

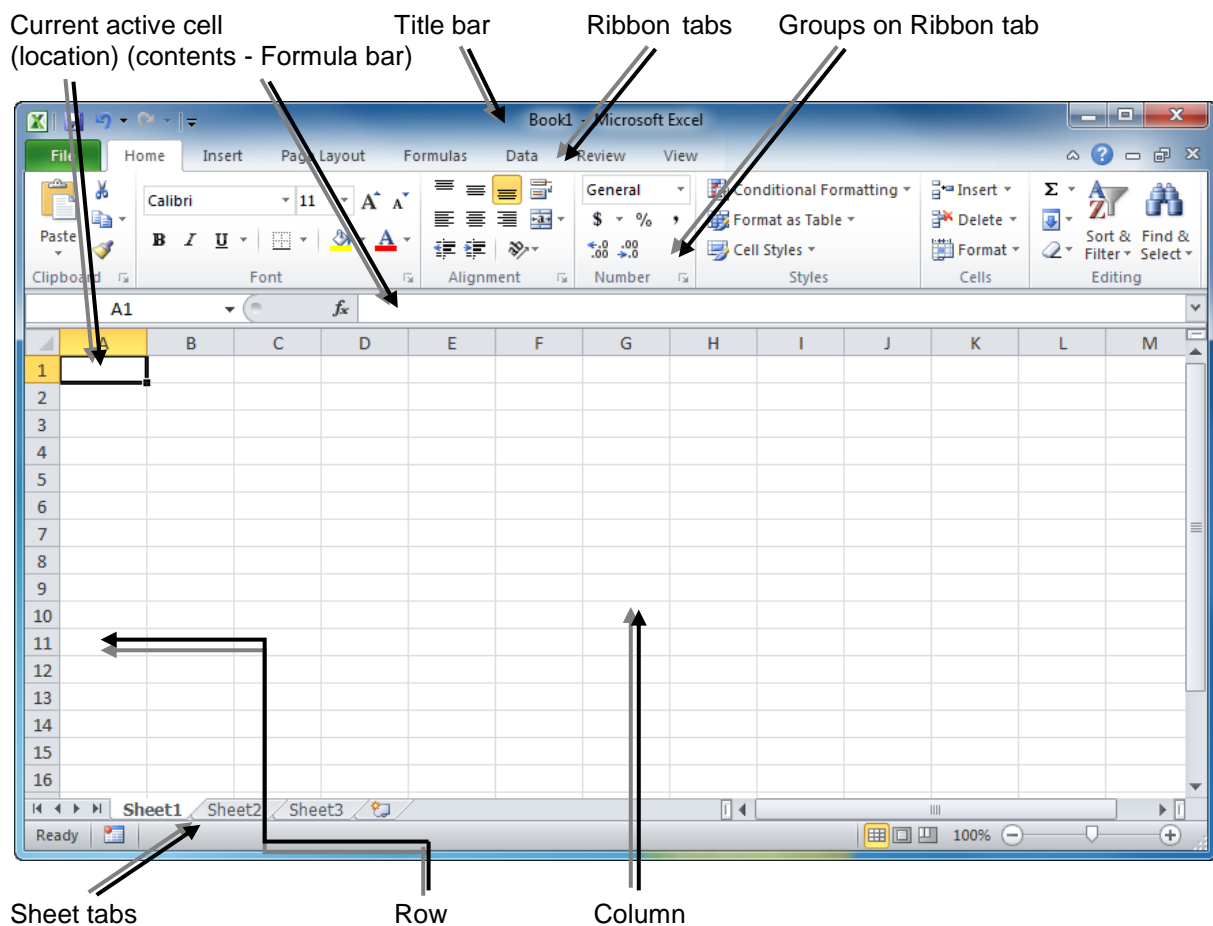
Spreadsheets with *Excel*

1. What is a Spreadsheet?

Spreadsheets allow the automation of the entering of numbers, typically budgets and statistics. They also allow “what if” questions to be asked. In effect, the spreadsheet is a tool for simulation, and can be used in this way in all sorts of non-business applications, e.g. for environmental simulation. They can also be used for organising data, producing simple collections of records which can be **sorted** and **searched**.

2. Using *Excel*

To start *Excel*, click on the **Start** button on the taskbar and from **Programs** select *Microsoft Excel*. To close *Excel* once you have finished working with it, select **Exit**, from the **File** menu. Before closing, ensure that all your work is properly saved.



A spreadsheet allows data, both text and numbers, to be laid out on a grid made up of individual cells ordered into rows and columns. Each cell can then be identified by its column and row number: thus cell **C5** is in column **C** and row **5**.

	A	B	C
1	Payments		
2	First Name	Last Name	normal rate
3	Archie	McGunk	6.7
4	Denzil	Ragout	6.5
5	Elaine	Crispp	8.25

Spreadsheets also allow cells to be **linked** to one another. Changing a value in one cell will change the values in cells which have been linked to it. Thus if cell **D6** is always twice the value of cell **A3**, then changing the value of **A3** from **4** to **7** will lead to the value in **D6** changing from 8 to 14. Cells may be linked to more than one other cell; so one cell may contain the sum of a whole row or column of cells. In this respect spreadsheets are very useful for the manipulation of numeric data.

3. Entering Data in a Cell

As information is typed in a cell, it appears first at the top of the screen in the **Formula Bar**. Having ensured that the entry is correct, press **Return**, which will move to the next row down or **Tab**, which will move to the next column across.

	C3	fx	6.7
	A	B	C
1	Payments		
2	First Name	Last Name	normal rate
3	Archie	McGunk	6.7

Alternatively, you can move to another cell using the cursor keys or the mouse.

The information can be confirmed by clicking the **✓** on the **Formula bar**, or removed by clicking the **X** on the formula bar. (These appear when you start typing in the cell). It is easiest to enter the information in a logical way, either across each row or down each column.

If data (typed or resulting from a calculation) does not fit into a cell, one of two things will happen. If the data is purely mathematical, then it will be displayed in scientific notation – a compressed format. (For instance, 67449037 would be shown as 6E+07). If the data represents something, e.g. currency, a series of hash marks will be displayed. *Do not worry*: the data is not lost; this just signifies that the data cannot be displayed properly unless you change the cell size.

	6E+07
C	D
7	
normal rate	pay
6.7	#####

You can do this by placing the cursor at the edge of the column heading (where it will change to a cross) then click and drag with the mouse to make the column wider.

C	↔	D
---	---	---

4. Editing Data

Before editing, you must select the cells to be edited, in one of the following ways:

- Click anywhere in a cell to select it – drag to select more than one cell.
- Click on the **row number** at the left of the window to select a whole row.
- Click and drag over several **row numbers** to select more than one row.
- For columns, click on the **column letter** at the top of the window.
- Click and drag to select more than one column.
- To select non-adjacent columns or rows press **Ctrl** and click in the row numbers or column letters required.
- To deselect, or to start again, click once anywhere on the worksheet.

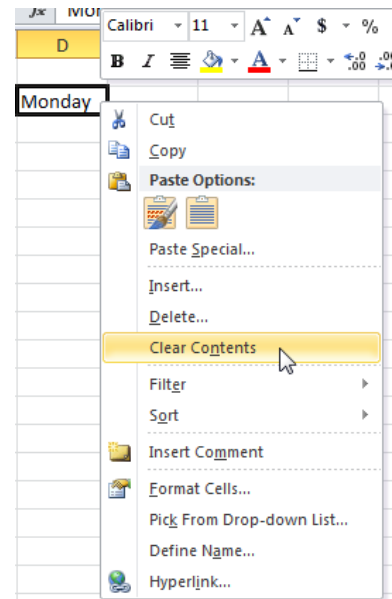
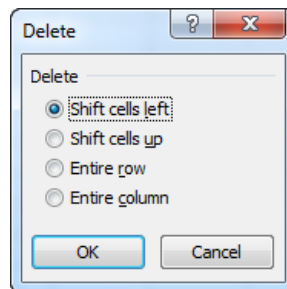
To *replace* a cell's contents, select the cell, type the new data and press **Return** or **Tab**.

To edit a cell's contents, select the cell then insert the cursor in the appropriate position in the **Formula bar**. Backspace to delete or type to add new data.

To delete data from a cell, right-click on the cell to display the drop down menu. Clicking the **Clear Contents** option will remove the data, *but not the formatting*, and leave the cells intact.

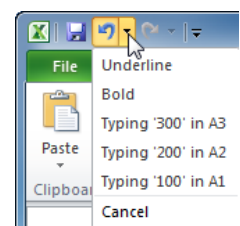
If you click the **Delete** option in the right-click menu, a **Delete** dialog box will be displayed. With the **Delete** option, you will physically remove rows/columns from the worksheet. Select your option and click **OK**.

Be careful how you use the options **Clear** and **Delete** on the **Edit** menu. **Clear** empties the cell contents without deleting the actual cell, whereas with **Delete** the cell will be removed.



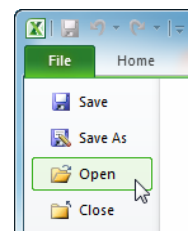
Inserting a blank row can be carried out by selecting the row, which you want to be moved down, then selecting **Insert Rows** from the **Cells** group on the **Home** tab. To insert a column, select the column to be moved to the right, then select **Insert Columns** the same way.

The last action can also be undone or redone. Click the **Undo** or **Redo** button on the **Excel Quick Access Toolbar** or use **Ctrl + Z** to undo, **F4** to repeat.



5. Loading Data from a File

Choose **Open** from the **File** tab. Select the drive and directory where your file is located. *Excel* files will have the extension **.xlsx**. If the **Workbook** you open has several sheets of data, select the sheet you want to work with by clicking the appropriate **Sheet tab** (at the bottom of the *Excel* window) with the mouse. If you simply want to create a new file from scratch, select **New** on the **File** tab.



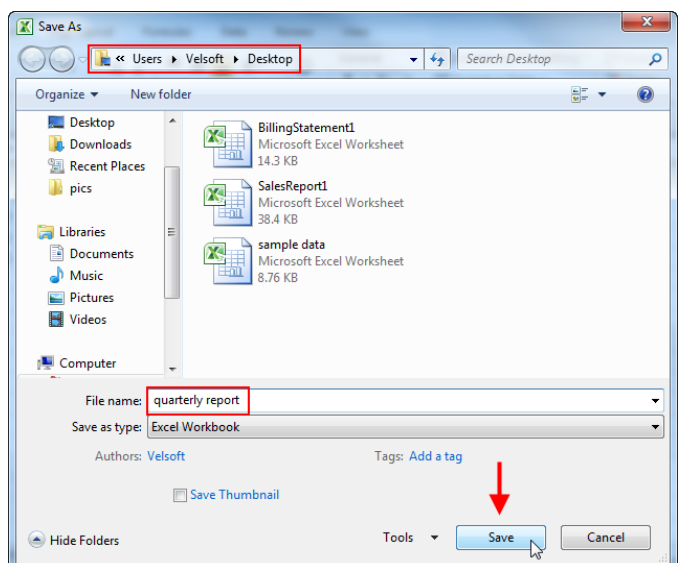
6. Saving data to a File



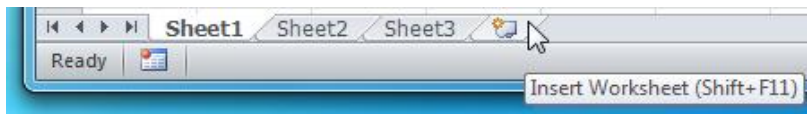
Click on the **Disc** icon on the **Excel Quick Access Toolbar** or use **Ctrl + S** or choose **Save** from the **File** tab. The first time you save a file the **Save As** dialog box appears.

Choose the drive and folder you want to save to as with other applications. Note that in *Excel*, a **Workbook** is the file in which you work and store information, and a **Workbook** can contain many worksheets (spreadsheets).

This way a series of related spreadsheets and/or charts can be kept together as one file.



There are usually 3 sheets to start with which can be added to if required. You can add a new worksheet by clicking on the **New Tab** icon. A new sheet appears, numbered in sequence.

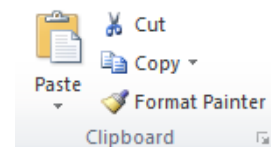


You can select a sheet to work in by clicking on its tab, at the bottom of the window. You may wish to give worksheets individual names: right click with the mouse and choose **Rename** from the menu which appears.

If you are working on a Workbook, save it regularly, and back up your file regularly, so that you can revert to a previously saved version should you mess something up.

7. Copying and Moving Data

To leave the data at the original position and copy it somewhere else select it, then click the **Copy** button in the **Clipboard** group on the **Home** tab (or press **Ctrl + C**). The cells will now have a flashing border around them.

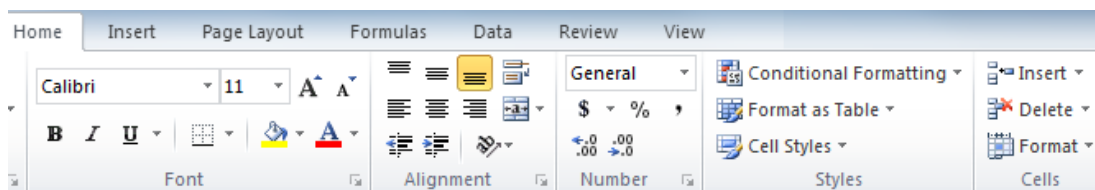


To cut text from one place in the worksheet and paste it to another location, select the text you want to cut then click on the **Cut** button (or press **Ctrl + X**). The cells will again have a flashing border around them.

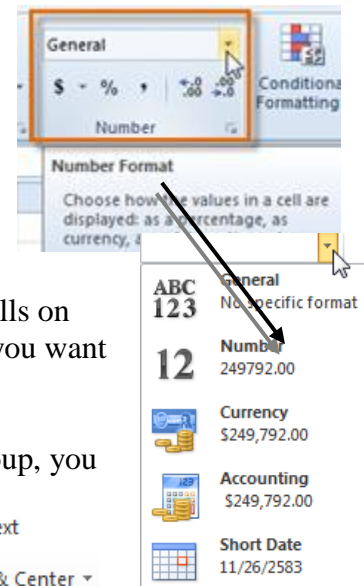
To paste the data in both cases, select the cell where you want the text to appear and click on the **Paste** button or press **Ctrl + V**. When pasting the data you need only select the starting cell and all the cells required will be filled. Be careful when pasting to ensure that there is room for all the data to fit or this action will over-write other data. You can paste repeatedly from a copy, but only once from a cut. When you paste from a cut, the flashing border will disappear. To remove the flashing border after pasting from a copy, press the **Esc** or **Enter** key or double click on any cell.

8. Formatting Cells

Select the cells that you want to format in the way described above. Format the data by choosing **Cells** from the **Format** menu, and selecting the format required in the **Format Cells** dialog box. Many of the choices here are the same as in *Word*: for instance you can change the text font, alignment, add a border, or background shading. Choose the type of formatting you want to use from the options on the **Home** tab. You will then be presented with menus, and buttons with which you can select the formatting you require.

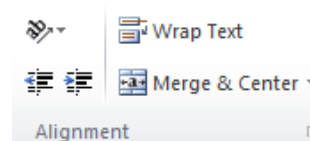


Specific to *Excel* is the wide range of **number** formats that can be applied to cells. There are several different categories of number formatting available: you can format for currency, time, date, fraction and even scientific numbering. For instance you can select the category **Currency** and then you can choose decimal places and a currency symbol. You can also custom the numbering to suit your specific needs.



Titles can be centred across a number of cells. Highlight the cells on the same row as the title (including the title cell) across which you want it to be centred.

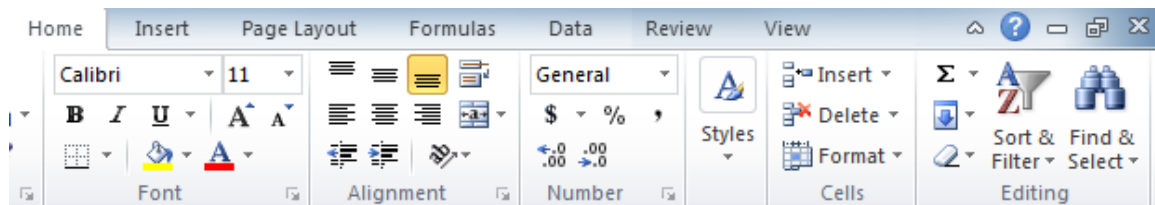
Then, from the **Home** tab on the Ribbon, on the **Alignment** group, you can press the **Merge and Centre** button.



The default cell is often not wide or high enough for the information to be entered, especially for row headings down the left of the screen. You can, however, change the size of a column or row. Point at the line on the right-hand side of the column whose width has to be changed. The mouse pointer will change. Click and drag to the right till the column is the required width. The height of a row can be changed in a similar fashion.

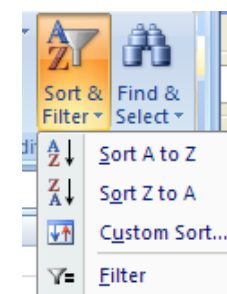
9. Sorting Data

Spreadsheet data can be reordered rapidly and easily. Data is usually sorted alphabetically or numerically in either ascending or descending order. You can sort the data by using the options in the **Sort & Filter** menu in the **Editing** group under the **Home** tab.



You can use one of the **AZ/ZA Sort** options; but first you must select a cell in the column you wish to sort on. These will only sort on one column: to sort on more than one column you must use the **Custom Sort** option.

Before you sort, you must select a cell within the data and this will be expanded to select all the data when you choose **Sort**. In the **Custom Sort** dialog box (see image next page) select which column or columns you wish the data sorted upon, then click **OK**.





You can sort on more than one heading. That is to sort *within the sort*. For instance a collection of data about a national company includes agents in each region. By sorting on **Region** and then on **Agent**, the data can be ordered to show each region in alphabetical order and the agents ordered alphabetically within each region.

Note: if the data in a column is text you will sort **A to Z** or **Z to A**; if it is numerical you will sort **Largest to Smallest** or **Smallest to Largest**.

10. Calculating with Formulae

A spreadsheet can enable you to add up columns and rows of numbers quickly and easily and to apply mathematical formulae to spreadsheet cells. You can type in a formula (*always beginning with the “=” sign*) to perform calculations using various mathematical operators, e.g.

+ add - subtract * multiply / divide

When calculating the result of a formula, *Excel* will always use these operators in a specific order:

1. Division or Multiplication

2. Addition or Subtraction.

Brackets can be used to alter this normal order, if required. For example:

$=2+2*2$ would give an answer of **6**, not **8** as you might expect. This is because the multiplication comes before the addition, so $2*2$ is done first, then **2** is added to the result.
 $=(2+2)*2$ would give the answer **8**, since whatever is in the brackets is calculated first.

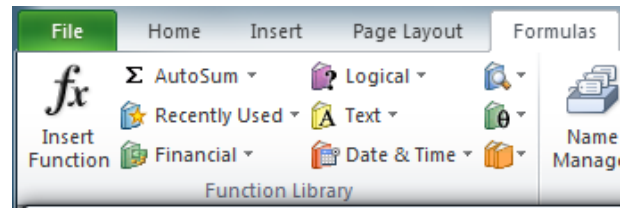
However, you will not usually be working solely with numbers, but will use cell references to perform calculations on the data you enter. Simple formulae may involve referencing data from only two cells. For example, to add the contents of cells **A1** and **A2** and place the result in **A3**, position the cell pointer in **A3** and type **=A1+A2**.

Remember, you must type the “=” sign. The result of the calculation appears in the cell, but the formula appears in the **Formula bar**. If either **A1** or **A2** changed, **A3** would automatically change to reflect the new result of the formula.

11. Functions

Excel has statistical, mathematical, financial, string and logical functions, which can be applied to your data. Select the **Formulas** tab to see **Function Library** group.

This has a selection of drop-down menus. There is a drop-down menu for each choice of function **category**, e.g. **Date & Time**, **Financial**, **Math & Trig**, **Statistical**, **Logical**, etc.



The ***fx*** (**Insert Function**) option to the left opens a dialog box which gives access to the all functions available; you can search or choose a category.

For example, under **Statistical** you can find:

MAX is used to find the maximum value of a range of cells, e.g. **=MAX(A1:A10)**

MIN is used to find the minimum value of a range of cells, e.g. **=MIN(A1:A10)**

AVERAGE is used to find the average of values in a range of cells, e.g.

=AVERAGE(A1:A10)

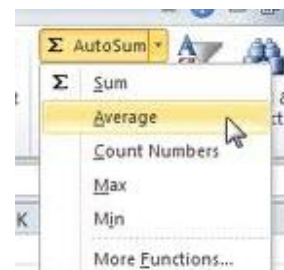
TODAY can be used to insert today's date into the current cell, e.g. **=TODAY()**

One very useful function (addition) is also available by using the **AutoSum** button.

Select a cell to contain the total (i.e. at the bottom of the cells you are adding) and click the **AutoSum** button (Σ). The computer will select a range of cells to be added.

The selection will be shown enclosed in dotted lines. You can alter this selection by dragging with the mouse. Press **Enter** to complete the function action.

In *Excel* the **AutoSum** button gives quick access to a menu of basic functions when the little down-arrow on this button is clicked. The options are: **Sum**, **Average**, **Count**, **Max** and **Min**. Selecting **More Functions** opens the **Insert Function** window.



12. Cell Reference

As explained above, one cell may hold a formula, which performs a calculation on data contained in one or more other cells. The same calculation can be performed repeatedly, on different sets of data. This can be done by copying and pasting the cell containing the formula for the calculation into other cells. *Excel* will automatically change the formula so that it will refer to the appropriate data. So if, for instance, you entered a formula to multiply the figures in cells **A1** and **B1** together, you could then do the same to the figures in the cells directly below by copying and pasting the formula.

	A	B	C	D
1	5.4	1.5		8.1
2	4.8	1.75		8.4
3	4.2	2		8.4
4				

=A1*B1

=A2*B2

=A3*B3

Thus the formula in cell **D1** (above) will multiply the number in cell **A1** by the number in **B1**. If any of these numbers change, the result in cell **D1** will also change. When the formula in

D1 is copied into cells **D2** and **D3**, the formula in each cell will be changed to refer to cells on the same column as in the original formula but on different rows, depending on the cells copied to.

This situation is known as **Relative Referencing**, as cells referenced by the formula change in relation to their position in a column or row. You must make sure that all the **rows** (or **columns**) are arranged in a similar way. Each copy of the formula will automatically change its cell reference so that it refers to and uses the appropriate data.

However, the situation often arises when a specific piece of data used in a calculation must always remain the same. For instance if you needed the same **constant** to be used by several formulae – such as a **VAT** rate. The rate could be entered in a cell, which could then be referenced by the formulae that needed to make use of the rate. (The advantage of doing this is that if you want to change the VAT rate later, you need only change one cell and all the formulae will reflect this change).

To ensure that the same cell is referenced by all the formulae, which require it, a dollar sign (\$) is placed in front of both the row and column references in the formulae which reference the cell containing the necessary data. This means that no matter what cell the formula is placed or copied into, it will always reference the same cell for the data.

	A	B	C	D
1	Price	Numbers	Total	Total (Pus VAT)
2	4.6	18	82.8	93.15
3	12.5	4	50	56.25
4	19.5	12	234	263.25
5				
6	VAT	12.5		

=C2+(C2/100*\$B\$6)

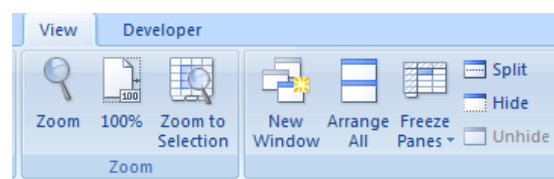
=C3+(C3/100*\$B\$6)

=C4+(C4/100*\$B\$6)

Thus you would make use of the data in cell **B6** by using the reference **\$B\$6**, to ensure that the same data was always used. This is known as **Absolute Referencing**. If the dollar sign is placed before a row reference number, but not a column reference letter, or vice-versa, then the absolute referencing only limits the reference to a specific row or column and not to a specific cell.

13. Freezing Panes

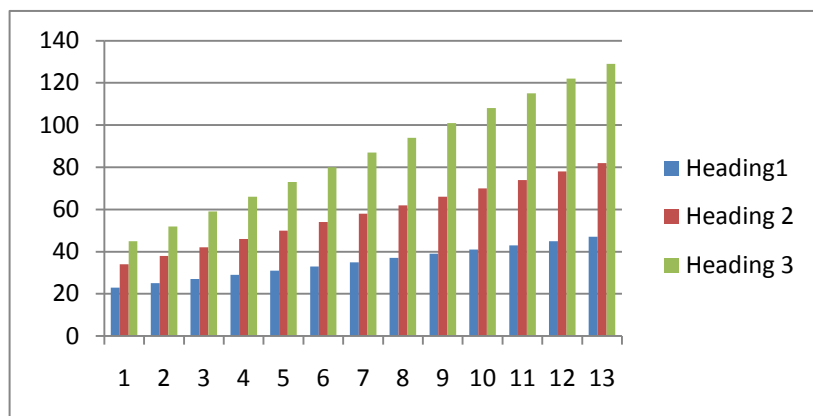
If you are scrolling through a list of data arranged in columns or rows, it is easy to lose track of what data in any particular cell refers to.



A solution to this problem is to **freeze** the cells in the row or column containing the headings. When this is done, the headings will remain static while the data scrolls past them; this way you will always see what headings refer to any data. To freeze panes, first select the row or column just after the line containing the headings, then select **Freeze Panes** from the **Window** group on the **View** tab.

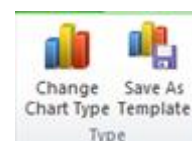
14. Charts

Basics: Charts enable you to show data in a graphic format. A chart can be created on a worksheet so that it appears alongside the data it represents, or as a separate worksheet. To create a chart using a keyboard shortcut, select the data to be charted and press **F11**. Creating a chart this way adds a new worksheet to the workbook called **Chart 1**.



The chart that is produced uses all the current defaults. If you haven't changed any of the default settings, the chart you will get by pressing **F11** is a **Column Cluster Chart**.

If this isn't the type of chart you want to produce then you need to change the default chart type. To do this, click the **Change Chart Type** button. (When you press **F11**, the new sheet containing the chart opens with **Chart Tools** active – as they are whenever you select a chart).



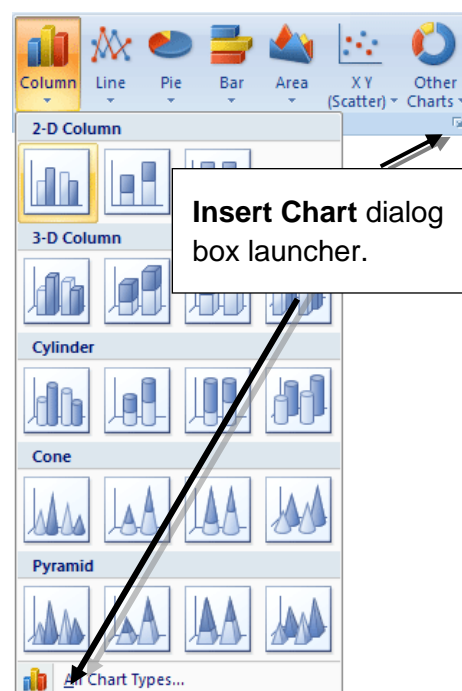
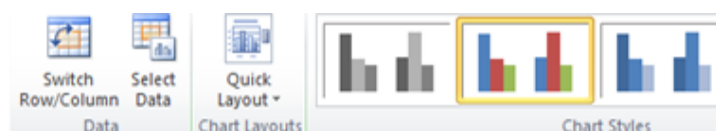
More on Charts

There are two other methods of creating charts, giving immediate access to a range of different chart types.

Select the data to be charted, including row or column headings to be used as labels, and then access the **Charts** group under the **Insert** tab.

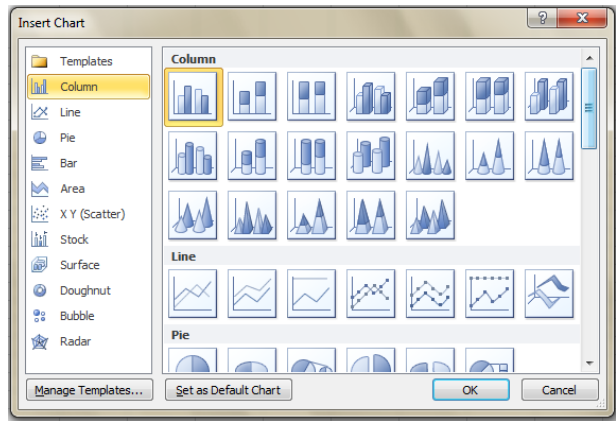
When you have made your selection of the chart options (selecting first general chart type, then subtype from the chosen menu), the chart automatically appears in the same worksheet as the selected data.

At the same time new chart options appear on the Ribbon.



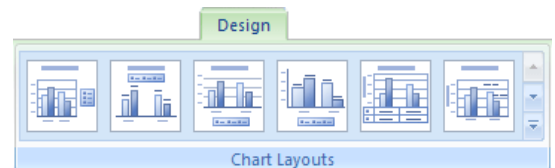
These options affect the way your charts will appear – so you should choose carefully as good choices will make it easier for others to understand what your chart represents.

If you prefer the more traditional style of chart selection, use the **Insert Chart** dialog box. **Note:** unlike the earlier version this dialog box does not allow you to format the layout of charts you choose nor add labels, legends or gridlines. However **Chart Tools** has options that allow you to do this (see below).

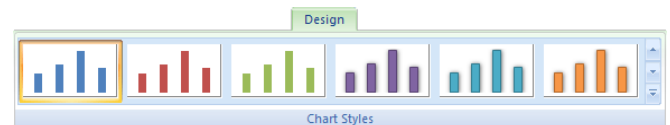


All the different chart types (e.g. **Bar**, **Pie**, **Column**, **Scatter**, etc.) available on the Ribbon are seen in the left-hand pane with the sub-types in the main pane accessible for selection.

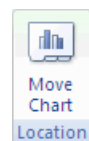
The **Chart Layouts** option (under the **Design** tab) allows you to choose different chart designs, for instance, below you see one which displays the data in a table below the chart.



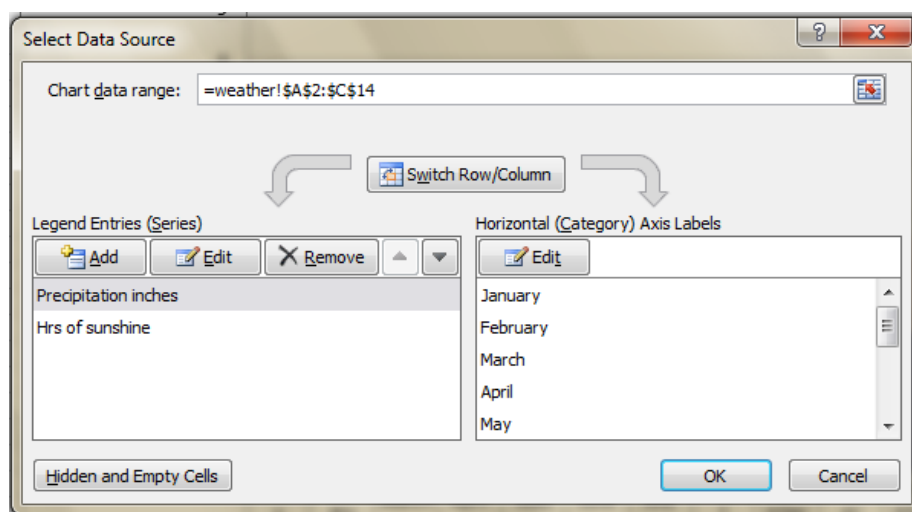
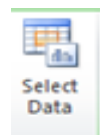
The **Chart Styles** option under the **Design** tab lets you to choose from a variety of colour styles.



Clicking once on a chart selects it and places sizing handles around it so that you can change its location or size on the screen, or delete it if you wish to replace it. You can also move a chart to a separate worksheet via the **Move Chart** button.



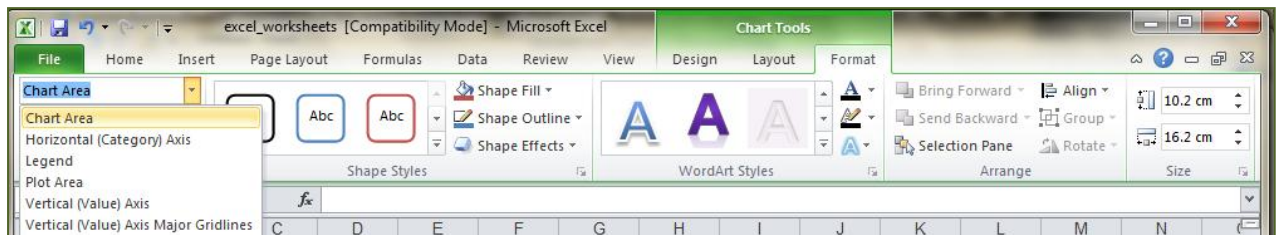
To add extra data to a chart – or change the data completely –select the chart and then click the **Select Data** button in the **Data** group. This can be useful – e.g. if you create a chart one year, when new data is added for the following year you can select it (using **Ctrl** key if necessary) to show a comparison for the two years.



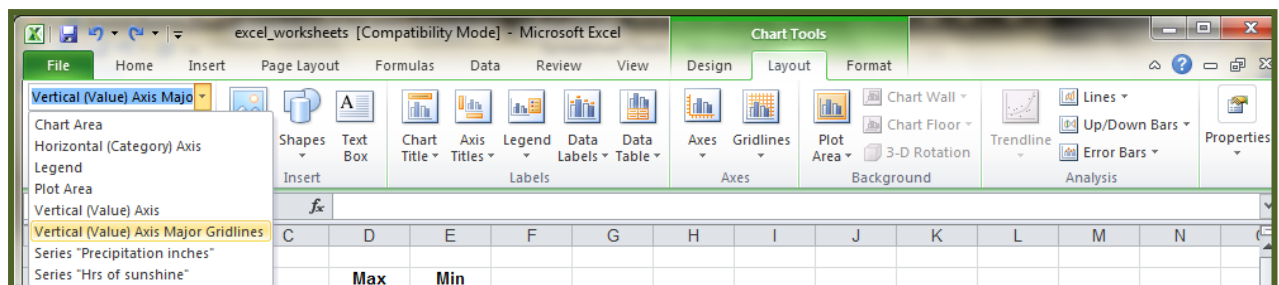
The **Select Data Source** dialog box opens, which displays your selections. You can make a selection by typing in the cell references the **Chart data range** box or by dragging over the data with the mouse.

Chart Layout and Format

You will often want to edit the chart format and layout (e.g. grid lines, data labels) and change the format. Of these the **Layout** is most important as it is this which (used properly) ensures your chart can be understood and interpreted correctly.



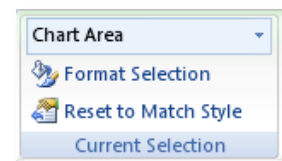
Format is an extension of the style option: you can change the shape, size colouring and text style within the chart area as well as adding various effects. You must be careful how you use this – too much unnecessary formatting can make a chart difficult to read (and therefore interpret).



The **Layout** tab allows you to edit titles, legends, labels; to add axes and gridlines. **Note:** to get the best out of these you'll generally need to enlarge the chart. When doing so make sure you keep the chart ratios constant so the data representation doesn't get distorted. If you want to make sure you get this right, simply move the chart to its own worksheet where it will be automatically enlarged in the correct ratios.

Take note: A Pie chart fits onto any page layout whether **Portrait** or **Landscape**, whereas most other formats are best printed in **Landscape** view.

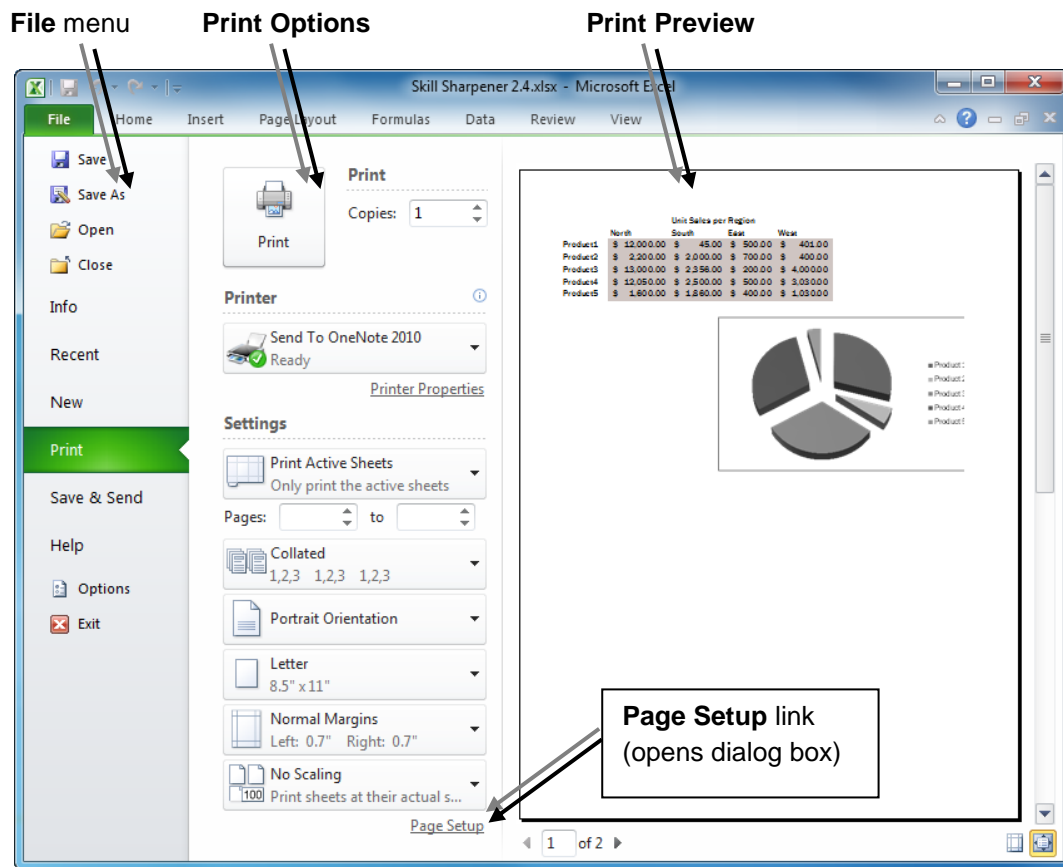
To adjust gridlines choose the **Format** tab in **Chart Tools** then select your axis from the **Chart Area** menu in the **Current Selection** group. Then, click **Format Selection**. Under **Axis Options** click **Fixed** and then type a different number in the **Major unit** or **Minor unit** box.



Note: Printing follows on the next page.

15. Printing

Before printing a worksheet, it is important to check how it looks. This can be done using the **Print** command under the **File** tab.

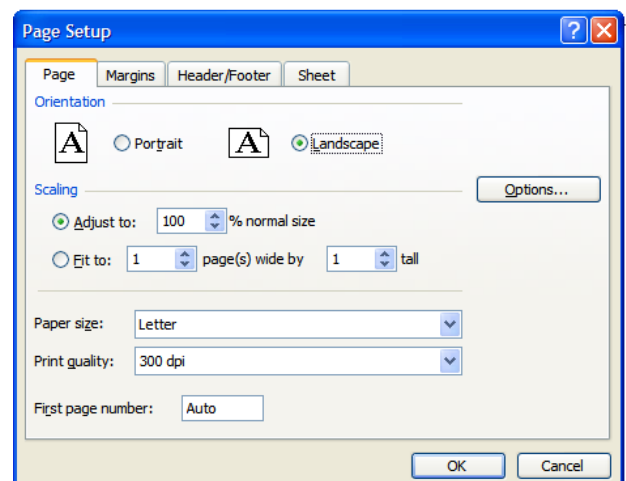


The **Preview** will indicate the number of pages at the bottom left-hand corner of the preview pane. The *orientation* of the paper can be set to *landscape* or *portrait*.

You should familiarise yourself with the various layout options, such as page fit and margins which can be accessed by clicking the **Page Setup** link which opens a dialog box.

Tabs let you select printing options:

- The default, **Page** option, allows you to select orientation, and adjust the fit of the worksheet so it will fit into a page.
- The **Margins** option allows you to adjust the margins on the worksheet.
- The **Header/Footer** option displays a window in which you can type a header and/or footer, which will be printed out on your spreadsheet.
- Click the **Custom Header** or **Custom Footer** button to add text or select options like date/page numbering.
- The **Sheet** option allows you to hide/display the gridlines or column and row headings, or *change the order in which pages will be printed*.



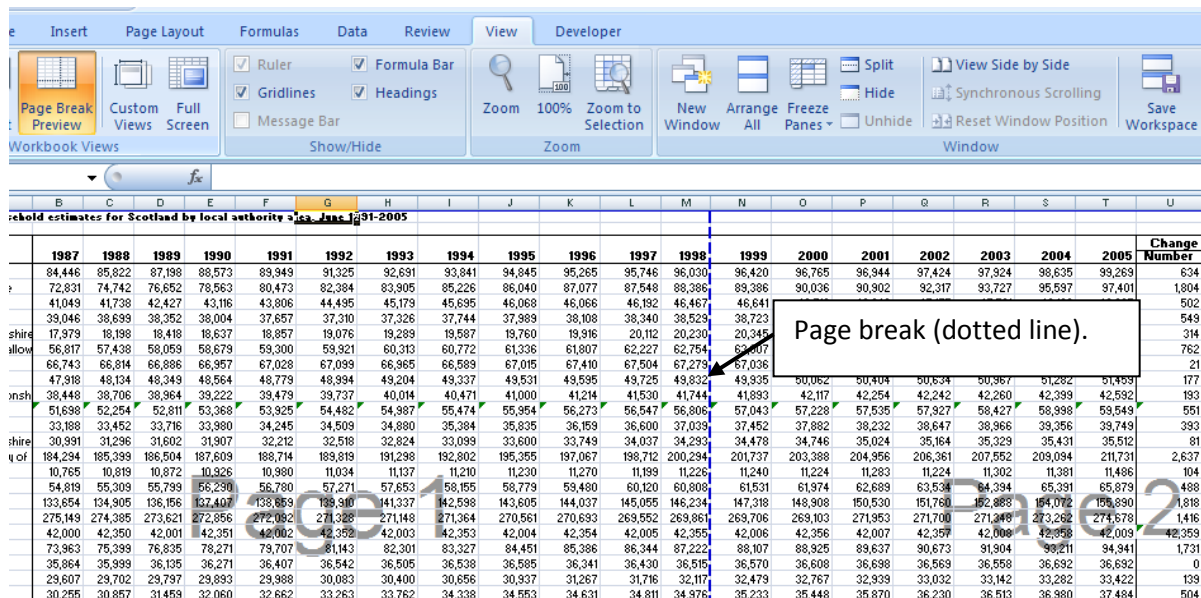
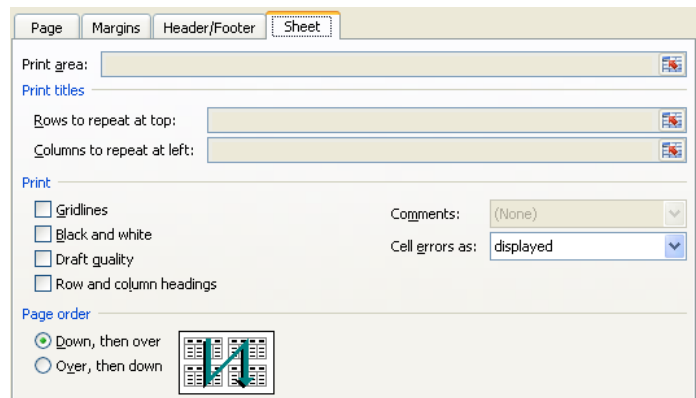
You should spend some time exploring the possibilities for yourself.

If a spreadsheet is too wide to fit across one sheet of **A4** paper in **Portrait** orientation, the **Landscape** option can be selected. The **Scaling** options under the **Page** tab of **Page Setup** can be used to decrease or increase the scale so that more or less data fits on a page.

Page Break

Sometimes scaling can't give a good fit without compromising readability and you'll need to print data over several pages. **Note:** if your data extends over several pages breaks will automatically be added. This won't always be where you'd prefer it however.

In **Page Break Preview** (under the **View** tab) you can adjust page breaks to get a better division of the data. You can move a page break by dragging it with the mouse.



You can even divide your worksheet up into smaller sections by inserting new page breaks. You do this by selecting the row or column below/right of where you want to insert the break then click **Breaks** in the **Page Setup** group, on the **Page Layout** tab.

You should move breaks/insert breaks to create logical divisions within the worksheet.