

IGCSE ICT



Excel 2003

Copyright 2009 Steve Copley

www.igcseict.info

This work is licensed under the Creative Commons
Attribution Non-Commercial 3.0 License

To view a copy of this license, visit
<http://creativecommons.org/licenses/by-nc/3.0/>

1	Cell and Range References	
1.1	Cell and Range References	4
1.2	Absolute (Locked) and Relative (Unlocked) References	6
2	Entering Formulae	
2.1	Typing Formulae into Cells	10
2.2	Using the FX button to Help Enter Functions	12
3	Examples of Formulae and Functions	
3.1	Basic Arithmetic (Add, Subtract, Multiply, Divide)	16
3.2	SUM - Adding up a Range of Numbers	18
3.3	AVERAGE - Finding the Average of a Range of Numbers	19
3.4	MIN - Finding the Lowest Value in a Range of Numbers	20
3.5	MAX - Finding the Highest Value in a Range of Numbers	21
3.6	COUNT - Finding How Many Numbers are in a Range	22
3.7	COUNTA - Counting the Number of Items in a Range	23
3.8	INT - Converting Numbers to Integers	24
3.9	ROUND - Rounding Up/Down Numbers	26
3.10	VLOOKUP - Looking up What Particular Values Mean	28
3.11	COUNTIF - Counting the Number of Specific Items in a Range	30
3.12	SUMIF - Adding up Specific Values in a Range	32
3.13	IF - Deciding What Will Go Into a Cell	34
3.14	Multiple IFs - Deciding Between More Than Two Things	36
4	Printing Your Spreadsheet	
4.1	Setting Up Your Page for Printing	39
4.2	Printing Formulae	41

Cell and Range References

Cell and Range References

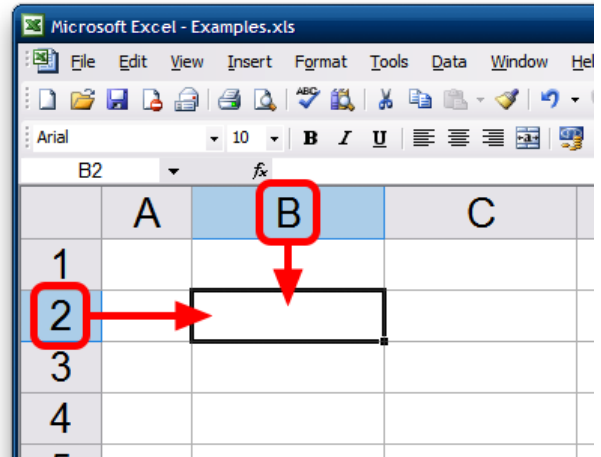
You **refer** to specific cell(s) in your spreadsheet using **cell references**

This lesson will explain what **cell** and **range references** are

Single cell reference

This cell is referred to using its **column letter** (B) and **row number** (2)

The **cell reference** is **B2**



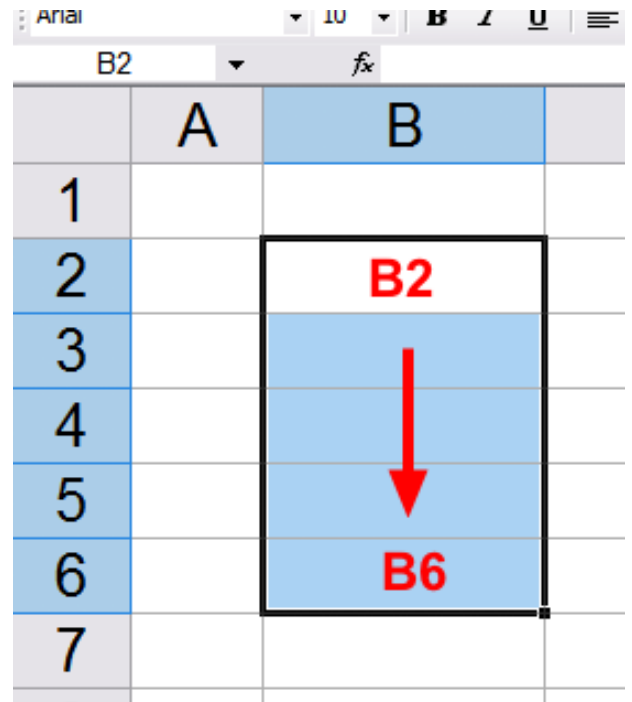
Referring to a group (range) of cells

A **group of cells** is called a **range**

This range of cells starts at cell **B2** and goes down to cell **B6**

The **range reference** is **B2:B6**

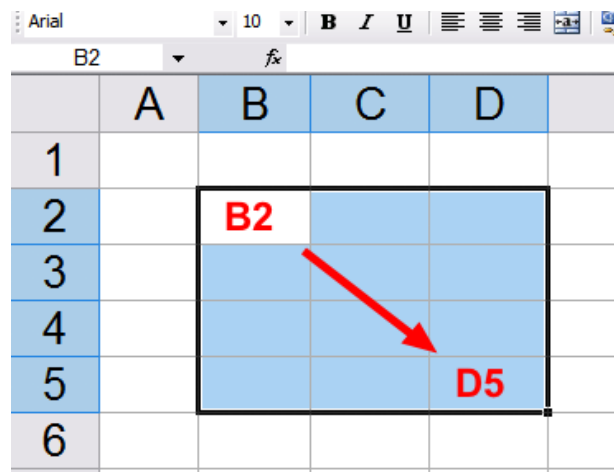
Note: the **colon** (:) is used to mean 'through to', as in 'B2 through to B6'



Larger cell ranges

When ranges go across multiple columns and rows, we use the **top-left** and **bottom-right** cells

The **reference** of this range is **B2:D5**



Absolute (Locked) and Relative (Unlocked) References

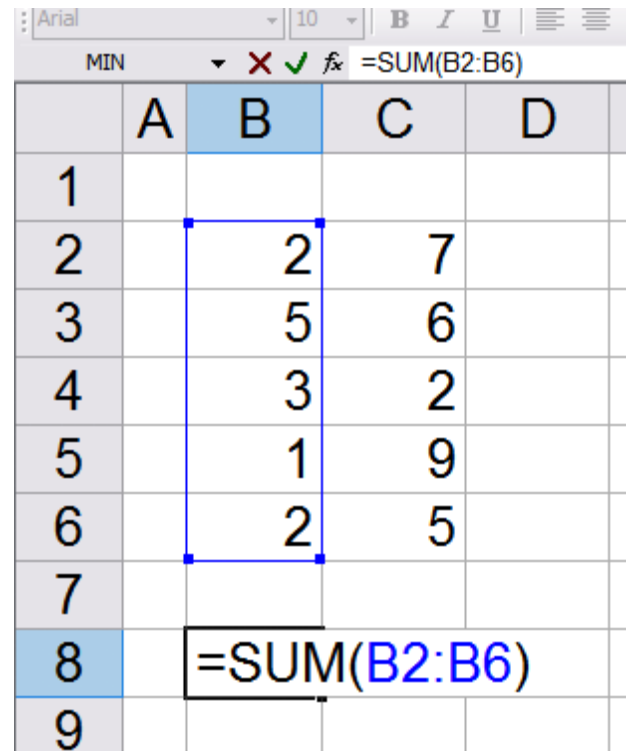
Sometimes, before we **copy** a formula to another cell, we need to **lock** some of the cell references

This lesson will show you how to create **locked** (**absolute**) cell **references**

Relative references

In this example, the range B2:B6 is 'unlocked'

B2:B6 is a **relative reference**



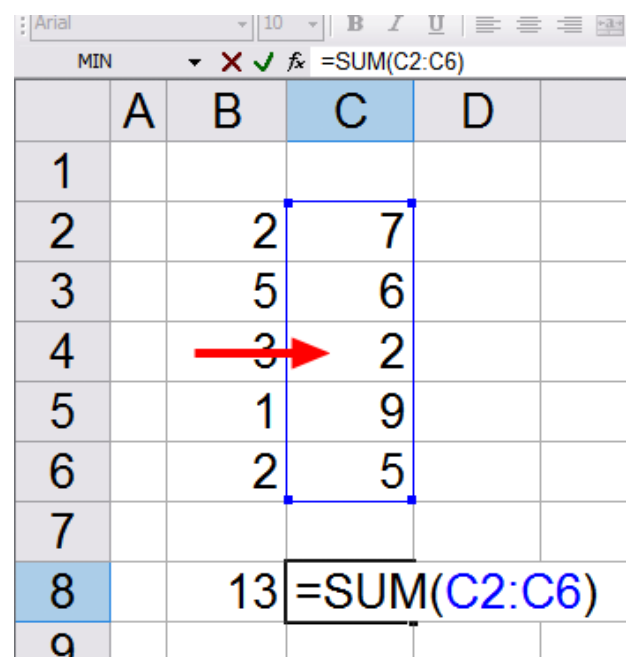
The screenshot shows an Excel spreadsheet with columns A, B, C, and D, and rows 1 through 9. The formula bar at the top shows the formula `=SUM(B2:B6)`. The range B2:B6 is highlighted with a blue border, indicating it is the range being summed. The formula is entered in cell B8.

	A	B	C	D
1				
2		2	7	
3		5	6	
4		3	2	
5		1	9	
6		2	5	
7				
8		=SUM(B2:B6)		
9				

This means that if the formula is **copied** from **B8** to **C8...**

The **relative cell references** in formula will **adjust automatically**: Now the formula refers to cells **C2:C6**

Note: Most of the time, this is exactly what you want to happen - it is very convenient!



The screenshot shows the same Excel spreadsheet as before, but the formula has been copied to cell C8. The formula bar now shows `=SUM(C2:C6)`. The range C2:C6 is highlighted with a blue border. A red arrow points from the original range B2:B6 to the new range C2:C6, illustrating the automatic adjustment of the relative reference. The value 13 is displayed in cell C8, which is the sum of the values in C2:C6 (7+6+2+9+5=29).

	A	B	C	D
1				
2		2	7	
3		5	6	
4		3	2	
5		1	9	
6		2	5	
7				
8		13	=SUM(C2:C6)	
9				

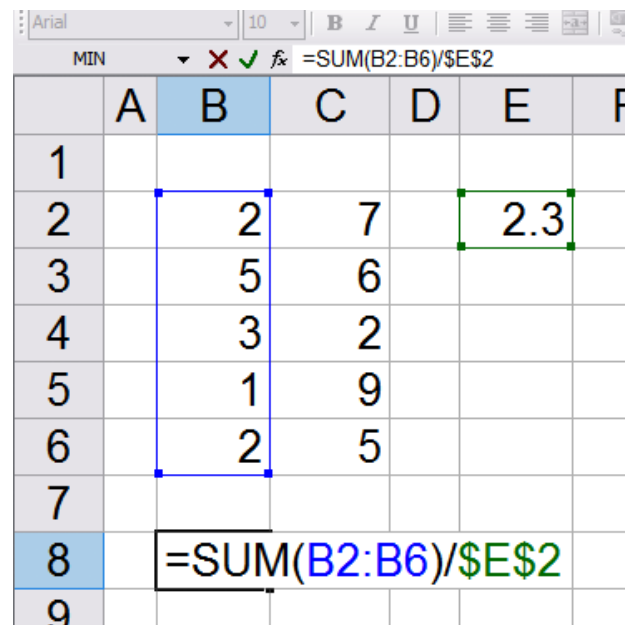
Absolute cell references

In this example the cell reference E2 is '**locked**'

\$E\$2 is an **absolute reference**

The **dollar signs (\$)** **lock** the cell reference

Note: You can lock any cell reference by **highlighting** it and pressing **F4** - you don't need to type the dollar signs yourself



A screenshot of an Excel spreadsheet. The formula bar shows `=SUM(B2:B6)/E2`. The spreadsheet has columns A through F and rows 1 through 9. Cell B2 contains 2, B3 contains 5, B4 contains 3, B5 contains 1, and B6 contains 2. Cell C2 contains 7, C3 contains 6, C4 contains 2, C5 contains 9, and C6 contains 5. Cell E2 contains 2.3 and is highlighted with a green border. Cell B8 contains the formula `=SUM(B2:B6)/E2`.

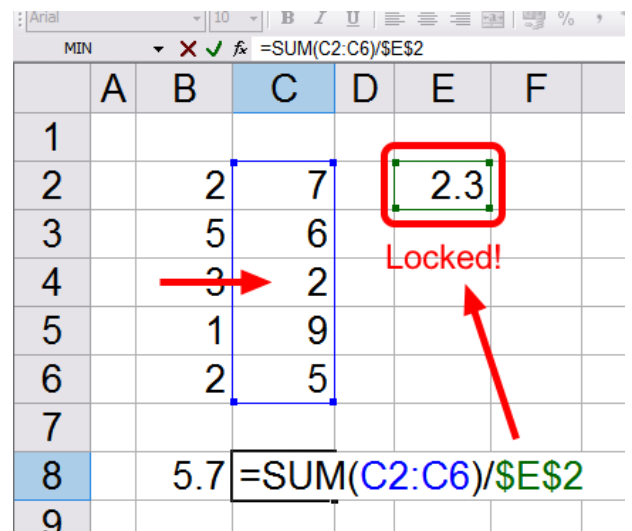
	A	B	C	D	E	F
1						
2		2	7		2.3	
3		5	6			
4		3	2			
5		1	9			
6		2	5			
7						
8						
9						

The absolute cell reference is needed so that when we **copy** the formula from **B8 to C8...**

The formula **still refers** to the cell **E2**

Absolute cell references **do not adjust automatically**

(Note: The relative reference B2:B6 was adjusted to C2:C6)

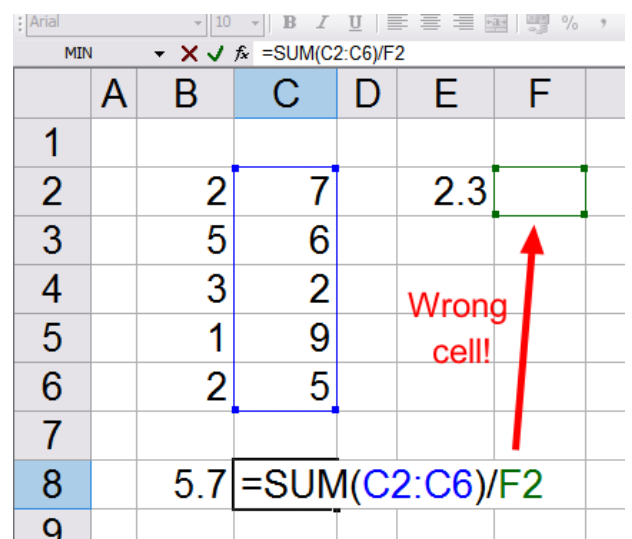


A screenshot of an Excel spreadsheet showing the formula from B8 copied to C8. The formula bar shows `=SUM(C2:C6)/E2`. Cell C2 contains 7, C3 contains 6, C4 contains 2, C5 contains 9, and C6 contains 5. Cell E2 contains 2.3 and is highlighted with a red border and labeled 'Locked!' with a red arrow. Cell C8 contains the formula `=SUM(C2:C6)/E2` and the value 5.7.

	A	B	C	D	E	F
1						
2		2	7		2.3	
3		5	6			
4		3	2			
5		1	9			
6		2	5			
7						
8			5.7			
9						

If E2 was left unlocked (a **relative** reference) and the formula was **copied** from **B8 to C8...**

The adjusted formula would now point to the **wrong cell**



A screenshot of an Excel spreadsheet showing the formula from B8 copied to C8 with a relative reference. The formula bar shows `=SUM(C2:C6)/F2`. Cell C2 contains 7, C3 contains 6, C4 contains 2, C5 contains 9, and C6 contains 5. Cell E2 contains 2.3. Cell C8 contains the formula `=SUM(C2:C6)/F2` and the value 5.7. A red arrow points to cell F2, labeled 'Wrong cell!'.

	A	B	C	D	E	F
1						
2		2	7		2.3	
3		5	6			
4		3	2			
5		1	9			
6		2	5			
7						
8			5.7			
9						

Absolute range references

In this example, the **range** B5:B11 has been **locked**

\$B\$5:\$B\$11 is an **absolute reference**

(Note: Reference B2 is left unlocked (relative) since we want it to adjust when we copy the formula down to cell D3)

	A	B	C	D	E	F
1						
2		Dog		=COUNTIF(\$B\$5:\$B\$11,B2)		
3		Cat				
4						
5		Dog				
6		Cat				
7		Cat				
8		Dog				
9		Cat				
10		Dog				
11		Cat				
12						

When the formula is **copied** from **D3 to D4...**

The **relative** reference, B2, is **adjusted** to B3

But the **absolute** reference, \$B\$5:\$B\$11, remains **unchanged**

	A	B	C	D	E	F
1						
2		Dog		3		
3		Cat		=COUNTIF(\$B\$5:\$B\$11,B3)		
4						
5		Dog				
6		Cat				
7		Cat				
8		Dog				
9		Cat				
10		Dog				
11		Cat				
12						

If we **didn't lock** the range there would be a **problem...**

When we **copied** the formula down, the range would refer to the **wrong group of cells**

Note: The coloured boxes really help you to notice problems like this

	A	B	C	D	E	F
1						
2		Dog		3		
3		Cat		=COUNTIF(B6:B12,B3)		
4						
5		Dog				
6		Cat				
7		Cat				
8		Dog				
9		Cat				
10		Dog				
11		Cat				
12						
13						

Entering Formulae

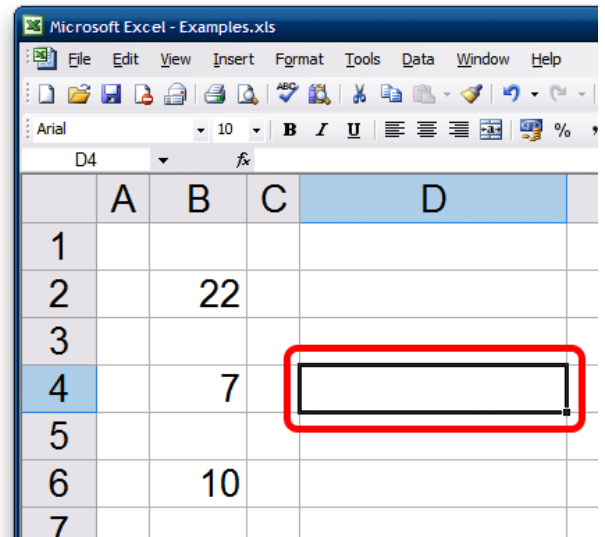
Typing Formulae into Cells

Formulae can be simply typed directly into a cell

This lesson will show you how to **type** a **formula** into a **cell**

Go to the cell where you want to put the formula

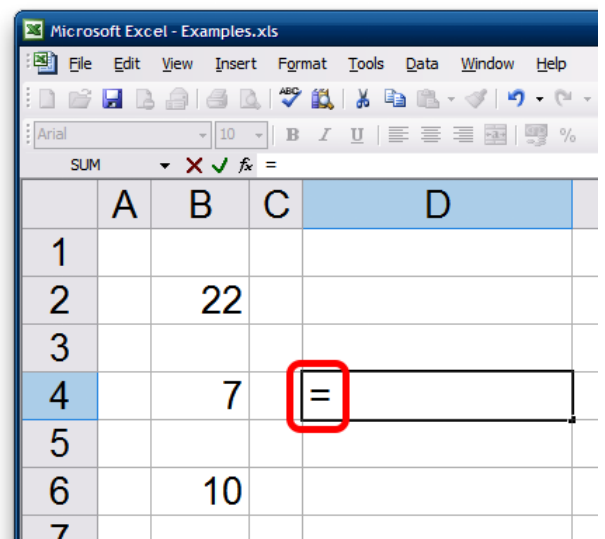
Click on the cell



Start entering the formula

Type an **equals sign (=)**

(All formulae begin with an equals sign)

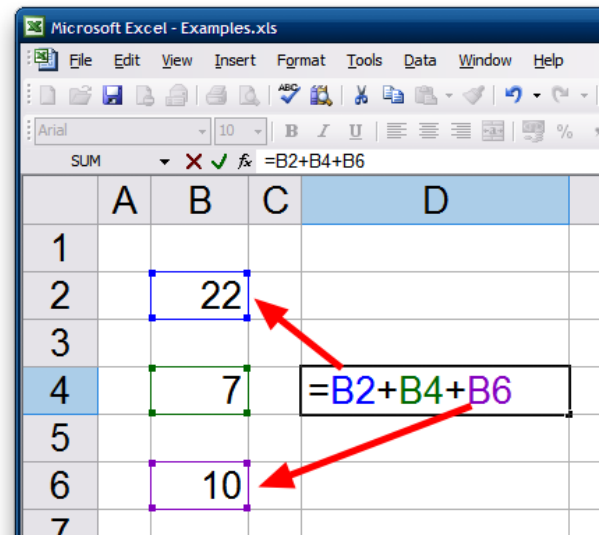


Complete the formula

Type in the remainder of the **formula**

Notice how the **cells** that you **reference** in your formula are **coloured** and **highlighted**

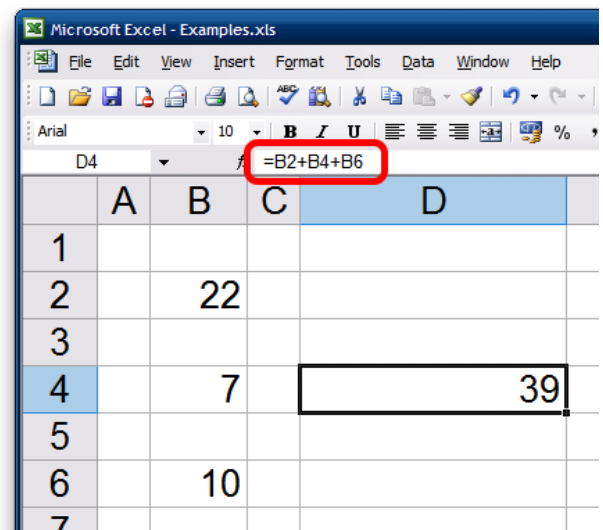
Note: Instead of typing **cell references** such as B4, you can just **click on the cell** - the reference will be typed for you



Press Enter to finish

You should see the result of your formula

Notice that you can still see the **formula** in the **Formula bar**



Using the FX button to Help Enter Functions

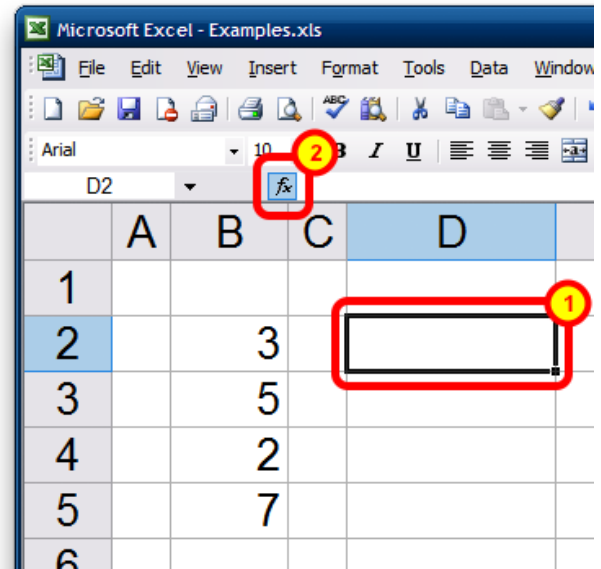
When entering functions, the **FX button** can really help you

This lesson will show you how to use the **FX** button to **find** and **enter** functions

Press the FX button

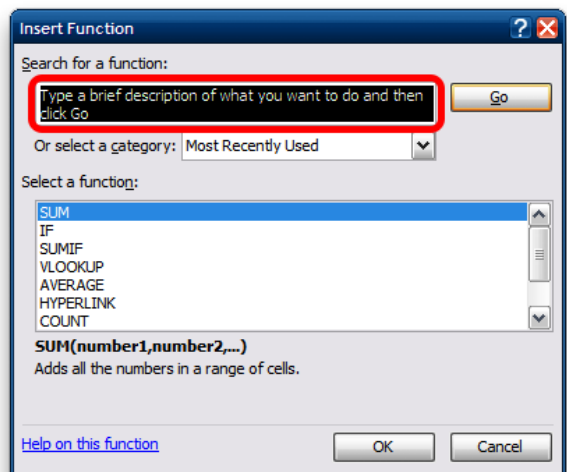
Click the **cell** where you want to add the function

Click the **FX button**, next to the Formula bar



The Insert Function window

The function **search** window appears

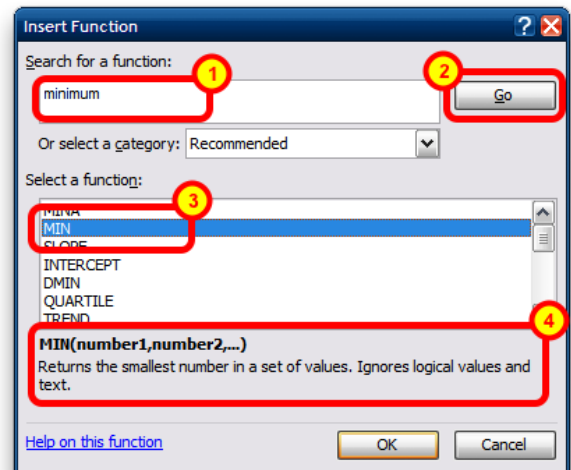


Search for the Function you want

Type in a **word** related to the function and then click **Go**

Choose the **function** from the search results

Check the **description** to make sure it's the function you need, then click **Ok**

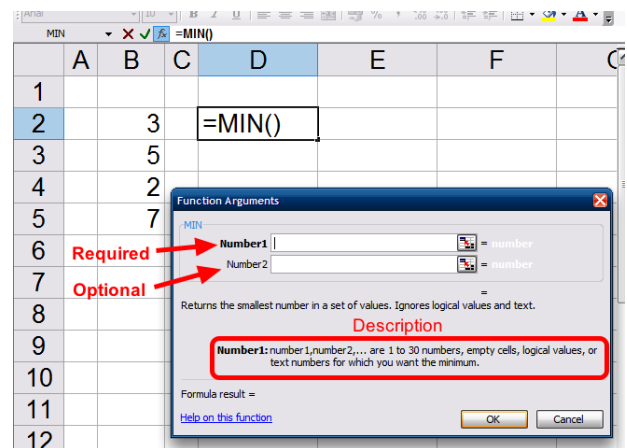


The Function Arguments (data) window

The **Function Arguments** (arguments means **data**, or **values**) window for your chosen function will appear

Note...

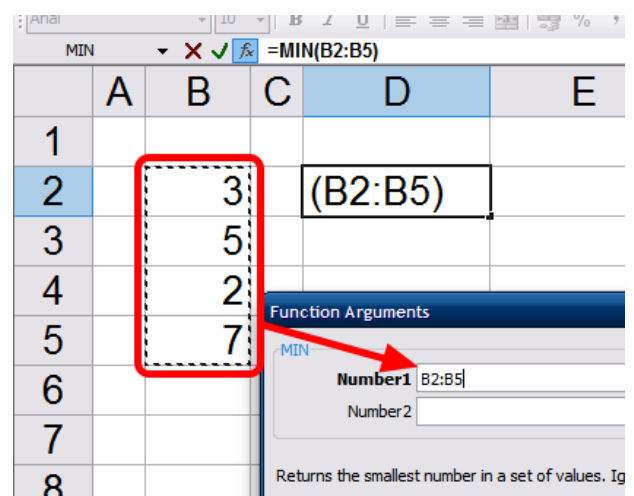
- **Required** arguments are in **bold**
- **Optional** arguments are not bold
- As you click in an argument box, you will see a **description** below



Add cell / range references to the Function Arguments

Highlight the cells that will provide the data (argument) for the function

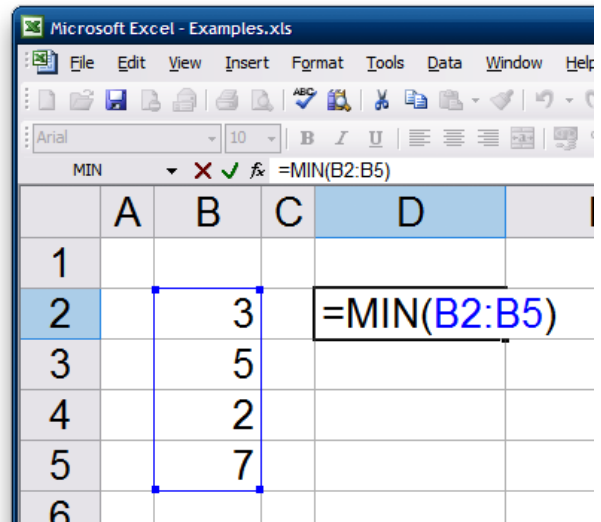
Note: If you highlight cell(s) with the mouse, the cell/range reference will be typed for you



Finish the Function

Click Ok and you will see the **result** of your function

If you **double-click** the function cell, you will see that the **function** has been **created** for you - no typing needed!



Examples of Formulae and Functions

Basic Arithmetic (Add, Subtract, Multiply, Divide)

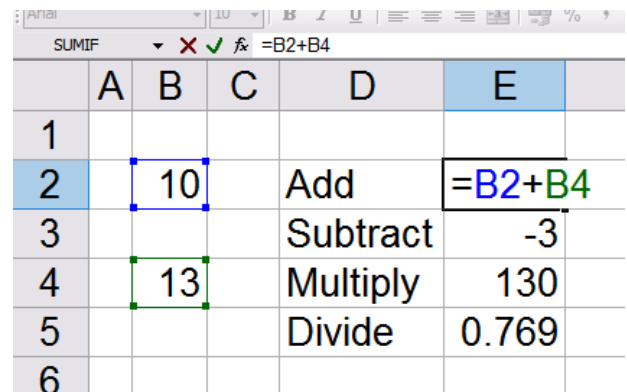
As well as complex functions and formulae, spreadsheets can do basic arithmetic

This lesson will show you how to write formulae for **basic arithmetic**

Addition (+)

Use the **plus sign** to add cells

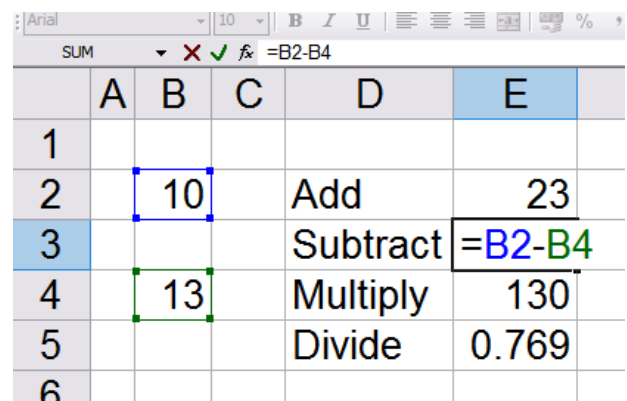
(Note: you only need to use SUM if you are adding up lots of cells in a range. For simple addition of just a couple of cells, use plus)



	A	B	C	D	E
1					
2		10		Add	=B2+B4
3				Subtract	-3
4		13		Multiply	130
5				Divide	0.769
6					

Subtraction (-)

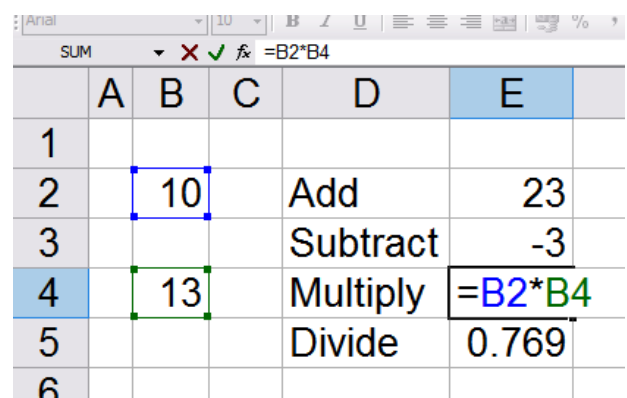
Use the **minus sign** to subtract cells



	A	B	C	D	E
1					
2		10		Add	23
3				Subtract	=B2-B4
4		13		Multiply	130
5				Divide	0.769
6					

Multiplication (*)

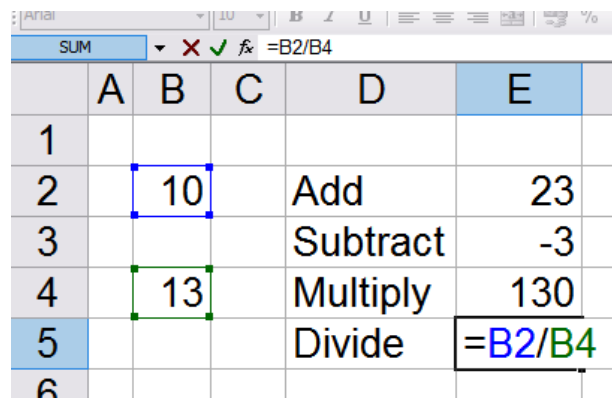
Use the **star** to multiply cells



	A	B	C	D	E
1					
2		10		Add	23
3				Subtract	-3
4		13		Multiply	=B2*B4
5				Divide	0.769
6					

Division (/)

Use the forward **slash** to divide cells



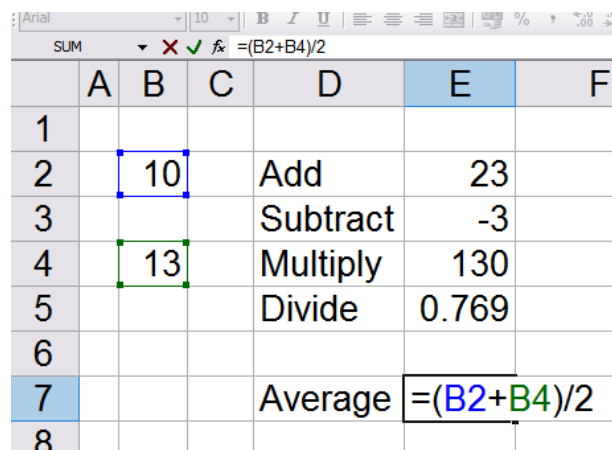
The screenshot shows an Excel spreadsheet with columns A through E and rows 1 through 6. The formula bar at the top displays $=B2/B4$. The spreadsheet contains the following data:

	A	B	C	D	E
1					
2		10		Add	23
3				Subtract	-3
4		13		Multiply	130
5				Divide	$=B2/B4$
6					

Combination

The arithmetic signs operations can be combined however you like

You can use brackets () to force certain operations to happen first - just like in Maths!



The screenshot shows an Excel spreadsheet with columns A through F and rows 1 through 8. The formula bar at the top displays $=(B2+B4)/2$. The spreadsheet contains the following data:

	A	B	C	D	E	F
1						
2		10		Add	23	
3				Subtract	-3	
4		13		Multiply	130	
5				Divide	0.769	
6						
7				Average	$=(B2+B4)/2$	
8						

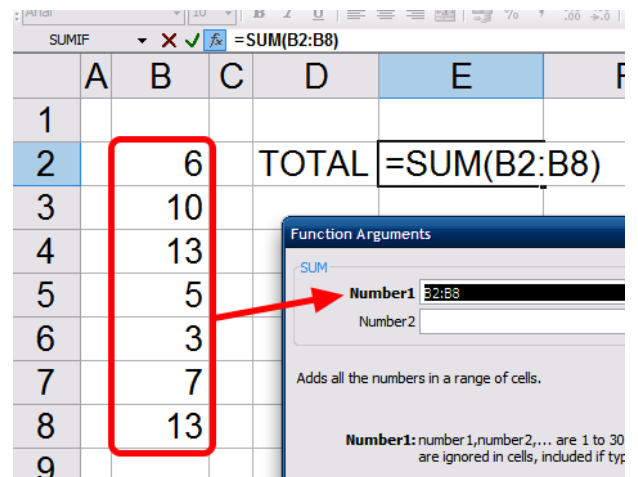
SUM - Adding up a Range of Numbers

The SUM function is used to **add up** a **range** of values

This lesson will show you how to use the **SUM** function

Create the SUM function using the FX button

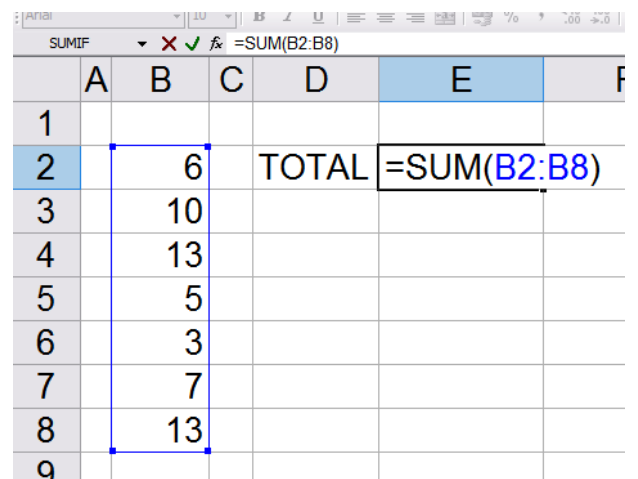
Highlight the **range** of numbers that you want to **add up**



Check the formula

Double-click the formula to open it

Check the correct cells are highlighted



Check the result

Make sure the result of the function seems correct

TOTAL	57
-------	----

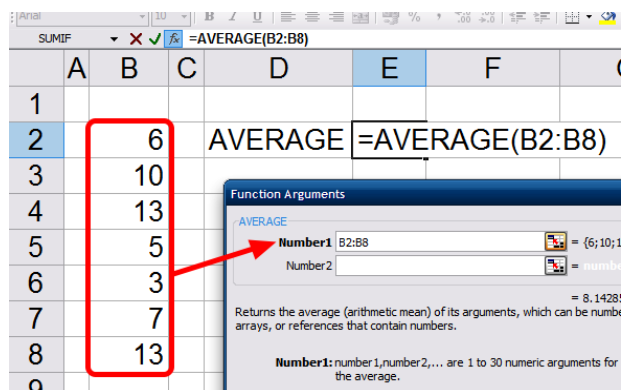
AVERAGE - Finding the Average of a Range of Numbers

The AVERAGE function is used to find the **average** of a **range** of values

This lesson will show you how to use the **AVERAGE** function

Use the FX button to create the function

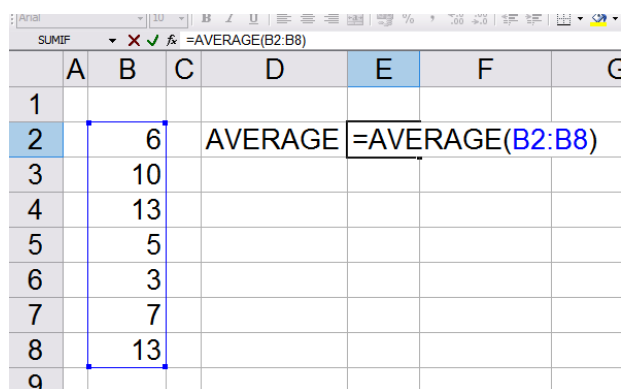
Highlight the **range** of values that you want to find the average of



Check the formula

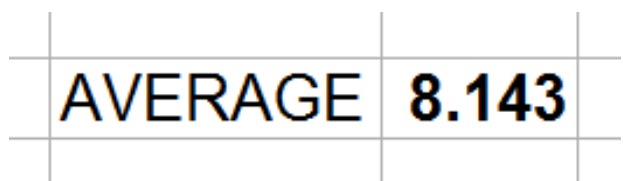
Double-click the formula to open it

Check the correct cells are highlighted



Check the result

Make sure the result of the function seems correct



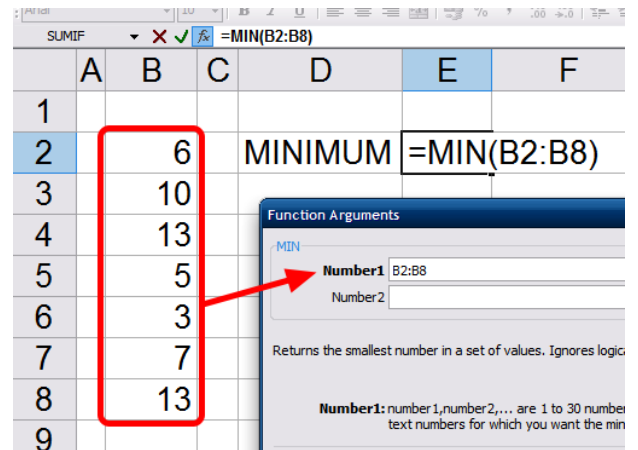
MIN - Finding the Lowest Value in a Range of Numbers

The MIN function is used to find the **smallest (minimum)** value in a **range** of values

This lesson will show you how to use the **MINIMUM** function

Use the FX button to create the function

Highlight the **range** of numbers tht you want to look through to find the smallest value

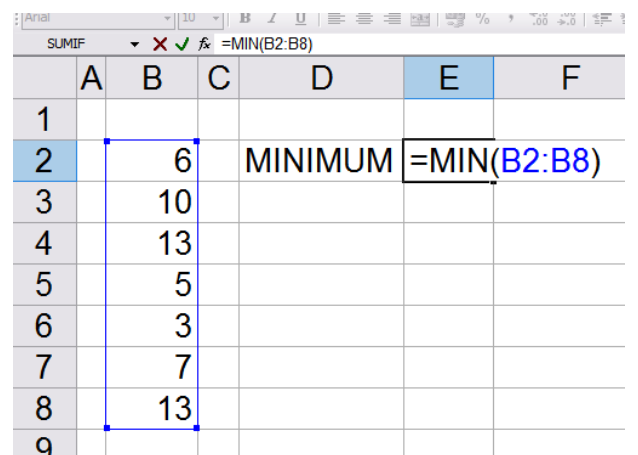


The screenshot shows an Excel spreadsheet with columns A through F and rows 1 through 9. In column B, rows 2 through 8, the values 6, 10, 13, 5, 3, 7, and 13 are listed. In cell E2, the text 'MINIMUM' is followed by the formula '=MIN(B2:B8)'. A red box highlights the range B2:B8. A red arrow points from this box to the 'Number1' field in the 'Function Arguments' dialog box, which is open over cell E2. The dialog box shows 'Number1' as 'B2:B8' and 'Number2' as an empty field. Below the dialog box, a description of the MIN function is visible: 'Returns the smallest number in a set of values. Ignores logic'.

Check the formula

Double-click the formula to open it

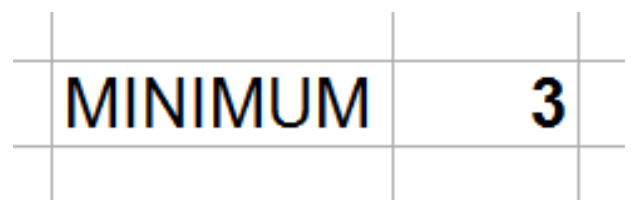
Check the correct cells are highlighted



The screenshot shows the same Excel spreadsheet as before. The formula bar at the top displays '=MIN(B2:B8)'. In the spreadsheet, the range B2:B8 is highlighted with a blue border, indicating it is selected. The text 'MINIMUM' is still in cell E2, and the formula '=MIN(B2:B8)' is now visible in the formula bar.

Check the result

Make sure the result of the function seems correct



The screenshot shows the final result of the MIN function. In cell E2, the text 'MINIMUM' is followed by the value '3'. This indicates that the function has successfully calculated the minimum value from the range B2:B8.

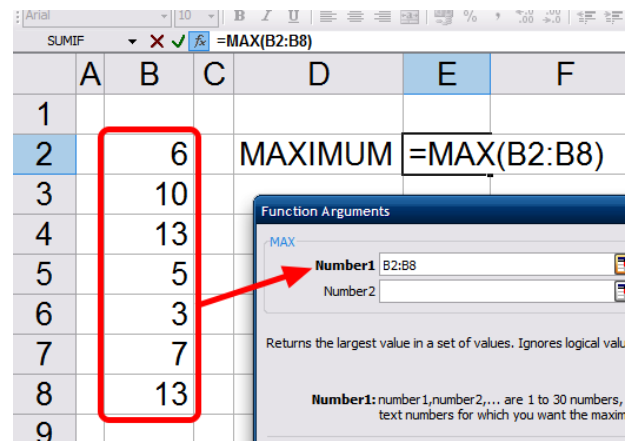
MAX - Finding the Highest Value in a Range of Numbers

The MAX function is used to find the **largest (maximum)** value in a **range** of values

This lesson will show you how to use the **MAXIMUM** function

Use the FX button to create the function

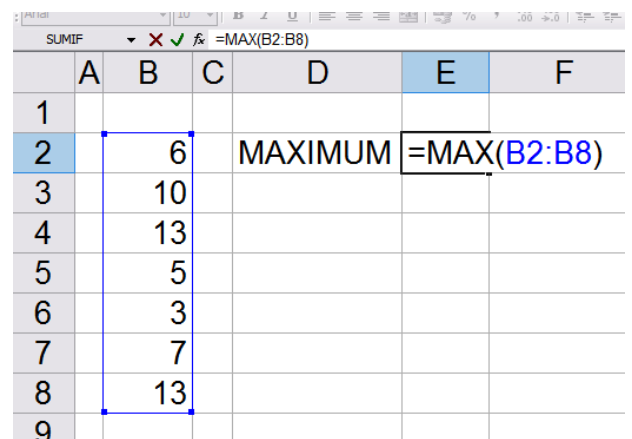
Highlight the **range** of numbers that you want to look through to find the highest value



Check the formula

Double-click the formula to open it

Check the correct cells are highlighted



Check the result

Make sure the result of the function seems correct

MAXIMUM	13
---------	----

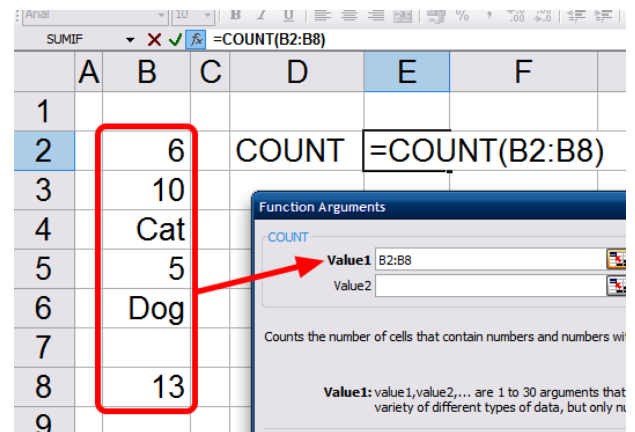
COUNT - Finding How Many Numbers are in a Range

The COUNT function is used to **count** the number of **numeric** values in a **range** of values

This lesson will show you how to use the **COUNT** function

Use the FX button to create the function

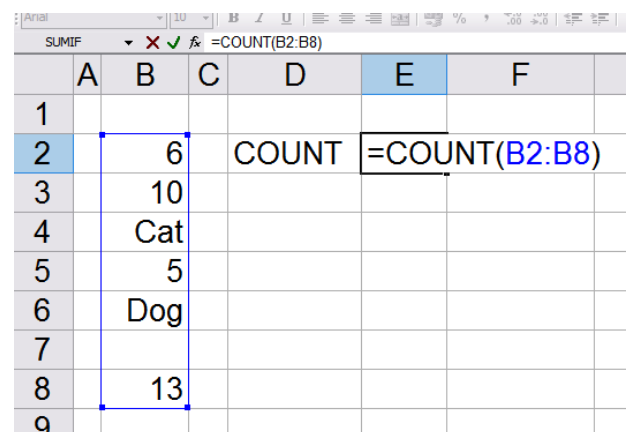
Highlight the **range** of numbers that you want to count



Check the formula

Double-click the formula to open it

Check the correct cells are highlighted



Check the result

Make sure the result of the function seems correct

Note: the COUNT function **only counts numeric values**

Text and blank spaces are **ignored**

	6	COUNT	4
	10		
	Cat		
	5		
	Dog		
	13		

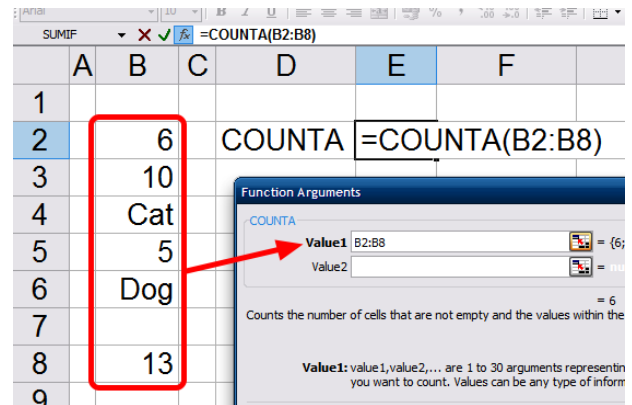
COUNTA - Counting the Number of Items in a Range

The COUNTA function is used to **count** the number of items (**text** or **numbers**) in a **range** of values

This lesson will show you how to use the **COUNTA** function

Use the FX button to create the function

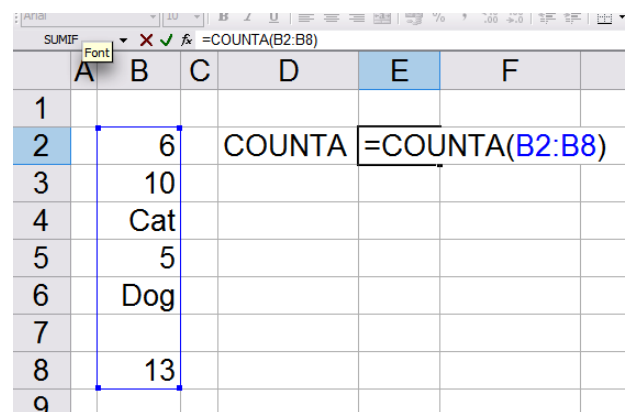
Highlight the range of items that you want to count



Check the formula

Double-click the formula to open it

Check the correct cells are highlighted



Check the results

Make sure the result of the function seems correct

Note: the COUNTA function **counts both numeric and text values**

(Think of the 'A' in COUNTA meaning 'all' or 'anything' - unlike the COUNT function which just counts numbers, COUNTA counts any items)

6	COUNTA	6
10		
Cat		
5		
Dog		
13		

INT - Converting Numbers to Integers

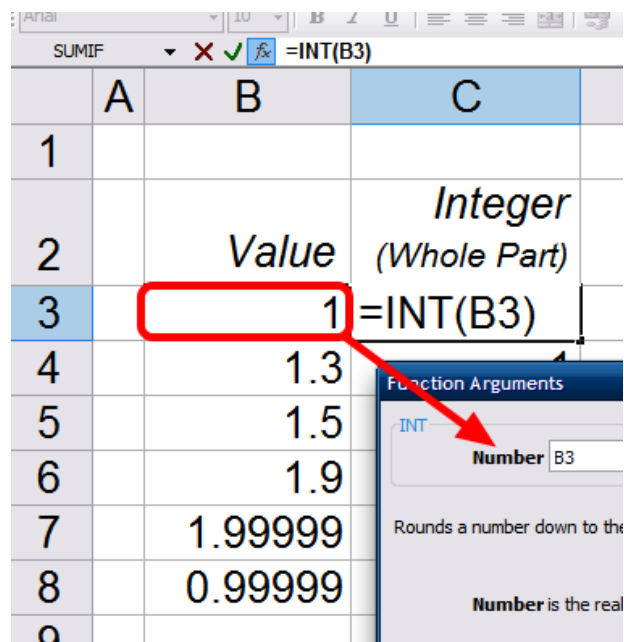
The INT function is used to find the **whole part** of a number - the **integer** part

Note: The integer part of a number is different from rounding the number - the integer part of 1.9999 is just 1 (the **whole part**, ignoring the decimal part)

This lesson will show you how to use the **INT** function

Use the FX button to create the function

Click the value that you want to find the **whole part** of

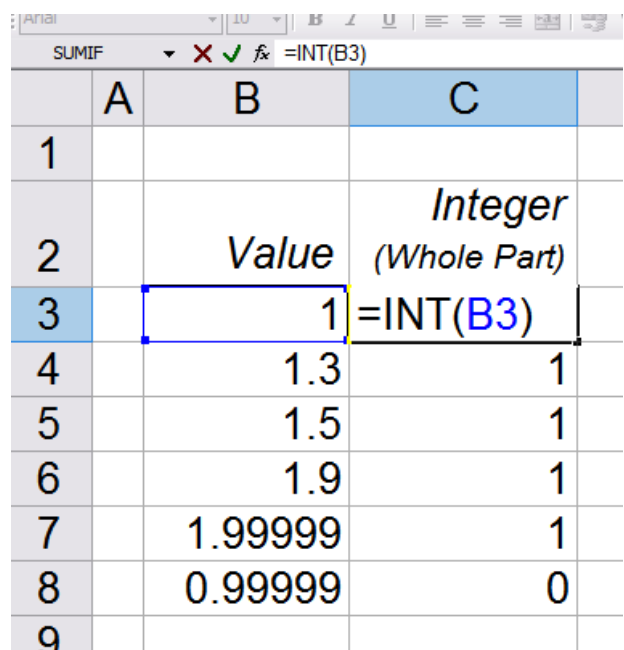


	A	B	C
1			
2		Value	Integer (Whole Part)
3		1	=INT(B3)
4		1.3	
5		1.5	
6		1.9	
7		1.99999	
8		0.99999	
9			

Check the formula

Double-click the formula to open it

Check the correct cell is highlighted



	A	B	C
1			
2		Value	Integer (Whole Part)
3		1	=INT(B3)
4		1.3	1
5		1.5	1
6		1.9	1
7		1.99999	1
8		0.99999	0
9			

Check the results

Make sure the results of the formulas look correct

Here you can see that the INT function always takes the **whole part** of the number

It does **not round** the number - it simply **ignores the decimal** part

<i>Value</i>	<i>Integer (Whole Part)</i>
1	1
1.3	1
1.5	1
1.9	1
1.99999	1
0.99999	0

ROUND - Rounding Up/Down Numbers

The ROUND function is used to find the **nearest whole number** to a numeric value - **rounding it up or down**

This lesson will show you how to use the **ROUND** function

Use the FX button to create the function

Click the **value** that you want to **round up or down**

The **num_digits** (number of digits) is the number of **decimal places** that are required.

We want **whole numbers**, so **num_digits** should be set to **0**

	A	B	C	D
1				
2		<i>Value</i>	<i>Rounded</i>	
3		1	=ROUND(B3,0)	
4		1.3		
5		1.5		
6		1.9		
7		1.99999		
8		0.99999		
9				

Check the formula

Double-click the formula to open it

Check the correct cell is highlighted

	A	B	C	D
1				
2		<i>Value</i>	<i>Rounded</i>	
3		1	=ROUND(B3,0)	
4		1.3	1	
5		1.5	2	
6		1.9	2	
7		1.99999	2	
8		0.99999	1	
9				

Check the results

Make sure the results of the formulas look correct

Here you can see that the ROUND function **rounds** values:

- Rounds **up** if decimal is .5 or more
- Rounds **down** if decimal is less than .5

<i>Value</i>	<i>Rounded</i>
1	Down 1
1.3	Down 1
1.5	Up 2
1.9	Up 2
1.99999	Up 2
0.99999	Up 1

VLOOKUP - Looking up What Particular Values Mean

The VLOOKUP function is used to find the **meaning** of a particular **value**. It does this by '**looking up**' the value in a **lookup table**

(Think of this process working in the same way you might **lookup** a **word** in a **dictionary** - you **search** for the word, and find its **meaning**)

This lesson will show you how to use the **LOOKUP** function

Consider this example

In our main **data table** we have a series of **codes**

We want to know what these **codes mean**

We also have a small **lookup table** containing the **meanings**

We will use a **VLOOKUP** function in cell F4 to lookup the code **DU** (in cell E4) in the **lookup table**

...

	A	B	C	D	E	F
1						
2		Lookup Table			Data Table	
3		Code	Name		Code	Animal
4		Ca	Cat		Du	
5		Do	Dog		Du	
6		Du	Duck		Do	
7		Go	Goat		Go	
8					Do	
9					Ca	
10					Go	
11						

Use the FX button to create the function

The **Lookup_value** is the **item** that you want to **lookup** information about

The **Table_array** is the **lookup table** - the table that contains the **meanings/definitions** of the items you want to lookup

Note: Only **highlight the data** in the lookup table - do **NOT** highlight the table **headings**

The **Col_index_num** (column index number) is set to **2** - this means that the meaning/definition is in the **2nd column** of the **lookup table**

	A	B	C	D	E	F	G	H
1								
2		Lookup Table			Data Table			
3		Code	Name		Code	Animal		
4		Ca	Cat		Du	=VLOOKUP(E4,B4:C7,2)		
5		Do	Dog		Du			
6		Du	Duck					
7		Go	Goat					
8								
9								
10								

Check the formula

Double-click the formula to open it

Check the correct cell is highlighted

(In this example you can see that we are looking up the code **DU** in the lookup table)

	A	B	C	D	E	F	G	H
1								
2		Lookup Table			Data Table			
3		Code	Name		Code	Animal		
4		Ca	Cat		Du	=VLOOKUP(E4,B4:C7,2)		
5		Do	Dog		Du			
6		Du	Duck		Do			
7		Go	Goat		Go			
8					Do			

Lock the lookup table reference before copying

We always want the **table** reference to point to the **same place**

So we need to **lock** it (make it an **absolute reference**)

Data Table	
Code	Animal
Du	=VLOOKUP(E4,\$B\$4:\$C\$7,2)
Du	
Do	

Even after the formula has been **copied** down into other rows, the table reference points to the **correct cells**

Lookup Table		Data Table	
Code	Name	Code	Animal
Ca	Cat	Du	Duck
Do	Dog	Du	Duck
Du	Duck	Do	Dog
Go	Goat	Go	Goat
		Do	Dog
		Ca	Cat
		Go	=VLOOKUP(E10,\$B\$4:\$C\$7,2)

Adjusted (points to Go in Lookup Table), Locked (points to \$B\$4:\$C\$7 in formula bar)

Check the results look ok

In this example you can see that the correct Animal names are being looked up from the lookup table

The process involves:

1. **DU** is taken to the **lookup table**
2. The **1st** column is **searched** for a match
3. When **DU is found**, the definition is taken from the **2nd column**

Lookup Table		Data Table	
Code	Name	Code	Animal
Ca	Cat	Du	Duck
Do	Dog	Du	Duck
Du	Duck	Do	Dog
Go	Goat	Go	Goat
		Do	Dog
		Ca	Cat
		Go	Goat

Diagram showing the lookup process: 1. DU is taken to the lookup table. 2. The 1st column is searched for a match. 3. When DU is found, the definition is taken from the 2nd column.

COUNTIF - Counting the Number of Specific Items in a Range

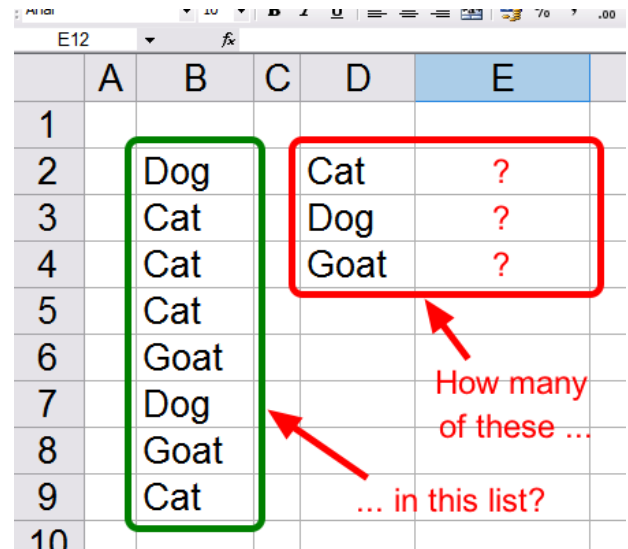
The COUNTIF function can be used to **count** the number of **specific values** in a range of cells

This lesson will show you how to use the **COUNTIF** function

Consider this example

In this example, we want to **count** the number of **Cats, Dogs and Goats** in a list

We start by counting the **Cats** using a **COUNTIF** function...



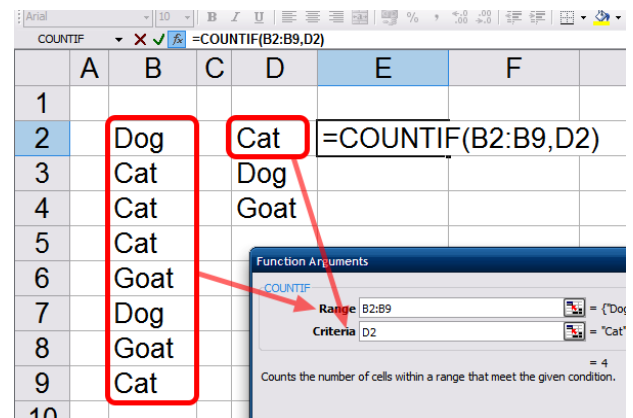
The image shows an Excel spreadsheet with columns A through E. Column A is empty. Column B contains a list of animals: Dog, Cat, Cat, Cat, Cat, Goat, Dog, Goat, Cat. Column C is empty. Column D contains the same list of animals: Cat, Dog, Goat. Column E contains question marks. A green box highlights the list in column B. A red box highlights the list in column D. A red arrow points from the text 'How many of these ...' to the red box. Another red arrow points from the text '... in this list?' to the green box.

	A	B	C	D	E
1					
2		Dog		Cat	?
3		Cat		Dog	?
4		Cat		Goat	?
5		Cat			
6		Goat			
7		Dog			
8		Goat			
9		Cat			
10					

Use the FX button to create the COUNTIF

The **range** is the **group of cells** that you want to count (the list in range B2:B9)

The **criteria** is the **specific** thing that you are **looking for** in the range (the word Cat in cell D2)



The image shows an Excel spreadsheet with columns A through F. Column A is empty. Column B contains a list of animals: Dog, Cat, Cat, Cat, Cat, Goat, Dog, Goat, Cat. Column C is empty. Column D contains the same list of animals: Cat, Dog, Goat. Column E contains the formula =COUNTIF(B2:B9,D2). Column F is empty. A red box highlights the list in column B. A red box highlights the word 'Cat' in cell D2. A red arrow points from the text 'Range' to the red box in column B. Another red arrow points from the text 'Criteria' to the red box in column D. A 'Function Arguments' dialog box is open, showing the formula =COUNTIF(B2:B9,D2) and the result = 4.

	A	B	C	D	E	F
1						
2		Dog		Cat	=COUNTIF(B2:B9,D2)	
3		Cat		Dog		
4		Cat		Goat		
5		Cat				
6		Goat				
7		Dog				
8		Goat				
9		Cat				
10						

Check the formula

Double-click the formula to open it

Check the correct cells are highlighted

	A	B	C	D	E	F
1						
2		Dog		Cat	=COUNTIF(B2:B9,D2)	
3		Cat		Dog		
4		Cat		Goat		
5		Cat				
6		Goat				
7		Dog				
8		Goat				
9		Cat				
10						

Lock the range before copying

The **range** must be **locked** (made **absolute**)

The **criteria** must be left **unlocked** (relative)

This is so that when the formula is **copied** down the **correct** list is still referred to

	A	B	C	D	E	F
2		Cat			=COUNTIF(\$B\$2:\$B\$9,D2)	
3		Dog			2	
4		Goat			2	

	A	B	C	D	E	F	G
2		Dog		Cat	4		
3		Cat		Dog	2		
4		Cat		Goat	=COUNTIF(B\$2:\$B\$9,D4)		
5		Cat					
6		Goat					
7		Dog					
8		Goat					
9		Cat					
10							

Check the results

Make sure the results of the functions look ok

Here we see that there are 4 Cats, 2 Dogs and 2 Goats in the list, which seems correct

Cat	4
Dog	2
Goat	2

SUMIF - Adding up Specific Values in a Range

The SUMIF function can be used to **add up values** in a range of cells when cells in another, **parallel range** match a given **specific criteria**

This lesson will show you how to use the **SUMIF function**

Use the FX button to create the SUMIF

In this example, we are adding up the value of Cats, Dogs and Goats in a list

We start by adding up the value of the Cats...

The **range** is the **group of cells** that you want to **look through** (the list in range B7:B14)

The **criteria** is the **specific** thing that you are **looking for** in the range (the word Cat in cell B2)

The **sum_range** is the **group of cells** that you want to **add up** if the criteria matches (the list in range D7:D14)

(Note: If you're confused about which range is which.... the **sum_range** must be the range with **numbers** in!)

The screenshot shows an Excel spreadsheet with the following data:

	A	B	C	D	E	F	G	H
1		Total		\$				
2		Cat						
3		Dog						
4		Goat						
5								
6		Animal		\$				
7		Cat		12				
8		Goat		10				
9		Cat		5				
10		Dog		3				
11		Goat		7				
12		Goat		9				
13		Dog		10				
14		Cat		12				
15								

The formula bar shows: `=SUMIF(B7:B14,B2,D7:D14)`

The Function Arguments dialog box is open, showing:

- Range: B7:B14
- Criteria: B2
- Sum_range: D7:D14

The dialog box also includes the text: "Adds the cells specified by a given condition or criteria." and "Range is the range of cells you want evaluated". The Formula result is 29.

Check the formula

Double-click the formula to open it

Check the correct cells are highlighted

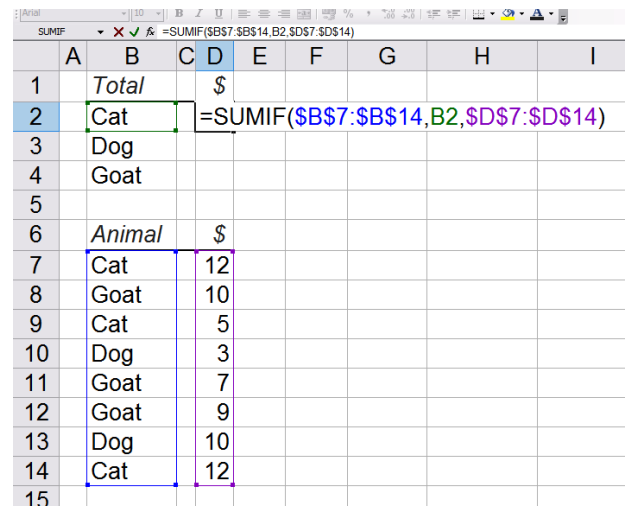
The screenshot shows the same Excel spreadsheet as before, but with the formula bar showing: `=SUMIF(B7:B14,B2,D7:D14)`

The cells B7:B14 (Cats, Dogs, Goats) and D7:D14 (values) are highlighted in blue, indicating they are the range and sum_range respectively. Cell B2 (Cat) is highlighted in green, indicating it is the criteria.

Lock the ranges before copying

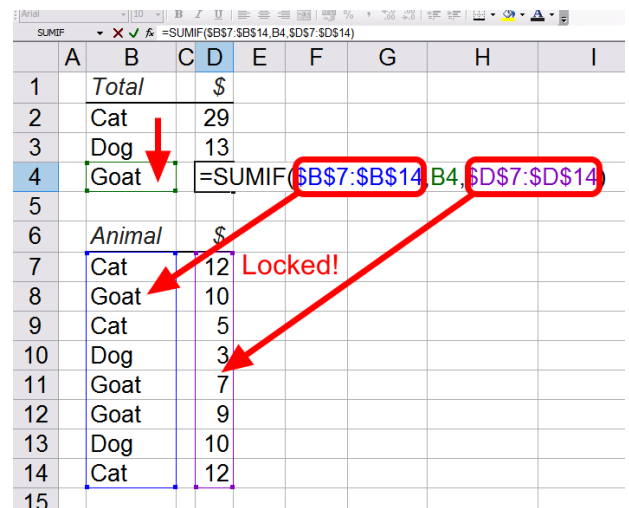
The **ranges** must be **locked** (made **absolute**)

The **criteria** must be left **unlocked** (relative)



	A	B	C	D	E	F	G	H	I
1		Total		\$					
2		Cat		=SUMIF(\$B\$7:\$B\$14,B2,\$D\$7:\$D\$14)					
3		Dog							
4		Goat							
5									
6		Animal		\$					
7		Cat		12					
8		Goat		10					
9		Cat		5					
10		Dog		3					
11		Goat		7					
12		Goat		9					
13		Dog		10					
14		Cat		12					
15									

This is so that when the formula is **copied** down the **correct** list is still referred to

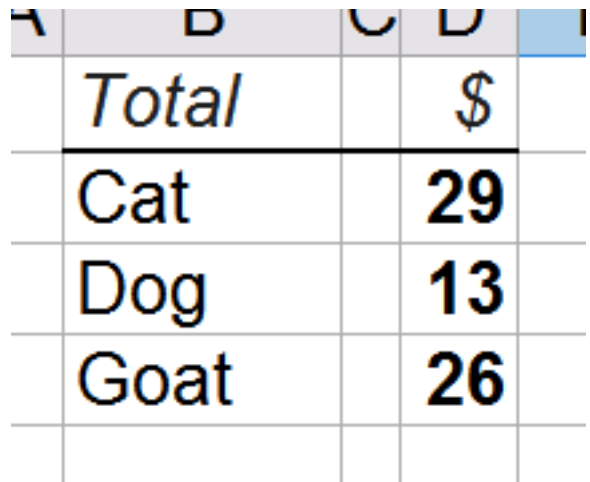


	A	B	C	D	E	F	G	H	I
1		Total		\$					
2		Cat		29					
3		Dog		13					
4		Goat		=SUMIF(\$B\$7:\$B\$14,B4,\$D\$7:\$D\$14)					
5									
6		Animal		\$					
7		Cat		12					
8		Goat		10					
9		Cat		5					
10		Dog		3					
11		Goat		7					
12		Goat		9					
13		Dog		10					
14		Cat		12					
15									

Check the results

Make sure the results of the functions look ok

Here we see that Cats are worth 29, Dogs are worth 13 and Goats are worth 26, which seems correct



A	B	C	D
	Total		\$
	Cat		29
	Dog		13
	Goat		26

IF - Deciding What Will Go Into a Cell

The IF function is used to make **choices** or **decisions** about what will appear in a cell

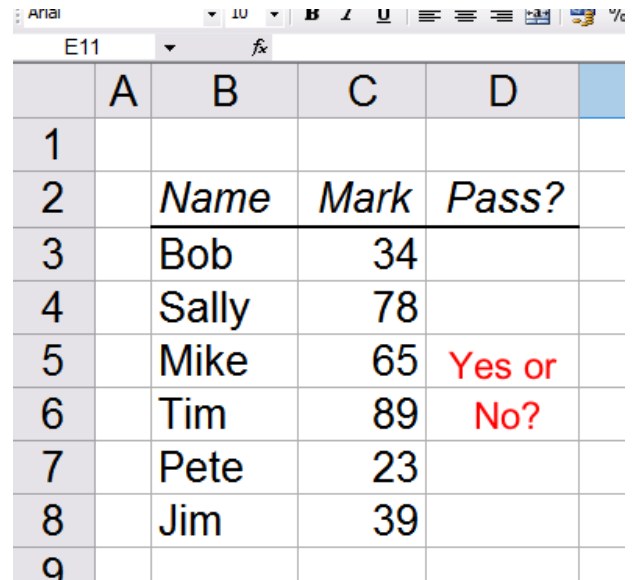
This lesson will show you how to use the **IF** function

Consider this example

Here we have a set of student marks.

If the mark is **more than 50**, the student **passes**

We will use an **IF** function in cell D3 to decide if Bob has passed...



	A	B	C	D
1				
2		<i>Name</i>	<i>Mark</i>	<i>Pass?</i>
3		Bob	34	
4		Sally	78	
5		Mike	65	Yes or
6		Tim	89	No?
7		Pete	23	
8		Jim	39	
9				

Use the FX button to create the function

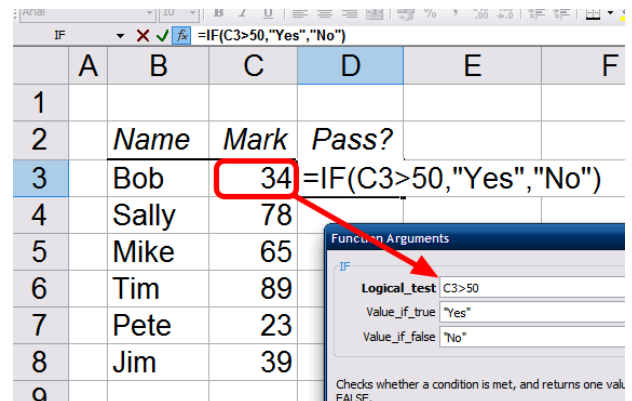
The **Logical_test** is the test that **decides** what we should put into the cell

Note: The **test** almost always involves an item of **data in a cell** being **compared** with a **value**, e.g.

B3 = 1

C4 <= 25

D2 = "DOG"



	A	B	C	D	E	F
1						
2		<i>Name</i>	<i>Mark</i>	<i>Pass?</i>		
3		Bob	34	=IF(C3>50,"Yes","No")		
4		Sally	78			
5		Mike	65			
6		Tim	89			
7		Pete	23			
8		Jim	39			
9						

The **Value_if_true** is what should be placed in cell D3 if the test is **true**

The **Value_if_false** is what should be placed in cell D3 if the test is **false**

Note: These values can be **anything** that you would normally put into a cell, e.g.

Numbers: 3, 0.5, 125%

Text: "Yes", "No", "Timmy"

Formula: D4*25

Check the formula

Double-click the formula to open it

Check the correct cell(s) is highlighted

	A	B	C	D	E	F
1						
2		Name	Mark	Pass?		
3		Bob	34	=IF(C3>50,"Yes","No")		
4		Sally	78			
5		Mike	65			

Check the results

After copying the formula down, we can see that 'Yes' appears next to the correct marks

	<i>Name</i>	<i>Mark</i>	<i>Pass?</i>
	Bob	34	No
	Sally	78	Yes
	Mike	65	Yes
	Tim	89	Yes
	Pete	23	No
	Jim	39	No

Multiple IFs - Deciding Between More Than Two Things

The IF function is used to make **choices** or **decisions** about what will appear in a cell

This lesson will show you how to use multiple **IF functions** to choose between **several** items

Consider this example

Here we have a set of student marks.

If the mark is:

- **80 or more**, the student gets a grade **A**
- **60 or more**, the student gets a grade **B**
- **40 or more**, the student gets a grade **C**
- Anything else, the student **Fails**

We will use a number of nested **IF** functions in cell D3 to decide Bob's grade...

(Note: '**Nested**' means that one IF function will be **inside** another which will be **inside** another... and so on)

	A	B	C	D
1				
2		<i>Name</i>	<i>Mark</i>	<i>Grade</i>
3		Bob	34	
4		Sally	78	
5		Mike	65	What
6		Tim	89	grade?
7		Pete	23	
8		Jim	45	
9				

Type in the start of the first IF function

(Note: Because we are nesting function we cannot use the FX button)

We are **testing** the mark (in cell C3) to see if it is **80 or more**

If this **test is true**, we will place the letter **A** in the cell

But if it's **not true**, what do we do? We need to do the **next test**...

	A	B	C	D	E
1					
2		<i>Name</i>	<i>Mark</i>	<i>Grade</i>	
3		Bob	34	=IF(C3>=80,"A",	
4		Sally	78		
5		Mike	65		
6		Tim	89		

Type the next IF function inside the first one

Now we are **testing** the same mark (in cell C3) to see if it is **60 or more**

If this **test is true**, we will place the letter **B** in the

	Mark	Grade
	34	=IF(C3>=80,"A", IF(C3>=60,"B",
	78	
	65	

cell

But if it's **not true**, what do we do? We need to do the **next test**...

Type the next IF function inside the second one

Now we are **testing** the same mark (in cell C3) to see if it is **40 or more**

Mark	Grade
34	=IF(C3>=80,"A", IF(C3>=60,"B", IF(C3>=40,"C",
78	
65	

If this **test is true**, we will place the letter **C** in the cell

But if it's **not true**, what do we do? There are no more tests - the student **failed**!

Complete the IF functions

If the student didn't get an A, B or C, they must have failed

Mark	Grade
34	=IF(C3>=80,"A", IF(C3>=60,"B", IF(C3>=40,"C", "Fail")))
78	
65	

So, we will place the word **Fail** in the cell

Finally, **finish** all of the IF functions by **closing the brackets** (3 brackets for 3 IFs)

Check the results

After copying the formula down, we can see that the correct grades appear next to the marks

Name	Mark	Grade
Bob	34	Fail
Sally	78	B
Mike	65	B
Tim	89	A
Pete	23	Fail
Jim	45	C

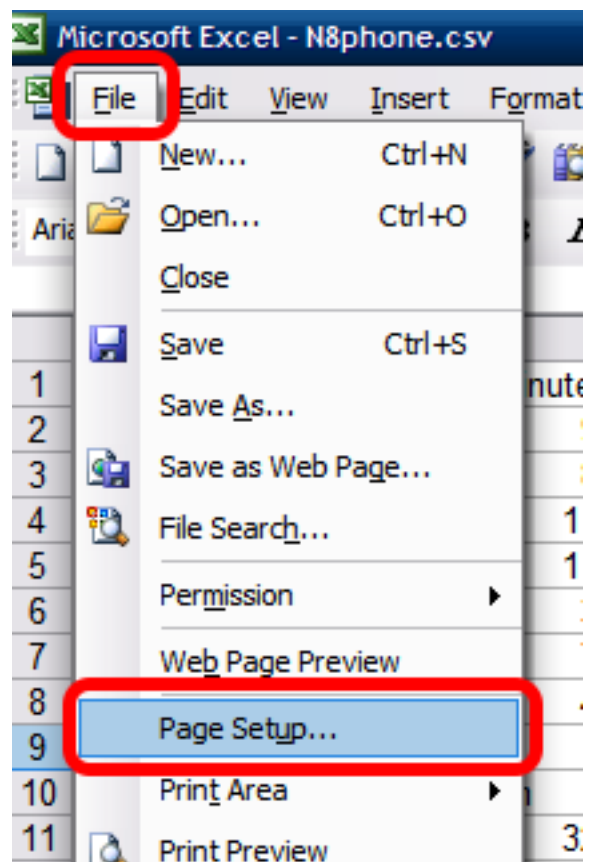
Printing Your Spreadsheet

Setting Up Your Page for Printing

This lesson will show you how to best **setup your page** for **printing** your spreadsheet

Open the Page Setup window

Click the **File** menu, then **Page Setup...**



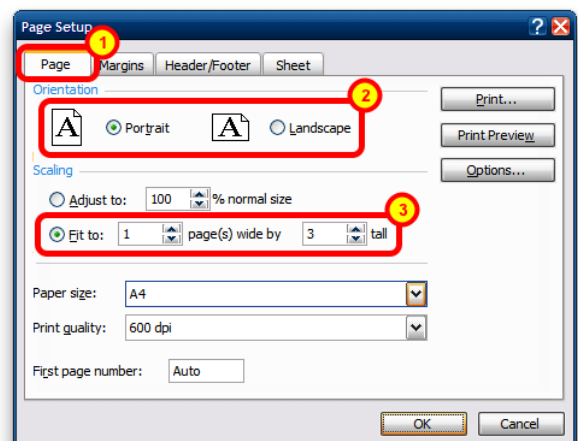
Set the page Orientation and Scaling

Select the **Page** tab

Chose the page **orientation** that you want:
Portrait or **Landscape**

Scale the page so that it **fits** on **1 page wide**.

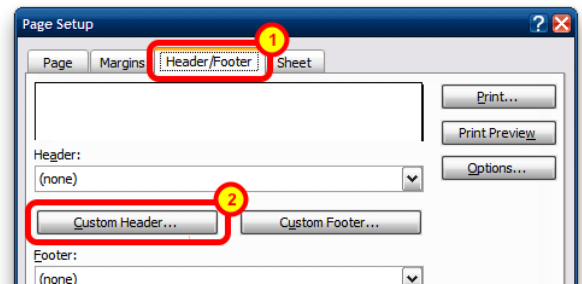
Allow the page to be **several pages tall**



Setup the page Header/Footer

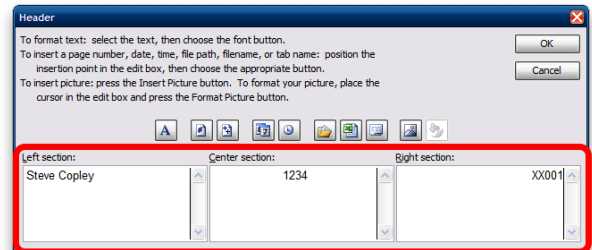
Chose the **Header/Footer** tab

Click **Custom Header**



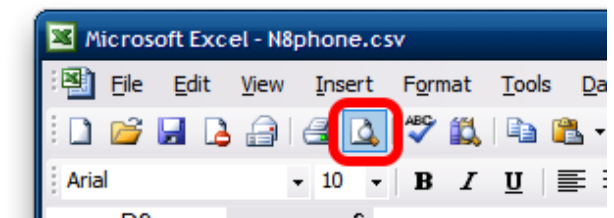
Add information to the header sections (name, etc.)

(Note: There are **buttons** that allow you to add **page number**, **date**, etc. if required)



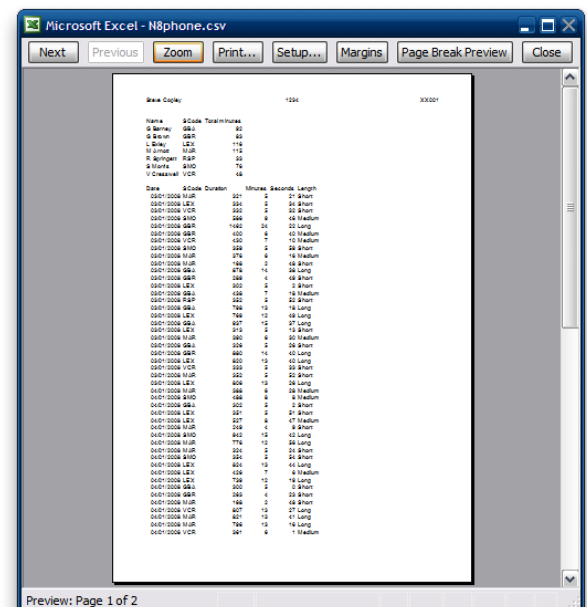
Preview the page

Click the **Print Preview** button on the toolbar



Check that your spreadsheet:

- Fits on the correct **number of pages**
- Doesn't have any data / formulae **chopped off**
- Is **readable**
- Has the correct **header / footer** information

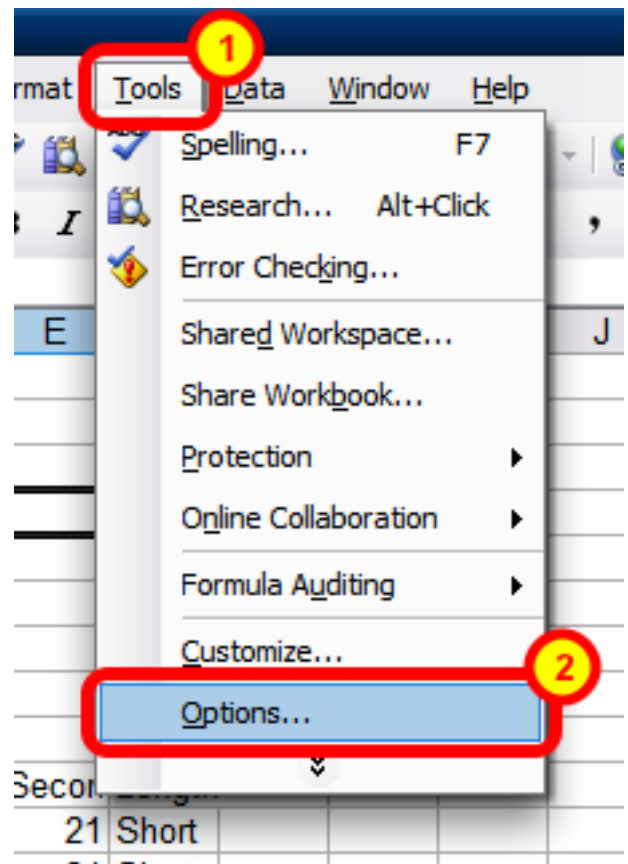


Printing Formulae

This lesson will show you how to **print** the **formulae** that you have created in your spreadsheet

Show the formulae

Click the **Tools** menu, then **Options...**

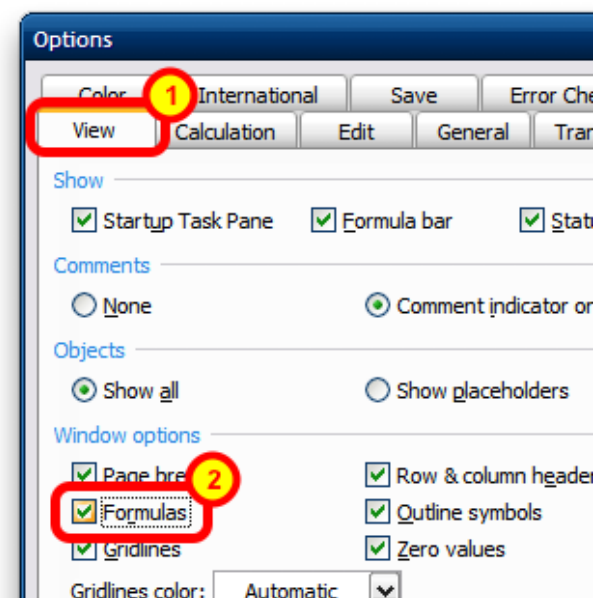


Select the **View** tab

Tick the **Formulas** box

Note: There is a **keyboard shortcut** for this: **Ctrl + `** (backward apostrophe - usually **top-left** key on most UK / US keyboards)

Each time you press this key, the spreadsheet will **toggle** between showing **values** and **formulae**

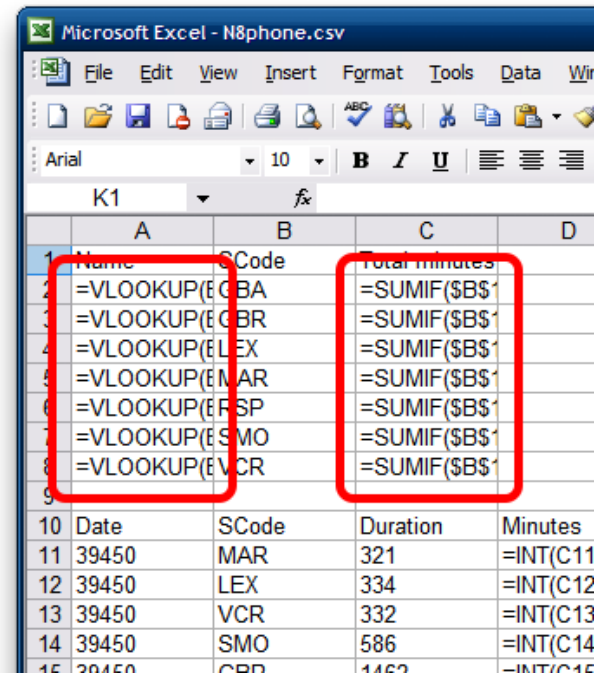


Resize the columns to make all formulae visible

Some of your longer formulae **not** be fully **visible**

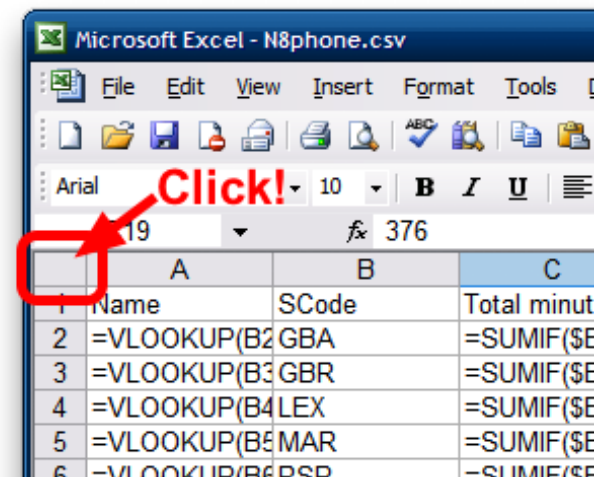
You need to **resize** the **columns** so that the full formulae can be seen

There is a very quick way to do this...

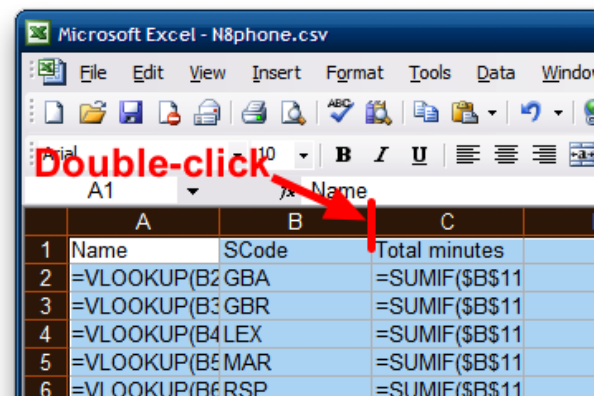


Click in the **top-left corner** of the spreadsheet

This will **highlight** the **whole** spreadsheet



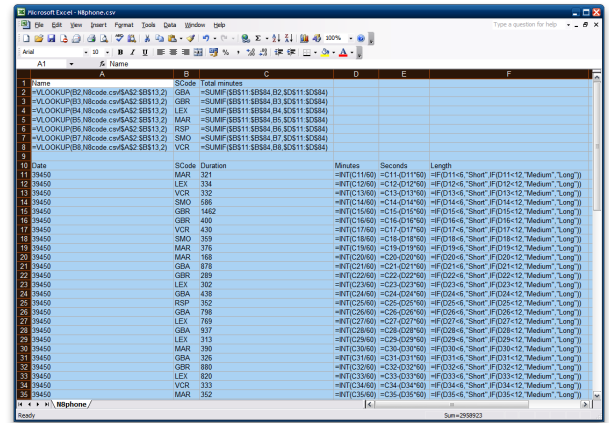
Then **double-click** the line **between** any two of the **column headings**



All of the **columns** will be **resized** to fit the formulae **exactly**

Setup your **page** ready for printing: portrait / landscape, fit to one page, etc. (See the Page Setup lesson)

You can now **print** your formulae



	A	B	C	D	E	F
1	Name	SCode	Total minutes			
2	=VLOOKUP(B2,Nilcode.csv\$A\$2:\$B\$13,2)	GBA	=SUM(\$B\$11:\$B\$14,\$D2:\$D\$11,\$D\$14)			
3	=VLOOKUP(B3,Nilcode.csv\$A\$2:\$B\$13,2)	GBR	=SUM(\$B\$11:\$B\$14,\$D3:\$D\$11,\$D\$14)			
4	=VLOOKUP(B4,Nilcode.csv\$A\$2:\$B\$13,2)	LEX	=SUM(\$B\$11:\$B\$14,\$D4:\$D\$11,\$D\$14)			
5	=VLOOKUP(B5,Nilcode.csv\$A\$2:\$B\$13,2)	MAR	=SUM(\$B\$11:\$B\$14,\$D5:\$D\$11,\$D\$14)			
6	=VLOOKUP(B6,Nilcode.csv\$A\$2:\$B\$13,2)	RSP	=SUM(\$B\$11:\$B\$14,\$D6:\$D\$11,\$D\$14)			
7	=VLOOKUP(B7,Nilcode.csv\$A\$2:\$B\$13,2)	SMO	=SUM(\$B\$11:\$B\$14,\$D7:\$D\$11,\$D\$14)			
8	=VLOOKUP(B8,Nilcode.csv\$A\$2:\$B\$13,2)	VCR	=SUM(\$B\$11:\$B\$14,\$D8:\$D\$11,\$D\$14)			
9						
10	Date	SCode	Duration	Minutes	Seconds	Length
11	19450	MAR	321	=INT(C11/60)	=C11-(D11*60)	=IF(D11<4,"Short",IF(D11<12,"Medium","Long"))
12	19450	LEX	334	=INT(C12/60)	=C12-(D12*60)	=IF(D12<4,"Short",IF(D12<12,"Medium","Long"))
13	19450	VCR	332	=INT(C13/60)	=C13-(D13*60)	=IF(D13<4,"Short",IF(D13<12,"Medium","Long"))
14	19450	SMO	586	=INT(C14/60)	=C14-(D14*60)	=IF(D14<4,"Short",IF(D14<12,"Medium","Long"))
15	19450	GBR	1462	=INT(C15/60)	=C15-(D15*60)	=IF(D15<4,"Short",IF(D15<12,"Medium","Long"))
16	19450	GBR	489	=INT(C16/60)	=C16-(D16*60)	=IF(D16<4,"Short",IF(D16<12,"Medium","Long"))
17	19450	VCR	430	=INT(C17/60)	=C17-(D17*60)	=IF(D17<4,"Short",IF(D17<12,"Medium","Long"))
18	19450	SMO	353	=INT(C18/60)	=C18-(D18*60)	=IF(D18<4,"Short",IF(D18<12,"Medium","Long"))
19	19450	MAR	376	=INT(C19/60)	=C19-(D19*60)	=IF(D19<4,"Short",IF(D19<12,"Medium","Long"))
20	19450	MAR	188	=INT(C20/60)	=C20-(D20*60)	=IF(D20<4,"Short",IF(D20<12,"Medium","Long"))
21	19450	GBA	879	=INT(C21/60)	=C21-(D21*60)	=IF(D21<4,"Short",IF(D21<12,"Medium","Long"))
22	19450	GBR	289	=INT(C22/60)	=C22-(D22*60)	=IF(D22<4,"Short",IF(D22<12,"Medium","Long"))
23	19450	LEX	362	=INT(C23/60)	=C23-(D23*60)	=IF(D23<4,"Short",IF(D23<12,"Medium","Long"))
24	19450	GBA	438	=INT(C24/60)	=C24-(D24*60)	=IF(D24<4,"Short",IF(D24<12,"Medium","Long"))
25	19450	RSP	352	=INT(C25/60)	=C25-(D25*60)	=IF(D25<4,"Short",IF(D25<12,"Medium","Long"))
26	19450	GBA	788	=INT(C26/60)	=C26-(D26*60)	=IF(D26<4,"Short",IF(D26<12,"Medium","Long"))
27	19450	LEX	789	=INT(C27/60)	=C27-(D27*60)	=IF(D27<4,"Short",IF(D27<12,"Medium","Long"))
28	19450	GBA	937	=INT(C28/60)	=C28-(D28*60)	=IF(D28<4,"Short",IF(D28<12,"Medium","Long"))
29	19450	LEX	313	=INT(C29/60)	=C29-(D29*60)	=IF(D29<4,"Short",IF(D29<12,"Medium","Long"))
30	19450	MAR	350	=INT(C30/60)	=C30-(D30*60)	=IF(D30<4,"Short",IF(D30<12,"Medium","Long"))
31	19450	GBA	326	=INT(C31/60)	=C31-(D31*60)	=IF(D31<4,"Short",IF(D31<12,"Medium","Long"))
32	19450	GBR	880	=INT(C32/60)	=C32-(D32*60)	=IF(D32<4,"Short",IF(D32<12,"Medium","Long"))
33	19450	LEX	829	=INT(C33/60)	=C33-(D33*60)	=IF(D33<4,"Short",IF(D33<12,"Medium","Long"))
34	19450	VCR	333	=INT(C34/60)	=C34-(D34*60)	=IF(D34<4,"Short",IF(D34<12,"Medium","Long"))
35	19450	MAR	352	=INT(C35/60)	=C35-(D35*60)	=IF(D35<4,"Short",IF(D35<12,"Medium","Long"))

Go back to showing the normal spreadsheet values

To **hide** the formulae and show the values again:

Untick the **Formulas** box in the **Options** window

Or press **Ctrl-`** again