

Excel 2007

Working with Formulas

In this lesson you will learn about:

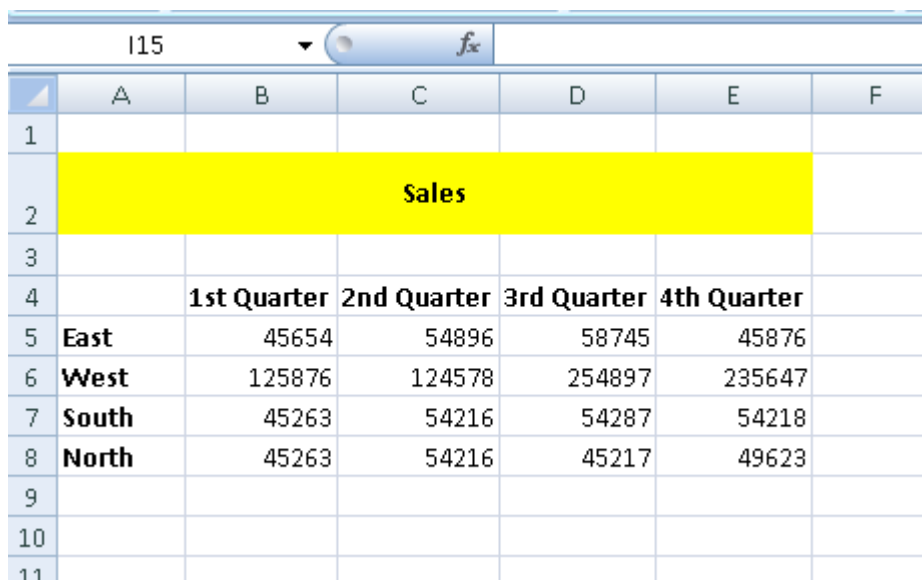
- Basic Formulas
- Order of Preference
- Relative Referencing
- Absolute Referencing
- Formula Ribbon

It is important that you Save and Print this lesson, in order to work along side of it as we progress, practising the techniques as we go. You will find that this will help you to retain the lesson skills.

Power up Excel 2007
Open a New Worksheet

Basic Formulas

We will start by adding the following simple table onto your worksheet, save and name it Sales. Rename your sheet, click on the sheet number Tab, right click with your mouse and Rename.



The screenshot shows an Excel worksheet with a grid from column A to F and row 1 to 11. The formula bar at the top shows '115' and a function button 'fx'. A yellow highlight covers the range B1:F2, with the word 'Sales' centered in row 2. The table data is as follows:

	A	B	C	D	E	F
1						
2		Sales				
3						
4		1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	
5	East	45654	54896	58745	45876	
6	West	125876	124578	254897	235647	
7	South	45263	54216	54287	54218	
8	North	45263	54216	45217	49623	
9						
10						
11						

This gives us something to work with. Notice the text area, next to the button with *fx* on it, this is the Formula Bar and where your formulas will be displayed when you insert them, you can also type in your formula directly into the total box.

The four basic formulas are Addition, Subtraction, Multiply and Divide. The way they are shown in Excel 2007 is:

Addition	=	+
Subtraction	=	-
Multiply	=	*
Divide	=	/

Let's try adding a simple formula: Point your cursor to an empty cell in your table and type in the formula box area or directly on the cell. 3+2 press enter and you will find that nothing happens. Do not worry this happens because we must always tell Excel 2007 we are doing a sum. We must add an = sign before our formulas, which is the SUM sign. Try =3+2 and then press enter. 5 Correct?

You can continue adding practise formulas this way but they may throw up the wrong answer. Insert =3+2*5 and press enter. What do you get? 13? This is clearly the wrong answer. It should be 25 so what has gone wrong?

Order of Preference

In Excel 2007 and previous versions, the order of preference is always * / before + and -. That means that Excel will multiply or divide before it adds up or subtracts. But, if we add a parenthesis before our formula, Excel will give the parenthesis the first order. Now try adding =(3+2*5) do you get 25? I hope so.

Addition and Subtraction have the same value. Multiplication and Division have the same value. Parenthesis always takes precedence.

The way of adding formula is to give the cell references. The cell reference is the cell where the row and column meet. You can see shown below that B6 cell is selected.

	A	B	C	D	E
1					
2	Sales				
3					
4		1st Quarter	2nd Quarter	3rd Quarter	4th Quarter
5	East	45654	54896	58745	45876
6	West	125876	124578	254897	235647
7	South	45263	54216	54287	54218
8	North	45263	54216	45217	49623
9					

Formula are added using the cell references.

In the following example I want to add up all of the rows for the year to get a total. I've added the formula as shown. (Note, the formula is inserted into the cell where I want the total, this is because I've placed my cursor point in that cell. Excel will always place the total where the cursor point is. Not where you think it should, at the end of a line for instance.

The screenshot shows an Excel spreadsheet with a formula bar at the top containing the formula `= (B5+C5+D5+E5)`. The spreadsheet has columns A through F and rows 1 through 10. Row 2 is highlighted in yellow and contains the word "Sales". Row 4 contains headers: "1st Quarter", "2nd Quarter", "3rd Quarter", "4th Quarter", and "Total". Rows 5 through 8 contain data for "East", "West", "South", and "North" respectively. The "Total" column (F) is currently empty, and the formula bar shows the formula being entered into cell F5.

	A	B	C	D	E	F
1						
2	Sales					
3						
4		1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total
5	East	45654	54896	58745	45876	<code>= (B5+C5+D5+E5)</code>
6	West	125876	124578	254897	235647	
7	South	45263	54216	54287	54218	
8	North	45263	54216	45217	49623	
9						
10						

If I now press the Enter key, the formula will be totalled up. Try this for yourself.

Here I have pressed the Enter key and the total has been added up. Note, also that when I point my cursor into the total cell, the formula I've used is also shown in the formula bar.

The screenshot shows the same Excel spreadsheet as before, but now the total value "205171" is displayed in cell F5. The formula bar at the top still shows the formula `= (B5+C5+D5+E5)`.

	A	B	C	D	E	F
1						
2	Sales					
3						
4		1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total
5	East	45654	54896	58745	45876	205171
6	West	125876	124578	254897	235647	
7	South	45263	54216	54287	54218	
8	North	45263	54216	45217	49623	
9						
10						

Cell F5 is the total of cells B5+ C5+D5 and E5. Insert the formula as shown to get a total. Once you have done that, we could do the same for each District's total. But there is another quicker way, place your cursor point on the F5 cell, where the small black box is, and hold and drag all the way down the column to the last row and then let go. You should have a table with the totals as shown below. We have copied the formula. If you do not have the same as below, keep practising. If you want to include cells in a range add a parenthesis, insert the first cell of the range then add (and the last cell of the range. For example (B6:E6)

The screenshot shows an Excel spreadsheet with the following data:

	A	B	C	D	E	F
1						
2	Sales					
3						
4		1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total
5	East	45654	54896	58745	45876	205171
6	West	125876	124578	254897	235647	740998
7	South	45263	54216	54287	54218	207984
8	North	45263	54216	45217	49623	194319
9						

The formula bar at the top shows the formula `= (B6+C6+D6+E6)`. A small black box is visible in cell F6, and a red box highlights the formula bar.

Excel 2007 has given us a small box which offers to total the next cell we will just ignore that. As you can see from this table, Excel 2007 has copied the cell formula and incremented the row by one, to give us the total of each row. If you place your cursor in each of the totals, you will see the formula change to the desired row, in the formula bar.

We can do this because Excel 2007 works with Relative and Absolute Referencing.

Note: Some people like to work with just the formula bar and if you were wondering what the tick and cross does, the Green Tick works the same as the Enter key, the Red Cross cancels the formula you placed in.

Relative and Absolute Referencing

Relative Referencing 'moves' the formula. The example above works by Relative Referencing. Absolute Referencing, does not move, it is Absolute.

Mostly we will be working with Relative Referencing with our formulas. However, sometimes it is necessary to work with Absolute Referencing.

G13		fx					
	A	B	C	D	E	F	G
1	Sales						
2							
3							
4		1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total	
5	East	45654	54896	58745	45876	205171	
6	West	125876	124578	254897	235647	740998	
7	South	45263	54216	54287	54218	207984	
8	North	45263	54216	45217	49623	194319	
9		262056	287906	413146	385364		
10							
11							
12							

B10		fx =B5*\$A\$10					
	A	B	C	D	E	F	
1	Sales						
2							
3							
4		1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total	
5	East	45654	54896	58745	45876	205171	
6	West	125876	124578	254897	235647	740998	
7	South	45263	54216	54287	54218	207984	
8	North	45263	54216	45217	49623	194319	
9	Year	262056	287906	413146	385364		
10	10%	4565					
11							

When working out commission rates you would need to use absolute referencing. Commission is paid at 10% for our example. So the formula would be =B5*\$B\$10 the dollar signs indicate it is absolute, before the column (B) a dollar sign is placed and before the row (10) a dollar sign is placed. As we want the commission to remain absolute on all Districts. We want the column and the row to remain absolute. We can now copy the cells along the 10% row to give us the commission earned for the whole year, knowing that A10 will remain at 10% for all of the calculations.

B10		fx =B5*\$A\$10				
	A	B	C	D	E	F
1						
2	Sales					
3						
4		1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total
5	East	45654	54896	58745	45876	205171
6	West	125876	124578	254897	235647	740998
7	South	45263	54216	54287	54218	207984
8	North	45263	54216	45217	49623	194319
9	Year	262056	287906	413146	385364	
10	10%	4565	5490	5875	4588	
11						
12						

To conclude in the first quarter the East District received 4565. percentage. In the next quarter they received 5490. And so on. Working out the formula for the next District we amend the formula in the formula bar to read for row 6 which is West District, to give us our percentages. We can also use partial absolute referencing.

- \$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.
- \$A\$1 Allows neither the column nor the row reference to change.

We will work on a more complicated formula now. Insert the following table and add the data. Do not insert in the discount column, you will need to insert the formula. =C\$5*A\$12

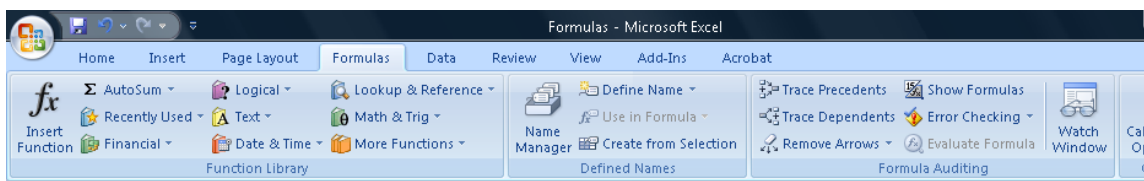
	A	B	C	D	E
1					
2	Sales				
3					
4	Catalogue No	Type	Price	Discount 1	Discount 2
5	222	M.Bike	456	45.6	
6	251	Racer	256		
7	123	Tricycle	89		
8	43	Teddy	101		
9					
10	Discounts				
11	1	2			
12	10%	15%			
13					

I have already inserted the data for the first discount; now all I need do is copy the formula down. The next formula is for 15%. See if you can complete it.

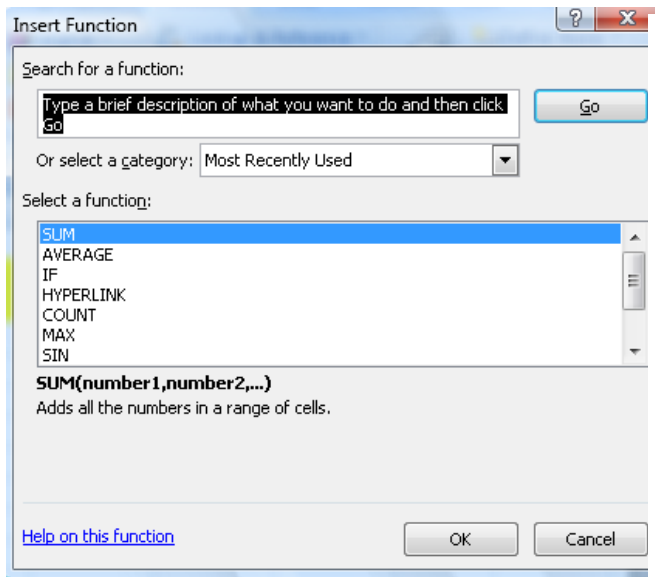
	A	B	C	D	E	F
1						
2	Sales					
3						
4	Catalogue No	Type	Price	Discount 1	Discount 2	
5	222	M.Bike	456	45.6	68.4	
6	251	Racer	256	25.6	38.4	
7	123	Tricycle	89	8.9	13.35	
8	43	Teddy	101	10.1	15.15	
9						
10	Discounts					
11	1	2				
12	10%	15%				
13						

Note the formula in the formula bar. To give the percentages of 15% Referencing is quite tricky to pick up but once you do, you can do many types of formulas.

Formula Ribbon



The Formula Ribbon, has many useful options. I shall go through them. The Insert Function, which when clicked gives you options of which function to use. Functions are for more advanced lessons.



Next on the Ribbon is the AutoSum which will calculate your totals for you when clicked.

Then we have the most recently used, which are functions again. Financial is mainly for accounting.

On the middle column Logical functions, text functions, and date and time functions as some people may need to work out the hourly rate for instance.

On the next column there is Lookup & Reference functions, maths and trig and more functions.

We then have the column on Define Names which is another advanced topic. Trace Presidents, which if clicked will show blue arrows where the formulas are on your table. Have a go now. To turn off Trace Presidents you would click on the remove arrows option. You then have an option to show formulas which, if pressed will widen your sheet and show the formulas before calculation. To set the sheet back to normal click on the formula option again.

Sales					
Catalogue No	Type	Price	Discount 1	Discount 2	
222	M.Bike	456	=C5*A\$12	=C5*B\$12	
251	Racer	256	=C6*A\$12	=C6*B\$12	
123	Tricycle	89	=C7*A\$12	=C7*B\$12	
43	Teddy	101	=C8*A\$12	=C8*B\$12	
Discounts					
1	2				
0.1	0.15				

We have the Error Checking button. If you do enter an error in Excel 2007, a small option box will open up allowing you to seek help if you cannot see the error.

That is the end of this lesson. If you practised the techniques as we worked through the lesson, you should have a good idea about formulas and referencing.

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 - Relative Referencing
 - Absolute Referencing
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