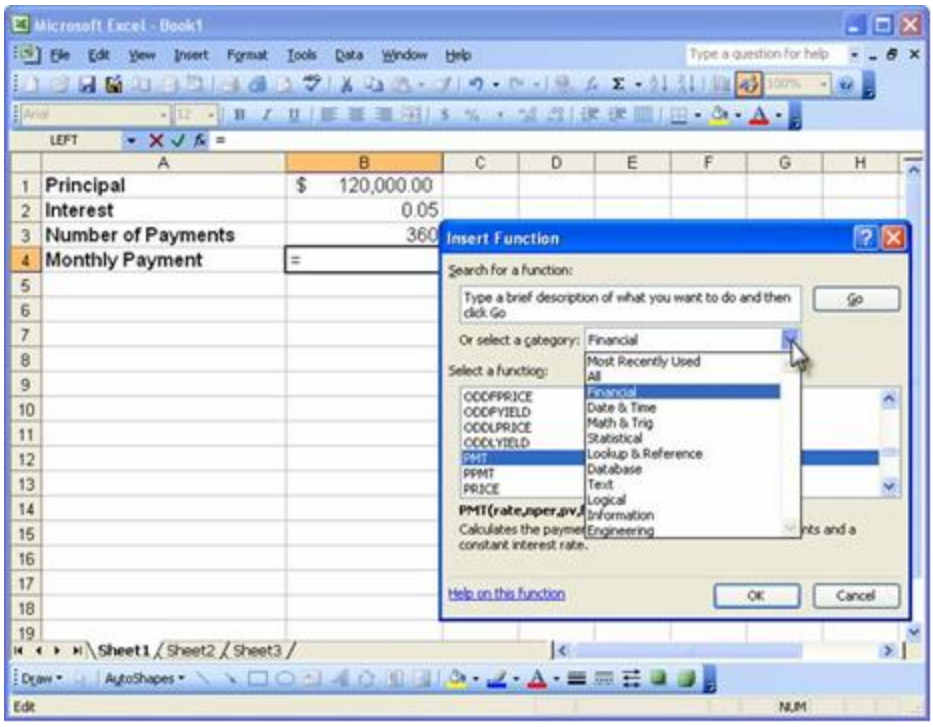


To get an accurate number of work days, enter any holidays in a separate area of the spreadsheet. Saturdays and Sundays are automatically deducted in the calculation.

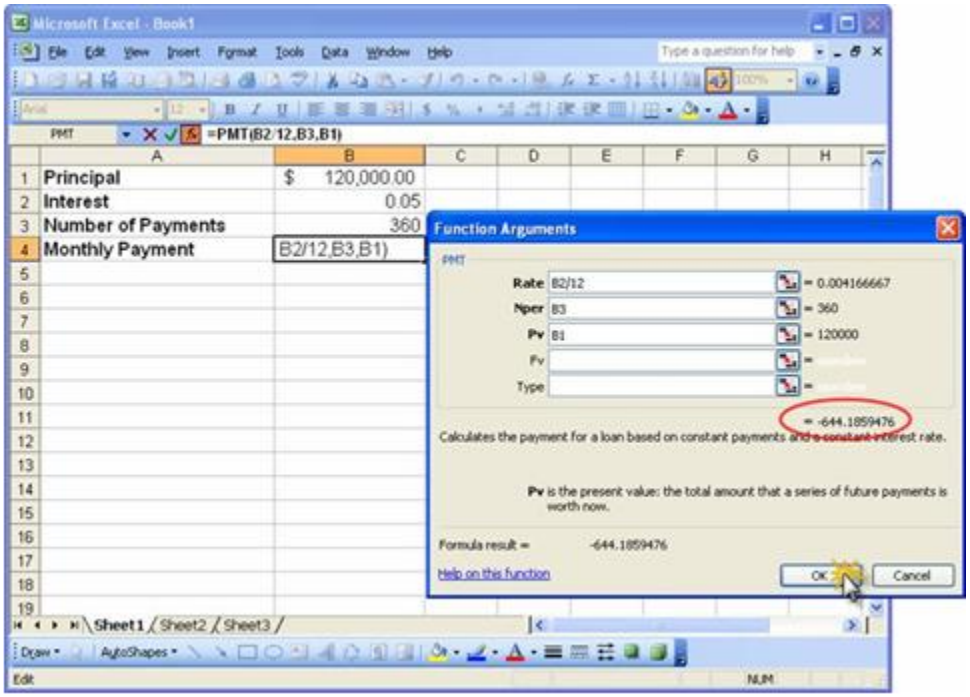


Payment Function

The Payment function can be found in the set of financial functions.



You can set up the required information in your spreadsheet, or enter the information directly in the formula.



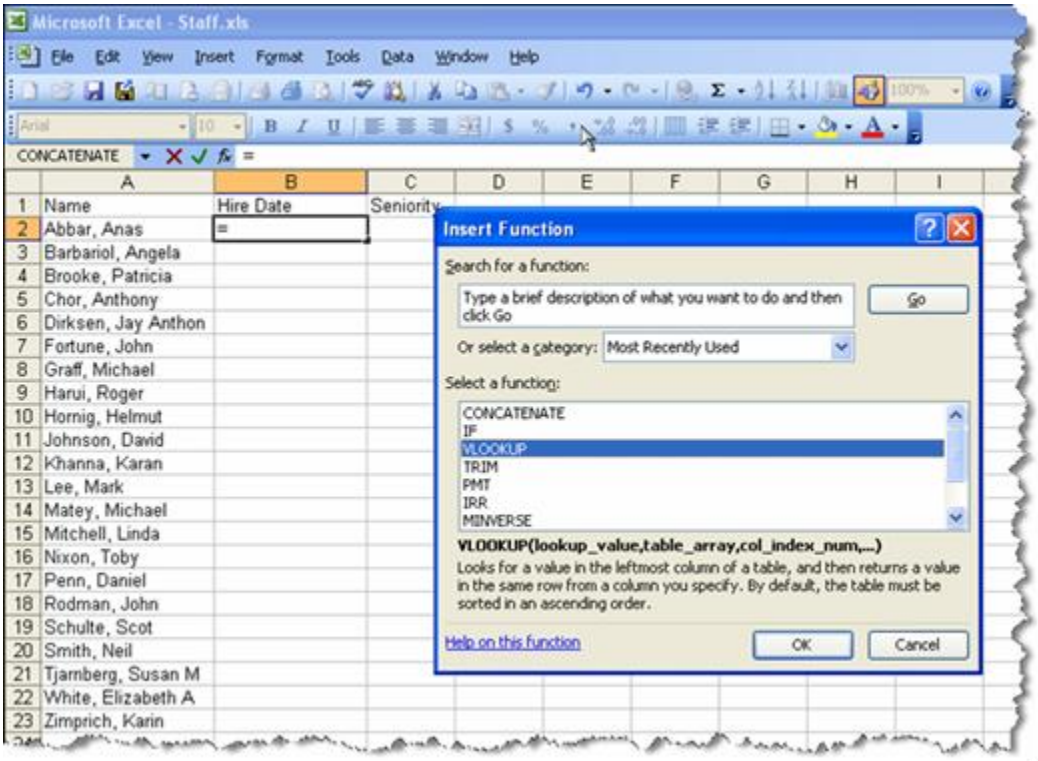
VLookup

VLookup stands for "vertical lookup" because the function will look vertically down a list to find a matching value, then retrieve the intended value from that row, or record. The less commonly used HLookup will search across columns for a match, then retrieve the value from that column.

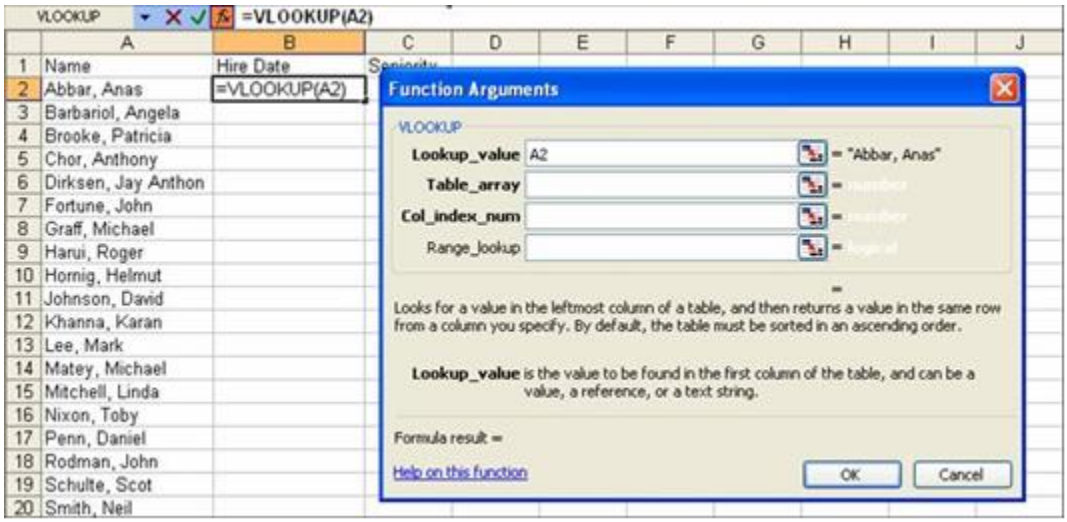
The first step to using VLookup is to have a list of values, with the identifying entry in the left column (Column A), and sort the list by Column A.

	A	B	C	D	E	F	G
1	**Full Name**	**Date of Hire**	**Date of Birth**	**Sex**	**Salary**	**Age**	
2	Abbar, Anas	6/24/85	10/16/62	F	91000	40	
3	Abercrombie, Kim	3/25/85	1/28/55	F	50000	27	
4	Ackerman, Pilar	4/26/89	10/5/50	F	31000	50	
5	Adell, Jeff	2/1/81	12/21/64	M	48000	27	
6	Akers, Kim	5/29/79	4/8/58	F	47000	56	
7	Akhtar, Sarah	10/15/89	4/22/70	F	60000	39	
8	Alboucq, Steve	1/12/92	5/28/64	M	100000	31	
9	Alexander, Sean P	7/6/00	10/16/62	M	29000	43	
10	Anderson, Amy	4/11/92	11/1/72	F	39000	37	
11	Anderson, Charlie	6/6/86	6/20/76	M	68000	49	
12	Atkinson, Teresa	4/6/88	1/14/61	F	85000	46	
13	Bacon Jr., Dan K	6/22/74	5/15/49	M	32000	52	
14	Baldwin, Amie	4/21/83	11/24/77	F	100000	48	
15	Barbariol, Angela	2/16/96	4/18/64	F	92000	50	
16	Barnhill, Josh	7/26/77	10/12/54	M	83000	40	
17	Barr, Adam	7/9/93	4/8/59	M	66000	46	
18	Barrett, Holly E	3/14/95	1/30/72	F	35000	50	
19	Beck, Bradley	12/20/98	2/5/58	M	70000	34	
20	Ben-Sachar, Ido	9/21/93	7/12/56	F	57000	27	
21	Benson, Max	11/22/77	9/2/75	M	97000	41	
22	Berge, Karen	6/1/97	2/27/65	F	35000	28	
23	Berglund, Andreas	3/19/88	10/21/54	M	93000	39	
24	Bergman, Ken	3/17/91	1/28/78	M	48000	44	
25	Berry, Jo	9/20/00	1/7/66	F	76000	52	
26	Bockman, Anne M	8/20/98	11/18/51	F	43000	28	
27	Bonifaz, Luis	6/10/96	4/4/68	M	77000	34	
28	Borm, Paul	6/3/86	11/13/63	M	55000	56	
29	Boseman, Randall	10/18/76	4/2/71	M	74000	54	
30	Bott, Greg	1/18/86	9/10/53	M	82000	47	

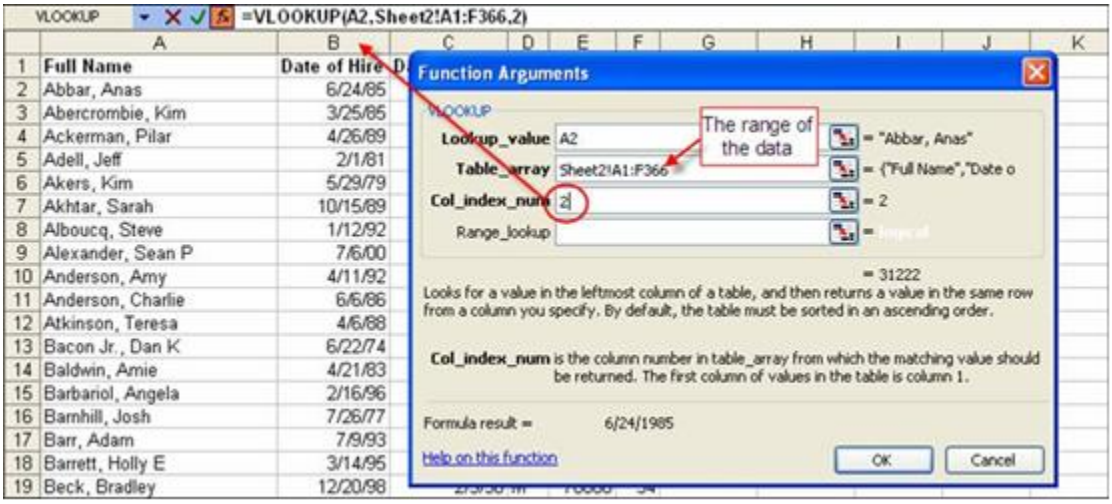
For this example, let's us VLookup to find the hire date for determining seniority. We're going to use the Function Wizard to build the formula.



Our Lookup Value is the employee's name in Column A.

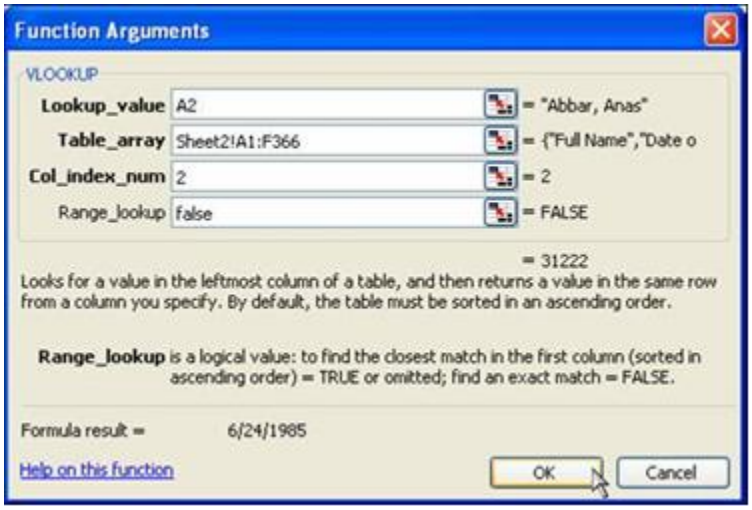


The Table Array is our list of employees and employment data, which we have on a separate sheet. The hire date happens to be in the 2nd column of that data range.



In this example, we will want "false" in the Range Lookup field so that we will find an exact match. If we were looking at numbers, such as a list of bonus ranges or income levels, we would use "true" to find the closest match.

Copying the formula down the cells will look up each person's name and retrieve the hire date.

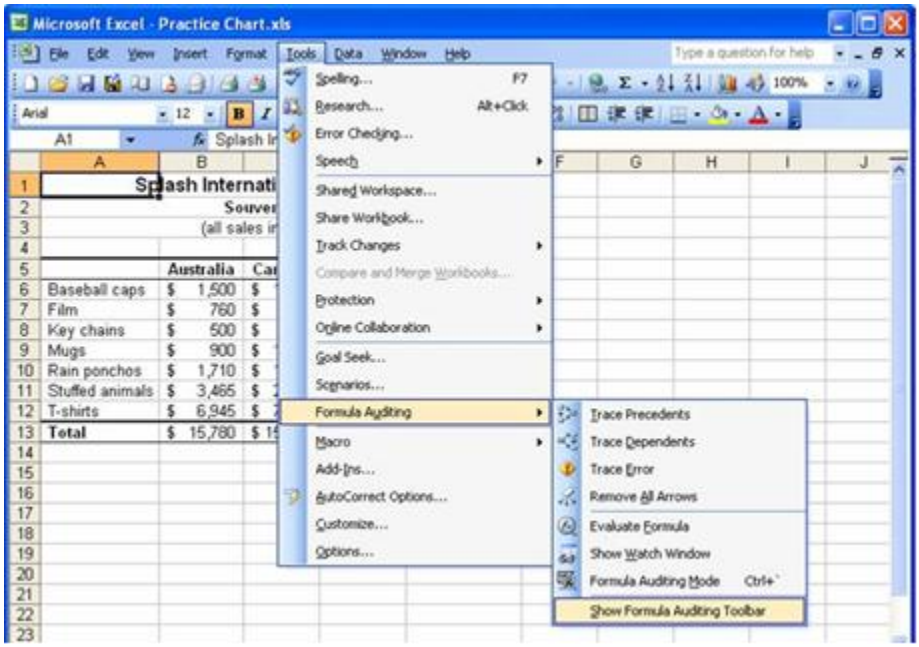


Tracing Errors in Formulas

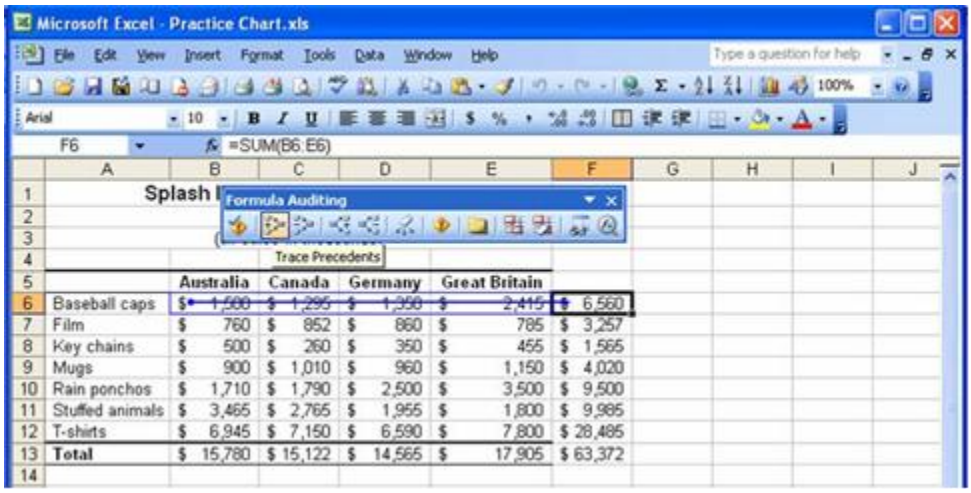
Below are the error values Excel reports when there is a problem with a formula

Error Value	Cause
#####	Occurs when a column is not wide enough, or a negative date or time is used.
#VALUE!	Occurs when the wrong type of argument or operand is used.
#DIV/0!	Occurs when a number is divided by zero (0).
#NAME?	Occurs when Microsoft Excel doesn't recognize text in a formula.
#N/A	Occurs when a value is not available to a function or formula.
#REF!	Occurs when a cell reference is not valid.
#NUM!	Occurs with invalid numeric values in a formula or function.
#NULL!	Occurs when you specify an intersection of two areas that do not intersect. The intersection operator is a space between references.

You can have Excel help you trace your formula through Tools… Formula Auditing…

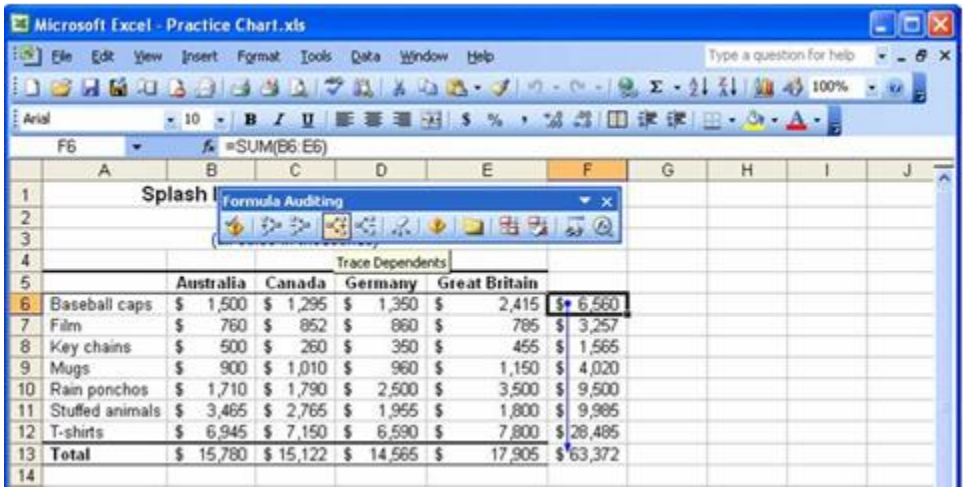


Precedents are those cells whose values are used in the formula in the selected cell.



		Australia	Canada	Germany	Great Britain	
6	Baseball caps	$ 1,500	$ 1,295	$ 1,350	$ 2,415	$ 6,560
7	Film	$ 760	$ 852	$ 860	785	$ 3,257
8	Key chains	$ 500	$ 260	$ 350	$ 455	$ 1,565
9	Mugs	$ 900	$ 1,010	$ 960	$ 1,150	$ 4,020
10	Rain ponchos	$ 1,710	$ 1,790	$ 2,500	$ 3,500	$ 9,500
11	Stuffed animals	$ 3,465	$ 2,765	$ 1,955	$ 1,800	$ 9,985
12	T-shirts	$ 6,945	$ 7,150	$ 6,590	$ 7,800	$ 28,485
13	**Total**	$ 15,780	$ 15,122	$ 14,565	$ 17,905	$ 63,372

Dependents are those cells that use the contents of the selected cell.



		Australia	Canada	Germany	Great Britain	
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