

# Formulas

## Creating formulas

- Open a workbook called **Formulas**. Click on cell **E3**.

In cell **E3** we need to create a formula that will calculate the value of the stock for that particular component. To do this we need to multiply the contents of cell **C3** by the content of cell **D3**.

- All formulas within Excel start with the 'equals' symbol.

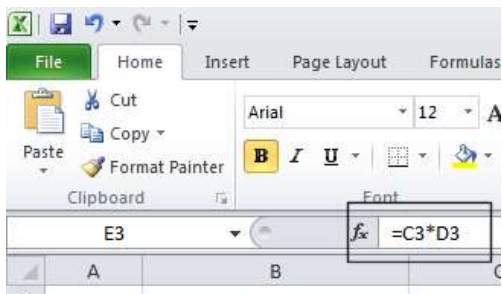
Type in the following formula.

**=C3\*D3**

**TIP:** the \* symbol means 'times'.

Press the **Enter** key and you will see the result of the calculation in cell **E3**.

- Click on cell **E3** and you will see the formula displayed in the bar above the worksheet.



## The easy way to create formulas

- Click on cell **E4** and type in the equals sign.

	A	B	C	D	E
1					
2		<b>Component Code Number</b>	<b>Number in stock</b>	<b>Value of each item</b>	<b>Total value in stock</b>
3		100847	2	22.99	45.98
4		100846	4	34.99	
5		100645	9	12.95	
6		100837	1	13.59	
7		100846	0	9.25	
8		100243	2	5.24	
9		100773	5	40.5	

- Click on cell **C4** and you see this.

	A	B	C	D	E
1					
2		<b>Component Code Number</b>	<b>Number in stock</b>	<b>Value of each item</b>	<b>Total value in stock</b>
3		100847	2	22.99	45.98
4		100846	4	34.99	=C4
5		100645	9	12.95	
6		100837	1	13.59	

- Type in the \* symbol, you see this.

IF					
	A	B	C	D	E
1					
2		<b>Component Code Number</b>	<b>Number in stock</b>	<b>Value of each item</b>	<b>Total value in stock</b>
3		100847	2	22.99	45.98
4		100846	4	34.99	=C4*
5		100645	9	12.95	
6		100837	1	13.59	
7		100846	0	9.25	
8		100243	2	5.24	
9		100773	5	40.5	

- Click on cell **D4** and you will see this.

	A	B	C	D	E
1					
2		<b>Component Code Number</b>	<b>Number in stock</b>	<b>Value of each item</b>	<b>Total value in stock</b>
3		100847	2	22.99	45.98
4		100846	4	34.99	=C4*D4
5		100645	9	12.95	
6		100837	1	13.59	
7		100846	0	9.25	
8		100243	2	5.24	
9		100773	5	40.5	

- Press the **Enter** key and you see the result of the calculation. This method may seem more complicated at first but when you are creating complex formulas, you will

find this method is actually easier and helps to reduce errors, such as typing incorrect cell references.

## Copying formulas

- Click on cell **E4**.
- Move the mouse pointer to the bottom-right border of this cell and you will notice that the mouse pointer changes to the shape of a small, solid black cross. When you see this shape change press the mouse button and while keeping the mouse button depressed, drag down to cell **E9**. Release the mouse button and you will see the formula copied down this range. If you look at the formula in each cell of the range the cell references are automatically adjusted to match each row, i.e. row 8 contains the formula **=C8\*D8**, while row 9 contains the formula **=C9\*D9**.

Your screen will now look like this.

	A	B	C	D	E
1					
2		<b>Component Code Number</b>	<b>Number in stock</b>	<b>Value of each item</b>	<b>Total value in stock</b>
3		100847	2	22.99	45.98
4		100846	4	34.99	139.96
5		100645	9	12.95	116.55
6		100837	1	13.59	13.59
7		100846	0	9.25	0
8		100243	2	5.24	10.48
9		100773	5	40.5	202.5
10					

- Save your changes and close the workbook.

## Operators

- Operators sound complicated. In reality they are items such as:

+	(plus)
-	(minus)
/	(divide)
*	(multiply)

You use operators as part of your formulas. There are other operators but these are the commonly used ones.

## Using operators in formulas

- Open a workbook called **Formula operators**.
- Click on cell **C3** and enter the following which will add the number **3** and **7**:

**=3+7**

Press the **Enter** key and you will see the result displayed in the cell.

- Click on cell **C4** and enter the following which will subtract the number **4** from the number **18**:

**=18-4**

Press the **Enter** key and you will see the result displayed in the cell.

- Click on cell **C5** and enter the following which will divide the number **20** by the number **4**:

**=20/4**

Press the **Enter** key and you will see the result displayed in the cell.

- Click on cell **C6** and enter the following which will multiply the number **4** by the number **9**:

**=4\*9**

Press the **Enter** key and you will see the result displayed in the cell.

- Save your changes and close the workbook.

## Formula error messages

- When writing formulas it is easy to make a mistake: listed below are some common error messages.

**#####**

The contents of the cell cannot be displayed correctly as the column is too narrow.

**#REF!**

Indicates that a cell reference is invalid. This is often displayed when you delete cells which are involved in a formula.

**#NAME?**

Excel does not recognize text contained within a formula.

**#DIV/0!**

This indicates that you have tried to divide a number by zero (0).

## Relative cell referencing within formulas

- Open a workbook called **Cell referencing**.
- The first worksheet within the workbook lets us look at relative addressing.
- Click on cell **E4**. We need to insert the formula for multiplying items in column C by the items in columns D. Type in the following formula:

**=C4\*D4**

- Press the **Enter** key and you will see the result of the calculation in cell **E4**.
- Click on cell **E4**, and move the mouse pointer to the bottom-right corner of cell **E4**, and when the pointer changes to the shape of a small black cross, press the mouse button, and keep it pressed down. Drag down the page to cell **E12** and then release the mouse button.
- If you click on cell **E5** you will see the following **=C5\*D5**.
- If you click on cell **E6** you will see the following **=C6\*D6**.
- If you click on cell **E7** you will see the following **=C7\*D7**.
- If you click on cell **E8** you will see the following **=C8\*D8**.
- If you click on cell **E9** you will see the following **=C9\*D9**.
- If you click on cell **E10** you will see the following **=C10\*D10**.
- If you click on cell **E11** you will see the following **=C11\*D11**.
- If you click on cell **E12** you will see the following **=C12\*D12**.
- As you can see the referencing is completely relative. This will become clearer when you have worked through the rest of this section.

## Absolute cell referencing within formulas

- Click on the **Absolute** tab at the bottom of the worksheet.
- Click on cell **D4**. We need to enter a formula that will take the price and then add 5% to the price to give a total value.

The 5% figure has been entered into cell **C15**.

- Type in the following formula into cell **D4**.

**=C4\*C15**

If you do the sums, you will find that this formula displays the correct delivery charge price in cell **D4**.

- Click on cell **D4**, and move the mouse pointer to the bottom-right corner of cell **D4**, and when the pointer changes to the shape of a small black cross, press the mouse button, and keep it pressed down. Drag down the page to cell **D12** and then release the mouse button. The data will look something like this.

Part Number	Price (excluding delivery)	Cost of delivery
100837	22.99	1.15
100263	10.95	0.00
100937	20.50	0.00
100234	10.50	0.00
100375	12.95	0.00
100746	29.84	0.00
100387	23.43	0.00
100883	9.48	0.00
100338	20.50	0.00

As you can see something has gone very wrong, as the 5% delivery charge appears to be 0 for most of the items.

- Click on cell **D5** and you can see what the problem is. The formula contained within this cell is:

**=C5\*C16**

Part of the cell reference points to cell **C16** (which if you check is empty). The problem is that because of the relative nature of the formula, the component that should always refer to the contents of the cell in **C15** (i.e. the delivery charge percentage), in fact move down as you drag down the screen to extend your calculations.

- Select the range **D4:D12** and press the **Del** key to delete the cell contents.
- Click on cell **D4** and we will try again. This time type in the following formula.

**=C4\*\$C\$15**

The dollar signs make the reference to cell **C15** absolute.

- Try extending the formula to fill the range down to **D12**. This time you should find that the delivery charges are calculated correctly.

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Part Number	Price (excluding delivery)	Cost of delivery
100837	22.99	1.15
100263	10.95	0.55
100937	20.50	1.03
100234	10.50	0.53
100375	12.95	0.65
100746	29.84	1.49
100387	23.43	1.17
100883	9.48	0.47
100338	20.50	1.03

**TIP:** You have seen relative and absolute referencing. You can also have mixed references, which contain an absolute and a relative reference.

- Save your changes and close the workbook.