



SWANSEA METROPOLITAN UNIVERSITY

PRIFYSGOL FETROPOLITAN ABERTAWE

Excel - Step by Step

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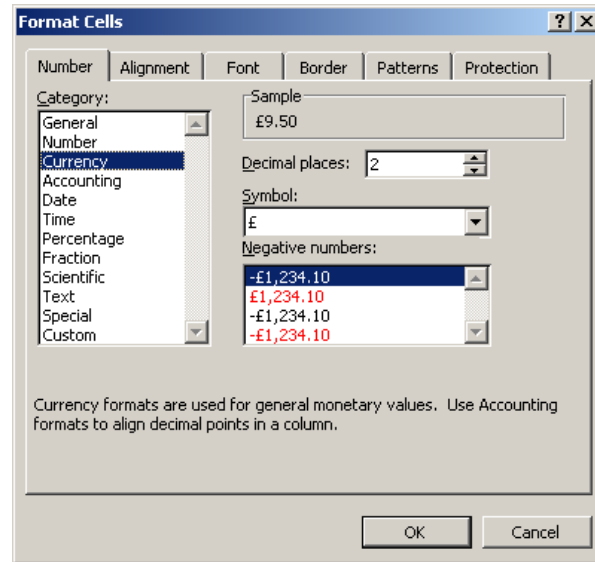
Using Excel

1. Open the Excel program by clicking on the Start button in the bottom left corner of the screen, select All Programs, then Microsoft Office and finally Microsoft Office Excel 2007. You will be presented with a blank workbook.
2. Click into cell A1. The black border indicates which cell you have selected. Create the spreadsheet shown below, remembering to put the text and numbers in the appropriate cells. Notice that as you type, the text appears not only in the cell, but also in the formula bar.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Name	Pay Rate	Hours	Gross Pay											
2	Wilson	9.5	38												
3	Williams	9	41												
4	Stephens	10.25	30												
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															

3. Embolden the column headings (Name, Pay Rate, Hours, Gross Pay) by clicking on the row 1 label button (to select the entire row), then the embolden icon on the formatting toolbar. **B**
4. Change the heading 'Hours' to 'Hours worked'. To do this, double-click on cell C1, then either:
 - Make the changes within the cell, or
 - Click into the formula bar to make the changes.
5. You will notice that some of the contents of cell C1, 'Hours worked', are now obscured because the column is too narrow to contain the text. To adjust the column width either:
 - Position the mouse pointer (the cross) at the right edge of the column C label button (the greyed row that contains the column characters A, B, C, etc.) until the pointer changes shape to a double-headed arrow. Double-click to have Excel automatically adjust the width of the column to fit the contents of the column. Or,
 - Adjust the column width manually by dragging the right border of the column's heading until it is wide enough to contain the data. Click anywhere in the worksheet to turn off the selection.

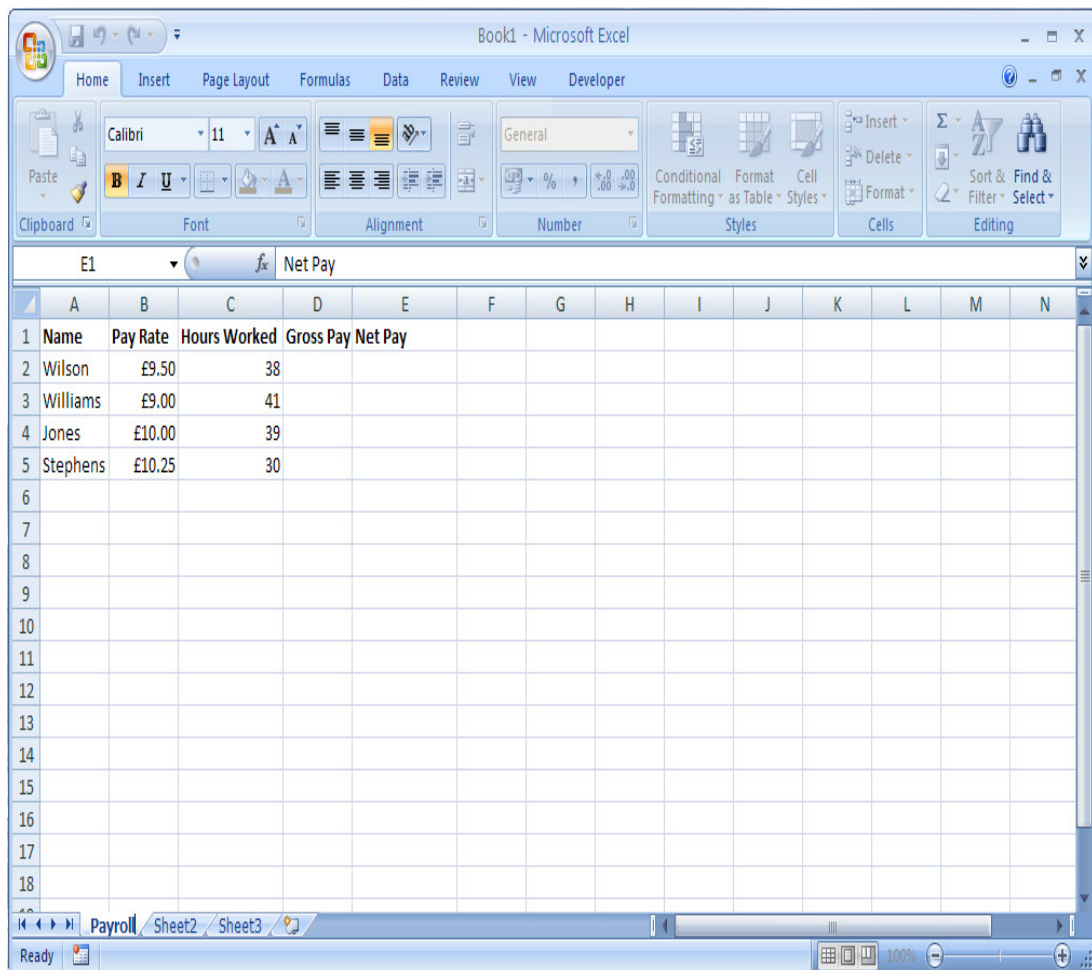
6. Because the default format for numbers, 'General', doesn't display zeros that don't affect the actual value of the number, the format of the numbers in cells B2-B4 must be changed to show that they are money values (currency). To do this:
 - a) Select (highlight) cells B2-B4.
 - b) Right click inside the highlighted cells and then select **Format Cells** from the pop up menu
 - c) Click the **Number** Tab.
 - d) Browse through the 'Category' list options, and then choose **Currency**.
 - e) Notice that the 'Decimal places' value has changed from 0 to 2.
 - f) If the 'Symbol' value is a \$, browse through the options and then select **£ English (United Kingdom)**.
 - g) Browse through the other tabs and if you wish, set other available options (such as the colour of the text and the background of cells).
 - h) When you have finished, click on **OK**.



Note: Excel lets you present numbers in a variety of formats. Formatting is used to identify numbers as currency, percentages, dates, etc. and to make numbers easier to read by aligning decimal points in a column. When you format a number, you change its appearance, not its numeric value. **Do not type the currency symbol directly into the text box!**

7. Insert a new row between rows 3 and 4:
 - a) Select row 4 (the row below where you want the new row to appear) by clicking on the grey row 4 label button.
 - b) Right-click the mouse and the shortcut menu appears. Select **Insert** and a new empty row appears in the workbook. Notice that the row numbers have changed to accommodate this new row.
 - c) Type in the name **Jones**, rate of pay **10**, hours worked **39**. Remember that you have previously formatted the rate of pay cells to display currency, so do not enter the £ sign or the two decimal places – let Excel do it automatically for you.
8. Insert a new column between columns C and D:
 - a) Select column **D** (the column after where you want the new column to appear) by clicking on the grey column **D** label button.
 - b) Right-click the mouse and the shortcut menu appears. Select **Insert** and a new empty column appears in the workbook. Notice that the column numbers have changed to accommodate this new column.
 - c) In cell D1, type in the label **Net Pay**.

9. Move column **D** (labelled **Net Pay**) so that it appears after the column labelled **Gross Pay**:
 - a) Select column **D**.
 - b) Right click on the column D label button and the shortcut menu appears. Select **Cut**. The column won't disappear yet but a flashing border will show you the cells that you have chosen to move.
 - c) Right-click on the column **F** label button. Select **Insert Cut Cells**. The Net Pay column should now follow the Gross Pay column.
10. Rename the worksheet Payroll: right-click on the 'Sheet 1' worksheet tab in the lower left hand section of the screen and select Rename. On the tab, type in **Payroll**, then click anywhere on the worksheet to exit. Your worksheet should look like the one below.

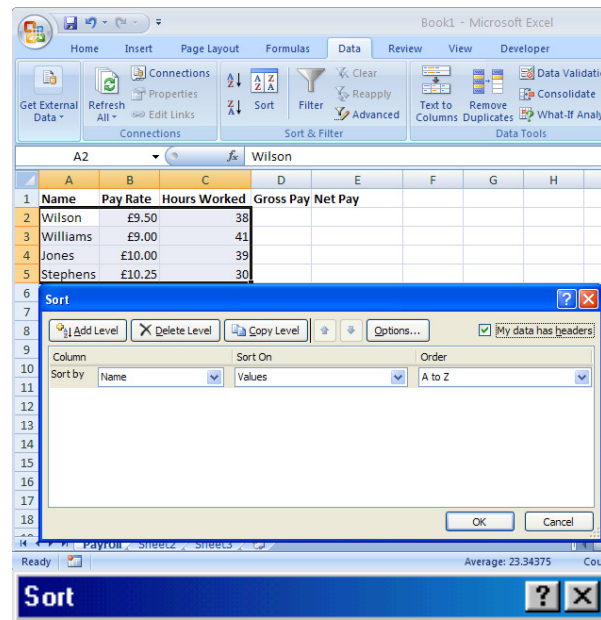


Sorting data

You will notice that the employees in the payroll spreadsheet are not listed alphabetically. To 'sort' the list alphabetically:

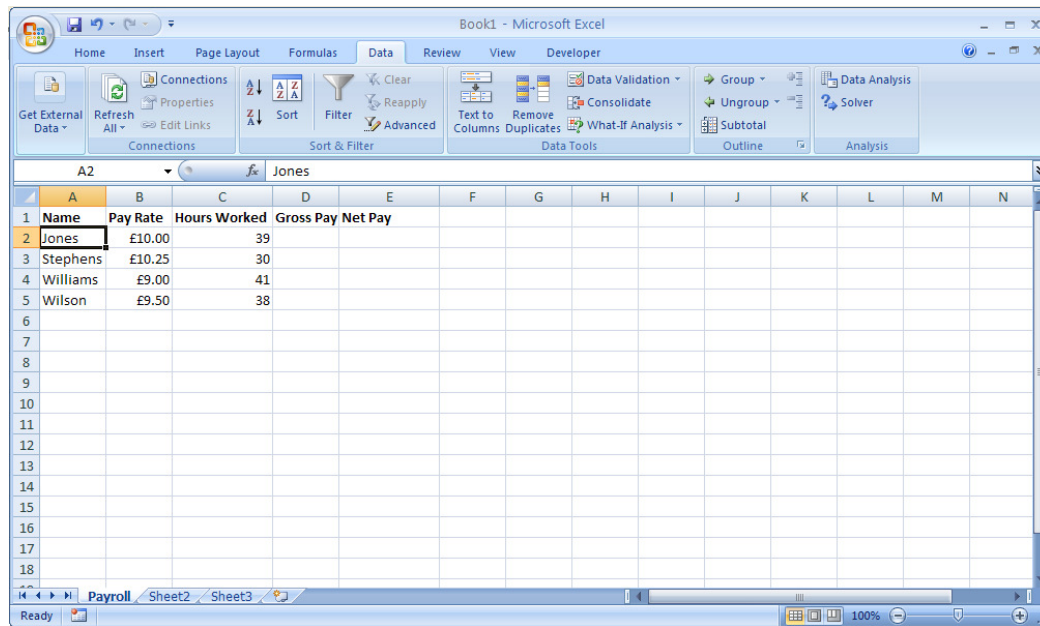
1. Select row labels 2 to 5. Either:
 - Click on row label 2, hold and drag to include row labels 3, 4 and 5, or
 - Click once on row label 2. Press and hold the 'shift' key **and** press the 'down' arrow key three times until rows 2 to 5 are selected.

2. From the **Data** pull-down menu, select **Sort**. The Sort dialogue box appears. It asks you how you want to sort your data (by which column(s)). We want to sort the list alphabetically by Name (column 1); Excel should have entered this for you by default, as it is the first column. If you click on the downward pointing arrow in the 'Sort by' box, all your columns are available for selection (should you wish to sort by some other column).



3. Select the **Ascending** option (alphabetically starting with A), then **OK**.

4. The rows should now be listed in alphabetical order (see below).



Creating Formulas In Excel

The distinguishing feature of a spreadsheet program such as Excel is that it allows you to create mathematical formulas and execute functions. Otherwise, it is not much more than a large table for displaying text.

Formulas are entered in the worksheet cell and must begin with an equal sign "=". The formula then includes the addresses of the cells whose values will be manipulated with appropriate operators (+ - / *) placed in between. After the formula is typed into the cell, the calculation executes immediately and the formula itself is visible in the formula bar.

You can create formulas in a number of ways, but some are more efficient than others. We'll begin with simple formulas that have one mathematical operation.

1. The following Payroll worksheet needs a formula to multiply Jones's pay rate (B2) by the hours worked (C2) in order to calculate his gross pay (D2). In other words, we have to place a gross pay formula in D2 that must read `=B2*C2`.

There are two main ways to achieve this - to type in the formula **or** to use the point and click method (have a go at both but remember to delete the first before you try the second):

Typing in the formula:

- Click on cell D2 (the cell where you want the result to appear).
- Type in `= B2*C2` (as you type, the formula appears in the formula bar).
- Press the enter key. The result of the calculation should now be in cell D2.

Entering a Point-and-Click Formula:

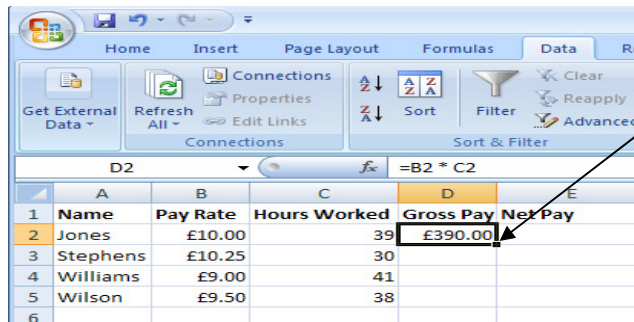
1. Click on cell D2 (the cell where you want the result to appear).
2. Type =
3. Click on B2 (the first cell you want to include in the formula).
4. Type the operator * (which means multiply).
5. Click on C2 (the next cell in the formula). (Note: it is possible to repeat steps 4 and 5 if we want to enter a larger formula).
6. Press the enter key. The result of the calculation should now be in cell D2.

Format the gross pay column to show currency (see below).

	A	B	C	D	E	F	G	H	I
1	Name	Pay Rate	Hours Worked	Gross Pay	Net Pay				
2	Jones	£10.00	39	£390.00					
3	Stephens	£10.25	30						
4	Williams	£9.00	41						
5	Wilson	£9.50	38						
6									

Using Autofill to Copy Formulas

Now that you understand formulas, you may be tempted to quickly create all the other gross pay formulas from our example. Don't - there's a much faster way. The formula for each employee's gross pay is the same: pay rate*hours worked. Since you've already created one working formula, all you need to do is to use AutoFill to 'fill' or copy the formula to the other cells.

The screenshot shows the Microsoft Excel interface. The 'Formulas' tab is active in the ribbon. The formula bar shows '=B2 * C2'. The worksheet has columns A through E and rows 1 through 6. Column A is 'Name', B is 'Pay Rate', C is 'Hours Worked', D is 'Gross Pay', and E is 'Net Pay'. Row 2 contains data for 'Jones': Pay Rate £10.00, Hours Worked 39, and Gross Pay £390.00. A black cross-shaped fill handle is visible in the bottom-right corner of cell D2. An arrow points from the text on the right to this fill handle.

	A	B	C	D	E
1	Name	Pay Rate	Hours Worked	Gross Pay	Net Pay
2	Jones	£10.00	39	£390.00	
3	Stephens	£10.25	30		
4	Williams	£9.00	41		
5	Wilson	£9.50	38		
6					

The square box in the lower-right corner of the cell pointer is called the fill handle. As you move the mouse toward the cell pointer, the mouse pointer changes shape to a black cross to let you know that you can use the mouse for a fill operation.

1. Click on cell D2 (the cell that contains the formula you want to copy to other cells).
2. Position your mouse pointer over the fill handle until it changes shape to a black cross.
3. Click on the fill handle and drag it to cover (select) cells D3 to D5 (the cells to where you want the formula copied).
4. Release the fill handle to fill the formula. The results of the calculations should now be displayed.
5. One at a time, click on cells D2 to D5 and look at the formula displayed in the formula bar. Notice that Excel has not created an exact copy of the formula, but has copied it **relative** to its new cell addresses. Unsurprisingly, this is known as relative referencing.

We now need to calculate the net pay of each employee. Net pay is calculated by multiplying gross pay*tax rate, and subtracting the result from gross pay. All our employees are taxed at a rate of 20%, therefore our net pay formula (beginning with Jones) must read =D2-(D2*0.2)

1. Click on cell E2 (the cell where you want the result to appear).
2. Type **=D2-(D2*0.2)** and then press the **Enter** key. Jones's net pay should now be displayed.
3. Fill the formula to cells E3:E5 (using the Autofill steps above).
4. Format the net pay column to show currency.

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fx

	A	B	C	D	E
1	Name	Pay Rate	Hours Worked	Gross Pay	Net Pay
2	Jones	£10.00	39	£390.00	£312.00
3	Stephens	£10.25	30	£307.50	£246.00
4	Williams	£9.00	41	£369.00	£295.20
5	Wilson	£9.50	38	£361.00	£288.80

Totalling Columns and Rows Using AutoSum



When you want to add the contents of a cluster of adjacent cells, rather than typing in a formula, it is often easier to use the Autosum function on the standard toolbar.

1. In cell A6, type in **TOTALS**, and embolden the row.
2. Select cells D2:D6 (the cells that contain the gross pay numbers you want to total and a blank cell to hold the totals).
3. Click the AutoSum button on the Home Tab. The gross pay total should now be displayed in cell D6.
4. Repeat steps 2 and 3 for the net pay total.

Working With Relative and Absolute Cell References

When you copy a formula from one cell to another Excel automatically adjusts each cell reference in the formula using relative referencing (as we did earlier). This, most of the time, is exactly what you want Excel to do. However, there are exceptions.

Suppose, for example, we would like to know what each employee's gross pay represents as a percentage of total gross pay. To calculate this for Jones, the formula would read gross pay/total gross pay or =D2/D6

1. First, type in a new heading, **Gross Pay %**, in cell F1.
2. As we want the result to read as a percentage, select the column F label, and click on the **percent style** icon on the **Home Tab**.
3. In cell F2 type in the formula **=D2/D6** and press the Enter key. The result should be displayed as a percentage (27%).
4. Fill the formula to cells F3:F6. The formula will not work. Look at the example below.

The screenshot shows the Microsoft Excel interface with the following data in the worksheet:

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Name	Pay Rate	Hours Worked	Gross Pay	Net Pay	Gross Pay %								
2	Jones	£10.00	39	£390.00	£312.00	27%								
3	Stephens	£10.25	30	£307.50	£246.00	#DIV/0!								
4	Williams	£9.00	41	£369.00	£295.20	#DIV/0!								
5	Wilson	£9.50	38	£361.00	£288.80	#DIV/0!								
6	TOTALS			£1,427.50	£1,142.00	#DIV/0!								

The formula bar shows the formula in cell F2 is =D2/D6. The error #DIV/0! appears in cells F3, F4, F5, and F6, indicating a division by zero error when the formula is copied to those cells.

While the formula produces a reasonable answer for Jones, the same formula is obviously wrong when filled to the other employees. So what happened? The formula in F2 was =D2/D6. When it was filled from F2 to F3, Excel changed each cell reference **relatively**, just as it did with the totals you filled earlier. (You can see which cells were referenced in a formula by double-clicking the formula.)

The formula in F3 was changed to =D3/D7, and the change from D6 to D7 created the problem. Rather than dividing Stephens' total into the Gross Pay Total, it tried to divide Stephens' total into the blank cell D7 – it moved both cell addresses down one row. The formulas for Williams and Wilson have a similar problem.

When you fill this formula, you want D2 to change to D3 (relative to the formula's new location) but you do not want D6 to change at all. The reference to D6 should be **absolute** (not changeable). You instruct Excel not to change the reference to D6 by making it an absolute cell reference. This is done by preceding the absolute cell references with dollar signs, such as \$D\$6.

5. Select cells F2:F6 and press the **delete** key on your keyboard to remove the failed formulas.
6. In cell F2, type in =D2/\$D\$6
7. Fill the formula to cells F3:F6. As you now fill the formula =D2/\$D\$6 to the other employees, D2 will change to D3, D4, etc., but D6 will always be D6.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Name	Pay Rate	Hours Worked	Gross Pay	Net Pay	Gross Pay %								
2	Jones	£10.00	39	£390.00	£312.00	27%								
3	Stephens	£10.25	30	£307.50	£246.00	22%								
4	Williams	£9.00	41	£369.00	£295.20	26%								
5	Wilson	£9.50	38	£361.00	£288.80	25%								
6	TOTALS			£1,427.50	£1,142.00	100%								
7														

Basic Excel Functions

Rather than forcing you to rack your brain and create cumbersome and complicated formulas on your own, Excel comes with predefined formulas called functions. Functions can be a more efficient way of performing mathematical operations than formulas. For example, if you wanted to add the values of cells D1 through D10, you would type the formula "`=D1+D2+D3+D4+D5+D6+D7+D8+D9+D10`". A shorter way would be to use the SUM function and simply type "`=SUM(D1:D10)`". Several other functions and examples are given in the table below:

Function	Example	Description
SUM	<code>=SUM(A1:100)</code>	finds the sum of cells A1 through A100
AVERAGE	<code>=AVERAGE(B1:B10)</code>	finds the average of cells B1 through B10
MAX	<code>=MAX(C1:C100)</code>	returns the highest number from cells C1 through C100
MIN	<code>=MIN(D1:D100)</code>	returns the lowest number from cells D1 through D100
SQRT	<code>=SQRT(D10)</code>	finds the square root of the value in cell D10
TODAY	<code>=TODAY()</code>	returns the current date (leave the parentheses empty)

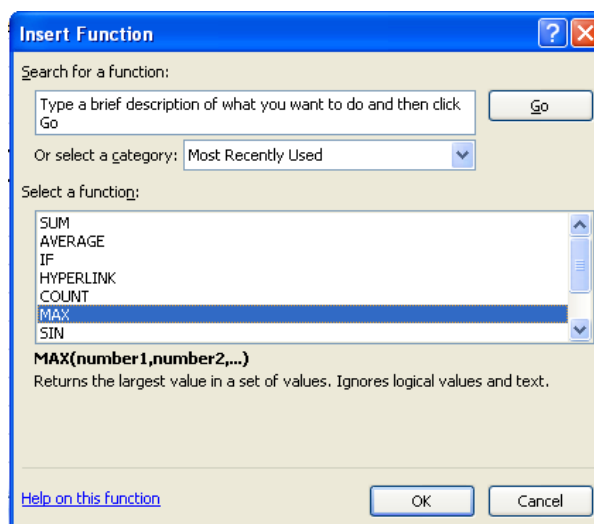
1. In cell A7, type in **AVERAGE**.
2. Click on B7.
3. Type `=average(B2:B5)` then press enter. The average rate of pay is now shown.
4. Repeat steps 2 and 3 to



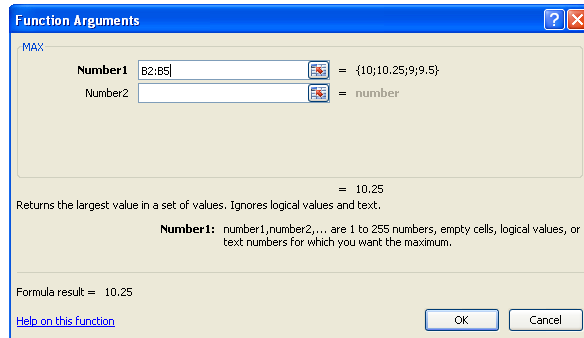
Insert Function Wizard

To help you choose the right function, Excel comes with the Insert Function feature, which guides you step-by-step to choosing a function and filling it with cell references. To use the Insert Function feature to identify the maximum rate of pay in our spreadsheet:

1. In cell A8, type in the label **Max**.
2. Click on cell B8.
3. Select on the Formulas Tab and then click the **Insert Function** icon (*fx*) to the left of the formula box. The Insert Function dialogue box appears as shown.
4. The most recently used functions are named in the lower pane. The 'select a category' option contains a complete list of **all** available functions – browse through. When ready, select **MAX** from the **Most Recently Used** list, and click **OK**.



5. A new dialogue box appears asking for the range of cells from which you want Excel to identify the maximum value (specific cell references). You *can* type in the specific cells in the range but it is easier here to use the point and click method. Click on the red coloured icon and the dialogue box *collapses* to allow you to see the worksheet. Select (highlight) cells B2 to B5 and the cell reference range appears in the collapsed dialogue box.



6. Click on the red icon in the collapsed dialogue box to restore the dialogue box, then **OK**. The results of the function are now in the worksheet.
7. Repeat the previous steps to calculate the minimum rate of pay in our spreadsheet. Put the results in row 9.
8. *Shortcut note:* if you click on the downward pointing arrow next to the autosum icon, a list of frequently used functions is displayed. You may also access the Insert Function wizard from this list.



Using the IF function

The IF function is used to evaluate whether a cell's value meets a certain condition, and to display results depending on whether or not the condition is met. For example, we might want to evaluate whether a student's exam mark is a Pass or Fail grade.

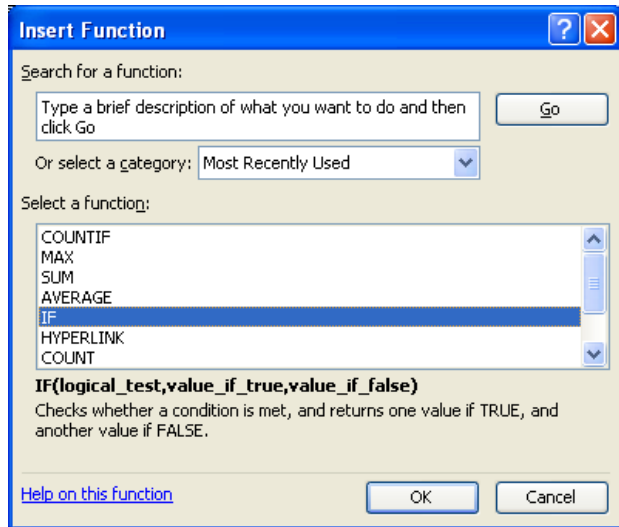
An IF statement can be constructed so that the cell adjacent to the exam mark reads Pass or Fail, depending on whether that student reaches, say, 50% or above.

In our payroll spreadsheet, we might want to calculate whether the employee has worked overtime:

1. Insert a new column called **Overtime** between Hours Worked and Gross Pay (select the column D grey label, right-click the mouse, choose Insert).

2. Click on cell D2.

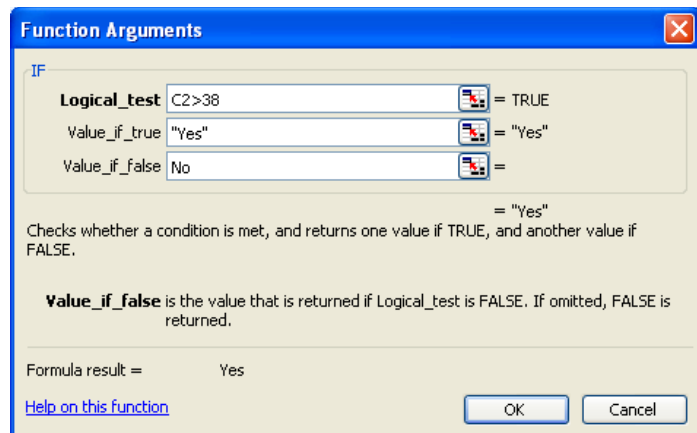
3. Click the **Insert Function** icon (fx) to the left of the formula box. The Insert Function dialogue box appears as shown.



4. From the **Most Recently Used** category, select **IF**, then OK.

5. A new dialogue appears in which we must specify our 'condition'. We are testing to see whether Jones has worked overtime, i.e. more than a 37 ½ hour week. In the logical test box, type in **C2>=38**

6. In the **Value_if_true** box, type in **Yes**. In other words, if Jones has worked 38 hours or more, the result Yes will be displayed in the Overtime cell.



7. In the **Value_if_false** box, type in **No**. In other words, if Jones has worked less than 38 hours, the result No will be displayed in the Overtime cell.

8. Click on **OK**. The result should be shown in the worksheet (see below).

9. Fill the function to cells D2: D5.

Book1 - Microsoft Excel

Formulas

fx =IF(C2>=38,"Yes","No")

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Name	Pay Rate	Hours Worked	Overtime	Gross Pay	Net Pay	Gross Pay %						
2	Jones	£10.00	39	Yes	£390.00	£312.00	27%						
3	Stephens	£10.25	30	No	£307.50	£246.00	22%						
4	Williams	£9.00	41	Yes	£369.00	£295.20	26%						
5	Wilson	£9.50	38	Yes	£361.00	£288.80	25%						
6	TOTALS				£1,427.50	£1,142.00	100%						
7	AVERAGE	£9.69	37										
8	MAX	£10.25											
9													
10													

Freezing Panes

If you have a large worksheet with column and row headings those headings will disappear as you scroll through the worksheet. By using the Freeze Panes feature, the headings can be visible at all times.

Look at the example below. The top horizontal headings and the left vertical headings have been frozen. Notice that the row numbers skip from 1 to 4, while the column letters skip from A to D.

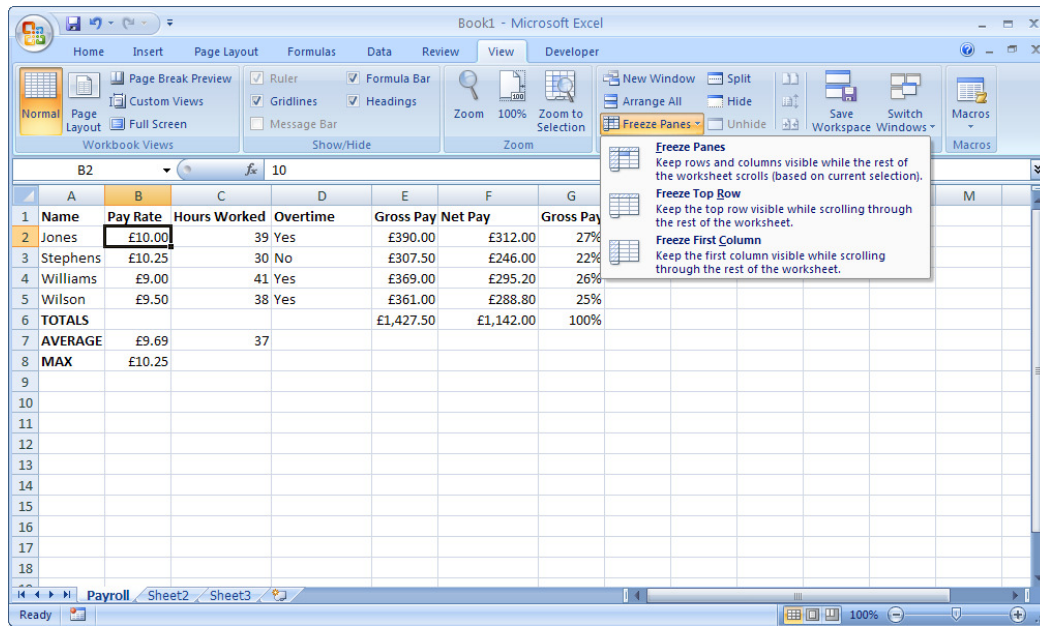
Book1 - Microsoft Excel

View

Freeze Panes

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Name	Pay Rate	Hours Worked	Overtime	Gross Pay	Net Pay	Gross Pay %						
4	Williams	£9.00	41	Yes	£369.00	£295.20	26%						
5	Wilson	£9.50	38	Yes	£361.00	£288.80	25%						
6	TOTALS				£1,427.50	£1,142.00	100%						
7	AVERAGE	£9.69	37										
8	MAX	£10.25											
9													

1. Firstly, select which part(s) of the worksheet you want to freeze. We want to freeze the top horizontal headings (row 1) and the left vertical headings (column 1).
2. Click on cell B2 (the cell below and to the right of where you want the split to appear).
3. From the **View Tab**, select **Freeze Panes** (see below).
4. Scroll through your worksheet to check that it has worked. If you want to remove the split, from the **View Tab**, select **Unfreeze Panes**.



Prettying up your data table (worksheet)

Your finished worksheet has taken much effort and time, but it *looks* rather dull! If you want fancy formatting without a lot of effort, use the AutoFormat feature.

1. Select the cells that you want to format. In the example on the right, cells A1: G6 have been selected.
2. From the **Home Tab**, select **Format as Table**.
3. The Format as Table dialogue box appears. Using the scroll bar, browse through the options and make your preferred selection.
4. Click on **OK**.

