UNDERSTANDING DATA EDITING

In computer jargon ***editing*** means changing – when you *edit* data, you are changing it. There are many ways in Excel that you can change your data – you can ***overwrite*** it and replace it with something entirely new; you can ***delete*** it entirely or; you can perform an Excel ***edit*** on the data where you change only a part of it.

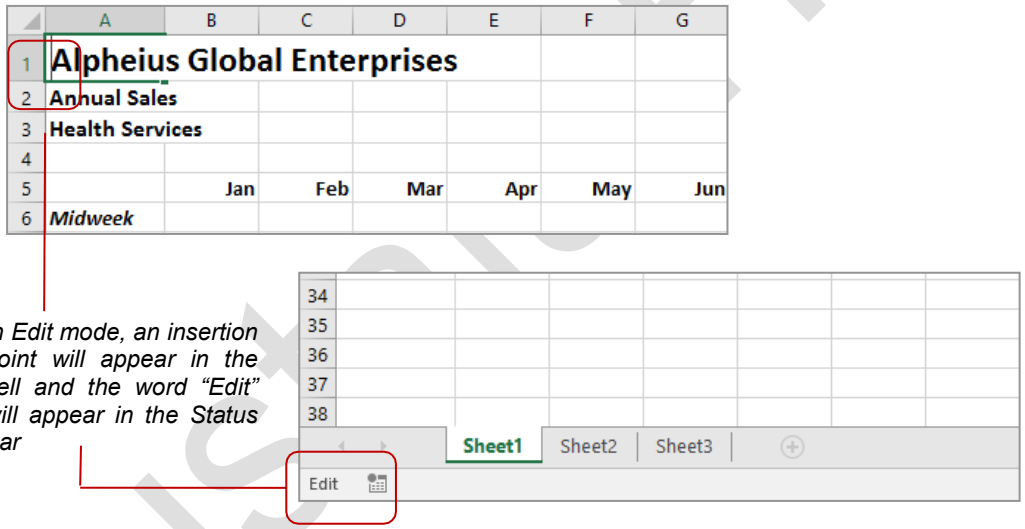
Overwriting Data

Overwriting is by far the easiest way to change existing data. To overwrite, you simply click on the cell that you want to change, type the new values, and then press Enter – the data that was there before is completely replaced by the new data you've typed.

Editing Data

Each cell in a worksheet can hold up to *32,767* characters. Even though it is unlikely that you'll ever use that many characters in a cell, there will be times when you have longer text entries or complex formulas that would be a pain to have to retype. In these situations, you can use Excel's editing features.

You can edit a cell either by double-clicking on it, or by pressing F2 on the keyboard. When a cell is in edit mode the status bar will show ***Edit*** rather than ***Ready***, and the insertion point will appear in the cell allowing you to choose which characters you want to change. Once the changes have been made you can press Enter to record the changes.



In Edit mode, an insertion point will appear in the cell and the word "Edit" will appear in the Status Bar

Deleting Data

There are two operations for removing unwanted data from a worksheet – you can either ***clear*** data or ***delete*** it entirely.

When you ***clear*** data from a worksheet you are *emptying* the cell or cells of their contents (you can actually specify other things to clear out as well, but that will only confuse matters at this point).

When you ***delete*** data from a worksheet you are *emptying* the cell or cells of their contents, but you also have the option of changing the layout of the worksheet by *shifting* data from adjacent cells into the one or ones that have been deleted.

At first, the difference between ***clear*** and ***delete*** may not be very clear. However, consider an annual budget that is showing forecasts on a monthly basis. You'll have a column of figures for each month of the year (January, February, March, through to December). If you ***clear*** the data for March you'll end up with an empty column. However, if you ***delete*** the data for March all of the columns to the right (April, May, etc) will shift one column to the left so that April occupies the column previously occupied by March, May that of April, June that of May, and so on.

OVERWRITING CELL CONTENTS

You can easily change the contents of a cell by retyping the contents of that cell. This process is known as ***overwriting*** and is the simplest form of editing. The overwriting process involves clicking on the cell that you wish to change and typing the new data. As soon as you press Enter or click elsewhere in the worksheet, the new data will replace the old cell entry.

Try This Yourself:

Open File

Before starting this exercise you MUST open the file Editing_1.xlsx…

1. Click in cell ***B7***

   This cell currently shows a value of 70,500 – notice that this appears in the formula bar…

2. Type **71456**, then press Enter

   This will place the new value in the cell, overwriting the old value and updating the formulas in the table

	A	B	C	D	E	F	G	H
1	**Alpheius Global Enterprises**							
2	**Annual Sales**							
3	**Health Services**							
4								
5		**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**
6	***Midweek***							
7	**Tuesday**	70,500	78,967	85,889	117,015	101,328	108,187	144,878
8	**Wednesday**	520,830	360,389	244,488	110,585	96,184	103,043	138,448
9	**Thursday**	83,296	520,242	82,467	112,728	97,899	104,757	140,592
10	**Friday**	520,140	83,333	87,611	119,158	103,043	109,901	147,022
11								
12	**Subtotal**	**1,194,766**	**1,042,931**	**500,455**	**459,486**	**398,454**	**425,888**	**570,940**

1

	A	B	C	D	E	F	G	H
1	**Alpheius Global Enterprises**							
2	**Annual Sales**							
3	**Health Services**							
4								
5		**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**
6	***Midweek***							
7	**Tuesday**	71,456	78,967	85,889	117,015	101,328	108,187	144,878
8	**Wednesday**	520,830	360,389	244,488	110,585	96,184	103,043	138,448
9	**Thursday**	83,296	520,242	82,467	112,728	97,899	104,757	140,592
10	**Friday**	520,140	83,333	87,611	119,158	103,043	109,901	147,022
11								
12	**Subtotal**	**1,195,722**	**1,042,931**	**500,455**	**459,486**	**398,454**	**425,888**	**570,940**

2

For Your Reference…

To ***overwrite cell contents***:

1. Click in a cell that contains data
2. Type the new data
3. Press Enter

Handy to Know…

- You can abort overwriting the contents of a cell by pressing Esc instead of Enter.
- Overwriting cell contents is particularly useful when there is a relatively small amount of data in the cell.

EDITING LONGER CELLS

Excel provides you with several ways of changing the contents of a cell without the need for retyping the entire entry. Some of the ways of editing a cell include: double-clicking in the cell, pressing F2 on the keyboard, and clicking in the ***Formula Bar***. All of these techniques place Excel in ***edit mode***. The method that you choose is one of personal preference.

Try This Yourself:

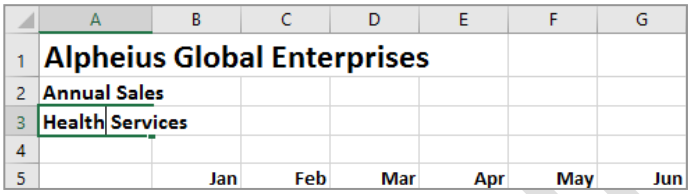
Same File *Continue using the previous file with this exercise, or open the file Editing_2.xlsx...*

1. Double-click in cell A3

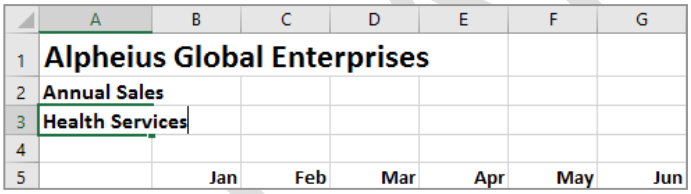
   The cell is now in edit mode, as indicated by the flashing insertion pointer in the cell, and the Edit message in the status bar at the bottom of the screen…

2. Press End to move the insertion pointer to the end of the text
3. Press Home to move the insertion pointer to the start of the text
4. Hold down Ctrl, then press → to move to the start of the next word
5. Type **and Related**, then press Space
6. Press Enter to complete the editing process

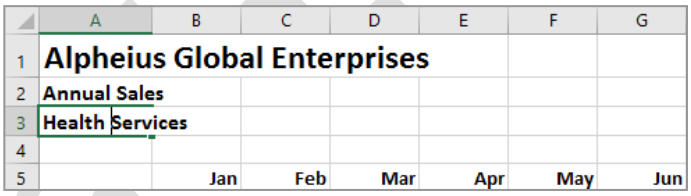
1



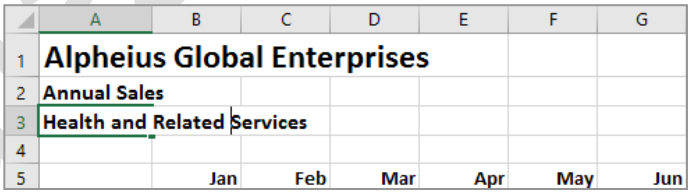
2



4



5



For Your Reference…

To ***edit long cell entries***:

1. Double-click on the cell to be edited, or press F2, or click on the ***Formula Bar***
2. Make the changes
3. Press Enter

Handy to Know…

- As well as the word ***Edit*** appearing in the status bar when you have placed Excel into edit mode, the ***Enter*** and ***Cancel*** icons are enabled in the ***Formula Bar***.

EDITING FORMULAS

When editing a formula you can often click out of the formula in edit mode. This allows you to move around the worksheet in order to click on a particular cell that you wish to include in the formula. Also, when you first edit a formula Excel displays the linked cells in a different colour. This makes it easy to follow the logic of the formula that you are editing.

Try This Yourself:

Same File *Continue using the previous file with this exercise, or open the file Editing_3.xlsx...*

1. Double-click in cell B20

   Notice the use of coloured cell indicators – it shows the immediate dependents of the formula. Cell B18 should be included, not cell B17…

2. Select B17 in the ***Formula Bar*** as shown

   The cell reference in the formula will appear selected…

3. Click in cell B18 in the worksheet

   B17 in the formula will change to B18…

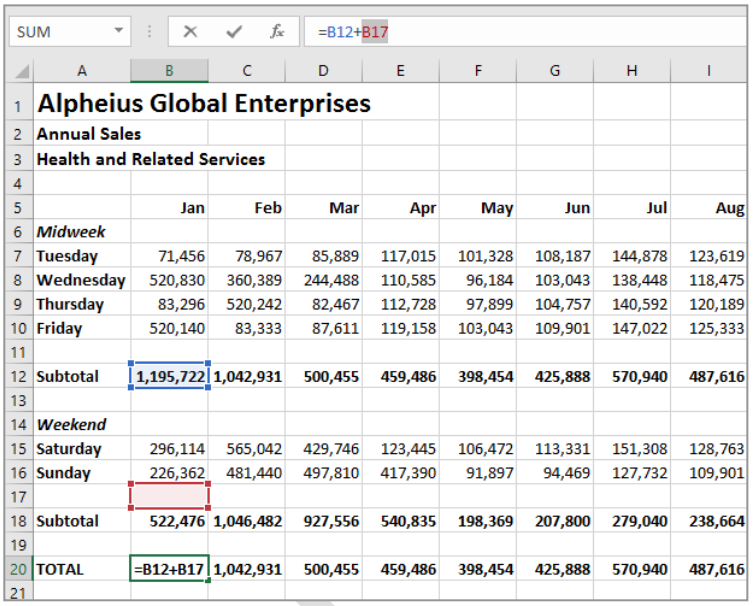
4. Press Enter to complete the formula

   You can now fill the changes across to the other cells…

5. Press ↑ to move the cell pointer back to cell B20

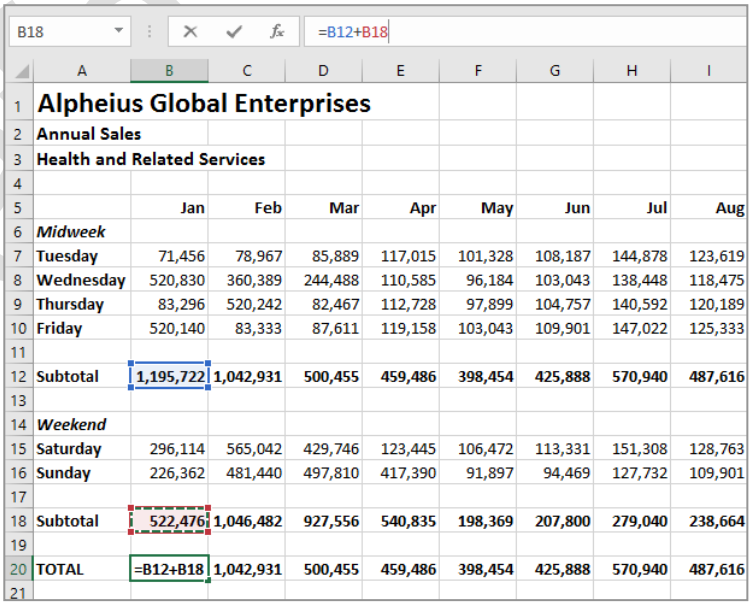
6. Click and drag the fill handle across to cell ***N20*** to fill the edited formula across these cells

2



	A	B	C	D	E	F	G	H	I
1	**Alpheius Global Enterprises**								
2	**Annual Sales**								
3	**Health and Related Services**								
4									
5		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
6	***Midweek***								
7	Tuesday	71,456	78,967	85,889	117,015	101,328	108,187	144,878	123,619
8	Wednesday	520,830	360,389	244,488	110,585	96,184	103,043	138,448	118,475
9	Thursday	83,296	520,242	82,467	112,728	97,899	104,757	140,592	120,189
10	Friday	520,140	83,333	87,611	119,158	103,043	109,901	147,022	125,333
11									
12	**Subtotal**	**1,195,722**	**1,042,931**	**500,455**	**459,486**	**398,454**	**425,888**	**570,940**	**487,616**
13									
14	***Weekend***								
15	Saturday	296,114	565,042	429,746	123,445	106,472	113,331	151,308	128,763
16	Sunday	226,362	481,440	497,810	417,390	91,897	94,469	127,732	109,901
17									
18	**Subtotal**	**522,476**	**1,046,482**	**927,556**	**540,835**	**198,369**	**207,800**	**279,040**	**238,664**
19									
20	**TOTAL**	**=B12+B17**	**1,042,931**	**500,455**	**459,486**	**398,454**	**425,888**	**570,940**	**487,616**
21									

3



	A	B	C	D	E	F	G	H	I
1	**Alpheius Global Enterprises**								
2	**Annual Sales**								
3	**Health and Related Services**								
4									
5		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
6	***Midweek***								
7	Tuesday	71,456	78,967	85,889	117,015	101,328	108,187	144,878	123,619
8	Wednesday	520,830	360,389	244,488	110,585	96,184	103,043	138,448	118,475
9	Thursday	83,296	520,242	82,467	112,728	97,899	104,757	140,592	120,189
10	Friday	520,140	83,333	87,611	119,158	103,043	109,901	147,022	125,333
11									
12	**Subtotal**	**1,195,722**	**1,042,931**	**500,455**	**459,486**	**398,454**	**425,888**	**570,940**	**487,616**
13									
14	***Weekend***								
15	Saturday	296,114	565,042	429,746	123,445	106,472	113,331	151,308	128,763
16	Sunday	226,362	481,440	497,810	417,390	91,897	94,469	127,732	109,901
17									
18	**Subtotal**	**522,476**	**1,046,482**	**927,556**	**540,835**	**198,369**	**207,800**	**279,040**	**238,664**
19									
20	**TOTAL**	**=B12+B18**	**1,042,931**	**500,455**	**459,486**	**398,454**	**425,888**	**570,940**	**487,616**
21									

For Your Reference…

To ***edit formulas***:

1. Double-click in the cell
2. Double-click in the cell reference to be changed
3. Click on the new cell to be referenced, then press Enter

Handy to Know…

- If you discover that you're changing the data in the wrong cells or that your correction isn't working you as you'd hoped, press Esc. The original cell contents will be redisplayed allowing you to start again.

CLEARING CELLS

If you wish to empty a cell without impacting on the layout of your worksheet, you will need to use the ***Clear*** operation in Excel. *Clearing* a cell (or many cells) actually *empties* the cell of its contents. You can also just clear the *formats* and speciality items such as *comments* and *hyperlinks*. Clearing is done using the ***Clear*** command on the ***Home*** tab or by pressing Del on the keyboard.

Try This Yourself:

Same File — *Continue using the previous file with this exercise, or open the file Editing_4.xlsx...*

1. Click in cell ***C7***

   This cell contains the sales for Feb…

2. Press Del to clear the value from the cell

   Notice that the totals change and that the cell remains the active cell…

3. Type **83999**, then press Enter

   Notice that the formatting (the comma in the numbers) has remained as before…

4. Click in cell ***C7*** again

5. Ensure the ***Home*** tab is selected, then click on ***Clear*** in the ***Editing*** group to display a menu of options

6. Select **Clear All** to clear the contents *and* the formatting from these cells

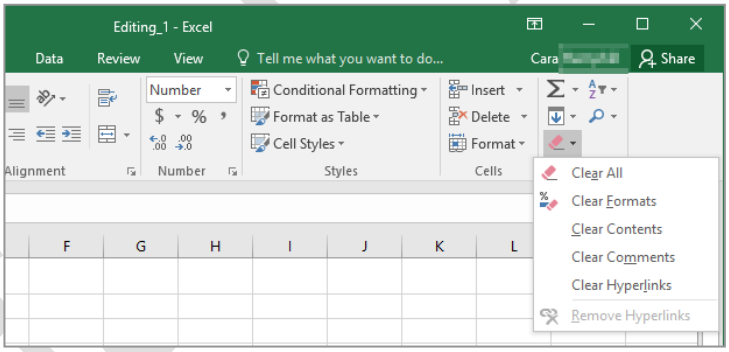
7. Type **91200**, then press Enter

   This time the formatting doesn't appear because the cell has been completely cleared

1

	A	B	C	D	E	F	G	H	I
1	**Alpheius Global Enterprises**								
2	**Annual Sales**								
3	**Health and Related Services**								
4									
5		**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**
6	***Midweek***								
7	**Tuesday**	71,456	78,967	85,889	117,015	101,328	108,187	144,878	123,619
8	**Wednesday**	520,830	360,389	244,488	110,585	96,184	103,043	138,448	118,475
9	**Thursday**	83,296	520,242	82,467	112,728	97,899	104,757	140,592	120,189
10	**Friday**	520,140	83,333	87,611	119,158	103,043	109,901	147,022	125,333
11									
12	**Subtotal**	**1,195,722**	**1,042,931**	**500,455**	**459,486**	**398,454**	**425,888**	**570,940**	**487,616**
13									

5



7

	A	B	C	D	E	F	G	H	I
1	**Alpheius Global Enterprises**								
2	**Annual Sales**								
3	**Health and Related Services**								
4									
5		**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**
6	***Midweek***								
7	**Tuesday**	71,456	91200	85,889	117,015	101,328	108,187	144,878	123,619
8	**Wednesday**	520,830	360,389	244,488	110,585	96,184	103,043	138,448	118,475
9	**Thursday**	83,296	520,242	82,467	112,728	97,899	104,757	140,592	120,189
10	**Friday**	520,140	83,333	87,611	119,158	103,043	109,901	147,022	125,333
11									
12	**Subtotal**	**1,195,722**	**1,055,164**	**500,455**	**459,486**	**398,454**	**425,888**	**570,940**	**487,616**
13									

For Your Reference…

To ***clear a cell***:

1. Click on the cell
2. Click on the ***Home*** tab, then click on ***Clear*** in the ***Editing*** group, or
   Click on the cell, then press Del

Handy to Know…

- The distinction between ***clearing*** a cell and ***deleting*** it is subtle but important – ***clearing*** a cell empties the cell contents while ***deleting*** a cell actually shifts other cells into its place.

DELETING DATA

The ***Delete*** operation in Excel *removes* cells, rows and columns from a worksheet. In the process it shifts adjacent cells, rows or columns into the position previously occupied by the deleted ones. This can have some serious consequences for your worksheet's layout and you should only use the ***Delete*** command when you truly understand and know what you are doing.

Try This Yourself:

Same File — *Continue using the previous file with this exercise, or open the file Editing_5.xlsx...*

1. Click in cell ***B5***, hold down Shift, then click in cell ***B12*** to select the range ***B5***:***B12***
2. On the ***Home*** tab click on the top half of ***Delete*** in the ***Cells*** group

   The columns to the right will be shifted left (i.e. Feb is now where Jan used to be) and some of the formulas are now corrupted…
3. Click in cell ***B15***, hold down Shift, then click in cell ***B20***
4. On the ***Home*** tab, click on the top half of ***Delete*** to move the columns left and correct the situation
5. Click on column heading ***C*** to select the entire column
6. On the ***Home*** tab, click on the top half of ***Delete*** to delete column ***C*** and move the columns on the right
7. Click on row heading ***6*** to select the entire row
8. On the ***Home*** tab, click on the upper part of ***Delete*** to delete the row and shift the others up

	A	B	C	D	E	F	G	H	I
1	**Alpheius Global Enterprises**								
2	**Annual Sales**								
3	**Health and Related Services**								
4									
5		**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**
6	***Midweek***								
7	**Tuesday**	71,456	91200	85,889	117,015	101,328	108,187	144,878	123,619
8	**Wednesday**	520,830	360,389	244,488	110,585	96,184	103,043	138,448	118,475
9	**Thursday**	83,296	520,242	82,467	112,728	97,899	104,757	140,592	120,189
10	**Friday**	520,140	83,333	87,611	119,158	103,043	109,901	147,022	125,333
11									
12	**Subtotal**	**1,195,722**	**1,055,164**	**500,455**	**459,486**	**398,454**	**425,888**	**570,940**	**487,616**
13									

1

	A	B	C	D	E	F	G	H	I
1	**Alpheius Global Enterprises**								
2	**Annual Sales**								
3	**Health and Related Services**								
4									
5		**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**
6	***Midweek***								
7	**Tuesday**	91200	85,889	117,015	101,328	108,187	144,878	123,619	164,168
8	**Wednesday**	360,389	244,488	110,585	96,184	103,043	138,448	118,475	157,738
9	**Thursday**	520,242	82,467	112,728	97,899	104,757	140,592	120,189	159,882
10	**Friday**	83,333	87,611	119,158	103,043	109,901	147,022	125,333	166,312
11									
12	**Subtotal**	**1,055,164**	**500,455**	**459,486**	**398,454**	**425,888**	**570,940**	**487,616**	**648,100**
13									

2

	A	B	C	D	E	F	G	H	I
1	**Alpheius Global Enterprises**								
2	**Annual Sales**								
3	**Health and Related Services**								
4									
5		**Feb**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**
6	**Tuesday**	91200	117,015	101,328	108,187	144,878	123,619	164,168	139,051
7	**Wednesday**	360,389	110,585	96,184	103,043	138,448	118,475	157,738	133,907
8	**Thursday**	520,242	112,728	97,899	104,757	140,592	120,189	159,882	135,621
9	**Friday**	83,333	119,158	103,043	109,901	147,022	125,333	166,312	140,765
10									
11	**Subtotal**	**1,055,164**	**459,486**	**398,454**	**425,888**	**570,940**	**487,616**	**648,100**	**549,344**
12									
13	***Weekend***								

8

For Your Reference…

To ***delete cells***, ***columns***, or ***rows***:

1. Select the cells, columns, or rows to delete
2. Click on the ***Home*** tab
3. Click on ***Delete*** in the ***Cells*** group

Handy to Know…

- The ***Undo*** tool on the ***Quick Access Toolbar*** allows you to undo previous operations including deletions.

USING UNDO AND REDO

Excel provides you with ***Undo*** and ***Redo*** tools on the ***Quick Access Toolbar*** which allow you to undo operations such as deletions and then if necessary redo them again. Undo is handy for those times when you've accidentally deleted something you wish you hadn't. As long as you haven't saved or closed the workbook, you'll be able to undo most operations.

Try This Yourself:

Same File *Continue using the previous file with this exercise, or open the file Editing_6.xlsx...*

1. Click in cell ***B5***, hold down Shift, then click in cell ***B11*** to select the range of cells from cell ***B5*** to cell ***B11***
2. On the ***Home*** tab, click on the top half of ***Delete*** in the ***Cells*** group to delete this range and also move cells and corrupt formulas
3. Repeat the above steps with the two ranges ***B14:B19*** and ***D5:D19***
4. Click on ***Undo*** in the ***Quick Access Toolbar*** three times to undo each of the deletions

   Excel stores each operation and you can undo them in the opposite sequence to which they were originally performed. This is like stepping back one step at a time through previous operations…
5. Click on the ***Redo*** tool in the ***Quick Access Toolbar*** three times to step forward through the operations again

1

	A	B	C	D	E	F	G	H	I
1	**Alpheius Global Enterprises**								
2	**Annual Sales**								
3	**Health and Related Services**								
4									
5		**Feb**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**
6	**Tuesday**	91200	117,015	101,328	108,187	144,878	123,619	164,168	139,051
7	**Wednesday**	360,389	110,585	96,184	103,043	138,448	118,475	157,738	133,907
8	**Thursday**	520,242	112,728	97,899	104,757	140,592	120,189	159,882	135,621
9	**Friday**	83,333	119,158	103,043	109,901	147,022	125,333	166,312	140,765
10									
11	**Subtotal**	1,055,164	459,486	398,454	425,888	570,940	487,616	648,100	549,344
12									
13	***Weekend***								

2

	A	B	C	D	E	F	G	H	I
1	**Alpheius Global Enterprises**								
2	**Annual Sales**								
3	**Health and Related Services**								
4									
5		**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**
6	**Tuesday**	117,015	101,328	108,187	144,878	123,619	164,168	139,051	183,458
7	**Wednesday**	110,585	96,184	103,043	138,448	118,475	157,738	133,907	177,028
8	**Thursday**	112,728	97,899	104,757	140,592	120,189	159,882	135,621	179,172
9	**Friday**	119,158	103,043	109,901	147,022	125,333	166,312	140,765	185,602
10									
11	**Subtotal**	459,486	398,454	425,888	570,940	487,616	648,100	549,344	725,260
12									
13	***Weekend***								

4

	A	B	C	D	E	F	G	H	I
1	**Alpheius Global Enterprises**								
2	**Annual Sales**								
3	**Health and Related Services**								
4									
5		**Feb**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**
6	**Tuesday**	91200	117,015	101,328	108,187	144,878	123,619	164,168	139,051
7	**Wednesday**	360,389	110,585	96,184	103,043	138,448	118,475	157,738	133,907
8	**Thursday**	520,242	112,728	97,899	104,757	140,592	120,189	159,882	135,621
9	**Friday**	83,333	119,158	103,043	109,901	147,022	125,333	166,312	140,765
10									
11	**Subtotal**	1,055,164	459,486	398,454	425,888	570,940	487,616	648,100	549,344
12									
13	***Weekend***								

For Your Reference…

To ***undo*** an ***operation***:

- Click on the ***Undo*** tool in the ***Quick Access Toolbar***

To ***redo*** an ***operation***:

- Click on the ***Redo*** tool in the ***Quick Access Toolbar***

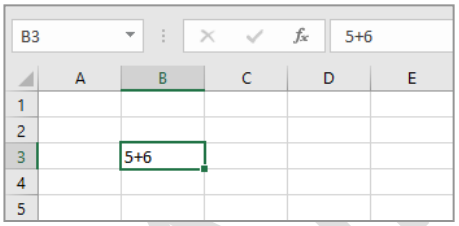
Handy to Know…

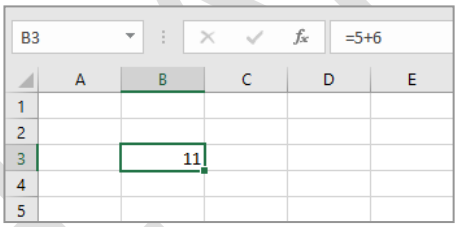
- Both the ***Redo*** and ***Undo*** tools have drop arrows next to them. These drop arrows show a history of previous operations. You can choose to undo or redo any operation using the history listing rather than stepping through each of the operations as we've done above.

UNDERSTANDING FORMULAS

Formulas are the key to using Excel practically and efficiently. ***Formulas***, like text, numbers and dates, are entered into a cell in a worksheet. Unlike the other data, however, ***formulas*** must begin with an equal (=) sign. In addition, formulas in Excel adhere to the basic rules of arithmetic known as ***BODMAS*** – so this is one maths lesson you must understand to master Excel formulas.

How Formulas Work





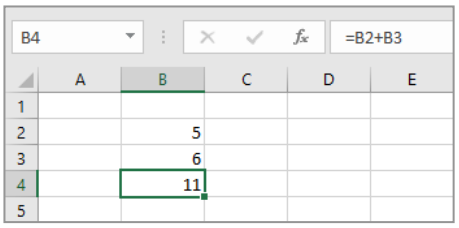
In Excel every formula that you create must start with an equal sign (**=**). The equal sign informs Excel that the data entered in that cell will be a formula and that Excel must therefore perform a calculation.

For instance, if you type **5+6** in a cell Excel will display ***5+6*** in that cell. Excel treats this entry as text and that is why the numbers are aligned to the left of the cell.

However, if you type **=5+6** in a cell Excel will perform the calculation and display **11** in that cell in the worksheet. When that cell is active, the formula **=5+6** will be displayed in the ***Formula Bar***. When working with formulas, it is important to look at the ***Formula Bar*** as well as the cell in the worksheet so that you know whether the cell contains a formula or normal data.

Cell Referencing For Perfect Formulas

Though typing a formula such as ***=5+6*** into a cell is an easy way to find the solution to a simple equation, it can make things more complicated later on. For example, if the data changes or you have mistyped a number, it can be time-consuming to enter the formula again. This is why it is better to type the numbers into their own separate cells, then type the ***cell addresses*** that refer to those numbers in the formula instead of typing numbers straight into a formula. This is especially useful when working with large amounts of data.



In the example shown to the right, the value ***5*** has been typed into cell ***B2***, the value ***6*** has been typed into cell ***B3***, and the formula **=B2+B3** has been typed into cell ***B4***. This might seem like a lot more typing than you might otherwise do, but the real gain lies in the functionality of what is done here. For example, if you need to know what **6** plus **6** equals, you simply type **6** in cell ***B2***, and the formula in cell ***B4*** will instantly update to show you the answer.

This occurs because Excel interprets the formula in cell ***B4*** and calculates that cell ***B4*** must equal the data in cell ***B2*** plus the data in cell ***B3***. If the data in either of the two referenced cells is changed, this formula is immediately recalculated and provides the latest result.

Rules For Using Formulas

There are four main arithmetic operations that can be performed in an Excel formula. Excel adheres to the ***BODMAS*** rules of arithmetic to determine the order in which calculations in any given formula are performed. The order is – *Brackets*, then *Orders* (otherwise known as *Powers*, or *Roots*, or *Exponents*, or *Indices*), then *Division*, then *Multiplication*, then *Addition*, then *Subtraction*. For example, the equation ***3 + 2 x 10*** could equal either ***50*** or ***23***. Using BODMAS the correct answer is ***23***: 2 x 10 = 20 + 3 = 23.

Computers do not have the standard arithmetic symbols that we are accustomed to. The keys on the keyboard that you will use to perform the four main arithmetic operations are shown below.

+	*Addition*	-	*Subtraction*
*	*Multiplication*	/	*Division*

CREATING FORMULAS THAT ADD

In Excel you can create ***formulas*** by typing them directly into the cells, or by clicking on the cells. When clicking on a cell, Excel types the cell address into the formula for you. This helps to avoid typing errors in your formulas. In this exercise you will use this method to create a formula that adds the gross pays for ***Alpheius Global Enterprises***.

Try This Yourself:

Open File — *Before starting this exercise you MUST open the file Formulas_1.xlsx...*

1. Click in cell ***E15***
   This is where we will add up all of the gross pays…
2. Type **=** to start the formula
3. Click in cell ***E8***, then type **+** (the *plus* sign)
   The E8 cell reference will be added to the formula and the active cell pointer will move back to cell E15 ready for the next cell reference – the formula is actually being typed as you click on the cells…
4. Repeat step ***3*** for each cell from cell ***E9*** to cell ***E12*** so that the formula eventually reads
   =E8+E9+E10+E11+E12+
   Remember to press + after you click in each cell…
5. Click in cell ***E13*** to add this to the end of the formula
   We don't need to type + as there are no more cells to add to the formula…
6. Press Enter to complete the formula

3

	A	B	C	D	E
1	**Alpheius Global Enterprises**				
2	**Weekly Payroll**				
3	**Department: Communications**				
4					
5					
6					
7	**First Name**	**Last Name**	**Hours**	**Rate**	**Gross Pay**
8	Angelo	Marcuzzo	43	35.60	1530.8
9	Riley	Griffin	35	32.10	1123.5
10	Celeste	O'Connor	28	12.50	350
11	Alex	Barnard	15.5	32.40	502.2
12	Tammy	Huber	22.5	10.25	230.625
13	Ishara	Tringali	40	10.25	410
14					
15	**Totals**				=E8+
16					

4

	A	B	C	D	E
1	**Alpheius Global Enterprises**				
2	**Weekly Payroll**				
3	**Department: Communications**				
4					
5					
6					
7	**First Name**	**Last Name**	**Hours**	**Rate**	**Gross Pay**
8	Angelo	Marcuzzo	43	35.60	1530.8
9	Riley	Griffin	35	32.10	1123.5
10	Celeste	O'Connor	28	12.50	350
11	Alex	Barnard	15.5	32.40	502.2
12	Tammy	Huber	22.5	10.25	230.625
13	Ishara	Tringali	40	10.25	410
14					
15	**Totals**				=E8+E9+E10+E11+E12+
16					

6

	A	B	C	D	E
1	**Alpheius Global Enterprises**				
2	**Weekly Payroll**				
3	**Department: Communications**				
4					
5					
6					
7	**First Name**	**Last Name**	**Hours**	**Rate**	**Gross Pay**
8	Angelo	Marcuzzo	43	35.60	1530.8
9	Riley	Griffin	35	32.10	1123.5
10	Celeste	O'Connor	28	12.50	350
11	Alex	Barnard	15.5	32.40	502.2
12	Tammy	Huber	22.5	10.25	230.625
13	Ishara	Tringali	40	10.25	410
14					
15	**Totals**				4147.125
16					

For Your Reference…

To ***create a formula*** using the ***pointing method***:

1. Click in the cell which will hold the formula
2. Type **=** then click on each of the desired cells (typing + after all except for the last)
3. Press Enter

Handy to Know…

- When creating a formula, it can be useful to allow Excel to enter the cell references as you click on various cells, as this way you can actually see the formula being built on the screen for you.

CREATING FORMULAS THAT SUBTRACT

There are many different types of formulas that can be written in Excel. Virtually any type of mathematical operation can be performed. For instance, you can create ***formulas*** that ***subtract*** one value from another. Because it is usual to include cell references in the formula, when any values change so to do the formula results.

Try This Yourself:

Same File

Continue using the previous file with this exercise, or open the file Formulas_2.xlsx...

1. Click on the Subtraction worksheet tab at the bottom of your screen to make it the active worksheet
2. Click in cell G8

   This is where we need to calculate Angelo Marcuzzo's Net Pay…
3. Type = to start the formula, then click on the gross pay value in cell ***E8***
4. Type **–** (the minus sign) to indicate that you wish to subtract from this value, then click on the tax value in cell ***F8***
5. Press Enter to complete the formula

   We can now fill this formula down for the other staff…
6. Click in cell ***G8***, then point to the small square at the bottom right of the cell until the mouse pointer changes to a small cross
7. Click and drag down to cell ***G15***, then release the mouse button
8. Click in cell ***G14*** and press Del to delete the unwanted formula

4

	A	B	C	D	E	F	G
1	**Alpheius Global Enterprises**						
2	**Weekly Payroll**						
3	**Department: Communications**						
4							
5							
6							
7	**First Name**	**Last Name**	**Hours**	**Rate**	**Gross Pay**	**Tax**	**Net Pay**
8	Angelo	Marcuzzo	43	35.60	1530.80	430.87	=E8-F8
9	Riley	Griffin	35	32.10	1123.50	322.56	
10	Celeste	O'Connor	28	12.50	350.00	89.55	
11	Alex	Barnard	15.5	32.40	502.20	232.45	
12	Tammy	Huber	22.5	10.25	230.63	89.56	
13	Ishara	Tringali	40	10.25	410.00	154.50	
14							
15	**Totals**				**4147.13**	**1319.49**	
16							

6

	A	B	C	D	E	F	G
1	**Alpheius Global Enterprises**						
2	**Weekly Payroll**						
3	**Department: Communications**						
4							
5							
6							
7	**First Name**	**Last Name**	**Hours**	**Rate**	**Gross Pay**	**Tax**	**Net Pay**
8	Angelo	Marcuzzo	43	35.60	1530.80	430.87	1099.93
9	Riley	Griffin	35	32.10	1123.50	322.56	
10	Celeste	O'Connor	28	12.50	350.00	89.55	
11	Alex	Barnard	15.5	32.40	502.20	232.45	
12	Tammy	Huber	22.5	10.25	230.63	89.56	
13	Ishara	Tringali	40	10.25	410.00	154.50	
14							
15	**Totals**				**4147.13**	**1319.49**	
16							

8

	A	B	C	D	E	F	G
1	**Alpheius Global Enterprises**						
2	**Weekly Payroll**						
3	**Department: Communications**						
4							
5							
6							
7	**First Name**	**Last Name**	**Hours**	**Rate**	**Gross Pay**	**Tax**	**Net Pay**
8	Angelo	Marcuzzo	43	35.60	1530.80	430.87	1099.93
9	Riley	Griffin	35	32.10	1123.50	322.56	800.94
10	Celeste	O'Connor	28	12.50	350.00	89.55	260.45
11	Alex	Barnard	15.5	32.40	502.20	232.45	269.75
12	Tammy	Huber	22.5	10.25	230.63	89.56	141.07
13	Ishara	Tringali	40	10.25	410.00	154.50	255.50
14							
15	**Totals**				**4147.13**	**1319.49**	**2827.64**
16							

For Your Reference…

To *create* a *subtraction formula*:

1. Click on the cell to hold the subtraction
2. Type **=** (equal sign), then click in the first cell
3. Type **–** (minus sign), then click on the cell to subtract
4. Press Enter

Handy to Know…

- You can mix various arithmetic signs in a formula to create more complex formulas. For example, you can have a complex formula that adds specific values and subtracts others.

FORMULAS THAT MULTIPLY AND DIVIDE

Basic formulas involve the same types of arithmetical operations within the one calculation – that is, addition, subtraction, multiplication, or division. You can mix these operations within the one formula as much and as often as you need. However, you should always keep in mind the basic rules of ***BODMAS***, especially where division is concerned.

Try This Yourself:

Same File

Continue using the previous file with this exercise, or open the file Formulas_3.xlsx...

In this exercise we'll calculate the superannuation payable for employees, which is 9% of their gross pay. The logic is:

gross x super rate
gross x 9 divided by 100
*gross * (9 / 100)*

Note that the brackets are for readability only and won't affect the calculation…

1. Click on the ***More Complex*** worksheet tab, then click in cell ***H8***

   This is where we will calculate Angelo's super…

2. Type **=** to start the formula, click in cell ***E8***, then type ***(9/100)**

3. Press Enter to complete the formula

   Let's fill down now…

4. Click in cell ***H8***, then click and drag the fill handle down to cell ***H13***

5. Repeat steps ***4*** and ***5*** to fill across to cell ***H15*** from cell ***G15***

	A	B	C	D	E	F	G	H
6								
7	First Name	Last Name	Hours	Rate	Gross Pay	Tax	Net Pay	Superannuation
8	Angelo	Marcuzzo	43	35.60	1530.80	430.87	1099.93	=E8*(9/100)
9	Riley	Griffin	35	32.10	1123.50	322.56	800.94	
10	Celeste	O'Connor	28	12.50	350.00	89.55	260.45	
11	Alex	Barnard	15.5	32.40	502.20	232.45	269.75	
12	Tammy	Huber	22.5	10.25	230.63	89.56	141.07	
13	Ishara	Tringali	40	10.25	410.00	154.50	255.50	
14								
15	Totals				4147.13	1319.49	2827.64	
16								

2

	A	B	C	D	E	F	G	H
6								
7	First Name	Last Name	Hours	Rate	Gross Pay	Tax	Net Pay	Superannuation
8	Angelo	Marcuzzo	43	35.60	1530.80	430.87	1099.93	137.772
9	Riley	Griffin	35	32.10	1123.50	322.56	800.94	101.115
10	Celeste	O'Connor	28	12.50	350.00	89.55	260.45	31.5
11	Alex	Barnard	15.5	32.40	502.20	232.45	269.75	45.198
12	Tammy	Huber	22.5	10.25	230.63	89.56	141.07	20.75625
13	Ishara	Tringali	40	10.25	410.00	154.50	255.50	36.9
14								
15	Totals				4147.13	1319.49	2827.64	
16								

4

	A	B	C	D	E	F	G	H
6								
7	First Name	Last Name	Hours	Rate	Gross Pay	Tax	Net Pay	Superannuation
8	Angelo	Marcuzzo	43	35.60	1530.80	430.87	1099.93	137.772
9	Riley	Griffin	35	32.10	1123.50	322.56	800.94	101.115
10	Celeste	O'Connor	28	12.50	350.00	89.55	260.45	31.5
11	Alex	Barnard	15.5	32.40	502.20	232.45	269.75	45.198
12	Tammy	Huber	22.5	10.25	230.63	89.56	141.07	20.75625
13	Ishara	Tringali	40	10.25	410.00	154.50	255.50	36.9
14								
15	Totals				4147.13	1319.49	2827.64	373.24
16								

5

For Your Reference…

To ***create*** a ***formula*** that ***multiplies*** or ***divides***:

- For multiplication, separate the variables with an asterisk (*)
- For division, separate the variables with a forward slash (/)

Handy to Know…

- More complex formulas can be managed using brackets. For example, if you want to multiply two numbers then divide them by the product of another two numbers, enclose both multiplication parts of the equation in brackets separated by a division sign. For example, ***(A*B)/(C*D)***.

UNDERSTANDING FUNCTIONS

Imagine creating a formula that adds fifty different cells, or a formula that a bank would use to work out monthly payments on a home loan. Both these formulas would be very long and complex and involve lots of typing. Fortunately, these types of calculations and others can be performed in Excel using built-in ***functions***.

Functions Overview

Functions are simply pre-programmed formulas already provided for you in Excel which can perform calculations covering a wide range of categories including *statistics*, *date and time arithmetic*, *financial calculations*, *lists*, *engineering* and much more.

Just like when you create a formulas, ***functions*** must start with an ***equal sign***. The equal sign is then followed by the specific ***name*** of the function (usually a descriptive name which indicates the purpose of the function). Most functions also require additional information known as ***arguments*** which are supplied to the function in brackets after the function name. Functions are therefore written as follows:

=*name*(*arguments*)

The arguments are quite often cell or range references that contain values that can be used in the function. For example, the most common function is the ***SUM*** function which, as its name suggests, is used to *sum* or add values together. If you wanted to add all of the values in the cells from ***B10*** to ***B25*** you would write this function as:

=SUM(B10:B25)

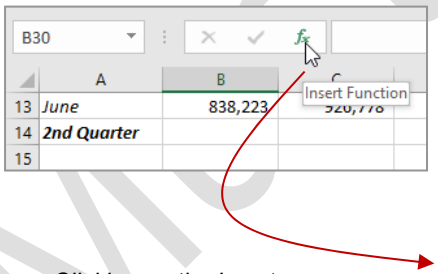
As you can see this is much simpler than writing your own referential formula which would look like:

=B10+B11+B12+B13+B14+B15+B16+B17+B18+B19+B20+B21+B22+B23+B24+B25

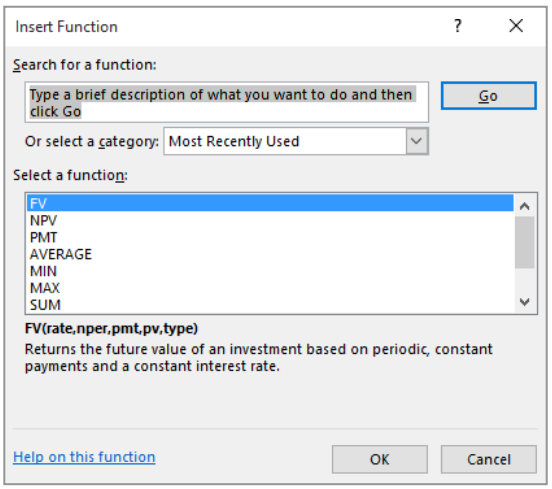
Imagine writing and proofing a formula where you had to add 200 cells!

Typing Functions

If you are familiar with the function that you need you can type it into a cell exactly the same way you type any other formula. If you are not sure if Excel has a function or you can't quite remember how it is written you can use the ***Insert Function*** tool on the ***Formula Bar*** to assist you. When you click on this tool the ***Insert Function*** dialog box will be presented to you which lists the most recently used or common functions and also allows you to search for other functions that you might need.



Clicking on the Insert Function tool will display the Insert Function dialog box



The ***Insert Function*** dialog box will also type the function out for you and then provide you with a further dialog box to guide you through the process of specifying the arguments that the function needs to perform its calculation.

USING THE SUM FUNCTION

One of the most commonly used functions is the SUM function. This function allows you to add the values in a range of cells. The function is written as =SUM(range or ranges to add). You can type the function and then use the pointing technique to fill in the arguments. Excel then paints marquees around the cells involved helping you to track your progress.

Try This Yourself:

Open File *Before starting this exercise you MUST open the file Formulas_4.xlsx...*

1. Click in cell ***B9***, then type **=sum(** to start the formula
2. Click in cell ***B6***, hold down Shift, then click in cell ***B8***

   Notice the relative addressing details, 3R x 1C, that appears in the tool tip…
3. Type **)**, then press Enter to complete the function
4. Click in cell ***B9***, then point to the fill handle and click and drag across to cell ***E9*** to fill across the range
5. Ensure that the range ***B9:E9*** is still selected, then, on the ***Home*** tab, click on ***Copy*** in the ***Clipboard*** group
6. Click in cell ***B14***, hold down Ctrl, then click in cells ***B19*** and ***B24***
7. Release Ctrl and press Enter to paste equivalent functions into the worksheet

1

	A	B	C	D	E	F
1	**Alpheius Global Enterprises**					
2	**Revenue Takings Last 12 Months**					
3						
4		***Auckland***	***Dublin***	***Melbourne***	***New York***	
5						
6	*January*	1,050,254	1,547,000	1,488,369	1,523,124	
7	*February*	1,524,294	1,685,548	1,599,854	1,789,552	
8	*March*	3,521,487	2,985,448	2,741,221	2,521,447	
9	***1st Quarter***	=sum(				
10		SUM(**number1**, [number2], ...)				

2

	A	B	C	D	E	F
1	**Alpheius Global Enterprises**					
2	**Revenue Takings Last 12 Months**					
3						
4		***Auckland***	***Dublin***	***Melbourne***	***New York***	
5						
6	*January*	1,050,254	1,547,000	1,488,369	1,523,124	
7	*February*	1,524,294	1,685,548	1,599,854	1,789,552	
8	*March*	3,521,487	2,985,448	2,741,221	2,521,447	
9	***1st Quarter***	=sum(B6:B8	3R x 1C			
10		SUM(**number1**, [number2], ...)				

7

	A	B	C	D	E	F
1	**Alpheius Global Enterprises**					
2	**Revenue Takings Last 12 Months**					
3						
4		***Auckland***	***Dublin***	***Melbourne***	***New York***	
5						
6	*January*	1,050,254	1,547,000	1,488,369	1,523,124	
7	*February*	1,524,294	1,685,548	1,599,854	1,789,552	
8	*March*	3,521,487	2,985,448	2,741,221	2,521,447	
9	***1st Quarter***	6,096,035	6,217,996	5,829,444	5,834,123	
10						
11	*April*	2,531,225	2,621,889	2,453,999	2,547,441	
12	*May*	550,998	850,554	818,874	837,228	
13	*June*	838,223	926,778	879,114	983,225	
14	***2nd Quarter***	3,920,446	4,399,221	4,151,987	4,367,894	
15						
16	*July*	1,936,882	1,641,554	1,507,774	1,386,448	
17	*August*	1,392,666	1,441,447	1,349,552	1,400,116	
18	*September*	3,332,211	223,323	322,332	673,322	
19	***3rd Quarter***	6,661,759	3,306,324	3,179,658	3,459,886	
20						
21	*October*	2,311,234	1,298,877	1,299,567	1,342,112	
22	*November*	1,234,455	2,341,122	1,884,566	324,555	
23	*December*	2,590,332	3,213,332	844,355	12,665,444	
24	***4th Quarter***	6,136,021	6,853,331	4,028,488	14,332,111	
25						

For Your Reference…

To ***type*** a ***sum function*** for a ***contiguous range***:

1. Type **=sum(**
2. Select the range of cells
3. Type **)**
4. Press Enter

Handy to Know…

- You can use the ***AutoSum*** command in the ***Editing*** group on the ***Home*** tab to automatically enter a sum function based on a range of cells.
- You can type the name of a function in upper or lowercase – it is not case sensitive.

SUMMING NON-CONTIGUOUS RANGES

Many users simply use the SUM function to add a continuous block of data – known as a range. But with Excel you can write a SUM function that adds up data from multiple ranges within a worksheet. The ability to sum *non-contiguous* ranges of data helps you to increase the level of functionality of your worksheet.

Try This Yourself:

Same File *Continue using the previous file with this exercise, or open the file Formulas_5.xlsx...*

1. Click in cell ***B26***, then type **=sum(** to start the formula
2. Click in cell ***B9***, type **,** (comma), then click in cells ***B14***, ***B19*** and ***B24*** – typing **,** (comma) after each cell except the last one
3. Press Enter to complete the function, then click in cell ***B26*** again

   You may notice that we didn't add a right bracket. Excel adds the bracket for you with functions that use only one set of brackets. You can also use multiple ranges in a function...
4. Click in cell ***C26***, then type **=sum(**
5. Hold down Ctrl and use the mouse to select the following ranges

   C6:C8 **C16:C18**
   C11:C13 **C21:C23**
6. Press Enter, then click in cell ***C26***
7. Point to the fill handle, then click and drag to cell ***E26*** to copy the function across

2

	A	B	C	D	E	F
7	*February*	1,524,294	1,685,548	1,599,854	1,789,552	
8	*March*	3,521,487	2,985,448	2,741,221	2,521,447	
9	***1st Quarter***	6,096,035	6,217,996	5,829,444	5,834,123	
10						
11	*April*	2,531,225	2,621,889	2,453,999	2,547,441	
12	*May*	550,998	850,554	818,874	837,228	
13	*June*	838,223	926,778	879,114	983,225	
14	***2nd Quarter***	3,920,446	4,399,221	4,151,987	4,367,894	
15						
16	*July*	1,936,882	1,641,554	1,507,774	1,386,448	
17	*August*	1,392,666	1,441,447	1,349,552	1,400,116	
18	*September*	3,332,211	223,323	322,332	673,322	
19	***3rd Quarter***	6,661,759	3,306,324	3,179,658	3,459,886	
20						
21	*October*	2,311,234	1,298,877	1,299,567	1,342,112	
22	*November*	1,234,455	2,341,122	1,884,566	324,555	
23	*December*	2,590,332	3,213,332	844,355	12,665,444	
24	***4th Quarter***	6,136,021	6,853,331	4,028,488	14,332,111	
25						
26	***Total***	=sum(B9,B14,B19,B24				
27		SUM(number1, [number2], [number3], **[number4]**, [number5], ...)				
28	***Monthly***					

5

	A	B	C	D	E	F
4		***Auckland***	***Dublin***	***Melbourne***	***New York***	
5						
6	*January*	1,050,254	1,547,000	1,488,369	1,523,124	
7	*February*	1,524,294	1,685,548	1,599,854	1,789,552	
8	*March*	3,521,487	2,985,448	2,741,221	2,521,447	
9	***1st Quarter***	6,096,035	6,217,996	5,829,444	5,834,123	
10						
11	*April*	2,531,225	2,621,889	2,453,999	2,547,441	
12	*May*	550,998	850,554	818,874	837,228	
13	*June*	838,223	926,778	879,114	983,225	
14	***2nd Quarter***	3,920,446	4,399,221	4,151,987	4,367,894	
15						
16	*July*	1,936,882	1,641,554	1,507,774	1,386,448	
17	*August*	1,392,666	1,441,447	1,349,552	1,400,116	
18	*September*	3,332,211	223,323	322,332	673,322	
19	***3rd Quarter***	6,661,759	3,306,324	3,179,658	3,459,886	
20						
21	*October*	2,311,234	1,298,877	1,299,567	1,342,112	
22	*November*	1,234,455	2,341,122	1,884,566	324,555	
23	*December*	2,590,332	3,213,332	844,355	12,665,444	
24	***4th Quarter***	6,136,021	6,853,331	4,028,488	14,332,111	
25						
26	***Total***	22,814,261	=sum(C6:C8,C11:C13,C16:C18,C21:C23			
27			SUM(**number1**, [number2], ...)			
28	***Monthly***					

For Your Reference…

To *type* a *sum function* for a *non-contiguous range*:

1. Type **=sum(**
2. Click on the first cell to sum
3. Type **,** and click in the next cell to sum
4. Type **)** then press Enter

Handy to Know…

- The big problem with typing a function is that there is more chance of making a typing mistake. Excel has in-built error checking, called Formula AutoCorrect, that can correct up to 15 of the most common mistakes users make (e.g. the right bracket to finish a function).

CALCULATING AN AVERAGE

The ***AVERAGE*** function allows you to average the values in a range of cells. It is written in much the same way as the ***SUM*** function, for example, ***=AVERAGE(range of cells to average)***. The average function can be applied using the ***Functions Wizard***, a part of Excel that takes you through the process of creating a function, or you can type it in yourself if you are comfortable with it.

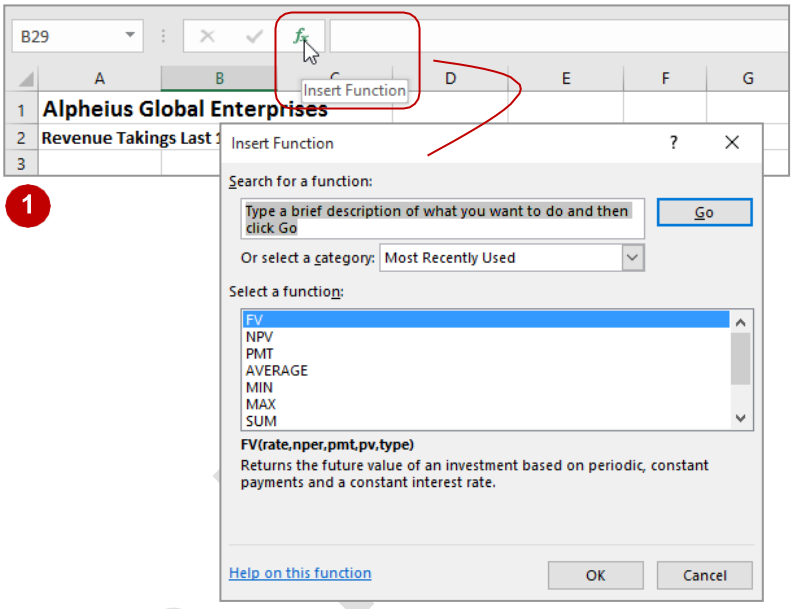
Try This Yourself:

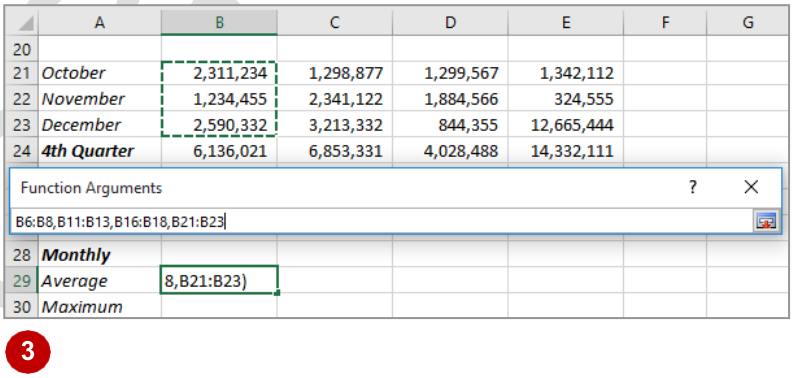
Same File *Continue using the previous file with this exercise, or open the file Formulas_6.xlsx...*

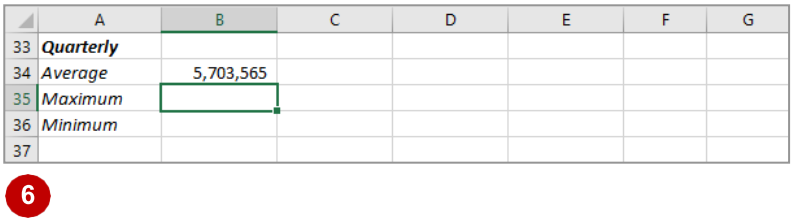
1. Click in cell ***B29***, then click on ***Insert Function***, as shown, to display the ***Insert Function*** dialog box
2. Click on ***AVERAGE*** in ***Select a function***, then click on **[OK]** to display the ***Function Arguments*** dialog box
3. Click on the ***Range Selector*** for ***Number1*** to minimise the wizard, then hold down Ctrl and select the following ranges

   B6:B8 **B16:B18**
   B11:B13 **B21:B23**
4. Press Enter to complete the range specifications, then click on **[OK]** to complete the process

   Let's use the AutoSum function…
5. Click in cell ***B34***, click on the ***Home*** tab, then click on the drop arrow for ***AutoSum*** in the ***Editing*** group and select **Average**
6. Click in cell ***B9***, hold down Ctrl, click in cells ***B14***, ***B19*** and ***B24***, then press Enter to complete the formula







For Your Reference…

To ***insert*** an ***average function***:

1. Click in the cell then click on the ***Insert Function*** tool
2. Click on ***AVERAGE*** in ***Select a function***
3. Insert the required ranges then click on **[OK]**

Handy to Know…

- You can type queries like "How do I work out the monthly payment for a car loan?" into the ***Search*** box in the ***Insert Function*** dialog box. Once you have selected a function from the ***Select a function*** list, the ***Function Arguments*** dialog box will help you to enter the values into the function.

FINDING A MAXIMUM VALUE

When reviewing a long list of numbers it is sometimes difficult to see which is the largest value in the list. The MAX function allows you to extract the highest value from a range of cells. It is written in much the same way as the SUM function: =MAX(range of cells). The function can either be typed into the worksheet or entered using the ***Function Wizard***.

Try This Yourself:

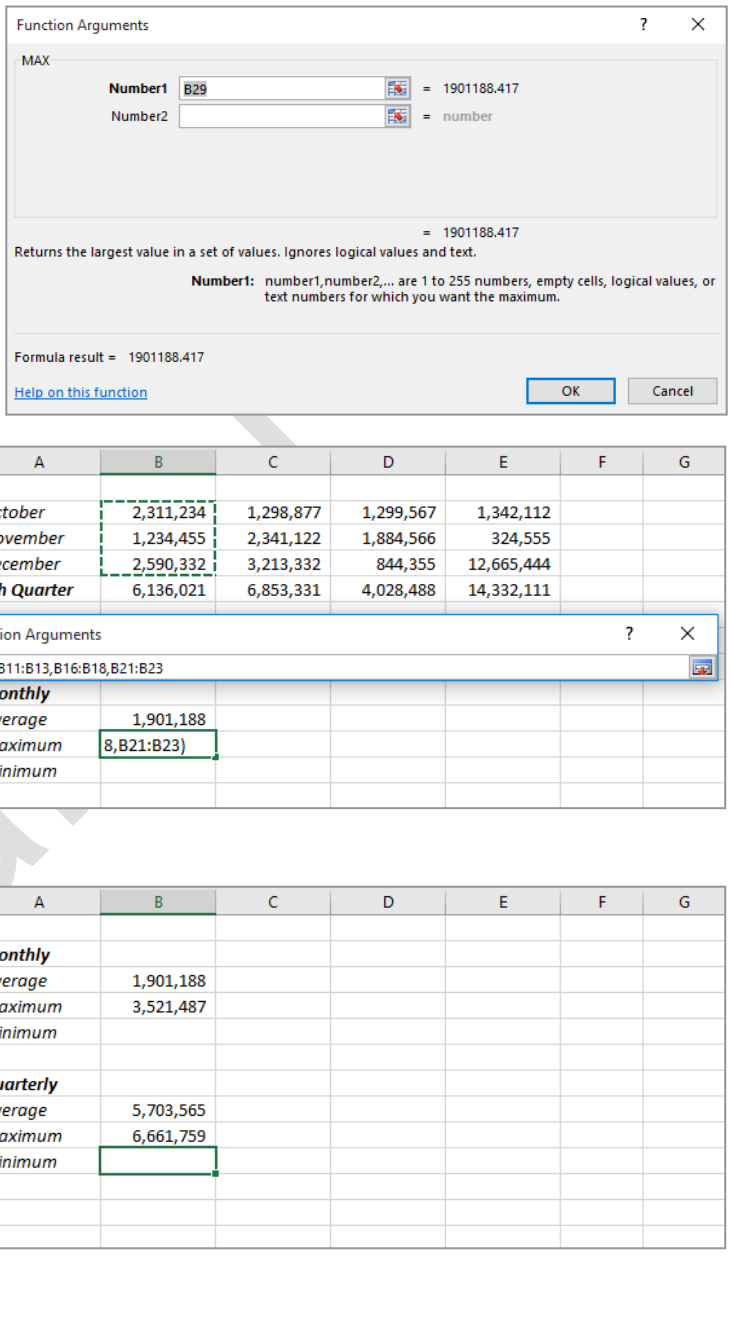
Same File

Continue using the previous file with this exercise, or open the file Formulas_7.xlsx...

1. Click in cell ***B30***, then click on ***Insert Function*** (to the left of the ***Formula Bar***) to display the ***Insert Function*** dialog box
2. Click on the drop arrow for ***Or select a category*** and click on ***All***
3. Scroll down and click on ***MAX*** in ***Select a function***, then click on **[OK]** to display the ***Function Arguments*** dialog box
4. Click on the ***Range Selector*** tool for ***Number1***, then hold down Ctrl and select the following ranges:

   B6:B8 **B16:B18**
   B11:B13 **B21:B23**

5. Press Enter to complete the range specifications, then click on **[OK]** to complete the process
6. Click in cell ***B35***, click on the ***Home*** tab, click on the drop arrow for the ***AutoSum*** command in the ***Editing*** group, then select **Max**
7. Click in cell ***B9***, hold down Ctrl, click in cells ***B14***, ***B19*** and ***B24***, then press Enter to complete the formula



For Your Reference…

To ***insert*** a ***maximum function***:

1. Click in the cell then click on the ***Insert Function*** tool
2. Click on ***MAX*** in ***Select a function***
3. Insert the required ranges then click on **[OK]**

Handy to Know…

- The ***MAX*** function is ideal for charting high points over a seasonal period. For example, you may have monthly sales figures and use a ***MAX*** function to display the maximum each month. This series can then be charted to show the high points in the sales.

FINDING A MINIMUM VALUE

The ***Minimum*** or MIN function allows you to extract the lowest value from a range of values. It is written in much the same way as the SUM function or ***MAX*** function: =MIN(range of cells).

The function can be applied using the ***Function Wizard***, or by typing the function in detail directly into the cell.

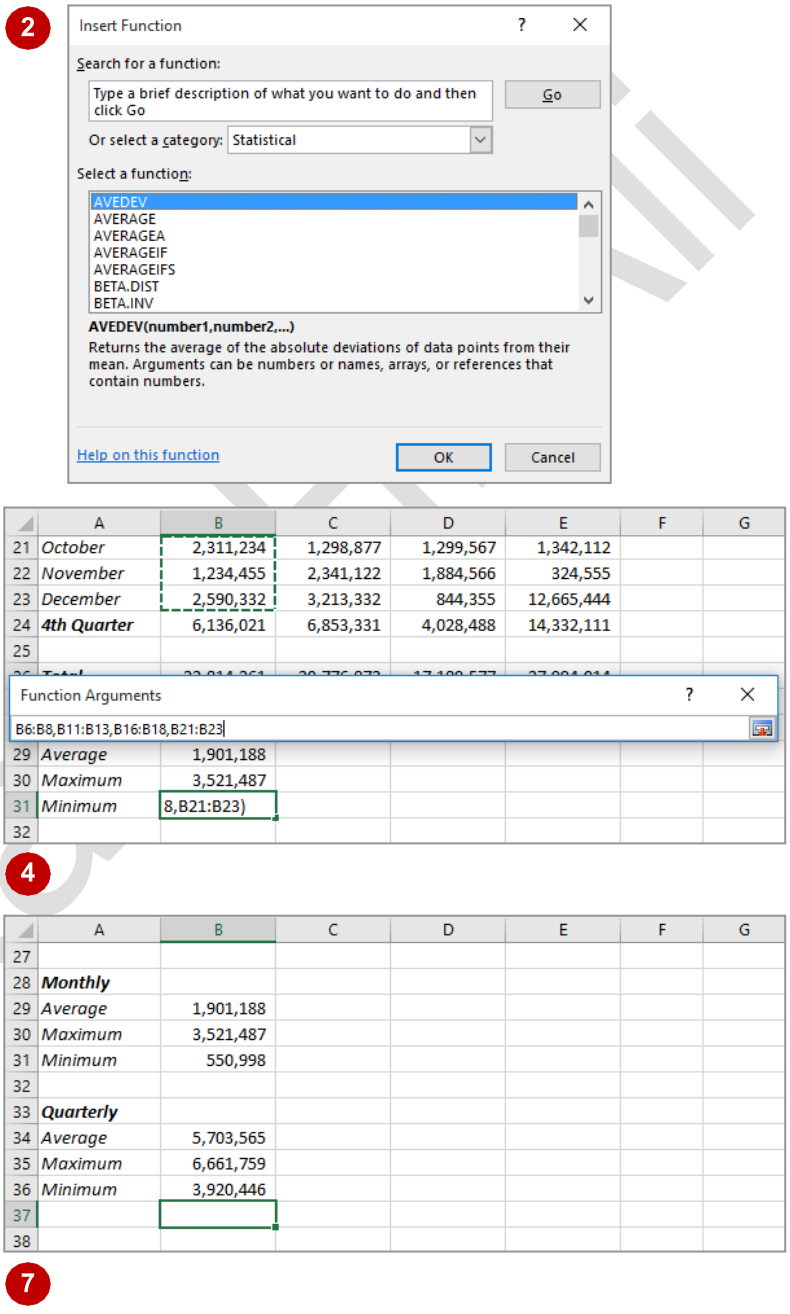
Try This Yourself:

Same File *Continue using the previous file with this exercise, or open the file Formulas_8.xlsx...*

1. Click in cell ***B31***, then click on ***Insert Function*** (to the left of the ***Formula Bar***) to display the ***Insert Function*** dialog box
2. Click on the drop arrow for ***Or select a category*** and click on ***Statistical***
3. Scroll down and click on ***MIN*** in ***Select a function***, then click on **[OK]** to display the ***Function Arguments*** dialog box
4. Click on the ***Range Selector*** tool to minimise the wizard, then hold down Ctrl and select the following ranges:

   B6:B8 **B16:B18**
   B11:B13 **B21:B23**
5. Press Enter to complete the range specifications, then click on **[OK]** to complete the process

   Let's simply type the function this time…
6. Click in cell ***B36*** and type **=MIN(B9,B14,B19,B24)**
7. Press Enter to complete the formula



	A	B	C	D	E	F	G
21	October	2,311,234	1,298,877	1,299,567	1,342,112		
22	November	1,234,455	2,341,122	1,884,566	324,555		
23	December	2,590,332	3,213,332	844,355	12,665,444		
24	**4th Quarter**	6,136,021	6,853,331	4,028,488	14,332,111		
25							
29	Average	1,901,188					
30	Maximum	3,521,487					
31	Minimum	8,B21:B23)					
32							

	A	B	C	D	E	F	G
27							
28	**Monthly**						
29	Average	1,901,188					
30	Maximum	3,521,487					
31	Minimum	550,998					
32							
33	**Quarterly**						
34	Average	5,703,565					
35	Maximum	6,661,759					
36	Minimum	3,920,446					
37							
38							

For Your Reference…

To ***insert*** a ***minimum function***:

1. Click in the cell then click on the ***Insert Function*** tool
2. Click on ***MIN*** in ***Select a function***
3. Insert the required ranges then click on **[OK]**

Handy to Know…

- You might use a ***MIN*** function in real life to find the lowest value in a large range of numbers. For example, in a large inventory it can be used to work out which product is the slowest seller.

CREATING MORE COMPLEX FORMULAS

You will often find that you are faced with creating formulas that need to add, subtract, multiply, divide, and so on, all in the same formula. These more complex formulas need to be thoughtfully planned. Begin by breaking a complex formula down into its component parts then apply the rules of ***BODMAS*** to ensure the calculations are performed as required.

Try This Yourself:

Open File

Before starting this exercise you MUST open the file Formulas_9.xlsx...

1 Click on the ***Multiplication & Addition*** worksheet tab

We need to create a formula that determines the average number of hours worked by each employee and then calculate how much the weekly payroll would be if all employees were paid a flat 22.50 per hour. There are two component parts here – first we need to find the average hours worked, then multiply this by the hourly rate times the number of employees…

2 Click in cell ***E16***, then type **=(sum(C8:C13)/6)** but don't press Enter

This formula calculates the average hours worked by the employees (an Average function would perform the same calculation)….

3 Type * (the asterisk symbol), then type **(B16*6)**

** instructs Excel we want to multiply this average. This part of the formula multiplies the hourly rate by the number of employees…*

4 Press Enter to complete the formula

	A	B	C	D	E	F	G
7	First Name	Last Name	Hours	Rate	Gross Pay		
8	Angelo	Marcuzzo	43	35.60	1530.8		
9	Riley	Griffin	35	32.10	1123.5		
10	Celeste	O'Connor	28	12.50	350		
11	Alex	Barnard	15.5	32.40	502.2		
12	Tammy	Huber	22.5	10.25	230.625		
13	Ishara	Tringali	40	10.25	410		
14							
15	Total Gross Pay				4147.125		
16	Hourly Rate:	22.5			=(sum(C8:C13)/6)		
17							
18							

2

	A	B	C	D	E	F	G
7	First Name	Last Name	Hours	Rate	Gross Pay		
8	Angelo	Marcuzzo	43	35.60	1530.8		
9	Riley	Griffin	35	32.10	1123.5		
10	Celeste	O'Connor	28	12.50	350		
11	Alex	Barnard	15.5	32.40	502.2		
12	Tammy	Huber	22.5	10.25	230.625		
13	Ishara	Tringali	40	10.25	410		
14							
15	Total Gross Pay				4147.125		
16	Hourly Rate:	22.5			=(sum(C8:C13)/6)*(B16*6)		
17							
18							

3

	A	B	C	D	E	F	G
7	First Name	Last Name	Hours	Rate	Gross Pay		
8	Angelo	Marcuzzo	43	35.60	1530.8		
9	Riley	Griffin	35	32.10	1123.5		
10	Celeste	O'Connor	28	12.50	350		
11	Alex	Barnard	15.5	32.40	502.2		
12	Tammy	Huber	22.5	10.25	230.625		
13	Ishara	Tringali	40	10.25	410		
14							
15	Total Gross Pay				4147.125		
16	Hourly Rate:	22.5			4140		
17							
18							

4

For Your Reference…

To ***create complex formulas***:

1. Plan your formula
2. Type your formula (keeping in mind the rules of ***BODMAS***)

Handy to Know…

- You may sometimes wish to enclose two component parts of a formula in brackets. While this is not necessary from a ***BODMAS*** point of view it does make the formula easier to read.

WHAT IF FORMULAS

When you've added formulas to your worksheet you have a ***calculation model***. Every time you change one of the dependent values that are used in a formula, that formula and any others that are dependent on it will update instantly. This allows you to perform ***what-if*** testing. For example, you can enter ***what if formulas*** that answer questions like 'what if inflation goes up by 2%?'.

Try This Yourself:

Same File

Continue using the previous file with this exercise, or open the file Formulas_10.xlsx...

1. Click on the ***Summary*** worksheet tab

   Notice the values on this worksheet…

2. Click on the ***More Complex*** worksheet tab to display the worksheet, then click in cell ***C8*** which contains the hours for ***Angelo Marcuzzo***

3. Type **37**, then press Enter

   Notice how the formulas update the values in row 15 as you change the dependent data…

4. Click on the hours for the other employees and type the new values as shown

5. Click on the ***Summary*** worksheet tab to return to the ***Summary*** worksheet

   The values will have automatically recalculated to reflect the changes

1

	A	B
1	**Alpheius Global Enterprises**	
2	**Weekly Payroll**	
3	**Department: Communications**	
4		
5		
6	**Summary**	
7		
8	Paid To Staff	2827.64
9	Paid To Insurance Company	373.24
10	Paid To Government	1319.49
11		

	A	B	C	D	E	F	G	H	I
1	**Alpheius Global Enterprises**								
2	**Weekly Payroll**								
3	**Department: Communications**								
4									
5									
6									
7	**First Name**	**Last Name**	**Hours**	**Rate**	**Gross Pay**	**Tax**	**Net Pay**	**Superannuation**	
8	Angelo	Marcuzzo	37	35.60	1317.20	430.87	886.33	118.55	
9	Riley	Griffin	25	32.10	802.50	322.56	479.94	72.23	
10	Celeste	O'Connor	33	12.50	412.50	89.55	322.95	37.13	
11	Alex	Barnard	16	32.40	518.40	232.45	285.95	46.66	
12	Tammy	Huber	43	10.25	440.75	89.56	351.19	39.67	
13	Ishara	Tringali	27	10.25	276.75	154.50	122.25	24.91	
14									
15	**Totals**				**3768.10**	**1319.49**	**2448.61**	**339.13**	
16									

4

5

	A	B
1	**Alpheius Global Enterprises**	
2	**Weekly Payroll**	
3	**Department: Communications**	
4		
5		
6	**Summary**	
7		
8	Paid To Staff	2448.61
9	Paid To Insurance Company	339.13
10	Paid To Government	1319.49
11		

For Your Reference…

To ***use*** a ***formula*** for ***what-if testing***:

1. Change the value in the cell that is referenced by a formula
2. Evaluate the changed results in the formula results cell

Handy to Know…

Excel has three different functions that can be applied for more advanced what-if testing:

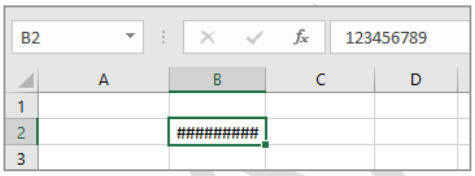
- ***SUMIF*** calculates a total amount based on a single condition.
- ***COUNTIF*** counts the number of times a value appears in a range of cells.
- ***IF*** is used for either/or scenarios.

COMMON ERROR MESSAGES

Microsoft Excel has some in-built messages that can assist you when something goes wrong with a formula. These messages appear in the cell that contains the formula, and sometimes also other formula cells that depend upon it. The messages are always prefixed with a hash sign (#) and appear with a code. The more common error messages are listed below.

A Line of Hash (#) Signs

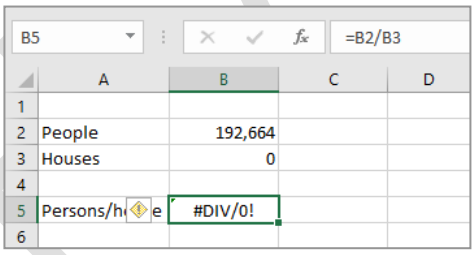
Sometimes referred to as "tramlines", a line of hash signs usually occurs because a column is not wide enough to display the numbers in the cell or formula. Widening the column will correct this problem – you can drag the column heading until the value in the cell appears as it should.



#DIV/0!

This message means you are trying to divide a value by zero – this is mathematically impossible. In the example at the left we are trying to find the average number of persons per household. All is fine as long as there is a value greater than zero in cell B3 (Houses). As soon as we change this to a zero an error message appears in the formula cell (B5).

To prevent the error you will need to enter a value greater than zero into cell B3, the *divisor* cell.

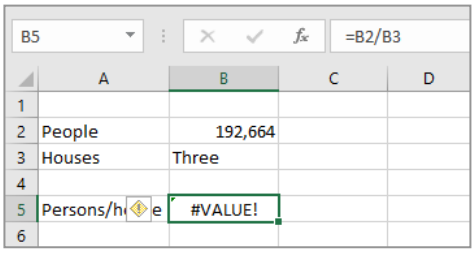


#VALUE!

In this message Excel is advising that something in the formula is not a value and therefore a calculation can't be made.

A close examination of the example at the left shows cell B3 contains the word "three". Therefore the formula in cell B5 is trying to divide 192,664 (in cell B2) with a word, which doesn't make sense.

To fix the error, a value (a number) will need to be entered in cell B3.



#NAME?

This message appears when text is found in a formula that can't be matched to either a legitimate function or range name.

In the example to the left, the formula has been entered as *=SOME(B3:B7)* – there is no such function as ***SOME***, and presumably the author should have typed *=SUM(B3:B7)*.