



Level 2

ICT

**Developing, Presenting and
Communicating Information**

Spreadsheets

Based on Microsoft Office 2010

At this Level 2 learners should be able to:

“Use appropriate software to meet the requirements of a complex data-handling task”

Functional Skills Standards 2011

Learning Objectives	“To be able to process and analyse numerical data”	FS	L2/7a
	“To be able to display numerical data in appropriate graphical format”	FS	L2/7b
	“To be able to use appropriate field names and data types to organise information”	FS	L2/7c
	“To be able to analyse and draw conclusions from a data set by searching, sorting and editing records”	FS	L2/7d

If you have to deal with lots of numbers and calculations, a **spreadsheet** program can be very useful to save you lots of time and effort and keep a record of the numerical data. Using **spreadsheets** allows you to:

- enter and edit text and numbers;
- use formulae to do calculations;
- alter the format of the figures;
- produce appropriate charts and graphs based on the data;
- analyse and draw conclusions from the data

The most widely used spreadsheet program is probably **Microsoft Excel**. This is the program we used for the examples in this section. If you need to remind yourself of how to set up a spreadsheet and complete simple calculations using one, revisit Level 1 ForSkills ICT resources on spreadsheets.

Glossary of Spreadsheet Symbols

= (always precedes the calculation)	Calculate
+	Add
-	Subtract
*	Multiply
/	Divide
Σ	Sum
#	Error
\$	Absolute cell reference

Learning Objectives

“To be able to process and analyse numerical data”

FS

L2/7a

Calculations

All spreadsheets follow the mathematical rule of **BODMAS**. This is the order in which any mathematical calculations are made.

This rule ensures that any numbers in brackets are calculated first before division, multiplication, addition and finally subtraction calculations are made.

- Brackets
- Divide
- Multiply
- Add
- Subtract

Example

$c7*(b7+b8)$ would add 10 and 18 and then multiply by £19.99

$c7*b7+b8$ would multiply 10 by 19.99 and then add 18

	A	B	C
4			
5			
6	Size	Number s	Price
7	10	10	19.99
8	12	18	19.99
9	14	24	19.99
10	16	20	19.99
11	18	8	19.99
12			
13			

In this case, forgetting to use the brackets would have made nonsense of the whole procedure. You clearly wanted to find out the total sales value of sizes 10 and 12 – i.e. £559.72 - whereas, if you had forgotten to put in the brackets, you would have ended up with a total of 217.9 – and a meaningless calculation!

Activity

Calculating Using Spreadsheets

- Open a new spread sheet;
- Use it to work out the following calculations;
- Save it to your documents, titled Farm Park;
- Print a copy of the completed spreadsheet for your tutor.

Study the following data from The Black Sheep Farm Park and then use the spreadsheet to calculate:

1. The total takings for each day;
2. The total takings for the week;
3. The percentage of weekly takings from concessionary tickets;
4. The total sales from admission sales;
5. The difference in sales between the most popular day and the least popular day.

Day	Adults	Concessions	Bags of Animal Feed
Monday	Closed		
Tuesday	98	109	30
Wednesday	76	87	19
Thursday	101	120	45
Friday	87	103	21
Saturday	209	404	100
Sunday	199	240	69
Adult tickets	£9.75		
Children and OAPs	£8.25		
Bag of animal feed	£1.50		

Copying and Pasting Formula

This works in a very similar way to **Microsoft Word**; you are able to copy and paste cells in **Excel**. Very cleverly, when you copy a formula from one cell to another it will automatically adjust so that it reflects its new position. This is known as a **relative reference**.

Example:

Open the spreadsheet you constructed on the Black Sheep Farm Park.

If all you were calculating was the number of purchases made each day, then you would use the formula =SUMd4+d5+d6 for Tuesday. If you copied that formula from d7 to e7 to find out the totals for Wednesday, the program will automatically add up all of the numbers in the cells e4, e5 and e6 altering the formula to =SUMe4+e5+e6.

However, what you need to do is use the same information from column b (i.e. the price) to multiply each day's numbers in order to work out the takings for each category.

- i.e. the numbers for the adult tickets all need to be multiplied by 9.75 (the value in b4);
- the numbers for the concessionary tickets all need to be multiplied by 8.25 (the value in b5);
- the numbers for the animal feed all need to be multiplied by 1.5 (the value in b6);

b4, b5, and b6 therefore need to be absolute cell references i.e. they need to remain constant each day.

To create an **absolute cell reference** within a formula, add the \$ sign to the cell reference. One \$ sign in front of the column letter and another \$ sign in front of the row number e.g. **\$B\$1**.

So Tuesday's takings were calculated by using this formula:

$$=(d4*b4)+(d5*b5)+(d6*b6)$$

However, to copy it to the other days we need to make the references in column b **absolute**. This will make the formula look like this:

$$=(d4*b4)+(d5*b5)+(d6*b6)$$

	A	B	C	D	E	F	G	H	I
1	Farm Park Takings								
2									
3	Item	Price	Mon	Tues	Wed	Thurs	Fri	Sat	Sunday
4	Adult tickets	9.75	0	98	76	101	87	209	199
5	Concessionary Tickets	8.25	0	109	87	120	103	404	240
6	Animal feed	1.5	0	30	19	45	21	100	69

Understanding this process will save you lots of time when faced with a task similar to this one.

Open another sheet on your spreadsheet. Enter only Tuesday's data initially and then try your new skill to calculate the figures for the rest of the week. Was it much quicker?

Making Adjustments to Spreadsheets

1. Inserting rows and columns

When you using spreadsheets on a regular basis to help organise your data, you may often need to add a row or column to keep your records up-to-date.

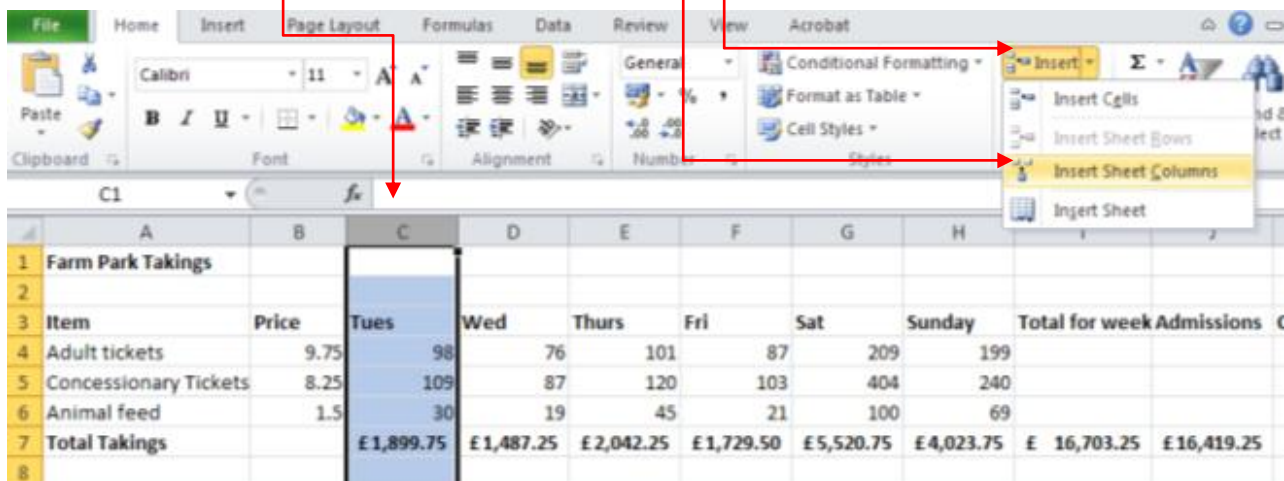
Columns are always inserted to the **left**.

Rows are always inserted **above**.

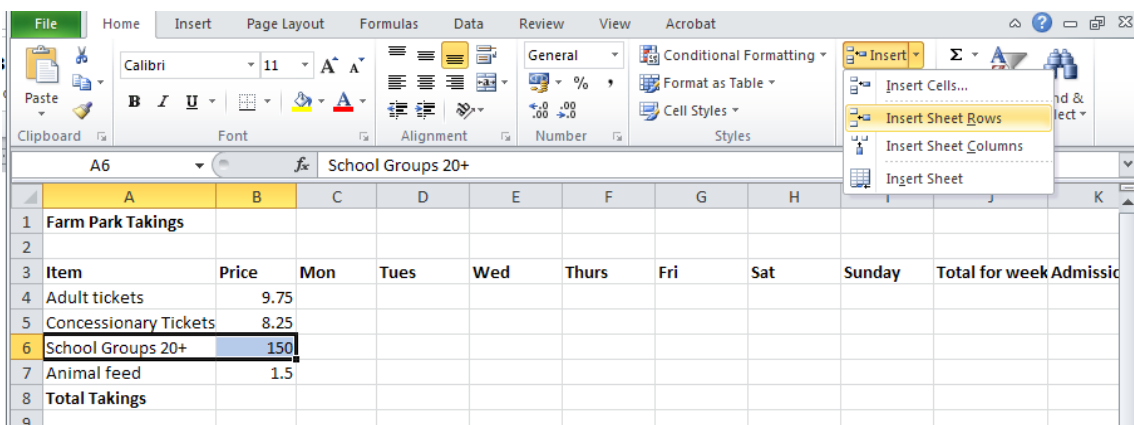
Examples

It has been decided to start opening the Farm Park on Mondays, so to add a column to this spreadsheet, a column to the left of Tuesday will need to be added. To do this:

- Highlight Column C by clicking in the heading bar;
- Select the **'Insert'** button;
- Select **'Insert Sheet Columns'**



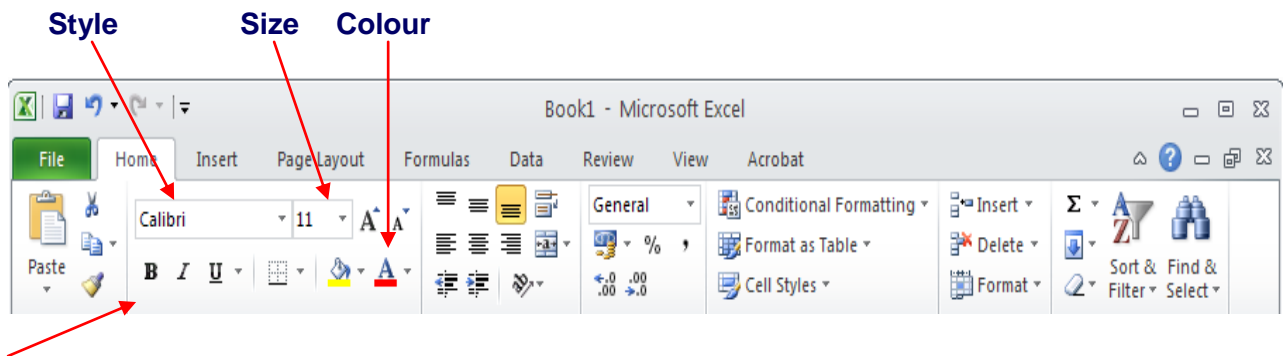
You will see that everything else has simply been 'moved up' a column – Tuesday has become Column D, Wednesday Column E etc



The Farm Park has also decided to add a new pricing category. This has been done by selecting the row below – in this case Animal feed – and then selecting **'Insert'** and **'Insert Sheet Rows'**

2. Formatting Text

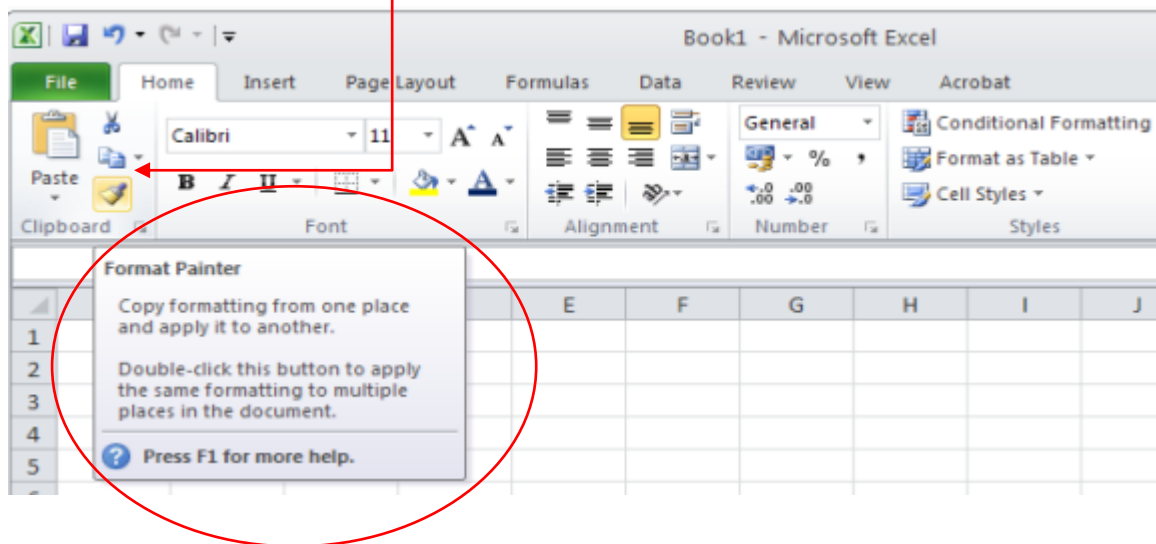
You will have noticed that the toolbar on Microsoft Excel is very similar to Microsoft Word and that means that changing the size, colour, style and format of the text you use on a spreadsheet created in this program is done in exactly the same way as in Microsoft Word.



Formatting **B** = bold
 I = italic
 U = underline

Adjusting the font can be a useful way of highlighting important information and presenting your data in a more professional, attractive manner.

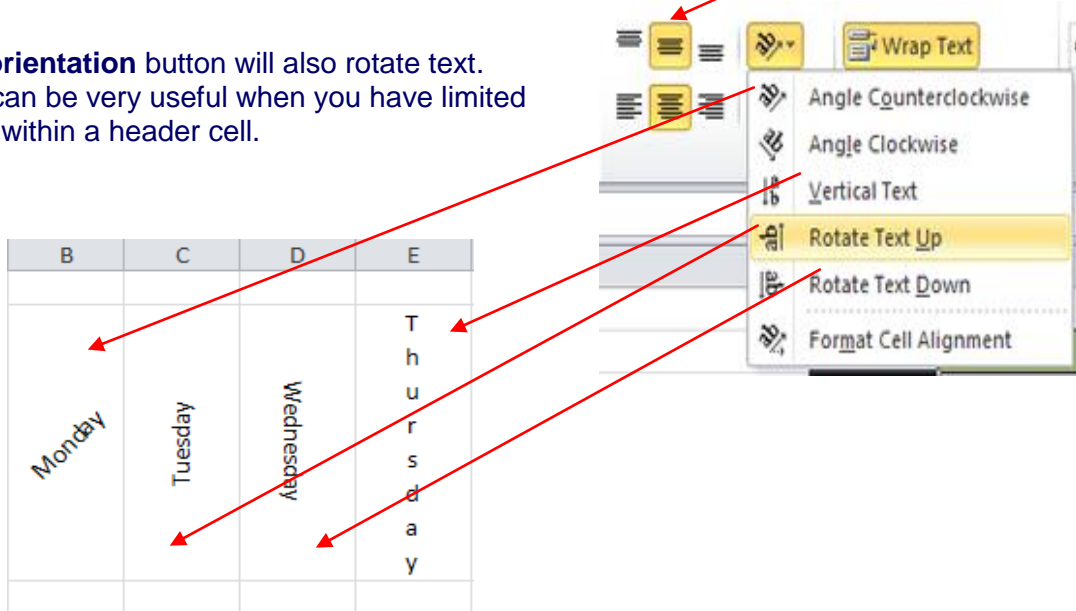
Once you have formatted a particular cell using whichever of these tools is most appropriate to your task, you may copy the formatting to other cells by using the Format Painter.



3. Aligning Text

Similarly you may align text within a cell in the same way you can **align text** within the cells of a table in **Word**.

The **orientation** button will also rotate text. This can be very useful when you have limited room within a header cell.



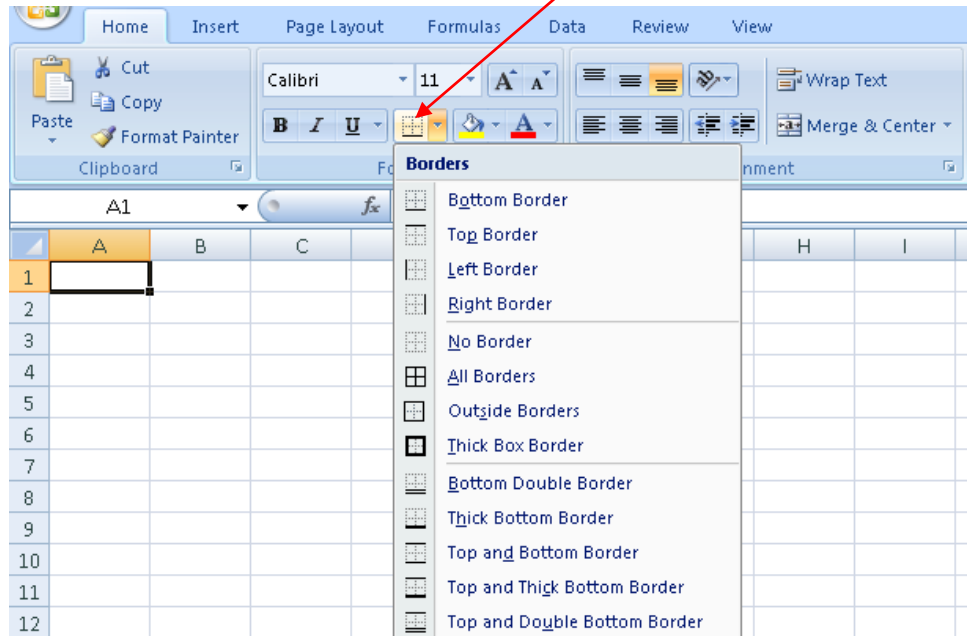
4. Creating Borders and Shading

To make your spreadsheets more attractive, it is also possible to add colour or border lines to the headers or to specific cells.

Highlight the row you wish to add colour to, in this case row 3, and choose the appropriate colour from the font icon. Similarly, add colour to your chosen column – in this case column F

	A	B	C	D	E
1	M Squared Ltd Staff hours April 2012				
2					
3	Name	Week 1	Week 2	Week 3	Week 4
4	James	42	39	39	39
5	Harry	45	40	39	40
6	Raj	36	40	36	36
7	Magda	32	39	32	32
8	Carolina	34	32	34	32
9	Stefan	29	21	29	24
10	Naomi	12	12	12	12
11	TOTAL				
12					

To add appropriate borders, select the specific area you wish to add borders to, followed by the appropriate borders from the drop down list on **Borders** in the 'Font' section



5. Formatting Numbers

When initially entering values into cells on a spreadsheet, they will appear as plain digits. However, to facilitate ease of understanding and interpretation you may need to **format** the numerical information entered.

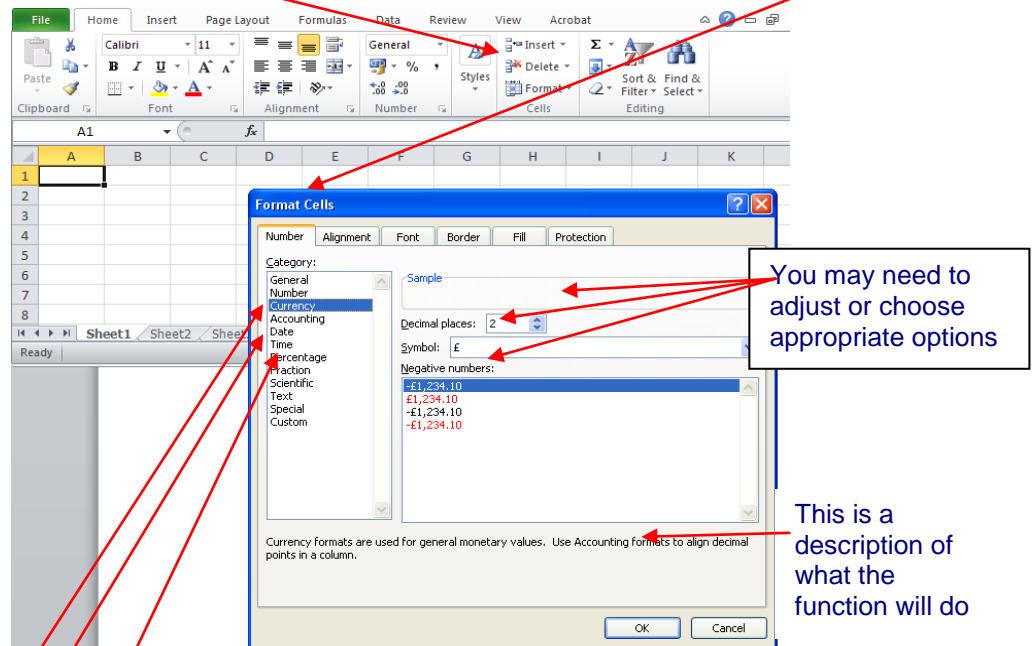
Examples: currency, date, time, percentages, fractions etc.

Activity

Formatting Numbers

Investigate how you can change currency, or enter times and dates by:

- Opening a new sheet
- Enter the data from the table below;
- Select '**Format**' and then '**Format Cells**' to see a window from which you select the **Number** tab;



- Use to the currency button to change the numbers to currency;
- Use to the date button to change the numbers to dates;
- Use to the time button to change the numbers to hours.

Enter the following numerical data onto a spreadsheet, format the numbers appropriately and work out the wages due to each person for each week.

Name	Rate per hour	W/E 13.01.12		W/E 20.01.12		W/E 27.01.12		W/E 03.02.12	
		No of hours	Pay	No of hours	Pay	No of hours	Pay	No of hours	Pay
S. Brown	6.95	6.5		8.25		10		9	
P. Black	6.95	12.5		13.75		14		14	
F. Smith	7.20	30		35		32		33	
H Thomson	9.20	36		36		36		36	
S.Legg	10.20	38.5		38.5		36		40	

Save the sheet in '**My Documents**' titled **Monthly Wages**.

Print a copy for your tutor.

Displaying and Printing Formulae

If you enter a formula into a cell, the result will be displayed within that cell. However, sometimes it may be useful to see the formula rather than the result e.g. when checking for errors.

To do this:

- Select **'Formulas'** tab;
- Select **'Show Formulas'**.

or

- Press **<Ctrl>**.

To print:

- Select **'Page Layout'** tab;
- Select **'Print'** from **'Sheet Options'** section;
- Return to main view using shortcut **<Ctrl>**.

Inserting Functions

Functions are time-saving shortcuts which are available in Excel which create formulae to calculate specific common calculations.

- Select **'Formulas'** tab;
- Select **'Insert Function'**;
- Select an appropriate **function** from the drop down list or type in the function you need;
- A description of what each function is used for will appear as you select the function

Example

The screenshot shows the Microsoft Excel interface with the **Formulas** tab selected. The **Insert Function** dialog box is open, displaying a search for the function 'average'. The function **AVERAGE** is selected in the list, and its description is shown: **AVERAGE(number1,number2,...)** Returns the average (arithmetic mean) of its arguments, which can be numbers or names, arrays, or references that contain numbers. Red arrows from the list above point to the 'Formulas' tab, the 'Insert Function' button, the search box, the selected function, and the function description.

Common Functions

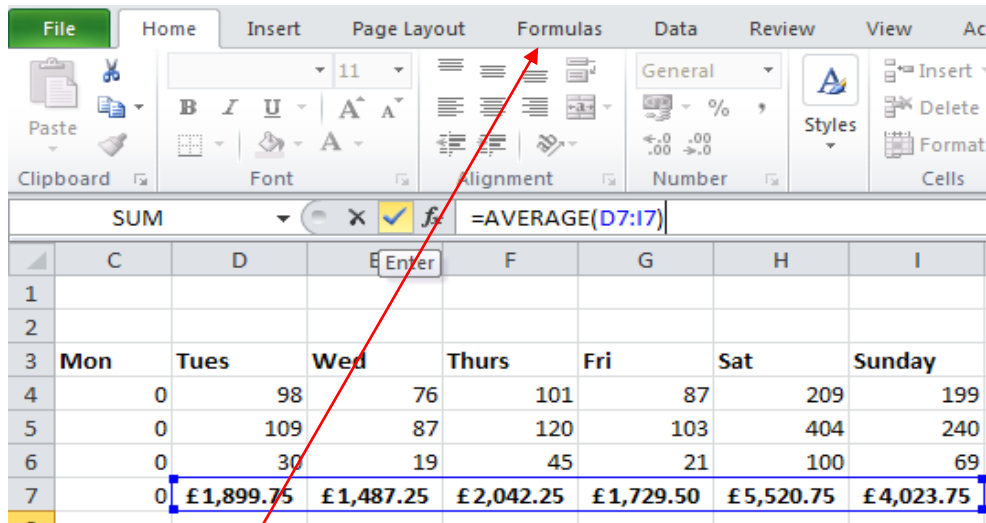
Average function

The **AVERAGE** function finds the average of the numbers in a cell range.

Example

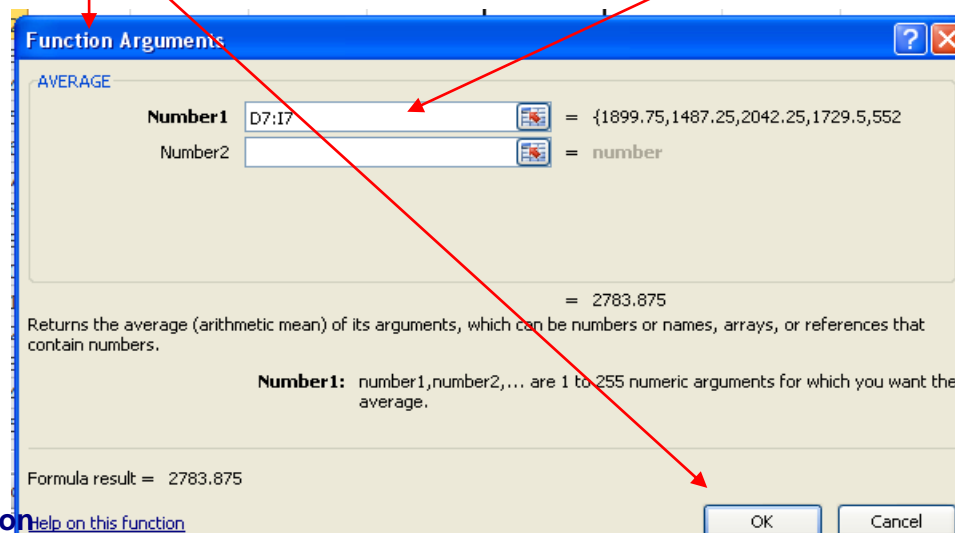
It can be typed directly into the cell. For example: **=AVERAGE(D7:I7)**

Select the **tick** or press the **Enter** key on the keyboard to accept the formula.



or

- Select the **Formulas** tab;
- Select '**Insert Function**'; (*fx*)
- Select **AVERAGE** from the drop down list;
- Select the OK button;
- When the **Function Arguments** dialogue box appears, check that the correct cell range is showing in the **Number 1** box. If not, type in the cell range you want to use.
- Click on the **OK** button and the **AVERAGE** function will be inserted into the cell.



MAX function [Help on this function](#)

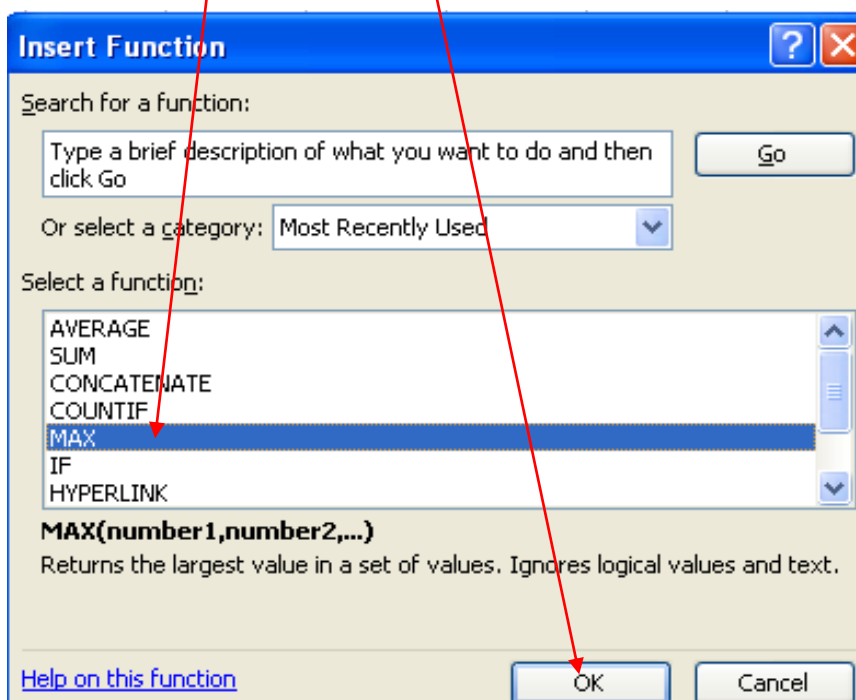
The MAX function finds the maximum or largest number in a specific cell range.

Example

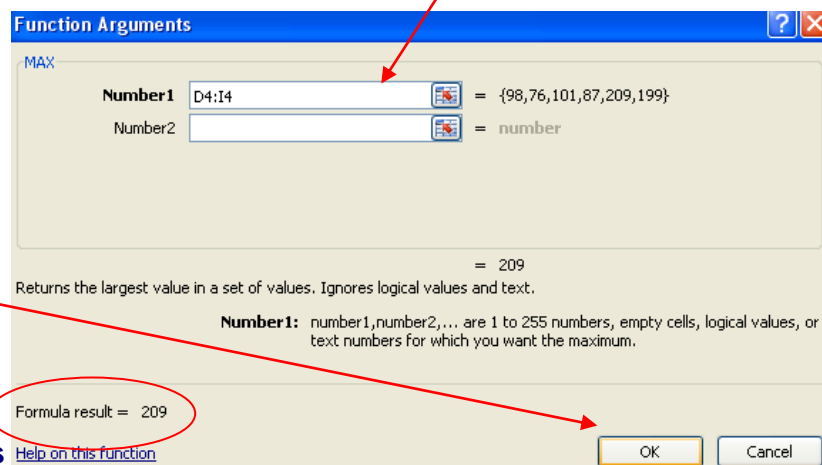
It can be typed directly into the cell. For example **=MAX(D4:I4)** – this will tell me the largest number of adult tickets sold. As before, you will need to **tick** the formula as accepted or select **Enter** before it will give you the answer.

or

- Select **Insert Function**, as before
- Select **MAX** and then **OK**



- Insert the correct range of cells



- Select **OK**

Answer also shows here
Other Common Functions

MIN function

The **MIN** function finds the minimum value or smallest numbers in a cell range.

This function works in a very similar way to MAX and AVERAGE.

The formula is **=MIN(A1:A10)** or whatever the relevant cell range is.

COUNT function

The **COUNT** function counts the number of cells that contain numbers in a specific cell range.

This function works in a very similar way to MAX and AVERAGE.

The formula is **=COUNT(A1:A10)** or whatever the relevant cell range is.

Activity

Using Formulae and Functions

- Open a new spreadsheet in Excel;
- Enter the following information about a sales company's monthly expenses;

Branch	Name	Wages	Motoring Expenses	Mobile Charges	Subsistence Expenses
Exeter	B. Babcock	£1 500	£400	£35	£200
	C. Ahmed	£1 500	£80	£35	£47
	K. Rowan	£1 500	£80	£35	£33
	S. Scott	£1 500	£100	£35	-
	J. Harper	£1 500	£1 000	£35	£400
	G. Platt	£1 500	£76	£35	-
Bournemouth	G. Lee	£1 500	£36	£35	-
	S. Hainey	£1 500	£550	£35	-
	J.Thompson	£1 500	£360	£35	£200
	P. West	£1 500	£76	£35	£47
	N. Storey	£1 500	£68	£35	£33
	M. Smith	£1 500	£80	£35	-
Reading	L. Linacre	£1 500	£96	£35	-
	R. Brown	£1 500	£674	£35	£320
	D. Davies	£1 500	£467	£35	-
	Y. Bray	£1 500	£66	£35	-
	M. Hayes	£1 500	£367	£35	--
	S.Rzepinski	£1 500	£367	£35	-
Derby	T. Statham	£1 500	£367	£35	-
	M. Homer	£1 500	£298	£35	-
	P. Hadley	£1 500	£490	£35	£50
	M. Parker	£1 500	£640	£35	£200
	N. Hamer	£1 500	£464	£35	£47
Peterborough	F. Tingle	£1 500	£45	£35	£33
	S. Owen	£1 500	£457	£35	-
	L. Boddy	£1 500	£34	£35	-
	S. Soni	£1 500	£332	£35	-
Stamford	P. Jani	£1 500	£280	£35	-
	P.Parker	£1 500	£65	£35	-
	S. Legg	£1 500	£555	£35	£46

- **Work out the following calculations;**
 1. What are the total expenses for each branch?
 2. What is the total for the company?
 3. How many employees are there in each branch/for the whole company?
 4. What is the average cost of motoring expenses over the whole company/
 5. Which branch has the lowest average of expenses per head **not** counting wages?
- **Save the spreadsheet;**
- **Print the spreadsheet for your tutor.**

Learning Objective

“To be able to display numerical data in appropriate graphical format”

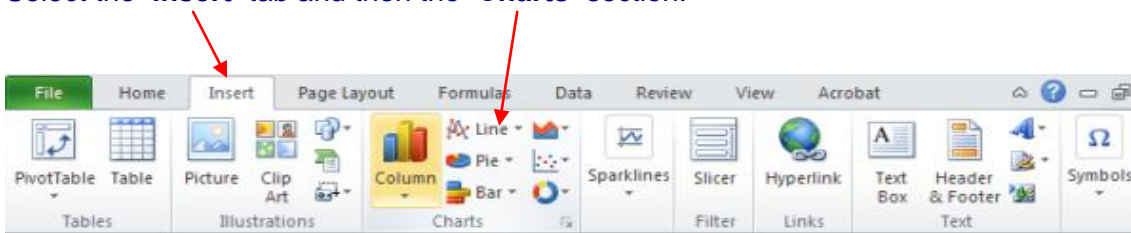
FS

L2/7b

Numerical information is sometimes more usefully presented using charts and graphs to aid ease of reading. You must decide whether the information you are presenting is most appropriately and efficiently presented using a pie chart, bar chart, single line graph, scatter graph etc.

Once you have made that decision, your data can easily be converted into appropriate graphical format using Excel.

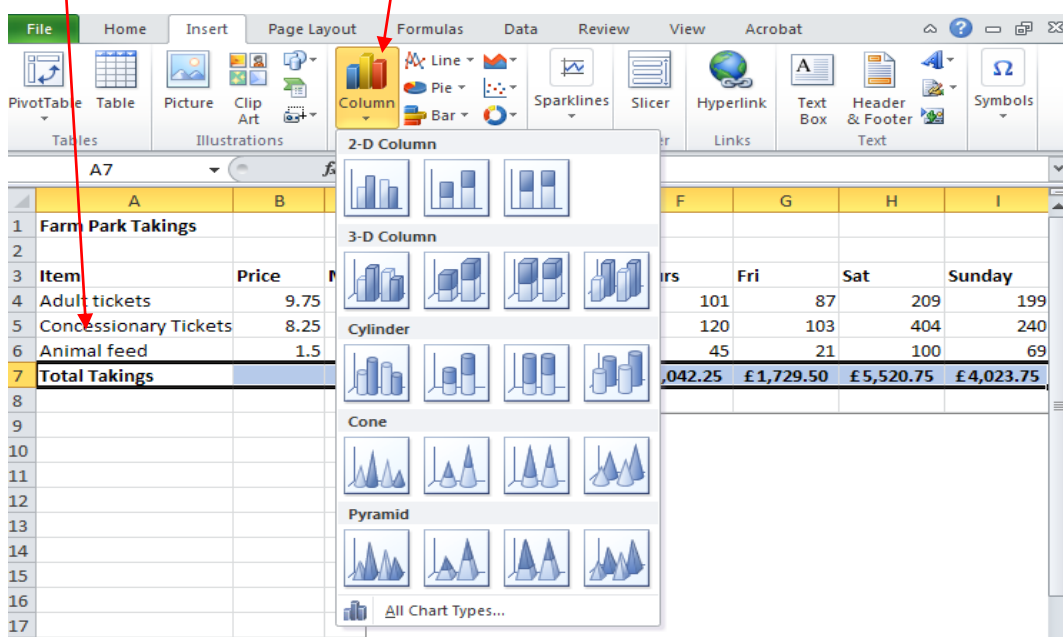
Select the **‘Insert’** tab and then the **‘Charts’** section.



You will then be faced with several choices: Column, Line, Pie, Bar, Area, Scatter, Doughnut etc. Within these choices there are also several design options.

Example

If you wanted to see how the total takings could be displayed in a column chart, you need to highlight the **Total Takings** row, and then select **Column**. You will then be faced with several different design options. Whichever kind of chart you select, you will be faced with several different design options. Simply select the one you wish to use. Experiment with several to see which is most appropriate for the task.



Now try the activity on the next screen.

Activity

Displaying Numerical Data in Graphical Format

- Open the spreadsheet '**Farm Park**' that you created earlier and saved;
- Investigate how **Excel** displays this information in chart format using all the different options;
- Note how **Excel** will automatically use any details from the original text to create legends and/or titles for the various charts;
- Simply by selecting a different option from the choice of charts, **Excel** will convert the chart and the data into a different graphic;
- Decide which option you think displays this data most efficiently and effectively;
- You may reposition elements within a chart manually by dragging and dropping – experiment with this option;
- You may adjust the colours and graphic designs if you wish;
- Check the axis titles, legends and data labels. Do you wish to alter or amend them? You may add, edit or remove any of these labels by following the on screen instructions;
- Now select the '**Move Chart**' button on the '**Design**' tab and move the chart to Sheet 2 on your spreadsheet;
- Save your work;
- Print Sheet 2 for your tutor.

You may copy and paste this chart into other applications like '**Word**' or '**PowerPoint**'.

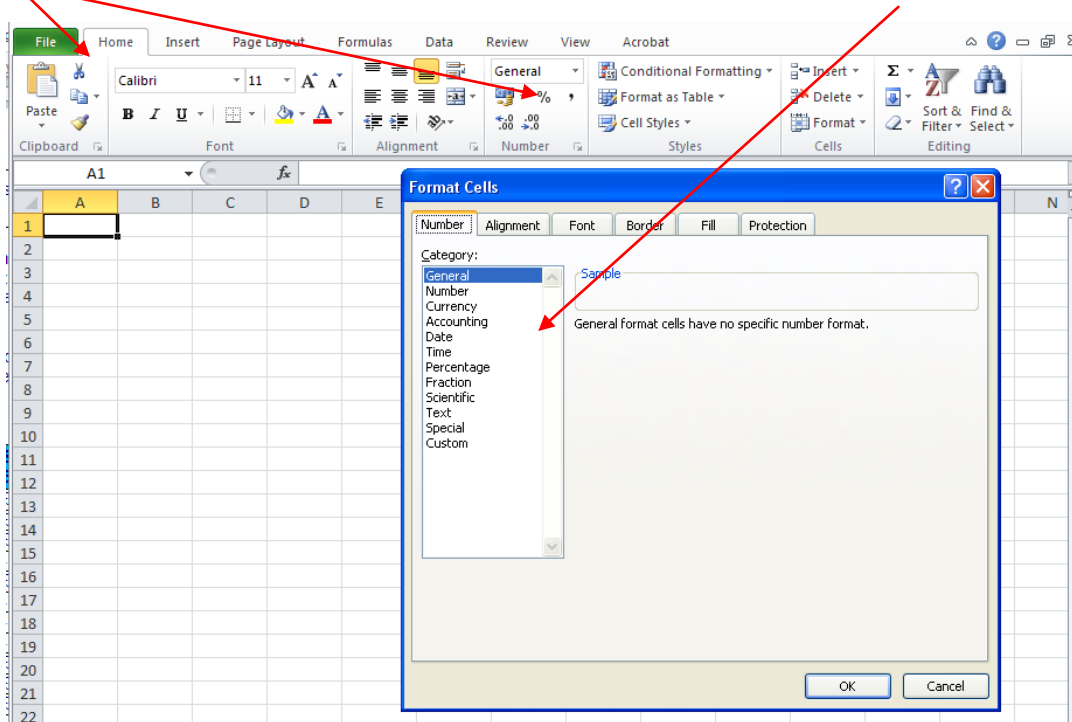
Learning Objective	“To be able to use appropriate field names and data types to organise information”	FS L2/7c
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It is essential, when creating either data bases or spreadsheets, to ensure that **field names** are given meaningful titles. Be specific in your labelling. So, for example, if you look back at the last task on Page 16, where you were given information in a table, you will notice that the table has titles which label each column and each row (the text in coloured cells).

When you converted this table to a spreadsheet, you would need to make sure the cells in your spreadsheet also contained these field names in order for the data to actually mean anything tangible. Just labelling them A, B, C, D and the areas Area 1, 2 etc would not be meaningful and make nonsense of the whole data.

Branch	Name	Wages	Motoring Expenses	Mobile Charges	Subsistence Expenses
Exeter	B. Babcock	£1 500	£400	£35	£200
	C. Ahmed	£1 500	£80	£35	£47
	K. Rowan	£1 500	£80	£35	£33
	S. Scott	£1 500	£100	£35	-
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	P. West	£1 500	£76	£35	£47
	N. Storey	£1 500	£68	£35	£33
	M. Smith	£1 500	£80	£35	-

Similarly, ensure that you specify the **data type** for each row or column by formatting them from the **General** section on the **Home** tab and then choosing the appropriate **data type**.



By doing this, the program will prevent you making simple errors like adding the wrong columns. For example, here, where the learner had meant to add currency amounts in column D and E but had erroneously typed in C and D, the program produced an error message since a date (in column C) cannot be added to an amount of money (in column D).

