

**LEARNER GUIDE**

**67465 National Certificate:  
Business Administration  
Services  
Level 3**

**Module 8 IT**

Unit Standard 7567 NQF Level: 3 Credits: 5  
Produce and use spreadsheets for business

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## PERSONAL INFORMATION

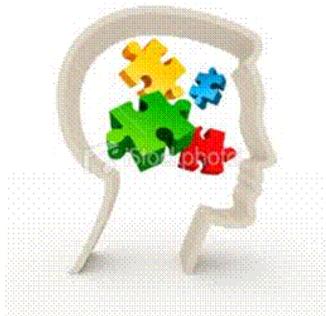
<b><i>NAME</i></b>	
<b><i>CONTACT ADDRESS</i></b>	
<b><i>Code</i></b>	
<b><i>Telephone (H)</i></b>	
<b><i>Telephone (W)</i></b>	
<b><i>Cellular</i></b>	
<b><i>Learner Number</i></b>	
<b><i>Identity Number</i></b>	

<b><i>EMPLOYER</i></b>	
<b><i>EMPLOYER CONTACT ADDRESS</i></b>	
<b><i>Code</i></b>	
<b><i>Supervisor Name</i></b>	
<b><i>Supervisor Contact Address</i></b>	
<b><i>Code</i></b>	
<b><i>Telephone (H)</i></b>	
<b><i>Telephone (W)</i></b>	
<b><i>Cellular</i></b>	

# INTRODUCTION

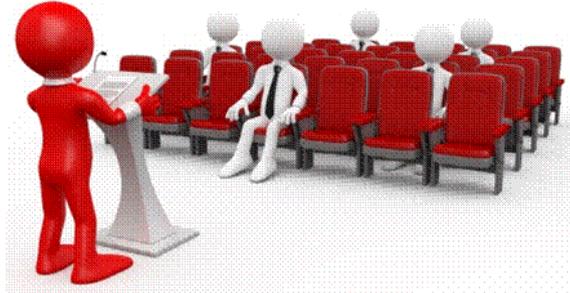
## ***Welcome to the learning programme***

Follow along in the guide as the training practitioner takes you through the material. Make notes and sketches that will help you to understand and remember what you have learnt. Take notes and share information with your colleagues. Important and relevant information and skills are transferred by sharing!



This learning programme is divided into sections. Each section is preceded by a description of the required outcomes and assessment criteria as contained in the unit standards specified by the South African Qualifications Authority. These descriptions will define what you have to know and be able to do in order to be awarded the credits attached to this learning programme. These credits are regarded as building blocks towards achieving a National Qualification upon successful assessment and can never be taken away from you!

## ***Programme methodology***



The programme methodology includes facilitator presentations, readings, individual activities, group discussions and skill application exercises.

Know what you want to get out of the programme from the beginning and start applying your new skills immediately. Participate as much as possible so that the learning will be interactive and stimulating.

The following principles were applied in designing the course:

- ✓ Because the course is designed to maximise interactive learning, you are encouraged and required to participate fully during the group exercises
- ✓ As a learner you will be presented with numerous problems and will be required to fully apply your mind to finding solutions to problems before being presented with the course presenter's solutions to the problems
- ✓ Through participation and interaction the learners can learn as much from each other as they do from the course presenter
- ✓ Although learners attending the course may have varied degrees of experience in the subject matter, the course is designed to ensure that all delegates complete the course with the same level of understanding
- ✓ Because reflection forms an important component of adult learning, some learning resources will be followed by a self-assessment which is designed so that the learner will reflect on the material just completed.

This approach to course construction will ensure that learners first apply their minds to finding solutions to problems before the answers are provided, which will then maximise the learning process which is further strengthened by reflecting on the material covered by means of the self-assessments.

### ***Different role players in delivery process***

- ✓ Learner
- ✓ Facilitator
- ✓ Assessor
- ✓ Moderator

## What Learning Material you should have

This learning material has also been designed to provide the learner with a comprehensive reference guide.

It is important that you take responsibility for your own learning process; this includes taking care of your learner material. You should at all times have the following material with you:

<p><b>Learner Guide</b></p> 	<p><b><i>This learner guide is your valuable possession:</i></b></p> <p>This is your textbook and reference material, which provides you with all the information you will require to meet the exit level outcomes.</p> <p>During contact sessions, your facilitator will use this guide and will facilitate the learning process. During contact sessions a variety of activities will assist you to gain knowledge and skills.</p> <p>Follow along in the guide as the training practitioner takes you through the material. Make notes and sketches that will help you to understand and remember what you have learnt. Take and share information with your colleagues. Important and relevant information and skills are transferred by sharing!</p> <p>This learning programme is divided into sections. Each section is preceded by a description of the required outcomes and assessment criteria as contained in the unit standards specified by the South African Qualifications Authority. These descriptions will define what you have to know and be able to do in order to be awarded the credits attached to this learning programme. These credits are regarded as building blocks towards achieving a National Qualification upon successful assessment and can never be taken away from you!</p>
<p><b>Formative Assessment Workbook</b></p> 	<p>The Formative Assessment Workbook supports the Learner Guide and assists you in applying what you have learnt.</p> <p>The formative assessment workbook contains classroom activities that you have to complete in the classroom, during contact sessions either in groups or individually.</p> <p>You are required to complete all activities in the Formative Assessment Workbook.</p> <p>The facilitator will assist, lead and coach you through the process.</p> <p>These activities ensure that you understand the content of the material and that you get an opportunity to test your understanding.</p>

## Different types of activities you can expect

To accommodate your learning preferences, a variety of different types of activities are included in the formative and summative assessments. They will assist you to achieve the outcomes (correct results) and should guide you through the learning process, making learning a positive and pleasant experience.



The table below provides you with more information related to the types of activities.

<b><i>Types of Activities</i></b>	<b><i>Description</i></b>	<b><i>Purpose</i></b>
<b><i>Knowledge Activities</i></b> 	You are required to complete these activities on your own.	These activities normally test your understanding and ability to apply the information.
<b><i>Skills Application Activities</i></b> 	You need to complete these activities in the workplace	These activities require you to apply the knowledge and skills gained in the workplace
<b><i>Natural Occurring Evidence</i></b> 	You need to collect information and samples of documents from the workplace.	These activities ensure you get the opportunity to learn from experts in the industry. Collecting examples demonstrates how to implement knowledge and skills in a practical way

## **Learner Administration**



### ***Attendance Register***

You are required to sign the Attendance Register every day you attend training sessions facilitated by a facilitator.

### ***Programme Evaluation Form***

On completion you will be supplied with a "Learning programme Evaluation Form". You are required to evaluate your experience in attending the programme.

Please complete the form at the end of the programme, as this will assist us in improving our service and programme material. Your assistance is highly appreciated.

## **Assessments**

The only way to establish whether a learner is competent and has accomplished the specific outcomes is through the assessment process. Assessment involves collecting and interpreting evidence about the learners' ability to perform a task.

To qualify and receive credits towards your qualification, a registered Assessor will conduct an evaluation and assessment of your portfolio of evidence and competency.

This programme has been aligned to registered unit standards. You will be assessed against the outcomes as stipulated in the unit standard by completing assessments and by compiling a portfolio of evidence that provides proof of your ability to apply the learning to your work situation.



### ***How will Assessments commence?***

#### ***Formative Assessments***

The assessment process is easy to follow. You will be guided by the Facilitator. Your responsibility is to complete all the activities in the Formative Assessment Workbook and submit it to your facilitator.

#### ***Summative Assessments***

You will be required to complete a series of summative assessments. The Summative Assessment Guide will assist you in identifying the evidence required for final assessment purposes. You will be required to complete these activities on your own time, using real life

projects in your workplace or business environment in preparing evidence for your Portfolio of Evidence. Your Facilitator will provide more details in this regard.

To qualify and receive credits towards your qualification, a registered Assessor will conduct an evaluation and assessment of your portfolio of evidence and competency.

## **Learner Support**

The responsibility of learning rests with you, so be proactive and ask questions and seek assistance and help from your facilitator, if required.



Please remember that this Skills Programme is based on outcomes based education principles which implies the following:

- ✓ You are responsible for your own learning – make sure you manage your study, research and workplace time effectively.
- ✓ Learning activities are learner driven – make sure you use the Learner Guide and Formative Assessment Workbook in the manner intended, and are familiar with the workplace requirements.
- ✓ The Facilitator is there to reasonably assist you during contact, practical and workplace time for this programme – make sure that you have his/her contact details.
- ✓ You are responsible for the safekeeping of your completed Formative Assessment Workbook and Workplace Guide
- ✓ If you need assistance please contact your facilitator who will gladly assist you.
- ✓ If you have any special needs please inform the facilitator

## Learner Expectations

Please prepare the following information. You will then be asked to introduce yourself to the instructor as well as your fellow learners



Your name:
The organisation you represent:
Your position in organisation:
What do you hope to achieve by attending this course / what are your course expectations?

# UNIT STANDARD 7567

## ***Unit Standard Title***

Produce and use spreadsheets for business

NQF Level: 3

Credits: 5

## ***Purpose***

People credited with this unit standard are able to:

- ✓ Plan and design computer spreadsheet documents to solve a business problem
- ✓ Format data in a spreadsheet.
- ✓ Create graphs
- ✓ Write macros
- ✓ Solve problems using a spreadsheet

## ***Learning assumed to be in place***

The credit value of this unit is based on a person having the prior knowledge and skills to use a PC, to produce and use spreadsheets using basic functions, and an understanding of basic business principles and practices

## ***Specific Outcomes and Assessment Criteria***

***Specific Outcome 1:*** Plan and design computer spreadsheet documents to solve a business problem

### ***Assessment Criteria***

- ✓ The problem is identified as being solvable by a spreadsheet
- ✓ The spreadsheet is designed and documented in keeping with the nature of the problem

***Specific Outcome 2:*** Produce a computer spreadsheet file to solve a business problem

### ***Assessment Criteria***

- ✓ Data is entered into the spreadsheet using labels and values
- ✓ Data is formatted to produce the required spreadsheet in terms of cell width, alignment, number and date and time formats
- ✓ Spreadsheet formulae are applied in order to produce the required spreadsheet in terms of statistical, time and date, financial and logical function
- ✓ Absolute cell referencing is used in order to copy formulae across and down
- ✓ Template files are created, used and documented to meet the user requirements
- ✓ Data integrity practices are demonstrated in terms of comparison with original information sources, audited formulae, check-totals and sort
- ✓ The spreadsheet contains cells, which are sorted numerically and alphabetically

***Specific Outcome 3:*** Use a computer spreadsheet file to solve a business problem

### ***Assessment criteria***

- ✓ Cell ranges within the spreadsheet are charted to meet user requirements
- ✓ The problem is solved by the spreadsheet created

- ✓ What if" exercises are applied to the spreadsheet in order to accommodate changes in requirements
- ✓ Where available, the use of the onscreen help facility is demonstrated
- ✓ File management techniques are demonstrated in terms of creating, naming, saving, copying, renaming, deleting, locating directory (folder), displaying directory contents printing and relocating
- ✓ The file is previewed and printed using page setup appropriate to the layout: Showing gridlines, setting printing range, shrinking to one page, alignment. Headers and footers

**Specific Outcome 4:** Manipulate the data in a spreadsheet

**Assessment criteria**

- ✓ The appearance of spreadsheet is modified to user requirements using formatting facilities: Alignment, cell widths, text style, font, colour, number, date and time formats
- ✓ Selected cells within an existing spreadsheet file are sorted numerically and alphabetically

**Unit Standard Essential Embedded Knowledge**

N/A

**Critical Cross-field Outcomes (CCFO)**

- ✓ Identify and solve problems
- ✓ Work effectively with others as a member of a team, group, organisation and community
- ✓ Organise and manage oneself and one`s activities responsibly and effectively.
- ✓ Collect, organise and critically evaluate information
- ✓ Communicate effectively using visual, mathematical, and language skills in modes of oral and written presentations
- ✓ Use science and technology effectively and critically (showing responsibility towards the environment and health of others).
- ✓ Demonstrate an understanding of the world as a set of related systems
- ✓ Contribute to the full personal development of each learner and the social and economic development of society at large, by making it the underlying intention of any programme of learning to make an individual aware of the importance of:
  - reflecting on exploring a variety of strategies to learn more effectively
  - participating as responsible citizens in the life of local, national and global communities
  - being culturally and aesthetically sensitive across a range of social contexts
  - exploring education and career opportunities and
  - developing entrepreneurial opportunities

# PLAN AND DESIGN A SPREADSHEET

## ***Specific Outcome***

Plan and design computer spreadsheet documents to solve a business problem

## ***Assessment Criteria***

- ✓ The problem is identified as being solvable by a spreadsheet
- ✓ The spreadsheet is designed and documented in keeping with the nature of the problem

Excel is a spreadsheet program. It adds long columns or rows of figures for you. You can also put together a list of clients or contacts with all their details: addresses, telephone numbers, postal addresses, etc.

The basic working environment in Excel is a workbook that can contain one or more worksheets. (Remember, in Word we spoke about a document - in Excel it is called a worksheet.)

A worksheet is similar to an accountant's ledger, with numbers; text and calculations lined up in columns and rows. However, unlike in an accountant's ledger, Excel will do the calculations for you.

Excel also makes it easier for you to change, delete or add information. You can also arrange multiple worksheets within a workbook – for example, you can place all the worksheets for one client

Other examples of spreadsheet programs are: Lotus 1,2,3 and Quattro Pro.

## **What Is An Electronic Spreadsheet?**

Traditionally, people used a ruled columnar pad, a pencil and eraser and a calculator when doing bookkeeping. A spreadsheet, called a workbook in Excel, replaces these tools. The program uses a format very similar to an analysis book which can be bought in any stationery shop: it looks like a large piece of paper with columns and rows on which you do your work.

# PRODUCE A SPREADSHEET

## ***Specific Outcome***

Produce a computer spreadsheet file to solve a business problem

## ***Assessment Criteria***

- ✓ Data is entered into the spreadsheet using labels and values
- ✓ Data is formatted to produce the required spreadsheet in terms of cell width, alignment, number and date and time formats
- ✓ Spreadsheet formulae are applied in order to produce the required spreadsheet in terms of statistical, time and date, financial and logical function
- ✓ Absolute cell referencing is used in order to copy formulae across and down
- ✓ Template files are created, used and documented to meet the user requirements
- ✓ Data integrity practices are demonstrated in terms of comparison with original information sources, audited formulae, check-totals and sort
- ✓ The spreadsheet contains cells, which are sorted numerically and alphabetically

# Changing The Position Of Text And Numbers In A Cell

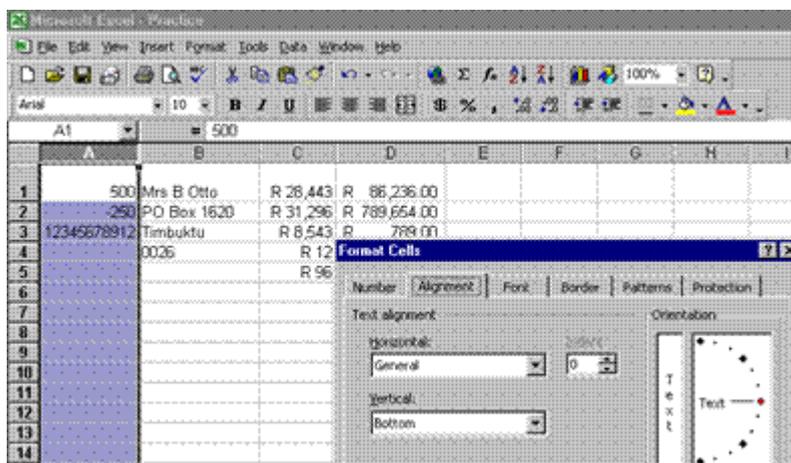
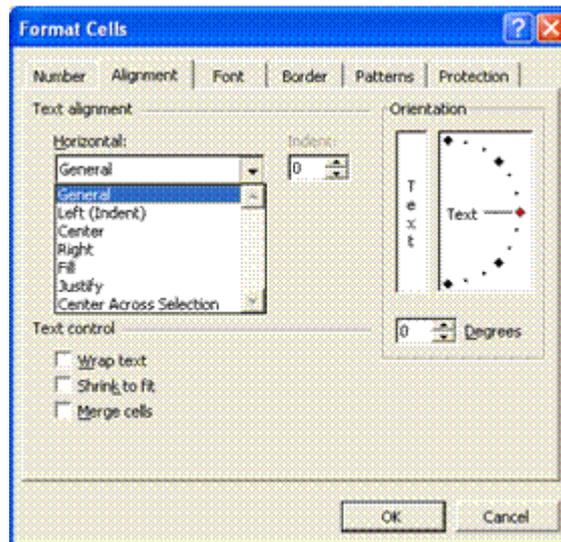
## Aligning Text And Numbers In A Cell

You can change the position of text and numbers in a cell. You can also choose whether to align right, left or centre.

### Using The Format, Cells Menu

Select column A and then select the **Format, Cells** menu. Click the **alignment** tab and study the screen. You have certain boxes with a number of choices. The horizontal choices are:

- ✓ **General:** will put the text to the left and the numbers to the right;
- ✓ **Left:** will put all contents to the left
- ✓ **Centre:** arranges contents in the cell centre
- ✓ **Right:** places all the content to the right side



- ✓ Select the **Centre** option and click **OK**.

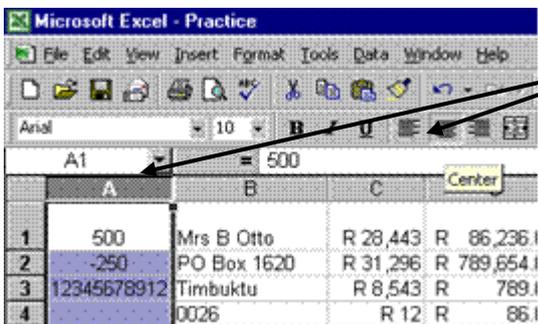
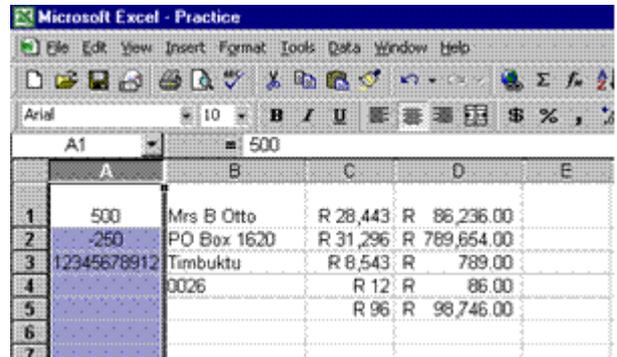
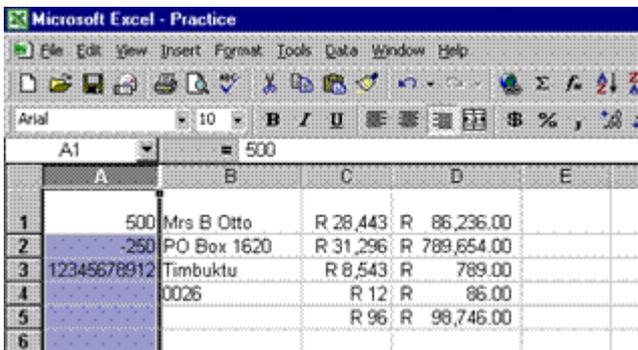
See how your cell contents are arranged in the centre of the cells.

- ✓ Now select the **Right** option and click **OK**.

The contents of the cells will be aligned to the right.

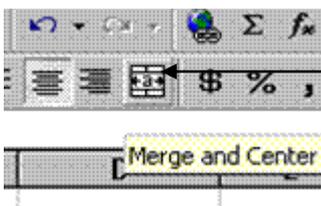
- ✓ While your column is still selected, click the **Left** option and click **OK**.

The contents of the cell will be aligned to the left.

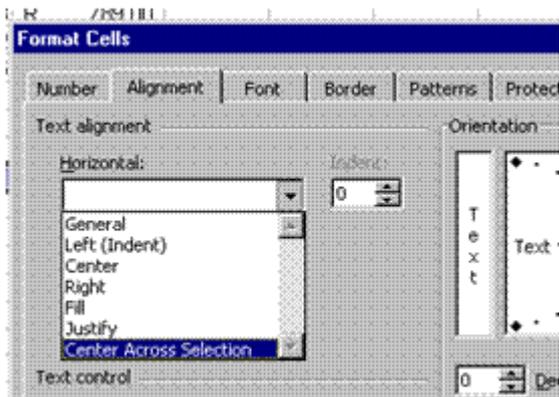


Using the toolbar: Select Column A and click the left align button on the formatting toolbar. See how the text automatically aligns to the left. Now click the centre button and the right align button to see the text centre and then align to the right.

## Centre Text Across Columns



Using the toolbar: Select the cells you want to centre and click on the Merge and Centre button of the formatting toolbar. See how the text is centred in the row



Using the format menu: Select the cells and click on format, cells. Click on the alignment tab and then select Centre across selection. The text will be centred in the row.

## Wrap Text

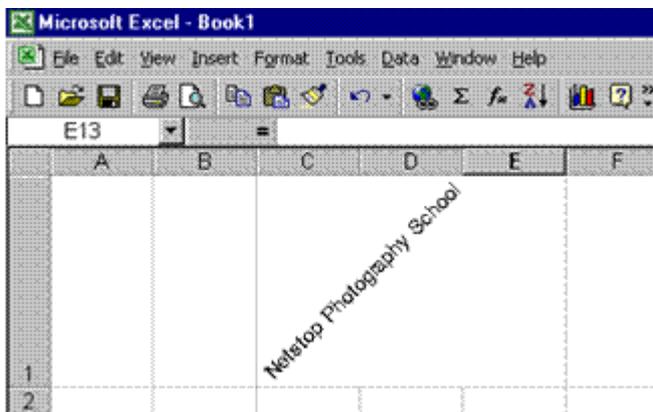
To display multiple lines of text within a cell:

- ✓ Select the cells you want to format.
- ✓ On the **Format** menu, click **Cells**, and then click the **Alignment** tab.
- ✓ Under **Text control**, select the **Wrap text** check box.
- ✓ You can also shrink the font size to show all data in a cell

## Rotate Text In A Cell

The data in a column is often very narrow while the label for the column is much wider. Instead of creating unnecessarily wide columns or abbreviated labels, you can rotate text and apply borders that are rotated to the same degree as the text. Select the cells in which you want to rotate text.

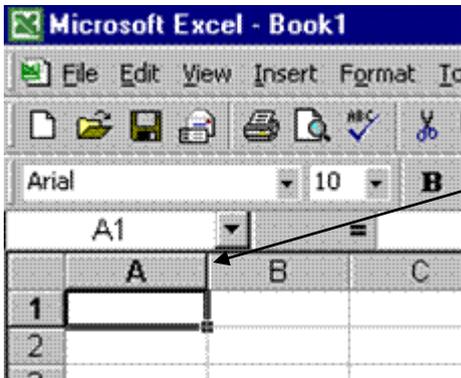
- ✓ On the Format menu, click Cells, and then click the Alignment tab.
- ✓ In the Orientation box, click a degree point, or drag the indicator to the angle you want.
- ✓ To display text vertically from top to bottom, click the vertical Text box under Orientation.



## Adjust Column Width And Row Height

### Exercises 19: Column Width

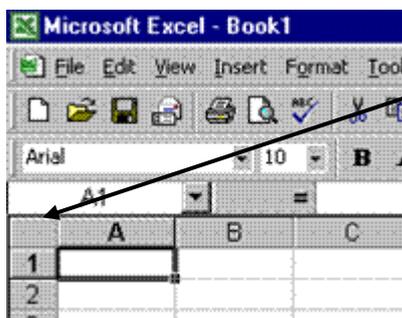
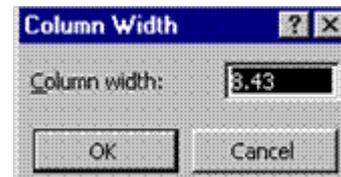
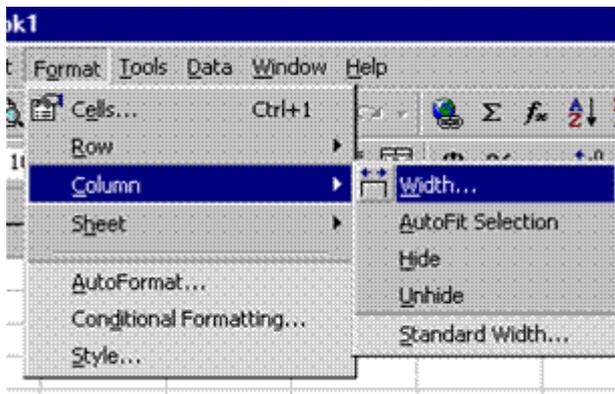
The standard width of a column is 8,43 characters.



Excel offers two methods of changing the column width: through the format menu or by using the mouse.

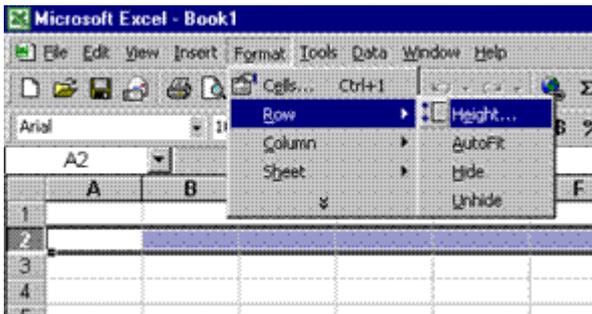
Point the mouse at the vertical line to the right of the column header until it turns into a **double-headed arrow**, then click and drag the mouse to the right or left

Using the Format menu: Select column A, or any cell from column A and select the **Format, Column** menu and click on width. Enter 15 in the dialogue box to increase the width of column C and click **OK**. The width will have increased on your screen.

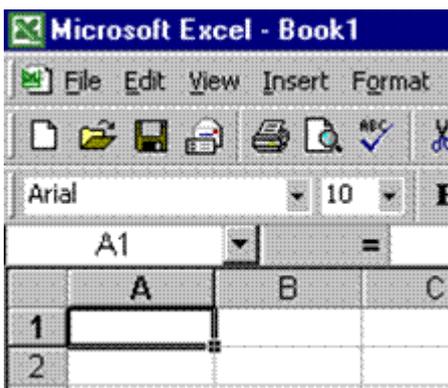


To change the column width of the entire sheet, Click the Select All button, in the top left hand corner of the worksheet, where the rows and columns meet. Select the format, column menu; enter the desired width and click OK. The column width for the entire sheet will change

## Exercises: Row Height



Format menu: **Select** the Row that you want to change, select the **Format, Row** menu and click height. Enter the height you require into the dialogue box and click **OK**.



Using the Mouse: **Point** the mouse to the vertical line at the bottom edge of the row heading until it turns into a double-headed arrow, then click and drag the vertical line to the desired height.

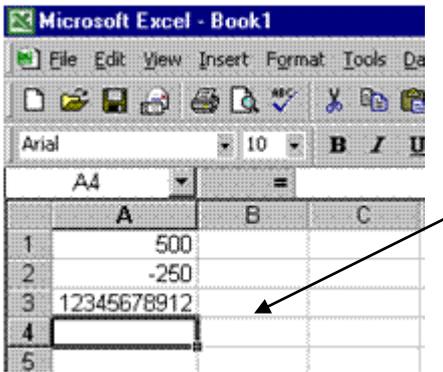
To change the row height of the entire sheet, Click the **Select All button**, in the top left hand corner of the worksheet, where the rows and columns meet. Select the format, row menu; enter the desired height and click OK. The row height for the entire sheet will change.

## Exercise 20

- ✓ Point the mouse at the vertical line to the right of the column header of column B until it turns into a double-headed arrow, then click and drag the mouse to the right until the text in the cells is fully visible.
- ✓ Select Row 1. Select the Format, Row menu and click height. Enter a height of 25 in the box and click OK. The height of the row will increase.

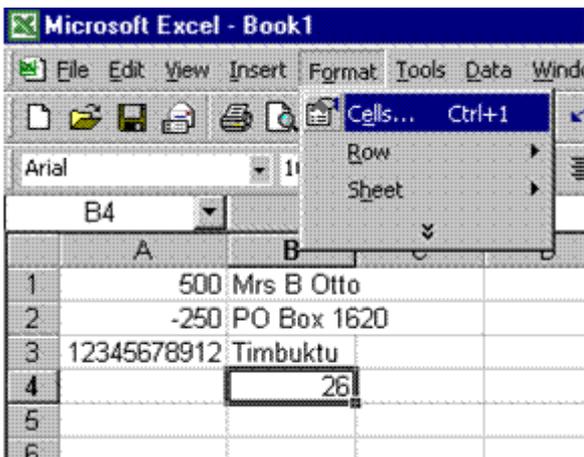
## Enter Data Into Cells

Entering data into cells: When you type numbers into a cell, they are automatically aligned to the right. If the number is too long, Excel will automatically widen the column. To enter a negative amount, either type a minus (-) before the amount or enclose it within a parentheses (1234).

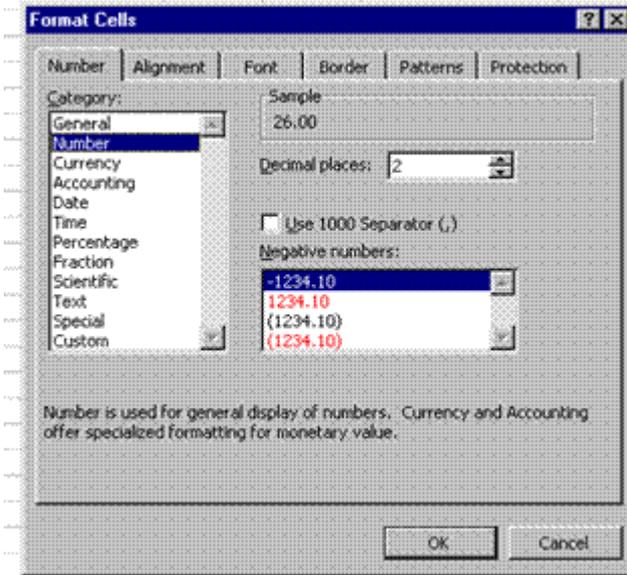


- ✓ Now click in Cell A1 to select it, then type 500 and press enter. In cell A2 type (minus) -250 and press the down arrow to select cell A3. In cell A3 type: 12345678912. See how Excel widens the column for the last set of numbers. *Please note that you have to tell the PC when you have finished entering data in a cell by moving out of the cell. This is what you do when you press Enter or use the keyboard arrows.*
- ✓ When you open a new worksheet, all the cells have general format. The format of the cell determines what the numbers, text, dates and so on in the cell look like after you have entered data into a cell.

A general format means that the cells have no specific number format. Let's find out what this means. In cell B1 type: Mrs B. Otto; in cell B2 type PO Box 1620; in cell B3 type Timbuktu; in cell B4 type the postal code 0026. See what happens to the postal code? In order to display the postal code correctly, we have to change the format of the cell. This will be done in the next step.



The format of a cell is changed via the format menu on the menu bar. Before we can change the format of a cell, we first have to tell the PC which cell we want to change. Click on cell B4, where the postal code should be. Then click on the format menu and click on cells.

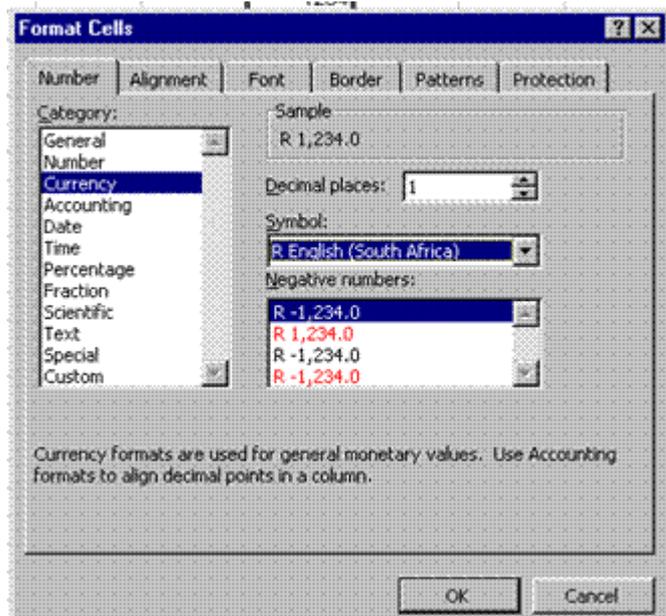
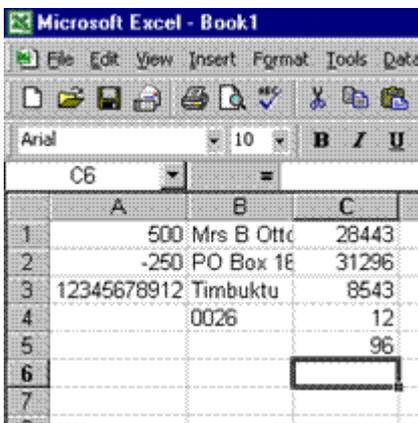


The explanation given says that: "Number is used for general display of numbers." Click OK and watch what happens. Oops, this is not what you wanted! But at least now you know that the Numbers format gives two decimal points and that it is used for a general display of numbers.

## Currency Format

### Exercise 21

In your practice file enter the following amounts in cells C1 to C5: C1: 28443; C2: 31296; C3: 8543; C4: 12; C5: 96.



- ✓ Then select these cells, click the Format menu from the menu bar and click cells. Click on the Numbers tab and then click on the currency category. The explanation reads: "Currency formats are used for general monetary values."
- ✓ Set the number of decimal places to zero and the currency to R English.
- ✓ Select the first figure in red in the box as the format for negative numbers. Click OK.

	A	B	C	D
1	500	Mrs B Otto	R 28,443	
2	-250	PO Box 18	R 31,296	
3	12345678912	Timbaktu	R 8,543	
4		0026	R 12	
5			R 96	

**See how the appearance of the cells has changed.**

If you look at the formula bar, the number appears unformatted (it does not show the R in front of the amounts). Excel uses the number in the formula bar when performing any calculations on this cell, in other words it uses the number only, not the currency.

## Accounting Format

### Exercise 22

- ✓ In Cells D1 to D5, enter the following numbers: D1: 86236; D2: 789654; D3: 789; D4: 86; D5: 98746.
- ✓ Once again, select Cells D1 to D5; click the **format** menu, click **cells** and then click the **number** tab, if necessary.
- ✓ Click the **accounting** category and look at the rest of the menu. You will see that you now have different options from the previous Exercises, when you clicked the currency category. You can either reduce or increase decimal places and select a different symbol.
- ✓ The explanation reads: "Accounting formats line up the currency symbols and decimal points in a column."
- ✓ Change the decimal places option to two; click on OK.

Now you can see that all the R signs are aligned underneath each other.

### Exercise 23

Put simply, a budget is a statement of your income and expenses, showing you how much money you have left once you have paid all your debts. Income is of course all your earnings: salary, commission, interest, maintenance, etc. Expenses are everything you have to pay: house rent, water and lights, telephone, school fees, transport, accounts, etc.

- ✓ Complete your monthly budget, or an imaginary one and save it to the hard drive. Name your workbook Budget and add your name.

## Entering Formulas Into Cells

You **ALWAYS** begin a = in the cell where you want the answer!

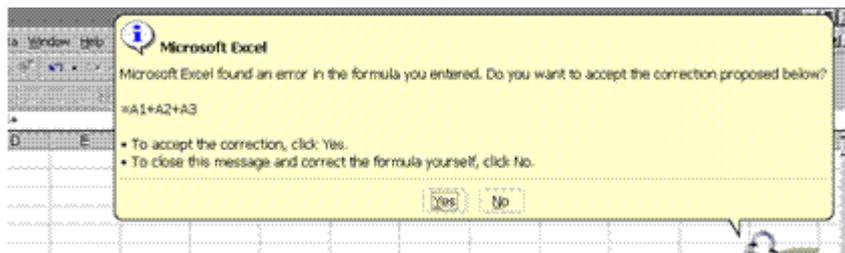
Excel uses the following arithmetic operators that you will find on your numeric keyboard on the right hand side of the keyboard:

- ✓ To Add use the + (plus)
- ✓ To Subtract use the - (minus)
- ✓ To Multiply use the \* (asterisk)
- ✓ To Divide use the / (forward slash)

Click on sheet 3 in your workbook.

## Exercise 24

- ✓ In cell A1 type 250; in cell A2 type 320; in cell A3 type 125.
- ✓ Start your calculation (your sum) by entering an = in cell A4
- ✓ Click cell A1 and press + .See how the formula shows in cell A4
- ✓ Click cell A2 and press+ .See how the formula shows in cell A4 as well as the Formula Bar
- ✓ Click cell A3 and press Enter - DO NOT PRESS + IN CELL A3!!! Press Enter!!!
- ✓ The answer will display in cell A4.
- ✓ If you press + and then Enter in cell A3, an error message will display. You can click on Yes and Excel will make the corrections as proposed, or you can click No and make the corrections yourself.



## Error Messages

When you are adding in Excel, it is similar to adding on a calculator. You will type + in all the cells except the last one, where you press enter. Excel will automatically calculate and display your answer in the cell nominated by you, where you typed the =.

If a formula cannot properly evaluate a result, Microsoft Excel will display an error value. Each error type has different causes, and different solutions. Error messages display in two ways: via the Office Assistant as in the example above and then as a message in a cell.

- ##### Occurs when a column is not wide enough, or a negative date or time is used. Enlarge the column
- #VALUE! Occurs when the wrong type of argument or operand is used. There is something wrong with your formula, check the formula again. Also check that you used the correct cell formatting.
- #NAME? Occurs when Microsoft Excel doesn't recognize text in a formula. Usually this happens when you used a label in a formula, without labels being allowed. This is covered later in the manual.
- #REF! Occurs when a cell reference is not valid

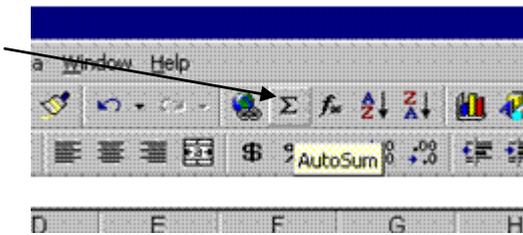
This lesson is important, because if you do not do the calculations in the right sequence, Excel will not be able to display the answer.

## Add A Column Using The Autosum Button

### Exercise 25

- ✓ You will find the **Autosum** button on the toolbar. Autosum will add totals in columns or rows for you:
- ✓ Click and drag down the cells in the column that you wish to add. End one cell below the last number. Then click the **AutoSum** button on the toolbar.
- ✓ Excel will add the total of the column automatically. Columns can only be added from the top to the bottom and rows from the left to the right

	A	B	C	D	E
1	R 250.00	21	1230		
2	R 320.00	42	4387		
3	R 125.00	121	2598		
4	R 695.00	35	1121		
5		219	7683		
6			5576		
7					
8					



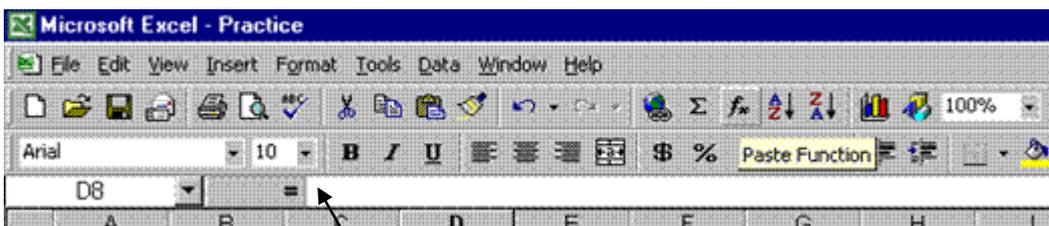
- ✓ You are still working in sheet 3, so enter the following amounts in column C:
- ✓ C1:1230; C2: 4387; C3:2598; C4: 1121; C5: 7683; C6: 5576.

	A	B	C	D	E
1	R 250.00	21	1230		
2	R 320.00	42	4387		
3	R 125.00	121	2598		
4	R 695.00	35	1121		
5		219	7683		
6			5576		
7			22595		
8					
9					

Click and drag from cell C1 to cell C7. Click on the Autosum button. The answer will be displayed in cell C7

## Adding Using The SUM Function

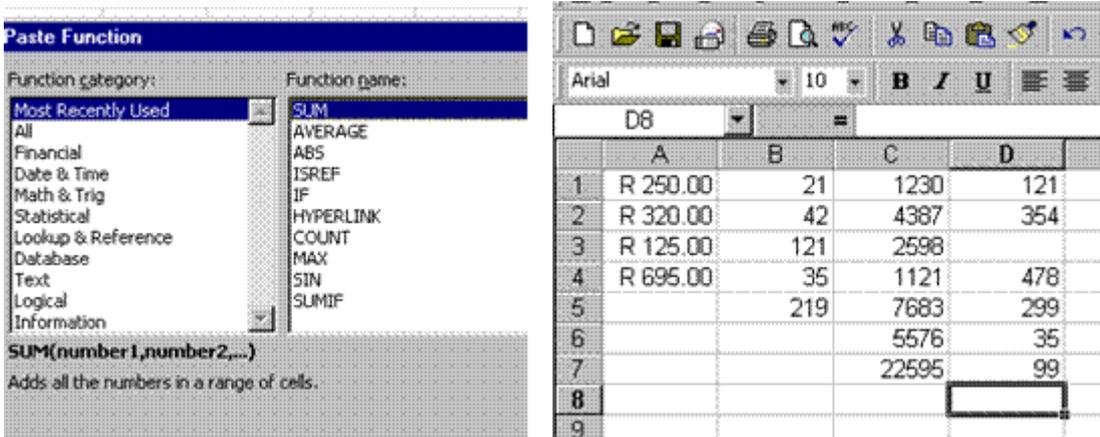
You can find the SUM function in two ways: through the Paste Function button or through the SUM function:



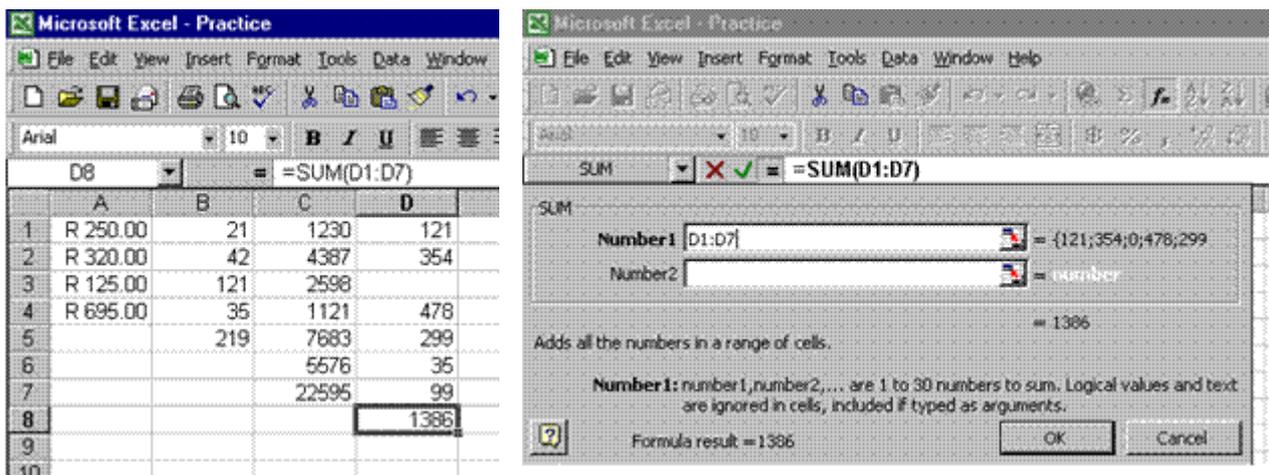
The SUM function appears in the Name box as soon as you click on the = sign on the formula bar.

## Exercises

- ✓ In column D enter the following amounts: D1 : 121; D2: 354; D3 no amount; D4: 478; D5: 299; D6: 35; D7: 99.



- ✓ Click in cell D8 and then click the Paste Function button on the toolbar.
- ✓ In the Function Name box select SUM and click OK.
- ✓ In Number 1 of the SUM box, type the following: D1:D7.
- ✓ The Name box will now display the word SUM and the formula bar will display the following:
  - ✓ =SUM (D1:D7)
- ✓ This is the correct way of using the SUM function. We will discuss functions again later in the manual
- ✓ Click OK and the answer will be displayed in cell D8.



## Exercises: Using The Sum Function In Rows

You can, of course, also use the Sum Function to do calculations in rows rather than in columns.

- ✓ In row 18, enter the following amounts: cell A18 : 257; cell B18 :799; cell C18 147.
- ✓ Click in cell D18, click the = sign on the formula bar, select Sum in the name box and click OK.
- ✓ In Number 1 of the Sum box, type A18:C18 and click OK.
- ✓ The answer will be displayed in cell D18.

## Subtracting

### Exercise 26

The procedure to subtract is the same as to add: click the cell where you want the answer and then process the calculation.

Remember, to subtract use the - (minus) on the numeric keyboard.

- ✓ In cell B6 type 115. Click in cell B7 and type =.
- ✓ click cell B5, press - (minus) on the numeric keyboard
- ✓ Click cell B6 and press Enter
- ✓ The answer will be displayed in cell B7

## Multiplication

### Exercise 27

To multiply, use the \* (asterisk) on the numeric keyboard.

- ✓ In cell F1 enter 247, cell F2: 23, cell F3: 3.
- ✓ Click on cell F4 and enter =
- ✓ Click on cell F1 and type \*, click on cell F2 and type \*
- ✓ Click cell F3 and press Enter. The answer will be displayed in cell F4.

## Division

### Exercises 28

To divide, use the / (forward slash) on the numeric keyboard.

- ✓ Enter the following amounts: cell A20: 8585; cell B20: 123.
- ✓ Click on cell C20, enter = .
- ✓ Click cell A7 and enter /, click cell B7 and press enter.
- ✓ The answer will be displayed in cell C20

## Labels And Values

### Labels

Worksheets often have labels (text) at the top of each column and to the left of each row that describe the data within the worksheet. You can use these labels within formulas when you want to refer to the related data. You can also create descriptive names that are not labels on the worksheet to represent cells, ranges of cells, formulas, or constants.

By default, Microsoft Excel does not recognize labels in formulas. To use labels in formulas, click **Options** on the **Tools** menu, and then click the **Calculation** tab. Under **Workbook options**, select the **Accept labels in formulas** check box.

**Use labels to represent cells** When you create a formula that refers to data in a worksheet, you can use the column and row labels in the worksheet to refer to the data

For example, the following example contains columns labelled Product 1, Product 2, and Product 3. To calculate the total value for the Product 1 column, use the formula =SUM (Product 1).

	A	B	C	D	E
1	Divison A	Product 1	Product 2	Product 3	
2	East	R 30.00	R 70.00	R 110.00	
3	West	R 40.00	R 80.00	R 120.00	
4	Total	R 70.00			
5					

Or if you need to refer to the Product 3 amount for the East division (that is, the value 110.00), you can use the formula =Product 3 East. The space in the formula between "Product 3" and "East" is the intersection operator. This operator designates that Microsoft Excel should find and return the value in the cell at the intersection of the row labelled East and the column labelled Product 3.

	A	B	C	D
1	Divison A	Product 1	Product 2	Product 3
2	East	R 30.00	R 70.00	R 110.00
3	West	R 40.00	R 80.00	R 120.00
4	Total	R 70.00	R 110.00	R 180.00
5				
6				

	A	B	C	D
1	Divison A	Product 1	Product 2	Product 3
2	East	R 30.00	R 70.00	R 110.00
3	West	R 40.00	R 80.00	R 120.00
4	Total	R 70.00	R 110.00	
5				

## Entering Text/Labels

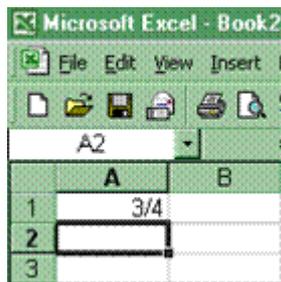
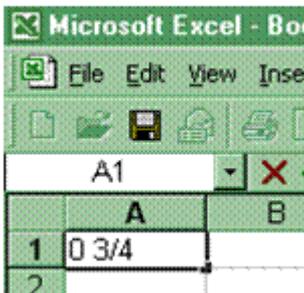
- ✓ Text can be any combination of numbers and characters
- ✓ Labels can contain numbers and may begin with numbers
- ✓ If you start a label with numbers, it will change to a label as soon as a label character is typed
- ✓ Any set of characters entered into a cell that Excel does not interpret as a number, formula, date, time, logical value or error value is interpreted as text
- ✓ Text can contain any string of up to 240 characters or numbers
- ✓ Numbers may appear in labels, but they cannot be manipulated arithmetically
- ✓ If you want to enter a number as text, e.g. a postal code, precede the entry with an apostrophe. The number will then align to the left of the cell

## Values

- ✓ There are two types of information that can be stored in cells in the worksheet.
- ✓ **Constant value:** data that is typed directly into the cell. It can be numeric, or text. Constant values do not change unless you select the cell and edit the value yourself.
- ✓ **A formula** is a sequence of values, cell references, names, functions, or operators that produces a new value from existing values. Formulas always begin with an equal = sign. A number that is produced as the result of a formula can change when other values in the worksheet changes.

### Entering Numbers/Values:

- ✓ A number entry can contain only numerals (0-9), a leading negative (-), positive (+), equal (=) or dollar (\$) sign; a trailing percent sign (%) or an E (scientific notation). All other combinations of numbers and nonnumeric characters are treated as text.
- ✓ To enter a fraction, type a 0 then press the space bar and enter the fraction:



- ✓ It is better to use a negative sign (-) rather than a parenthesis (( )) to indicate a negative number.
- ✓ You cannot include spaces and commas in numbers, the decimal point is a full stop.
- ✓ Excel keeps track of up to 15 decimal places, the formula bar shows only 9
- ✓ An entry can end with % that tells Excel to divide the preceding value by 100.

## Number Formats

Excel contains many built-in number formats you can choose from:

- ✓ The **General** format is the default number format. For the most part, what you enter in a cell that is formatted with the General format is what is displayed. However, if the cell is not wide enough to show the entire number, the General format rounds numbers with decimals and uses scientific notation for large numbers.
- ✓ **Number** format is used for general display of numbers.
- ✓ **Currency** formats are used for general monetary values
- ✓ **Accounting** formats line up the currency symbols and decimal points in a column
- ✓ **Date** formats display date and time serial numbers as date values. Use time formats to display only the time portion
- ✓ **Text** format cells are treated as text even when a number is displayed in the cell. The cell is displayed exactly as entered
- ✓ **Percentage** formats multiply the cell value by 100 and displays the result with a percentage symbol. Numbers above 1 are automatically entered as percentages; and numbers below 1 are converted to percentages by multiplying by 100. For example, entering 10 results in 10%, and entering .1 results in 10%. To have all numbers

converted by multiplying by 100, on the **Tools** menu, click **Options**, click the **Edit** tab, and then clear the **Enable automatic percent entry** check box. To quickly display numbers as percentages of 100, click **Percent Style** on the **Formatting** toolbar

- ✓ The **Special** category includes formats for postal codes and phone numbers. The postal codes are formatted for use in the USA, unfortunately, and will not display SA postal codes in the desired format. You can use either the text format for this, or create a custom format.

## ***Change How A Number Looks Without Changing The Number***

You can use number formats to change the appearance of numbers, including dates and times, without changing the number behind the appearance. For example, you can display a number such as .08 as 8%.

- ✓ Select the cells you want to format.
- ✓ On the **Format** menu, click **Cells**, and then click the **Number** tab.
- ✓ In the **Category** list, click a category, and then select the options you want.

## ***Reset A Number Format***

- ✓ Select the cells you want to format.
- ✓ On the **Format** menu, click **Cells**, and then click the **Number** tab.
- ✓ In the **Category** list, click **General**.

## ***Increase Or Decrease The Number Of Decimal Places Shown***

- ✓ Select the cells you want to format.
- ✓ On the **Formatting** toolbar, do one of the following:
- ✓ To display fewer digits after the decimal point, click **Decrease Decimal**
- ✓ To display more digits after the decimal point, **Increase Decimal**

## ***Show Or Hide The Thousands Separator In A Number***

- ✓ Select the cells you want to format.
- ✓ On the **Format** menu, click **Cells**, and then click the **Number** tab.
- ✓ In the **Category** list, click **Number**.
- ✓ Select or clear the **Use 1000 separator (,)** check box.
- ✓ To quickly add commas to separate thousands, select the cells, and then click **Comma Style** on the **Formatting** toolbar.

## ***Add Or Remove A Currency Symbol***

- ✓ Select the cells you want to format.
- ✓ On the **Format** menu, click **Cells**, and then click the **Number** tab.
- ✓ In the **Category** list, click **Currency**.
- ✓ In the **Symbol** list, do one of the following:
- ✓ To add a currency symbol, select the one you want.
- ✓ To remove a currency symbol, click **None**.

## ***Display Leading Or Trailing Zeros In A Number***

- ✓ You can use custom number formats to retain leading zeros in numbers that you enter.
- ✓ Select the cells you want to format.
- ✓ On the **Format** menu, click **Cells**, and then click the **Number** tab.

- ✓ To display Use this code
- ✓ 12 as 00012 and 123 as 00123 00000
- ✓ 12 as 00012 and 123 as 000123 "000"#
- ✓ 123 as 0123 "0"#
- ✓ 8.9 as 8.900 #.000
- ✓ .631 as 0.6 0.#
- ✓ In the **Category** list, click **Custom**.
- ✓ In the **Type** box, edit the number format codes to create the format you want.

## ***Naming Cells And Cell Ranges***

### **Name A Cell Or A Range Of Cells**

You can use range names in place of cell references in formulas. Instead of listing the references for the range, you can use its name. Names can make your formulas easier to understand if you need to go back and find out what you did.

- ✓ Select the cell, range of cells, or nonadjacent selections that you want to name.
- ✓ Click the Name box at the left end of the formula bar.
- ✓ Type the name for the cells. Press ENTER.

### **Guidelines For Naming Cells, Formulas, And Constants**

- ✓ The first character of a name must be a letter or an underscore character. Remaining characters in the name can be letters, numbers, periods, and underscore characters
- ✓ Names cannot be the same as a cell reference, such as Z\$100 or R1C1.
- ✓ Can more than one word be used? Yes, but spaces are not allowed. Underscore characters and periods may be used as word separators — for example, Sales\_Tax or First.Quarter.
- ✓ How many characters? A name can contain up to 255 characters.
- ✓ If a name defined for a range contains more than 253 characters, you cannot select it from the Name box.
- ✓ Are names case sensitive? Names can contain uppercase and lowercase letters. Microsoft Excel does not distinguish between uppercase and lowercase characters in names. For example, if you have created the name Sales and then create another name called SALES in the same workbook, the second name will replace the first one.

<b><i>Valid</i></b>	<b><i>Invalid</i></b>
Last Week Profit	95.Income (starts with a number)
ProSt_1994	Grand Total (has a space)
UnitPrice	A1 (same as a cell reference)
Sales	R3C2 (same as a cell reference)

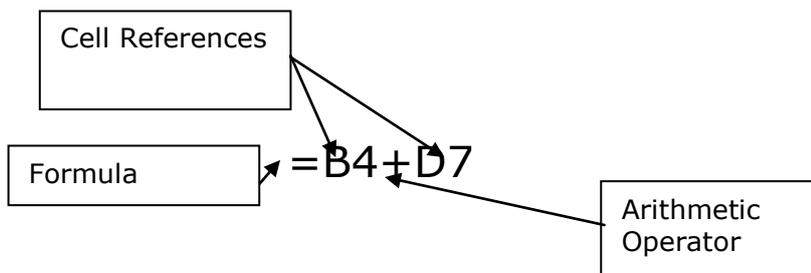
# Formulas

Performing calculations is one of the main uses of spreadsheets. Excel allows you to build complex formulas using arithmetic operators and predefined functions.

A formula is a calculation designed to produce a particular result. A formula can use constant number values or references to values stored in cells on the worksheet. Excel includes many built-in functions to help you create formulae that perform complex calculations easily.

## Entering formulas

A formula is started by entering the = sign in a cell:



## Formula Elements

=	Begins a formula. The + or – signs may be used in place of = if the next element is a cell reference, but not if it is a function name.
Brackets ( )	Used to denote precedence in calculating sections of the formula and to enhance function ranges
Cell References	A location on the sheet containing a value to work with. Storing values in cells rather than in the formula makes a spreadsheet much easier to maintain
Arithmetic Operators	+ Add; - Subtract; * Multiply; / Divide; % Calculate a percentage
Constant	Number. This will remain the same until the value is changed in the formula.
Worksheet Functions	Words such as SUM, COUNT, AVERAGE and many others that perform specialised arithmetic
Range Reference	the starting and ending cell of a group of cells enclosed in brackets. When the cells are contiguous, for example SUM (A1:A20) they are separated by a colon (:). When the cells are non-contiguous, for example SUM(A1,A5,A15,A20), they are separated by a comma (,).

## Constructing formulas

The structure or order of the elements in a formula determine the final result of the calculation. Formulas in Microsoft Excel follow a specific syntax, or order, that includes an equal sign (=) followed by the elements to be calculated (the operands), which are separated by calculation operators. Each operand can be a value that does not change (a constant value), a cell or range reference, a label, a name, or a worksheet function.

Excel performs the operations from left to right — according to the order of operator precedence — starting with the equal sign (=).

## The order in which Microsoft Excel performs operations in formulas

If you combine several operators in a single formula, Microsoft Excel performs the operations in the order shown in the following table. For example, if you want to add and multiply in the same formula, Excel will first multiply and then add. See the example shown below.

The following formula produces 11 because Excel calculates multiplication before addition. The formula multiplies 2 by 3 and then adds 5 to the result. :

=5+2\*3

You can control the order of calculation by using parentheses to group operations that should be performed first.

So, you can use parentheses to change the syntax. In the example below, Excel adds 5 and 2 together and then multiplies the result by 3 to produce 21.

=(5+2)\*3

If a formula contains operators with the same precedence — for example, if a formula contains both a multiplication and division operator — Excel evaluates the operators from left to right. To change the order of evaluation, enclose the part of the formula to be calculated first in parentheses. When you want to subtract and add, for example, Excel will do it in the order you enter it in your formula. Excel will first subtract 230 from 531 and then add 434.

=531-230+434

## Calculation operators in formulas

Operators specify the type of calculation that you want to perform on the elements of a formula. Microsoft Excel includes four different types of calculation operators: arithmetic, comparison, text, and reference.

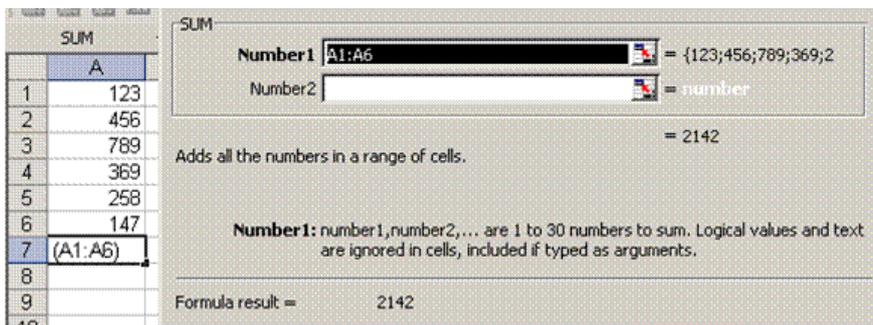
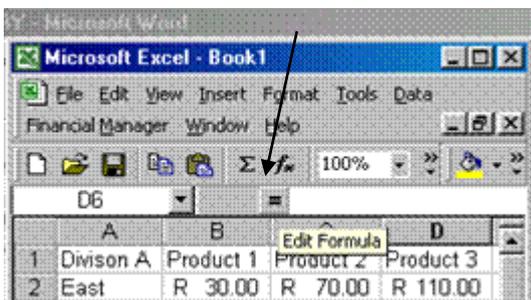
The order in which Excel will perform calculations:

<b>Operator</b>	<b>Description</b>
: (colon) (single space)	
, (comma)	Reference operators
-	Negation (as in -1)
%	Percent
^	Exponentiation
* and /	Multiplication and division
+ and -	Addition and subtraction
&	Connects two strings of text (concatenation)
= < > <= >= <>	Comparison

**Arithmetic operators.** These are the ones you will use the most. To perform basic mathematical operations such as addition, subtraction, or multiplication; combine numbers; and produce numeric results, use the following arithmetic operators.

Arithmetic operator		Meaning	Example
+	(plus sign)	Addition	3+3
-	(minus sign)	Subtraction	
	Negation	3-1	-1
*	(asterisk)	Multiplication	3*3
/	(forward slash)	Division	3/3
%	(percent sign)	Percent	20%
^	(caret)	Exponentiation	3^2 (the same as 3*3)

When you create a formula that contains a function, the Formula Palette helps you enter worksheet functions. As you enter a function into the formula, the Formula Palette displays the name of the function, each of its arguments, a description of the function and each argument, the current result of the function, and the current result of the entire formula. To display the Formula Palette, click Edit Formula in the formula bar.



## Editing formulas

You can use the Formula Palette to edit functions in formulas. Select a cell that contains a formula, and then click Edit Formula to display the Formula Palette. The first function in the formula and each of its arguments appear in the palette. You can edit the first function or edit another function in the same formula by clicking in the formula bar anywhere within the function. For example, you can change the cell references in the example below:

## Cell and Range References

A reference identifies a cell or a range of cells on a worksheet and tells Microsoft Excel where to look for the values or data you want to use in a formula. With references, you can use data

contained in different parts of a worksheet in one formula or use the value from one cell in several formulas. You can also refer to cells on other sheets in the same workbook, to other workbooks, and to data in other programs. References to cells in other workbooks are called external references. References to data in other programs are called remote references.

## Relative references

When you create a formula, references to cells or ranges are usually based on their position relative to the cell that contains the formula. In the following example, cell B6 contains the formula =A5; Microsoft Excel finds the value one cell above and one cell to the left of B6. This is known as a relative reference.

When you copy a formula that uses relative references, Excel automatically adjusts the references in the pasted formula to refer to different cells relative to the position of the formula. In the following example, the formula in cell B6, =A5, which is one cell above and to the left of B6, has been copied to cell B7. Excel has adjusted the formula in cell B7 to =A6, which refers to the cell that is one cell above and to the left of cell B7.

## Absolute references

If you don't want Excel to adjust references when you copy a formula to a different cell, use an absolute reference. For example, if your formula multiplies cell A5 with cell C1 (=A5\*C1) and you copy the formula to another cell, Excel will adjust both references. You can create an absolute reference to cell C1 by placing a dollar sign (\$) before the parts of the reference that do not change. To create an absolute reference to cell C1, for example, add dollar signs to the formula as follows:

=A5\*\$C\$1

## Move or copy a formula

- ✓ When you move a formula, the cell references within the formula do not change.
- ✓ When you copy a formula, absolute cell references do not change; relative cell references will change. If you do not want the cell references to change, use absolute cell references.

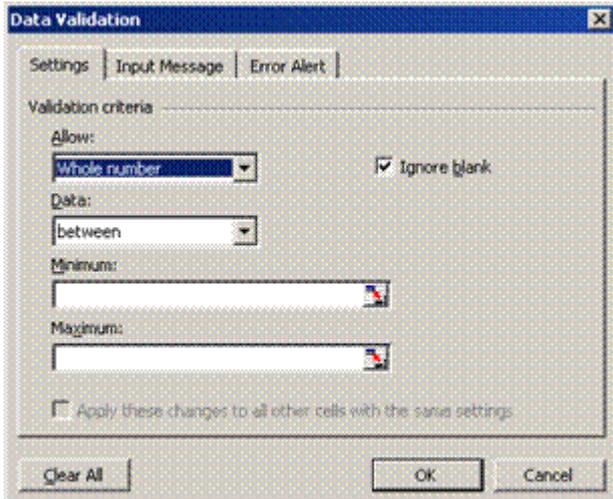
## Set Up Data Entry Validation

Data validation is setting up criteria for any data entered into the cell. If the data entered does not match the criteria, an error message can be displayed and the data entry cancelled.

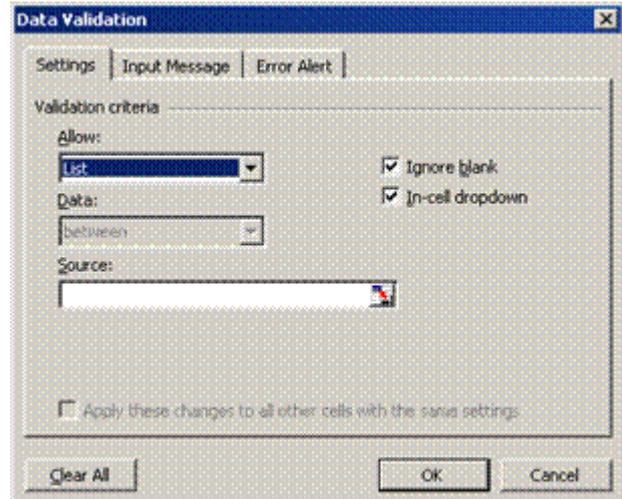
Validation checks data entered either manually or by a macro and also applies to the results of formulas.

## To Apply Data Validation To A Cell

- ✓ Select the cell(s) to be validated
- ✓ From the **Data** menu, select **Validation...**
- ✓ The **Data Validation** dialogue box is displayed.
- ✓ Select the **Settings** tab
- ✓ From the **Allow:** box, select the type of data that you want to allow in the cell
- ✓ Additional selection boxes are displayed depending on the validation type.



*Example of whole number validation*



*Example of list validation*

Various selections are available. You can specify a range of whole numbers, decimals, dates or times. You can limit selections to items on a list or restrict the length of text entries. If you select the **Custom** option, you can validate data based on the results of a formula.

- ✓ From the **Data:** list box, select an operator to use to evaluate criteria

For example, you can force the cell entry to match one value, a range of values, or make it greater or less than a value. You can prevent specific entries using the **Not Equal To** operator.

The list boxes under **Data:** change depending on the values selected in **Allow:** and **Data:**, but they are all used to enter the data value(s) to match.

- ✓ Type values into the boxes

**OR**

- ✓ Type a range containing the values to test

**OR**

- ✓ Click the worksheet selection icon  and select the range where the criteria values are placed then press **Enter**

*Tip* **To type a list, separate items in the list using a comma. If you select the Custom option, you can type or select a formula to evaluate data entry.**

- ✓ Click the **Ignore blank** check box if the cell may be left blank
- ✓ Select any other options appropriate to the input type

For example, if you limit data to a list, you can display the list as a drop-down control in the cell by selecting **In cell dropdown**.

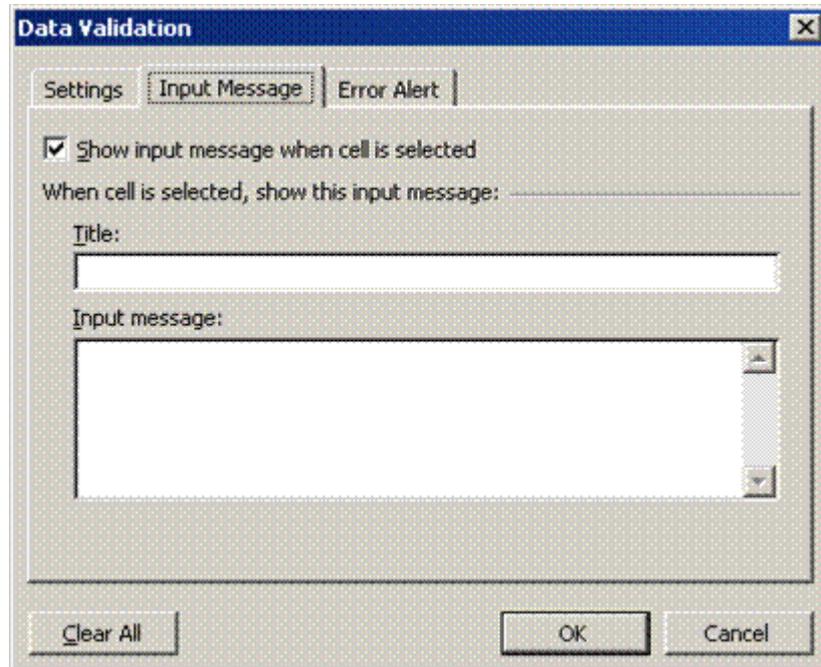
- ✓ Click **OK**

*Tip* **To remove data validation, click Clear All.**

## To Create A Data Validation Input Message

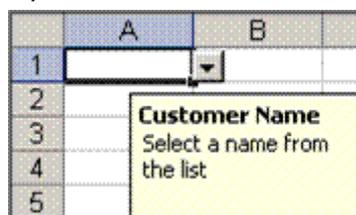
A data input message can be set for each cell that is validated. As soon as the cell is selected the **Input Message** box is displayed. An option **not** to display the message is also contained within the dialogue box.

- ✓ From the **Data Validation** dialogue box, select the **Input Message** tab



*Data Validation dialogue box - Input Message tab*

- ✓ In the **Title:** box, enter a title for the message window
- ✓ In the **Input Message:** box, type the message about entering data in the cell
- ✓ Click **OK**
- ✓ The **Input** message is displayed as soon as the cell is selected.



*Input Message*

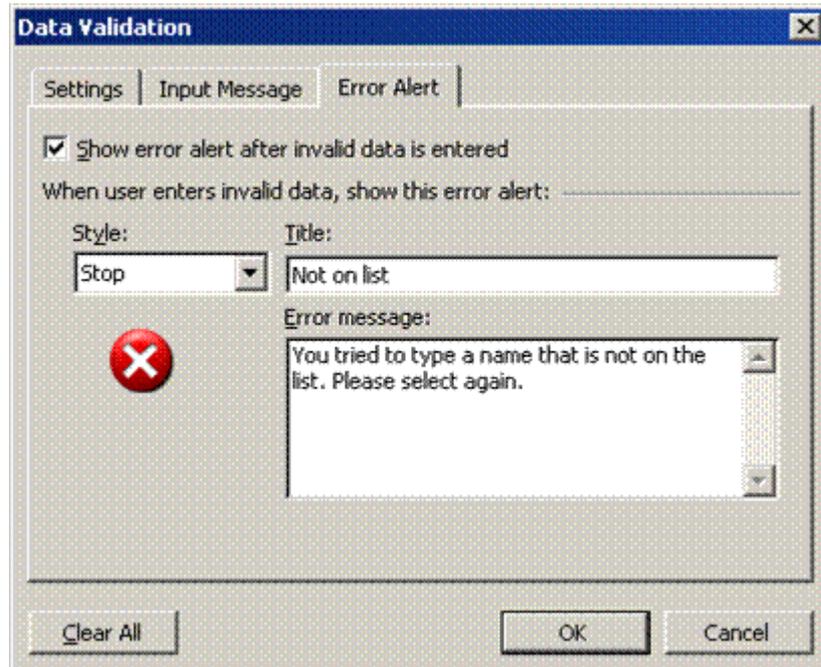
## To Create A Data Validation Error Message

An error message can be set for each validated cell. There are three types of error message.

- ✓ **Stop** will not accept an incorrect entry at all.
- ✓ **Warning** allows an incorrect entry to be accepted or rejected.
- ✓ **Message** displays the message and accepts the incorrect entry.

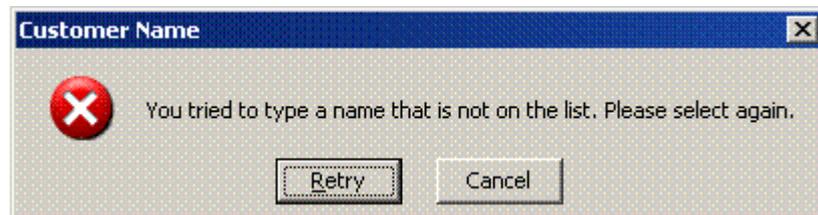
As soon as data entry is completed, if it is not within the allowable range, the **Error Alert** message box is displayed. An option **not** to display the message is also contained within the dialogue box.

- ✓ From the **Data Validation** dialogue box, select the **Error Alert** tab



*Data Validation dialogue box - Error Alert tab*

- ✓ In the **Style:** box, select the message type
- ✓ In the **Title:** box, enter a title for the message window
- ✓ In the **Error message:** box, type a helpful message describing the error and how to correct it
- ✓ Click **OK**
- ✓ When incorrect data is entered into the cell the error message is displayed.



*Data Validation message*

## Validate A Worksheet

If you choose to **allow** invalid entries, you can highlight them on the worksheet.

## To Highlight Invalid Data

- ✓ From the **Tools** menu select **Formula Auditing** then from the submenu, select **Show Formula Auditing Toolbar**
- ✓ The **Formula Auditing** toolbar is displayed.
- ✓ Click the **Circle Invalid Data** button 
- ✓ A red circle is displayed around cells containing invalid data.

	A	B	C	D
	<i>Salary/</i>			
1	<i>Shift</i>	<i>Staff</i>	<i>Shifts</i>	<i>Cost</i>
2	£40.00	John	6	£240.00
3	£40.00	Terry	7	£280.00
4	£50.00	Sally	0	£0.00
5	£40.00	Sunni	8	£320.00
6	£30.00	Margaret	7	£210.00
7	£30.00	Thomas	9	£270.00
8	£40.00	Janine	0	£0.00
9	£30.00	Stephanie	7	£210.00
10	£40.00	Roderick	0	£0.00
11	<i>Total Cost</i>			<b>£1,530.00</b>
12	<i>Shifts Required</i>			41
13	<i>Shifts Worked</i>			44

*Invalid data highlighted*

## To Remove Invalid Data Highlights

- ✓ Correct the entry in the cell then click **Circle Invalid Data**  again

**OR**

- ✓ On the **Formula Auditing** toolbar, click **Clear Validation Circles** 

The red circles are removed from around all cells containing invalid data, but the data in them remains unchanged.

## Exercise 29

- ✓ Open the workbook **VALIDATION**
- ✓ In cell **B7** (Overheads Growth) create a validation entry
- ✓ Set these validation settings: Whole Number, Less than 1; and switch off **Ignore blank**
- ✓ Set the **Input Message** title to "Input Overheads" and the message to "Enter a fraction such as .15, or a percentage such as 15%"
- ✓ Set the **Error Alert** to **Stop**; title to "High Overheads", and the message as "Unrealistic figure, please re-enter."
- ✓ In cell **B7** enter the number **2**
- ✓ Reset the validation **Error Alert** to **Warning**
- ✓ In cell **B7** enter the number **2**, and accept the number
- ✓ Display the **Formula Auditing** toolbar
- ✓ Use the **Circle Invalid Data** button  to highlight the number 2 in cell **B7**

- ✓ Close the file *without* saving it

To distribute data to people who do not have access to the Microsoft Excel application (or are using a different version of it), you can save a workbook in a different file format to allow them to open and edit it in whatever spreadsheet software they have.

## ***Save A Workbook As A Template***

If you select ***Template*** from the ***Save as type:*** box, the workbook will be saved as a template in the Office ***Templates*** folder. You can use the template to create new workbooks, containing the same data, formulas, and formatting as the original.

## ***Working With Functions***

Excel's functions are built-in calculation tools that perform complex financial, statistical or analytical calculations, assist in decision-making and create or manipulate text. Although you can enter many of these functions manually as a formula, using built-in functions can help reduce errors.

You worked with the =SUM function in a previous session when you added using Autosum and Paste Function. A function is a predefined formula designed to make life easier by doing a common or a complicated task. If there is no pre-defined functions available, you can enter a formula.

### FORMULA

=A1+A2+A3+A4

=A8-A10

(A1+A2+A3+A4+A5)/5

### FUNCTION

=SUM(A1:A7)

No function available, use the formula

=AVG(A1:A5)

## **Function Format**

Each function consists of the equal (=) sign, the function name and the arguments. Arguments are cells used for carrying out of the calculation. The most common argument type is numeric, but arguments can also be text, values, dates, time or arrays. The general format of a function is:

=FUNCTION-NAME(ARGUMENT1, ARGUMENT2....)

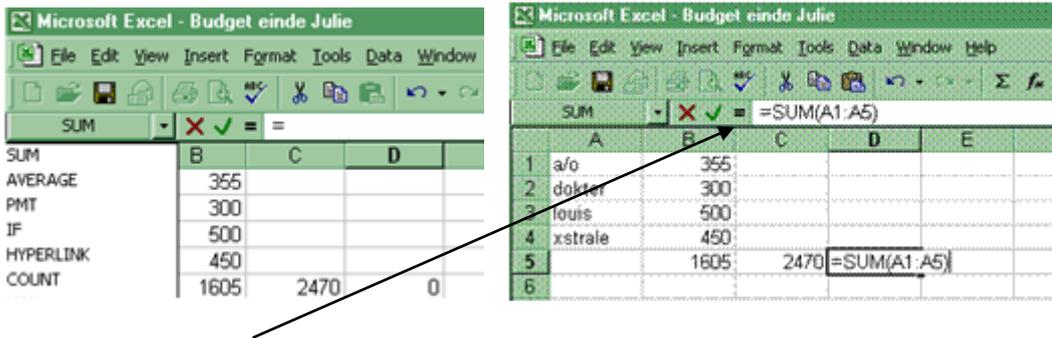
Note that spaces are not used and that a comma separates the arguments if there are more than one. The function name must be one of the pre-defined functions available in Excel, there are more than 200.

Arguments are the specifications that tell Excel on which data it must perform the function. In the =SUM function, the argument was the range which was to be summed.

## **Entering Functions**

In the active cell, type =, followed by the function name, followed by an open parenthesis. Then specify the cell or range of cells you want the function to use, followed by a closed parenthesis. Press Enter to display the result of the formula in the cell. See what happens to the Name box and the formula bar when you do this.

=SUM(A1:D1)



## Create a function by pointing

- ✓ Click on the = on the formula bar
- ✓ Select a function from the Name box.

## ***Basic Mathematical Functions***

### **SUM**

Adds all the numbers in a range of cells.

#### ***Syntax***

SUM(number1,number2, ...)

Number1, number2, ... are 1 to 30 arguments for which you want the total value or sum.

#### ***Remarks***

- ✓ Numbers, logical values, and text representations of numbers that you type directly into the list of arguments are counted. See the first and second examples following.
- ✓ If an argument is an array or reference, only numbers in that array or reference are counted. Empty cells, logical values, text, or error values in the array or reference are ignored. See the third example following.
- ✓ Arguments that are error values or text that cannot be translated into numbers cause errors.

### **ROUND**

Rounds a number to a specified number of digits.

#### ***Syntax***

ROUND(number,num\_digits)

Number is the number you want to round.

Num\_digits specifies the number of digits to which you want to round number.

#### ***Remarks***

- ✓ If num\_digits is greater than 0 (zero), then number is rounded to the specified number of decimal places.
- ✓ If num\_digits is 0, then number is rounded to the nearest integer.
- ✓ If num\_digits is less than 0, then number is rounded to the left of the decimal point.

## Example

	A	B
1	<b>Formula</b>	<b>Description (Result)</b>
2	=ROUND(2.15, 1)	Rounds 2.15 to one decimal place (2.2)
3	=ROUND(2.149, 1)	Rounds 2.149 to one decimal place (2.1)
4	=ROUND(-1.475, 2)	Rounds -1.475 to two decimal places (-1.48)
5	=ROUND(21.5, -1)	Rounds 21.5 to one decimal place to the left of the decimal point (20)

## INT

Rounds a number down to the nearest integer

### Syntax

INT(number)

Number is the real number you want to round down to an integer.

### Example

	A	
1	<b>Data</b>	
2	19.5	
	<b>Formula</b>	<b>Description (Result)</b>
	=INT(8.9)	Rounds 8.9 down (8)
	=INT(-8.9)	Rounds -8.9 down (-9)
	=A2-INT(A2)	Returns the decimal part of a positive real number in cell A2 (0.5)

## Statistical Functions

Statistical functions perform different counting operations on data.

When using these functions, you should be aware of different types of empty values that a cell can hold:

- ✓ Blank - blank cells contain no data at all.
- ✓ Empty text - resulting from a formula that assigns a null text string ("") to a cell.
- ✓ Zero - a cell storing the value 0 (zero).

Different functions may treat either empty text or zero-value cells or both as blanks.

## Use Counting Functions

Variations on the COUNT function allow you to calculate the number of values used in a range.

### COUNT function

**COUNT** (*value1, value2, ...*) returns the number of numbers supplied by the Value1, Value2... arguments. A "number" is a numeric value, a date or time, or text representing a number (for example, "two" is included in the result). Other text, logical values, errors, and blank cells are not included in the result. Arguments are typically cell ranges, but you can supply any type of value if necessary. You can include up to 30 arguments.

In the example below, in cells F3 and G3, the COUNT function is being used to count valid values in D3:D10 and E3:E10 respectively (**=COUNT(D3:D10)**). Note that zero values (E7 and E9) are counted, but text (D7) and blanks (D10) are not.

	A	B	C	D	E	F	G	
1	<b>Weekly Charge Sheet</b>							
2	<b>Name</b>	<b>Job Code</b>	<b>Hours</b>	<b>Hourly Rate</b>	<b>Charges</b>	<b>Values in D</b>	<b>Values in E</b>	
3	Jolly, R	P	40	30.00	1200.00	6	8	
4	Smith, P	M	24	27.00	648.00			
5	Newman, C	A	32	18.50	592.00			
6	Leen, V	A	35	18.50	647.50			
7	Taylor, R	C	40	Code?	0.00			
8	Robinson, M	A	40	18.50	740.00			
9	Richards, A	P	0	30.00	0.00			
10	<b>Total</b>		<b>211</b>		<b>3827.50</b>			

**Tip**      *COUNT is equivalent to PURECOUNT in Lotus 1-2-3.*

### COUNTA function

**COUNTA** (*value 1, value 2, ...*) works like COUNT, but includes any type of value (including text and error messages) in the result. The only values **not** counted are blank cells.

In the example below, COUNTA is being used in place of COUNT. Cell D7 is now being counted as a value even though it is a text value. D10 is still excluded because it is blank.

	A	B	C	D	E	F	G	
1	<b>Weekly Charge Sheet</b>							
2	<b>Name</b>	<b>Job Code</b>	<b>Hours</b>	<b>Hourly Rate</b>	<b>Charges</b>	<b>Values in D</b>	<b>Values in E</b>	
3	Jolly, R	P	40	30.00	1200.00	7	8	
4	Smith, P	M	24	27.00	648.00			
5	Newman, C	A	32	18.50	592.00			
6	Leen, V	A	35	18.50	647.50			
7	Taylor, R	C	40	Code?	0.00			
8	Robinson, M	A	40	18.50	740.00			
9	Richards, A	P	0	30.00	0.00			
10	<b>Total</b>		<b>211</b>		<b>3827.50</b>			

## COUNTIF function

**COUNTIF** (*range, criteria*) counts the number of values within the **range** that meet the given **criteria**. Criteria can be a number, text, or expression.

	A	B	C	D	E	F
1	<b>Weekly Charge Sheet</b>					
2	<b>Name</b>	<b>Job Code</b>	<b>Hours</b>	<b>Hourly Rate</b>	<b>Charges</b>	<b>"A" Job Codes</b>
3	Jolly, R	P	40	30.00	1200.00	3
4	Smith, P	M	24	27.00	648.00	
5	Newman, C	A	32	18.50	592.00	
6	Leen, V	A	35	18.50	647.50	
7	Taylor, R	C	40	Code?	0.00	
8	Robinson, M	A	40	18.50	740.00	
9	Richards, A	P	0	30.00	0.00	
10	<b>Total</b>		<b>211</b>		<b>3827.50</b>	

In the example, in cell **F3** the **COUNTIF** function counts the number of cells in the range **B3:B9** that contain the text "A" (**=COUNT(B3:B9,"A")**).

## Use Averaging Functions

### AVERAGE and AVERAGEA functions

**AVERAGE** (*value 1, value 2, ...*) returns the average (or **mean**) value. It can take up to 30 arguments. If an argument is non-numeric, the value is ignored and does not affect the result.

**AVERAGEA** is the same, except that it treats text and blank cells as zero. True values are equivalent to 1; false values to zero.

	A	B	C	D	E	F	G
1	<b>Weekly Charge Sheet</b>						
2	<b>Name</b>	<b>Job Code</b>	<b>Hours</b>	<b>Hourly Rate</b>	<b>Charges</b>	<b>Average Rate</b>	<b>AverageA Rate</b>
3	Jolly, R	P	40	30.00	1200.00	23.75	20.36
4	Smith, P	M	24	27.00	648.00		
5	Newman, C	A	32	18.50	592.00		
6	Leen, V	A	35	18.50	647.50		
7	Taylor, R	C	40	Code?	0.00		
8	Robinson, M	A	40	18.50	740.00		
9	Richards, A	P	0	30.00	0.00		
10	<b>Total</b>		<b>211</b>		<b>3827.50</b>		

AVERAGE compared with AVERAGEA

In the example above, the text value "Code?" is ignored by AVERAGE but treated as zero by AVERAGEA, explaining the difference in results.

## Use Other Statistical Functions

Except for LARGE, the following functions all take up to 30 arguments.

<b>Functions</b>	<b>Notes</b>
MIN MINA	Returns the smallest value from its arguments. MINA treats text, blanks, and FALSE values as zero; TRUE values as 1. MIN ignores non-numeric values.
MAX MAXA	Returns the largest value from its arguments. MAXA treats text, blanks, and FALSE values as zero; TRUE values as 1. MAX ignores non-numeric values.
LARGE(range, n)	Returns the n-th largest value in the range (where n = 1, the largest value is returned). #NUM error is returned if n is greater than the number of values in the range.
MEDIAN	Returns the value in the middle of its arguments.
MODE	Returns the most frequently occurring value from its arguments.
STDEV STDEVA	Estimates the standard deviation (that is, a value measuring how far values in the sample are spread from the average (mean) value). The lower the standard deviation, the less spread out the values in the sample are. Standard deviation is used to compare sets of data.

### Exercise 30

- ✓ Open the workbook **GRADES**
- ✓ (1) Create a formula in A2 to calculate the number of A grades achieved by students (range **D33:AC152**), using relative or absolute references so that you can fill the formula across to G2 accurately
- ✓ (2) In B3, create a formula to show what percentage of the total passes at that grade represent, then fill the formula across to G2
- ✓ (3) In A4, create a formula to count the number of A passes, using an IF formula to insert a zero-length string ("") if the result is 0
- ✓ Copy the formula in A4 down to row 29 then use Find and Replace to adjust the column reference in each cell
- ✓ Copy the formulas in B4:B29 to column G, making sure that the absolute/relative cell referencing you have used produces correct results (alternatively, you could use named ranges or labels if you know how)
- ✓ (4) Assuming A=10pts, B=8pts, C=6pts, D=4pts, and E=2pts, create a formula and fill down B33:A152 to calculate the number of points scored by each student
- ✓ (5) Create a formula in I1 to calculate the number of students
- ✓ (6) Create formulas in I2 and I3 to calculate what percentage of total entrants achieved passes graded from A-C and A-E

- ✓ (7) Create a formula to work out the average number of passes at grades A-C for any given subject - **do not** treat empty cells as zero values
- ✓ (8) Create formulas in I5 and I6 to show the highest and lowest student points totals
- ✓ Save and close the workbook

# **SOLVE A BUSINESS PROBLEM**

## ***Specific Outcome***

Use a computer spreadsheet file to solve a business problem

## ***Assessment criteria***

- ✓ Cell ranges within the spreadsheet are charted to meet user requirements
- ✓ The problem is solved by the spreadsheet created
- ✓ "What if" exercises are applied to the spreadsheet in order to accommodate changes in requirements
- ✓ Where available, the use of the onscreen help facility is demonstrated
- ✓ File management techniques are demonstrated in terms of creating, naming, saving, copying, renaming, deleting, locating directory (folder), displaying directory contents printing and relocating
- ✓ The file is previewed and printed using page setup appropriate to the layout: Showing gridlines, setting printing range, shrinking to one page, alignment. Headers and footers

# ***Create And Edit A Graph/Chart***

## **Chart Types**

When planning a chart, one of the main decisions to make is to choose the chart type. There are fourteen main types to choose from in Excel. The following are the most commonly used types:

<b>Bar chart</b>	to compare values
<b>Column or Line</b>	to compare values often over a period of time
<b>Area</b>	to compare values over time and show how the total value breaks down
<b>Pie</b>	to show how a total breaks down

## **Uses of charts**

Bar Chart	Compares measurements at intervals, the bars run horizontally
Column Chart	Compares measurements at intervals and provide a view of data at a specific time - a snapshot. Column charts are available in 2-D and 3-D format. The bars run vertically. They are stacked and 100% stacked types are available.
Line Charts	Show the changes in data or trends over a given period of time. They are used to emphasize rather than compare.
Pie Charts	Show the breakdown of a total. The pie can be exploded into slices to emphasize certain data.
XY (Scattered Charts)	Show a degree of correspondence between two series of numbers. These are scientific charts.
Area Charts	Show the amount of change in a set of values over a specific interval of time. They are similar to line charts but are used to emphasize the rate of change rather than the amount of change
Doughnut Charts	Display several series of data in successive rings, as opposed to a Pie Chart that will only display single data series
Radar Charts	Display the best and worst combinations of values. Colours and patterns are used to designate areas with the same value.
Bubble Charts	Are used in the same way as an XY Scatter chart, only displaying bubbles of different sizes at the data points to indicate the value of a third number.

## **Plotting a chart**

Data for a chart has to be laid out in a table with column and row headings, but you do not have to select all the data. Bar, column and line charts are made up of:

- ✓ The data series (the values that are plotted),
- ✓ The value axis (displaying the range of values in the data series)

- ✓ And the category axis (displaying the range of items providing the values)

## Create a chart

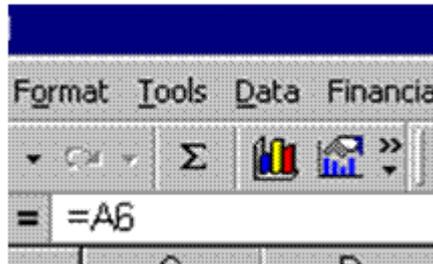
- ✓ You can create either an embedded chart or a chart sheet.
- ✓ Select the cells that contain the data that you want to appear in the chart.
- ✓ If you want the column and row labels to appear in the chart, include the cells that contain them in the selection.
- ✓ Click **Chart Wizard**
- ✓ Follow the instructions in the Chart Wizard.

### **Create a chart from nonadjacent selections**

- ✓ Select the first group of cells that contain the data you want to include.
- ✓ While holding down CTRL, select any additional cell groups you want to include.
- ✓ The nonadjacent selections must form a rectangle.
- ✓ Click **Chart Wizard**
- ✓ Follow the instructions in the Chart Wizard.

### **Create a chart in one step**

- ✓ To create a chart sheet that uses the default chart type, select the data you want to plot, and then press F11.
- ✓ To create an embedded chart that uses the default chart type, select the data you want to plot, and then click **Default Chart**. If the **Default Chart** button is not available, add it to a toolbar.
- ✓ When you create a chart using this quick procedure, the default chart type for Microsoft Excel is used. The default chart type is a column chart, unless you have changed it.



## Edit Chart Elements

The individual chart elements can also be selected and customised, for example the font, scale, colour and size.

### **Change chart labels, titles, and other text**

Most chart text — such as category axis labels, data series names, legend text, and data labels — is linked to the cells on the worksheet used to create the chart. If you edit the text of these items on the chart, they are no longer linked to the worksheet cells. To change the text of these items and maintain links to worksheet cells, edit the text on the worksheet.

- ✓ To change legend text or data series names on the worksheet, click the cell that contains the data series name you want to change, type the new name, and then press ENTER.
- ✓ To change legend text or data series names on the chart, click the chart, and then click **Source Data** on the **Chart** menu. On the **Series** tab, click the data series names you

want to change. In the **Name** box, specify the worksheet cell you want to use as the legend text or data series name. You can also type the name you want to use.

- ✓ If you type a name in the **Name** box, the legend text or data series name is no longer linked to a worksheet cell.
- ✓ To change data labels on the worksheet, click the cell that contains the information you want to change, type the new text or value, and then press ENTER.
- ✓ To change data labels on the chart, click once on the data label you want to change to select the data labels for the entire series, and then click again to select the individual data label. Type the new text or value, and then press ENTER.
- ✓ If you change the data label text on the chart, it is no longer linked to a worksheet cell.
- ✓ To change category axis labels on the worksheet, click the cell that contains the label name you want to change, type the new name, and then press ENTER.
- ✓ To change category axis labels on the chart, click the chart, and then click Source Data on the Chart menu. In the Category axis labels box on the Series tab, specify the worksheet range you want to use as category axis labels. You can also type the labels you want to use, separated by commas, for example: Division A, Division B, Division C
- ✓ If you type the label text in the Category axis labels box, the category axis text is no longer linked to a worksheet cell.

### Ways to select chart items

- ✓ To select a chart item by using the mouse, do one of two things:
- ✓ Click the chart item you want. Data series, data labels, and the legend have individual elements that can be selected after you select the group. For example, to select a single data marker in a data series, click the data series, and then click the data marker. Microsoft Excel displays the name of a chart item in a tip when you rest the pointer over the item if you have the **Show names** check box selected (**Tools** menu, **Options** command, **Chart** tab).
- ✓ Click the chart, click the arrow next to the **Chart Objects** box on the **Chart** toolbar, and then click the item you want

### Edit chart and axis titles

- ✓ Click the title you want to change.
- ✓ Type the new text you want.
- ✓ Press ENTER.

### Select a different chart type

For most 2-D charts, you can change the chart type of either a data series or the entire chart. For bubble charts, you can change only the type of the entire chart. For most 3-D charts, changing the chart type affects the entire chart. For 3-D bar and column charts, you can change a data series to the cone, cylinder, or pyramid chart type.

- ✓ Do one of the following:
- ✓ To change the chart type of the entire chart, click the chart.
- ✓ To change the chart type of a data series, click the data series.
- ✓ On the **Chart** menu, click **Chart Type**.
- ✓ On the **Standard Types** or **Custom Types** tab, click the chart type you want.
- ✓ To apply the cone, cylinder, or pyramid chart type to a 3-D bar or column data series, click **Cylinder**, **Cone**, or **Pyramid** in the **Chart type** box on the **Standard Types** tab, and then select the **Apply to selection** check box.

## Default Charts

The default chart type for Microsoft Excel is a column chart, unless you are creating a PivotChart report, in which case the default chart type is a stacked column chart. If you routinely create a different type of chart, such as a line chart, you can change the default chart type. If you already have a chart that has the chart type, items, and formatting you want, you can use that chart as the default chart type.

### ***Change the default chart type***

- ✓ To activate the **Chart** menu, click a chart.
- ✓ On the **Chart** menu, click **Chart Type**.
- ✓ On the **Standard Types** or **Custom Types** tab, click the chart type you want.
- ✓ The **Custom Types** tab lists the current default chart, the built-in custom chart types, and any custom chart types you've added. You can create a chart with the chart type, items, and formatting you want and then save it as a custom chart type.
- ✓ Click **Set As Default Chart**, and then click **Yes**.
- ✓ To close the dialog box without changing the chart type of the current chart, click **Cancel**.
- ✓ To close the dialog box and change the chart type of the current chart, click **OK**.

### ***Use the selected chart as the default chart type***

- ✓ Click the chart you want to use as the default chart type.
- ✓ On the **Chart** menu, click **Chart Type**.
- ✓ On the **Custom Types** tab, click **Set As Default Chart**, and then click **Yes**.
- ✓ If the **Add Custom Chart Type** dialog box appears, type a name in the **Name** box, type a description in the **Description** box, and then click **OK**.

## Format a chart

In Office, you can use either Excel or the add-in application Microsoft Graph to create charts. Both types of chart can be inserted in a file as an object. The tools used to modify and format charts using the Excel chart editor or the Graph chart editor are very similar.

Formatting a chart allows you to make data series more distinctive, add extra information (such as data values and labels), or simplify a chart by removing unnecessary elements.

**Note** *In the following topics, all references to the Chart toolbar can be taken to apply to the Standard Graph toolbar as well.*

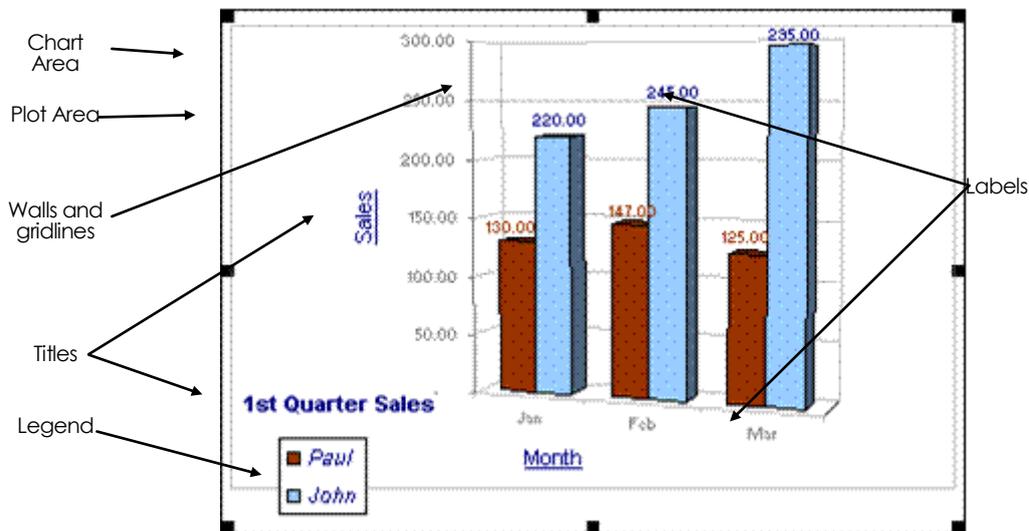
## Add or Remove Chart Elements

Aside from the graph itself, most charts contain additional elements that make the chart easier to read and interpret.

## Chart Elements

Some of the more common elements of a basic chart are listed in the table below:

Element	Use
Chart Area	A collection of all the individual elements making up the chart (the chart "background").
Plot Area	The series, axes, and labels. The plot area is useful for moving or resizing the "data" area of the chart.
Legend, Titles, and Labels	Resize, reposition, and format the legend, titles, and labels.
Series and Values	Format the values making up the chart data.
Walls, Floor, Corners, and Gridlines	Format the area directly behind the plotted values.



*Example chart elements*

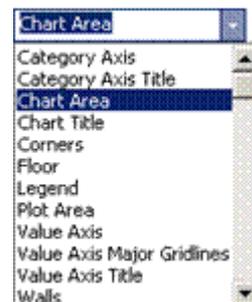
### To select a chart element

- ✓ Click the chart element you want to select

**OR**

- ✓ On the **Chart** toolbar, click the arrow on the **Chart Objects** box and select the object from the list

Black selection handles are shown around the object.



*Chart Objects button*

**Tip** To select individual data points in a data series, click the series once then click the data point.

### To resize a chart element

- ✓ You can click-and-drag on the handles of any of the chart elements to resize or modify them

For example, dragging the corner handles of a 3D chart changes the perspective.

### To delete a chart element

- ✓ Most chart elements can be removed by selecting them and pressing **Delete**

### To add or remove titles

The range of options available for a chart depends on the chart type. Typically, you can add titles and labels to identify the chart, axes, data series, and data points. You can also choose whether to show or hide gridlines.

- ✓ Open the chart object or select the chart sheet
- ✓ From the **Chart** menu, select **Chart Options...**

The **Chart Options** dialogue box is displayed.

- ✓ Click the **Titles** tab

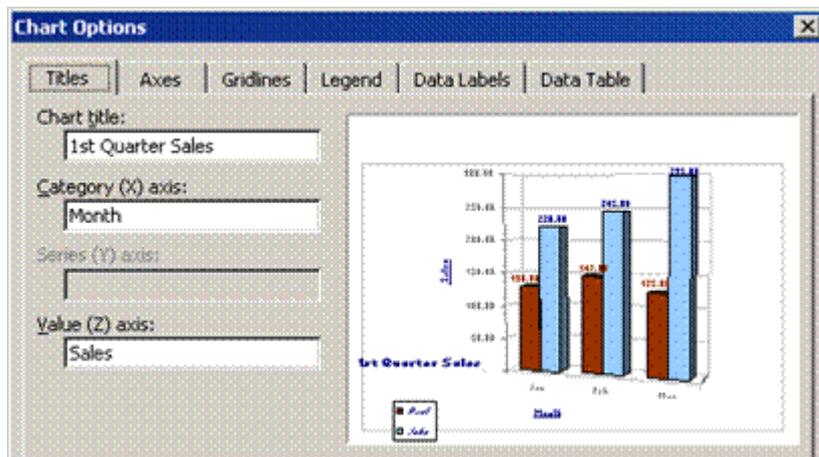


Chart Options - Titles dialogue box

- ✓ In the **Chart title:** box, type a chart title
- ✓ If you want, in the **Category (X) axis:** box, type a title for the X (horizontal) axis
- ✓ If you want, in the **Value (Z) axis:** box, type a title for the Z (vertical) axis

**Note** To remove a title, delete the text in the box.

### To add data labels

Data labels mark the exact value or percentage represented by a data point. Data labels are often used in bar or column charts to pinpoint values when data points are close together. Data labels are also commonly used in pie charts to identify the exact percentage represented by each pie slice.

- ✓ Click once on the chart object or chart sheet
- ✓ From the **Chart** menu, select **Chart Options...** then click the **Data Labels** tab

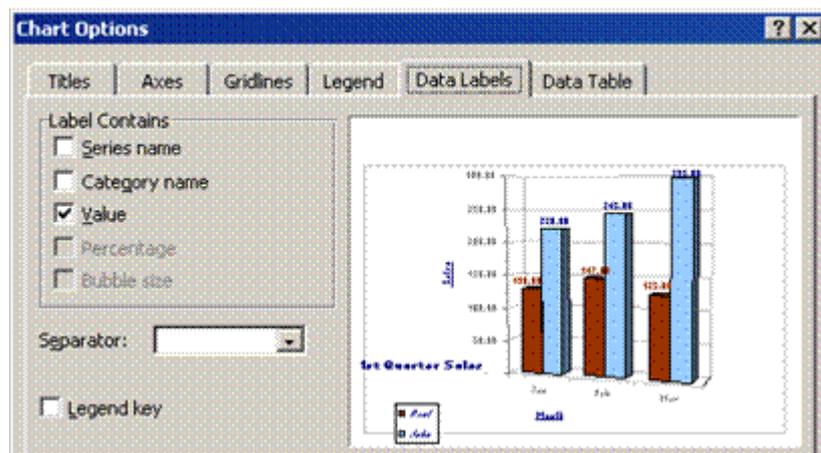


Chart Options - Data Labels dialogue box

- ✓ De-select the check boxes to remove any data labels
- ✓ Click **Value** to display a value next to each data point
- ✓ Click **Series name** or **Category name** to display the category label next to the data point
- ✓ Click **OK**

**Tip** Use the Data Table **tab** to show the chart's source data.

### **To add, remove, and change the position of a legend**

A legend uses colour-coded boxes to identify the data series in a chart. If the North data series is represented in a bar chart by blue bars, for example, the legend shows a small blue box next to North.

- ✓ Click once on the chart object or chart sheet
- ✓ From the **Chart** menu, select **Chart Options...** then click the **Legend** tab

The **Legend** tab in the **Chart Options** dialogue box is displayed.

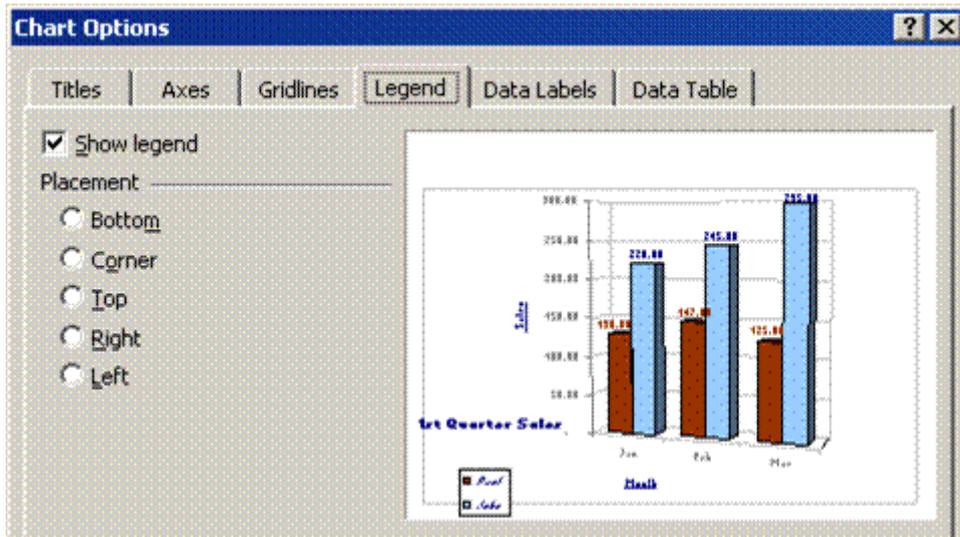


Chart Options - Legend dialogue box

- ✓ To show or hide the legend, check or uncheck the **Show legend** box
- ✓ From the **Placement** options select a new position for the legend
- ✓ Click **OK**

### To show or hide axes and gridlines

If a chart shows data labels, you might prefer to hide one or both axes. Gridlines help to compare data, but you may prefer to get a "cleaner" look by hiding them.

- ✓ Click once on the chart object or chart sheet
- ✓ From the **Chart** menu, select **Chart Options...** then click the **Axes** tab
- ✓ Check or clear the **Category (X) axis** and/or **Value (Y) axis** boxes to show or hide the horizontal and/or vertical axis respectively

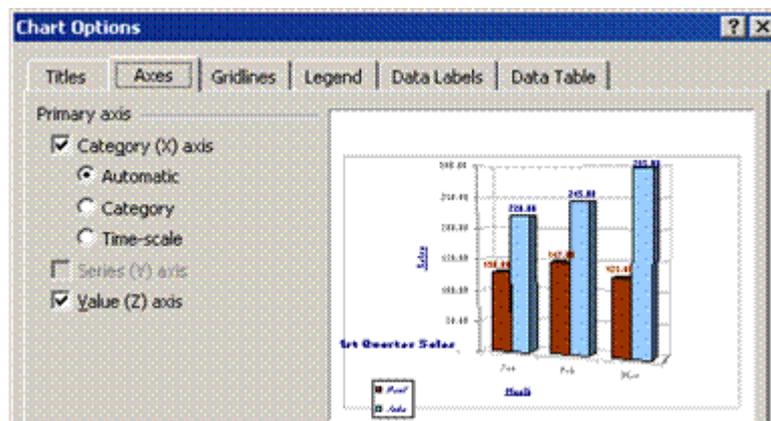


Chart Options - Axes dialogue box

- ✓ Click the **Gridlines** tab

Major gridlines mark out the values shown on the axes. Minor gridlines mark out values **between** the major gridlines.

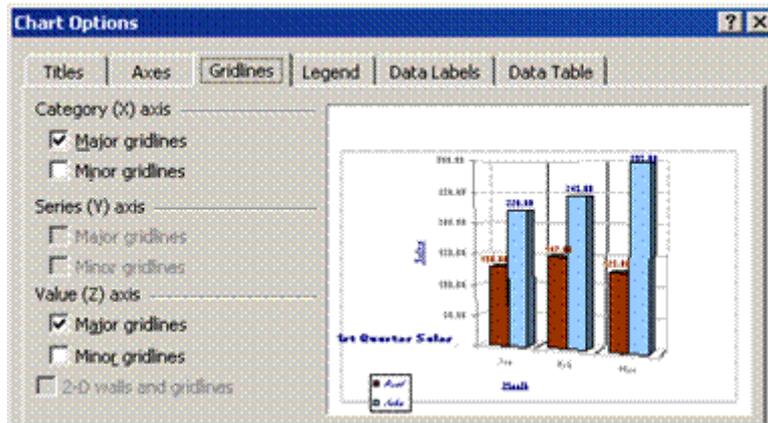


Chart Options - Gridlines dialogue box

- ✓ Select or de-select check boxes for the gridlines you want to show or hide
- ✓ Click **OK**

**Tip** *The range of values used for gridlines is determined automatically. You can adjust it by formatting the chart axis (see below).*

## Modify the Formatting of a Chart

For each chart type, the individual elements of the chart can be selected and customised, for example, the font, scale, colour, and size.

Basic font, fill, and line changes can be made using the **Formatting** toolbar. Alternatively, you can use the **Format Chart Object** dialogue box.

**Tip** *If the chart will be printed in black-and-white/greyscale, you should consider whether different colours used in a chart will be distinctive enough when printed. If producing a chart for greyscale printing, consider using fill pattern effects or grey fills and different line/borders. If you do use colours, make sure that they contrast strongly.*

### ***To edit chart elements using the Chart/Graph toolbar***

The **Standard Graph** toolbar (used to edit a Graph object) contains different buttons than the **Chart** toolbar (used in Excel).

Click	To	Click	To
<div style="border: 1px solid gray; padding: 2px;">Chart Area</div> Chart Objects	Select an element of the chart to format.	 Import File	(Graph Only) Import data into the datasheet from another file.

 Format Chart Objects	Display a dialogue box to format the selected chart object.	 View Datasheet	(Graph Only) Display the datasheet window, allowing you to add or edit data.
 Chart Type	Select a different chart type.	 Category Axis Gridlines	(Graph Only) Show or hide major gridlines for the category axis.
 Legend	Show or hide the chart legend.	 Value Axis Gridlines	(Graph Only) Show or hide major gridlines for the value axis.
 Data Table	Show or hide a table of the chart data below the chart.	 Angle Clockwise	Slope the selected text down.
 By Row	Plot the data series by row (the series label would normally come from the first value in the row).	 Angle Counterclockwise	Slope the selected text up.
 By Column	Plot the data series by column (the series label would normally come from the first value in the column).		

### ***To change the formatting of a chart element***

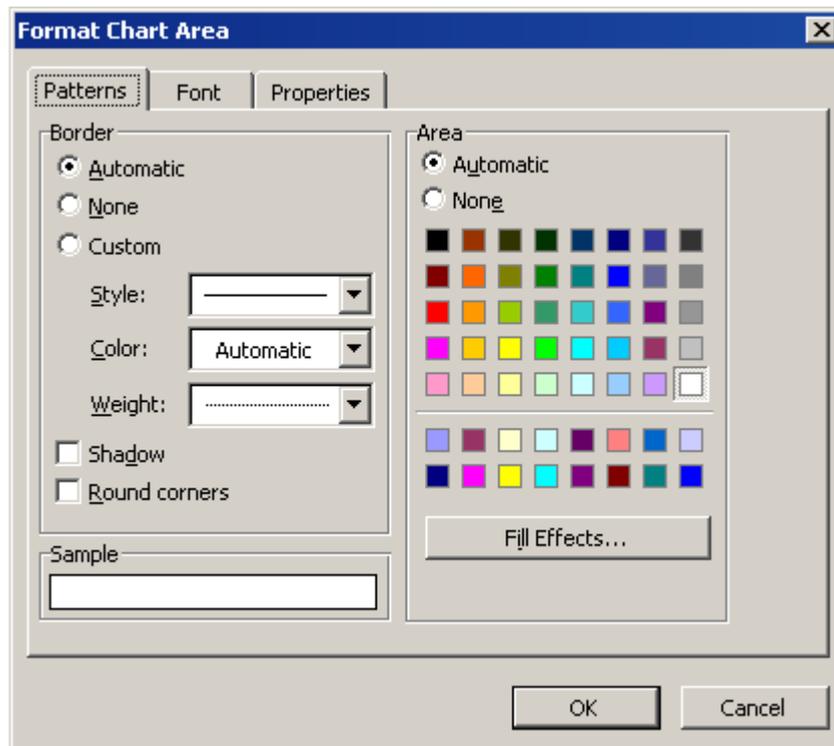
You can apply different line and shading colours to the most elements of a chart and change the colour of text. You can also apply different value formats to chart data.

- ✓ Select the chart element (by clicking on it or by selecting it from the **Chart** toolbar)
- ✓ On the **Chart** toolbar, click **Format Chart Objects** 

**OR**

- ✓ From the **Format** menu, select **Selected Element...** (SpeedKey: Ctrl + 1)

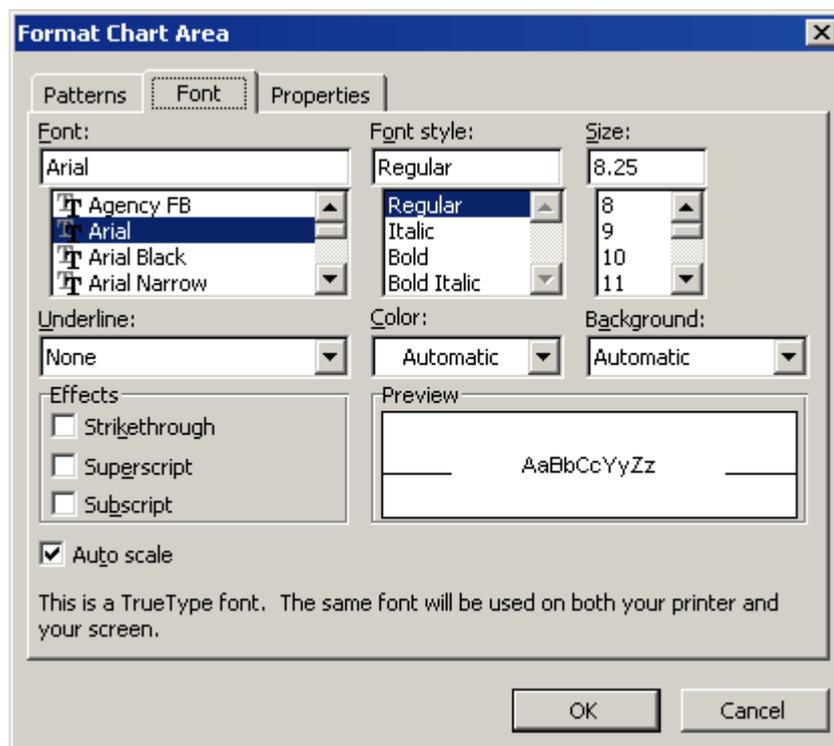
The **Format ChartElement** dialogue box is displayed.



Format dialog box - Patterns tab

The **Format** dialog box will have different tabs depending on which element is selected.

- ✓ Click the **Patterns** tab to change the line (border) and fill (area) colours and styles
- ✓ If the element has text associated with it, you can adjust the font and colour using the **Font** tab



Format dialog box - Font tab

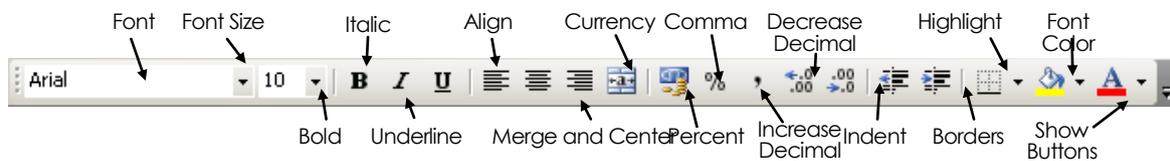
- ✓ Select the font formatting that you want to apply

- ✓ Set font colour and shading by choosing options from the **Color:** and **Background:** list boxes
- ✓ Optionally, to scale text automatically if you resize the chart, check the **Auto scale** box
- ✓ Click **OK**

**Tip** *If an element comprises of values of a specific data type, use the **Number tab** to adjust value formatting (for example, to display decimals, currency symbols, date/time formats, and so on).*

### **To change font and line/fill formatting of chart elements using the *Formatting toolbar***

- Select the chart element to be formatted
- On the **Formatting** toolbar, select the formatting option required



*Formatting toolbar (Excel)*

## Format a Chart Axis

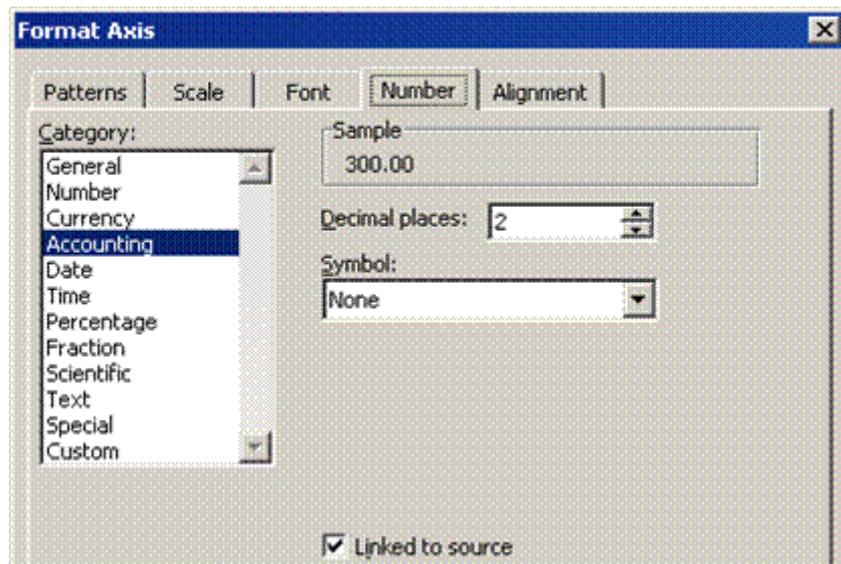
With an axis, you can adjust font (including text alignment) and line formatting and adjust the range of values shown (scale).

### **To change the formatting of values on an axis**

- ✓ To format labels on an axis, double-click on the axis

The **Format Axis** dialogue box is displayed.

- ✓ Select the **Number** tab



Format Axis dialogue box

- ✓ Set options as you would for a normal cell value format

**OR**

- ✓ Check the **Linked to source** box to use the value formatting used in the source cell(s)
- ✓ Once you have chosen the format you want to use, click **OK**

### **To modify the scale and display units of an axis**

In some circumstances, the scale of the value axis that is determined automatically may not be appropriate. For example, if a chart contains many low values and one very high value, you may want to cut off the high value in order to show the spread of low values in more detail.

If the axes of your chart consist of large number values, you can make the axis text shorter and more readable by changing how the units are displayed on the axis. For example, if the chart values range from 1,000 to 5,000, you can display the numbers as 1 to 50 on the axis and show a label that indicates that the units express thousands.

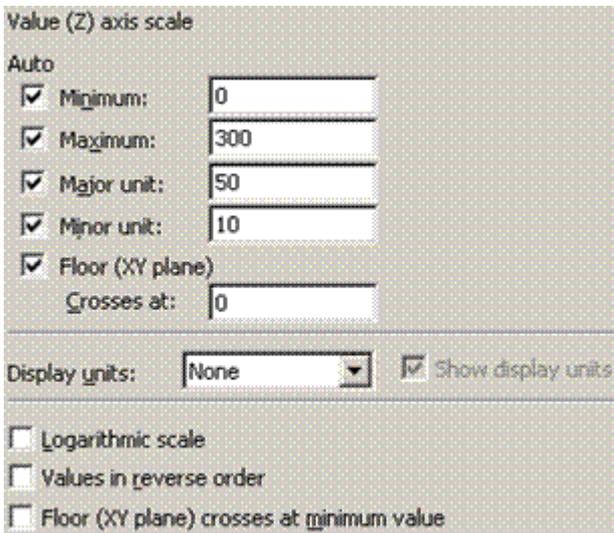
- ✓ Select the chart axis that you want to change
- ✓ From the **Format** menu, select **Selected Axis...** and click the **Scale** tab

The **Format Axis** dialogue box is displayed.

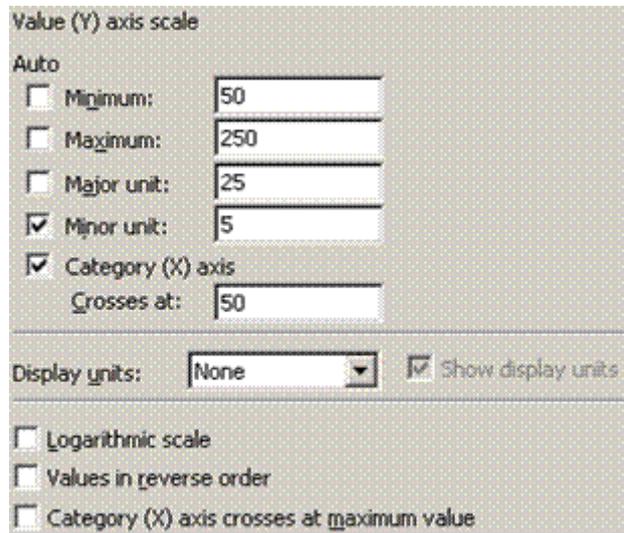
- ✓ Click the down arrow to the right of the **Display units:** box and select the appropriate option
- ✓ Select the **Show display units label on chart** check box

The **Minimum:** and **Maximum:** boxes allow you to enter the lowest and highest values you want to be displayed on the chart. Optionally, you can change the size of the units (which affect how gridlines are displayed).

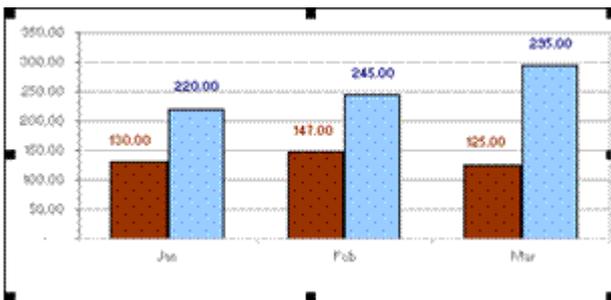
- ✓ Set the values you want
- ✓ Click **OK**



Original settings, producing the chart below...



New scale and maximum value produce this chart...



Original chart

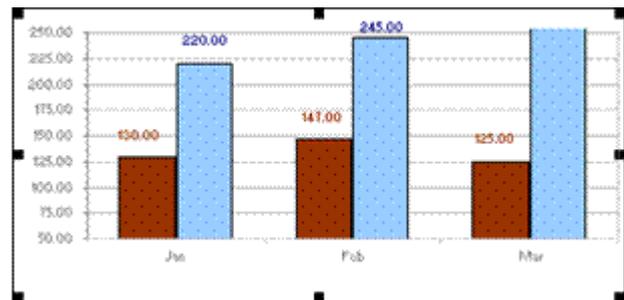


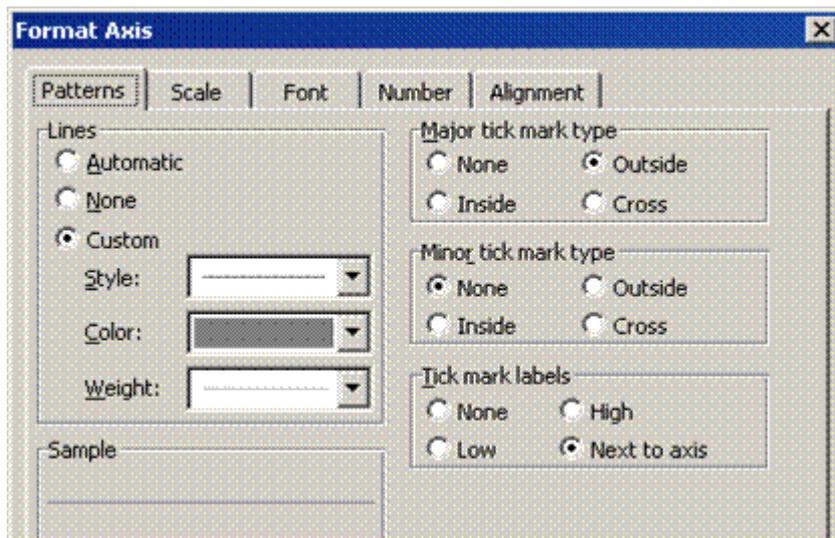
Chart with new settings applied

To modify the line width of chart axes

- ✓ Select the axis to format then on the **Chart** toolbar, click **Format Axis** (SpeedKey: **Ctrl** + **1**)

The **Format Axis** dialogue box is displayed.

- ✓ Click the **Patterns** tab
- ✓ Format Axis - Patterns dialogue box In the **Lines** panel, click the **Custom** option then select options from the **Style:**, **Color:** and **Weight:** (line width) list boxes
- ✓ Click **OK**



## Format a Data Series

When formatting data series, you need to make sure that each series is distinctive and consistent. If you are printing in black-and-white, consider using fill patterns as well as colours to identify each series.

You can apply different formatting to individual points within a data series (for example if you want to highlight a particularly high value) but in most cases, you should keep points within each series consistent.

### ***To change the series order***

In Excel (not Graph), you can modify the order in which data series are displayed.

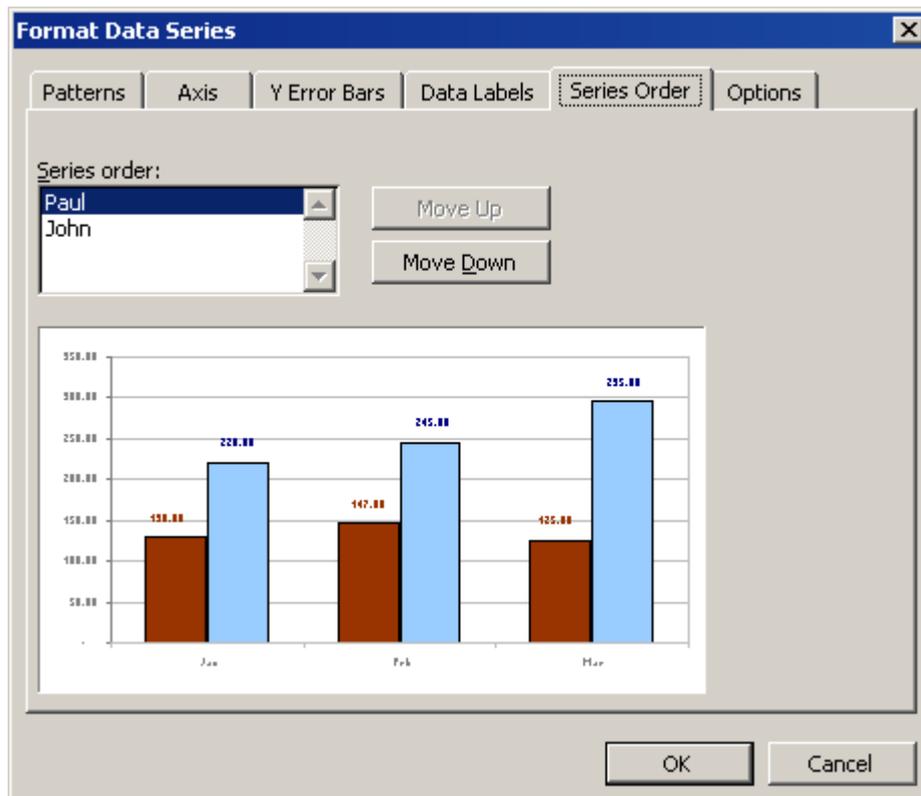
- ✓ Select a **Series** element (by clicking on it or by selecting it from the **Chart** toolbar)
- ✓ On the **Chart** toolbar, click **Format Chart Objects** 

### **OR**

- ✓ From the **Format** menu, select **Selected Data Series...** (SpeedKey: Ctrl + 1)

The **Format** dialogue box is displayed. The **Format** dialogue box will have different tabs depending on which element is selected. You can usually change things like the border or background colours, line colours and styles, font formatting and so on.

- ✓ Click the **Series Order** tab



Format Data Series dialogue box - Series Order tab

- ✓ Use the **Move Up** and **Move Down** buttons to change the series order
- ✓ Click **OK**

### **To widen the gap between columns/bars**

In a 2-D bar or column chart, you can change the **overlap** (or the amount of space between data series). You can also change the **gap width** (the distance between columns in different **categories**).

In a 3-D chart, you cannot change the overlap, but you can change settings for the **gap depth** (the amount by which the columns are offset from the **floor**) and the **chart depth** (the degree of perspective shown on columns).

You only need to select a single data series to re-format the whole chart.

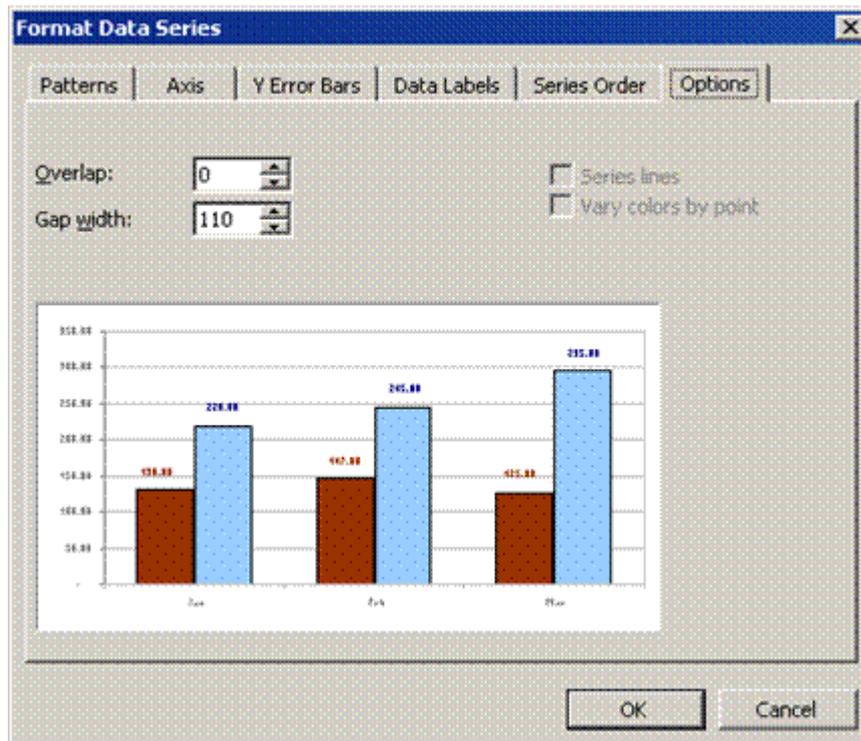
- ✓ Click once on the data series in the chart you want to change

This selects all of the columns in the series.

- ✓ From the **Format** menu, select **Selected Data Series...**

The **Format Data Series** dialogue box is displayed.

- ✓ Click the **Options** tab



Format Data Series - Options tab

- ✓ In the **Overlap:** box, enter a value between **-100** and **100**

The higher the value, the greater the overlap. Using a negative value inserts spaces between the columns within a category.

**OR**

- ✓ To change the amount of space between each **category**, in the **Gap width:** box enter a value of between **0** and **500**

The higher the value, the greater the amount of space between each category.

- ✓ Click **OK**



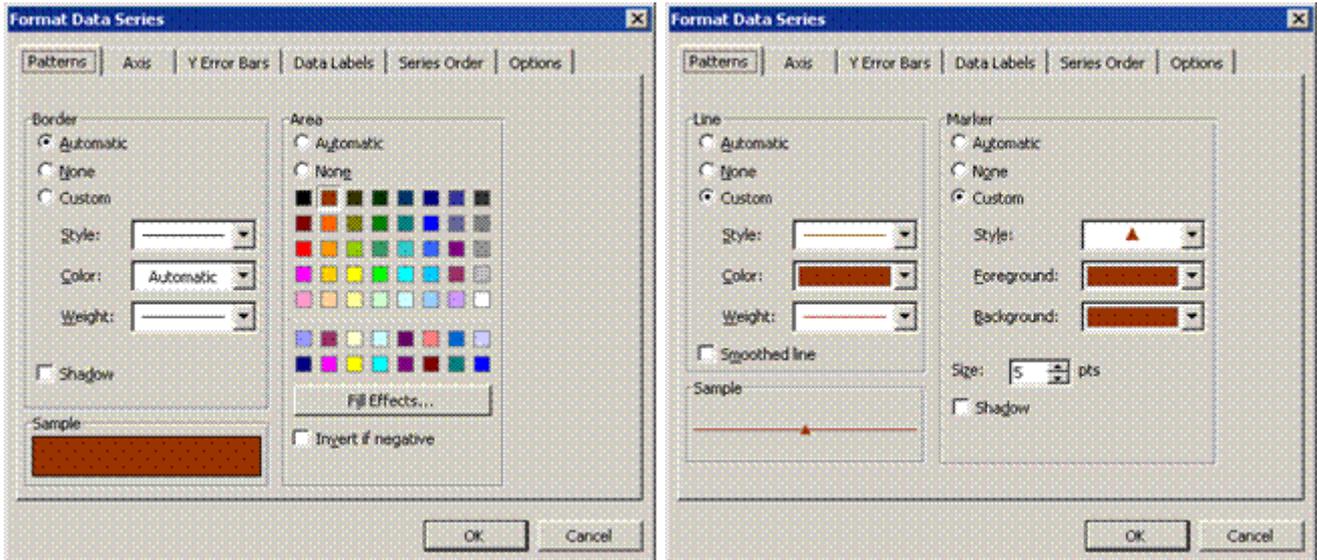
Overlap of 50 and Gap width of 25

**To change format data markers**

Bar, column, area, and pie charts have data markers that can be formatted with different border and fill colours and effects.

On a line chart, you can change the **colour** and **style** of the line and the **shape** and **colour** used for data markers (each value point on the line).

- ✓ Select the data series you want to change
- ✓ From the **Format** menu, select **Selected Data Series...** then click the **Patterns** tab



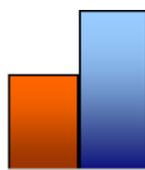
Format Data Series - Patterns for bar and line charts

- ✓ Select options for the marker's border/line and fill colour
- ✓ Click **OK**

### **To apply a fill effect to a data series**

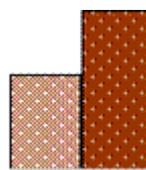
Fill effects can add interest to a chart, especially in column and pie charts. Using pictures can help to make a chart more meaningful. For example, you could use product pictures to illustrate sales of different products. Using a pattern fill effect can help to contrast series if the chart is printed in black-and-white.

As with drawing objects, you can format markers with gradient, texture, pattern, and picture fill effects.



Jan

Charts with Gradient Effect



Jan

Chart with Texture Effect



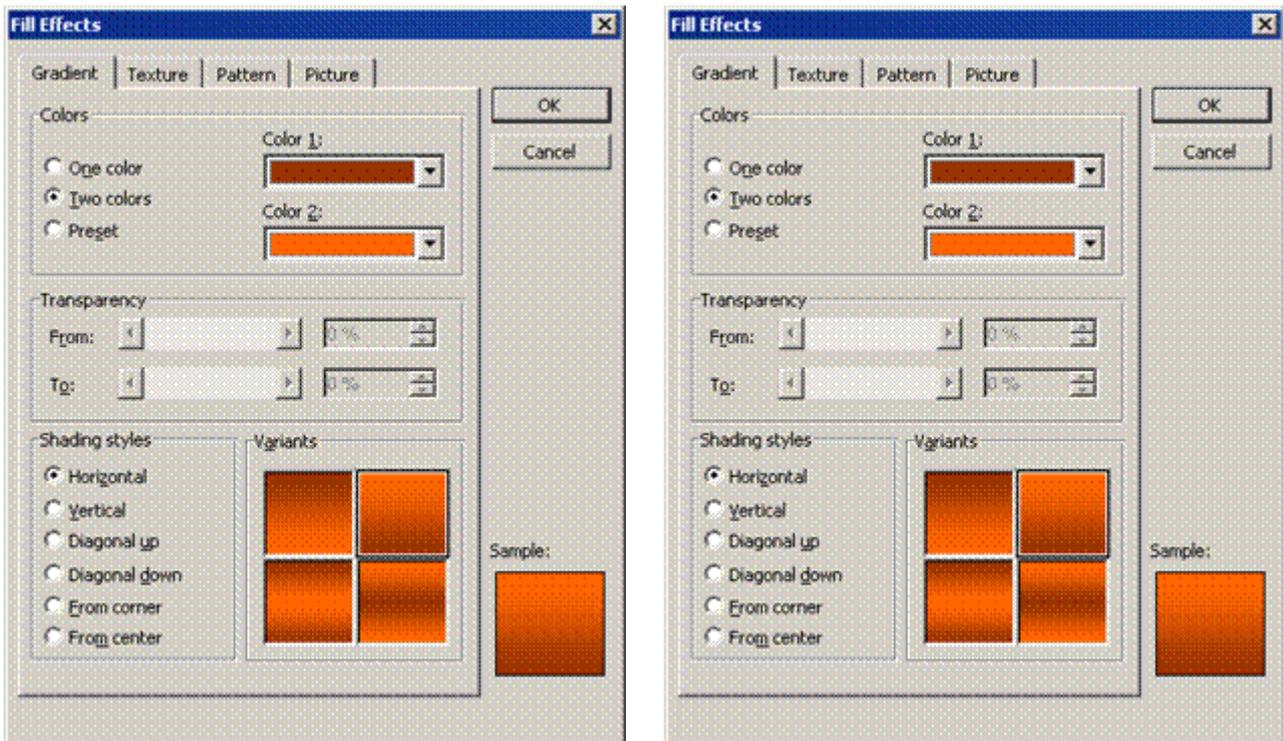
Jan

Chart with Picture Effect

- ✓ Select the data series you want to change
- ✓ From the **Format** menu, select **Selected Data Series...** then click the **Patterns** tab
- ✓ Click the **Fill Effects...** button

The **Fill Effects** dialogue box is displayed.

- ✓ Select the tabbed heading for the type effect you want to apply



Gradient and Pattern tabs in the Fill Effects dialogue box

- ✓ Select from the effect options then click **OK**

*Tip* **On a 3-D chart, you can use the Shape tab to change the shape of the markers used for each series. For example, one series could be a cylinder and another a pyramid.**

### **To change the formatting of a single data point within a data series**

- ✓ Select the data series you want to change the colour of by clicking on any of the columns in the series once
- ✓ Now click once on the data point in the data series that you want to change

This now selects the single data point within the data series

- ✓ From the **Format** menu, select **Selected Data Point...**

The **Format Data Point** dialogue box is displayed.

- ✓ Select options for the marker's border/line and fill colour and/or fill effects
- ✓ Click **OK**

## Create an XY (Scatter) Chart

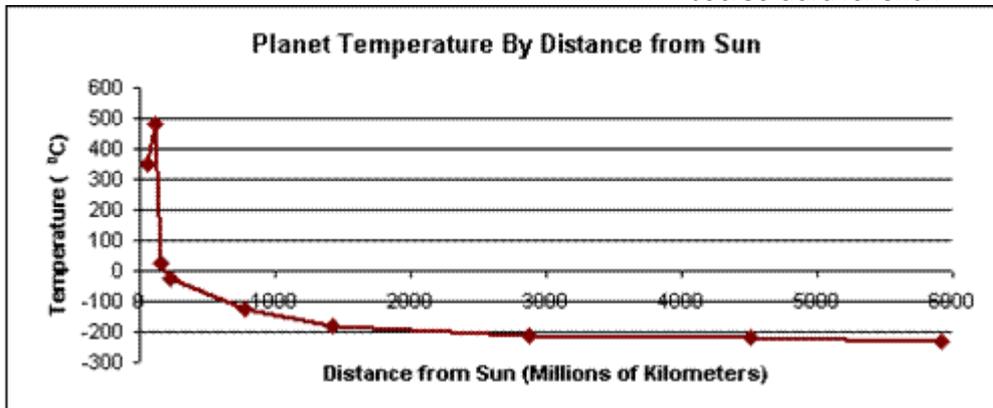
An XY (Scatter) chart has **two** value axes. Unlike other charts, markers are positioned on the chart according to value only - they are not organised into categories.

Data for a scatter chart is normally laid out in a two-column table. The first column or row in the table contains X values (horizontal axis); the second column or row contains Y values (vertical axis).

In the example, Distance from Sun provides values for the X axis; Temperature provides values for the Y axis. You can see that, with the exception of Venus, temperatures are lower the farther a planet is from the sun.

	A	B	C
1		<i>Distance from Sun (Millions of Kilometers)</i>	<i>Temperature (°C)</i>
2	<i>Mercury</i>	57.91	350
3	<i>Venus</i>	108.21	480
4	<i>Earth</i>	149.6	22
5	<i>Mars</i>	228	-23
6	<i>Jupiter</i>	778.3	-123
7	<i>Saturn</i>	1429.39	-180
8	<i>Uranus</i>	2875	-214
9	<i>Neptune</i>	4501	-220
10	<i>Pluto</i>	5913	-230

Source data for chart



Scatter graph with smoothed line

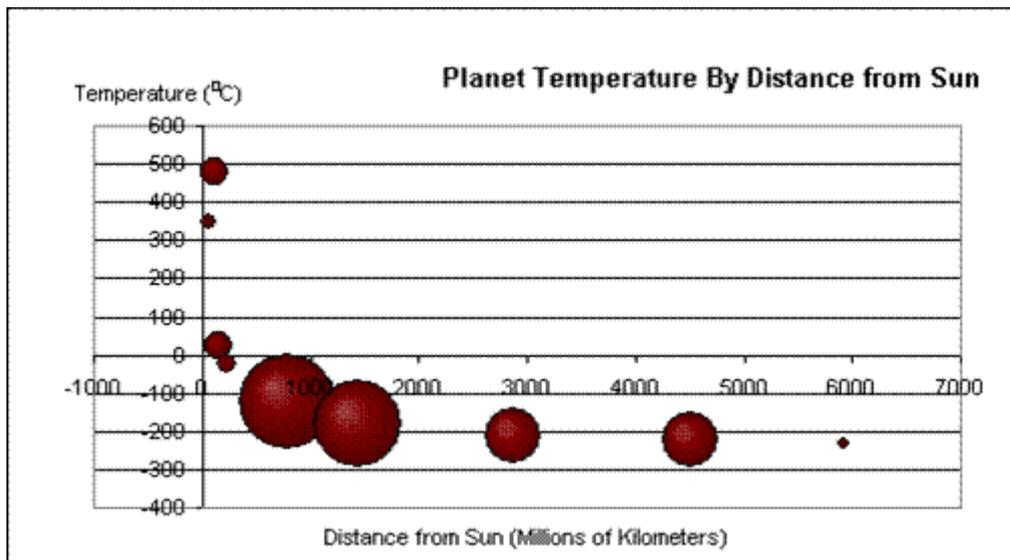
**Note** A scatter chart with a line drawn on it may look like a line chart but the underlying data is very differently organised. A line chart displays data at regular intervals, using categories on the Y axis. A scatter chart is used to display clusters of data (where lots of values may occur at the same point in the chart). A line chart cannot do this.

A scatter graph is not always drawn with a line to connect the points - an important use of scatter graphs is to show the **distribution** of values rather than to compare data sets.

A variation on a scatter graph is the **bubble chart**. A bubble chart shows a **third** value, indicated by the size of the data point (the bubble). In the following example, each planet's diameter has been represented on the bubble chart.

	A	B	C	D
1		<i>Distance from Sun (Millions of Kilometers)</i>	<i>Temperature (°C)</i>	<i>Diameter (Kilometers)</i>
2	<i>Mercury</i>	57.91	350	4880
3	<i>Venus</i>	108.21	480	12104
4	<i>Earth</i>	149.6	22	12756
5	<i>Mars</i>	228	-23	6792
6	<i>Jupiter</i>	778.3	-123	143844
7	<i>Saturn</i>	1429.39	-180	120536
8	<i>Uranus</i>	2875	-214	51118
9	<i>Neptune</i>	4501	-220	49532
10	<i>Pluto</i>	5913	-230	2310

Source data for bubble chart



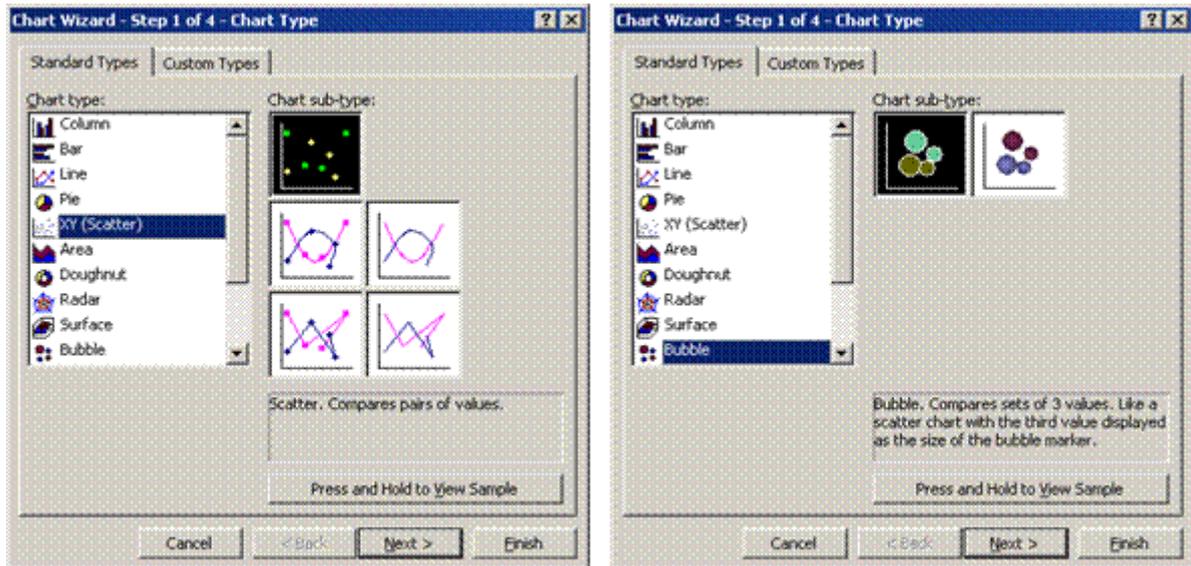
3-D bubble chart

## To create an XY (Scatter) or bubble chart in Excel

- ✓ Arrange the data that you want to chart into two columns (scatter chart) or three columns (bubble chart)
- ✓ The column on the left should contain X-axis values. Alternatively, you can arrange data in two rows, with the top row containing X-axis values.
- ✓ Select the data in the columns
- ✓ On the **Standard** toolbar, click **Chart Wizard** 

**OR**

- ✓ From the **Insert** menu, select **Chart...**
- ✓ The **Chart Wizard Step 1** dialogue box is displayed.



Scatter and bubble-type charts

- ✓ From the **Chart type:** list, select **XY (Scatter)** or **Bubble**
- ✓ From the **Chart Sub-type:** box, select a chart style
- ✓ For scatter charts, you can chart with or without lines and with or without markers. You can choose between smoothed lines or straight lines. For a bubble chart, you can choose whether to use a 3-D effect or not.
- ✓ Click the **Press and Hold to View Sample** button to see how the selected data will appear as a chart
- ✓ Click **Next >** and complete the Chart Wizard as normal

### To create an XY scatter graph using Microsoft Graph

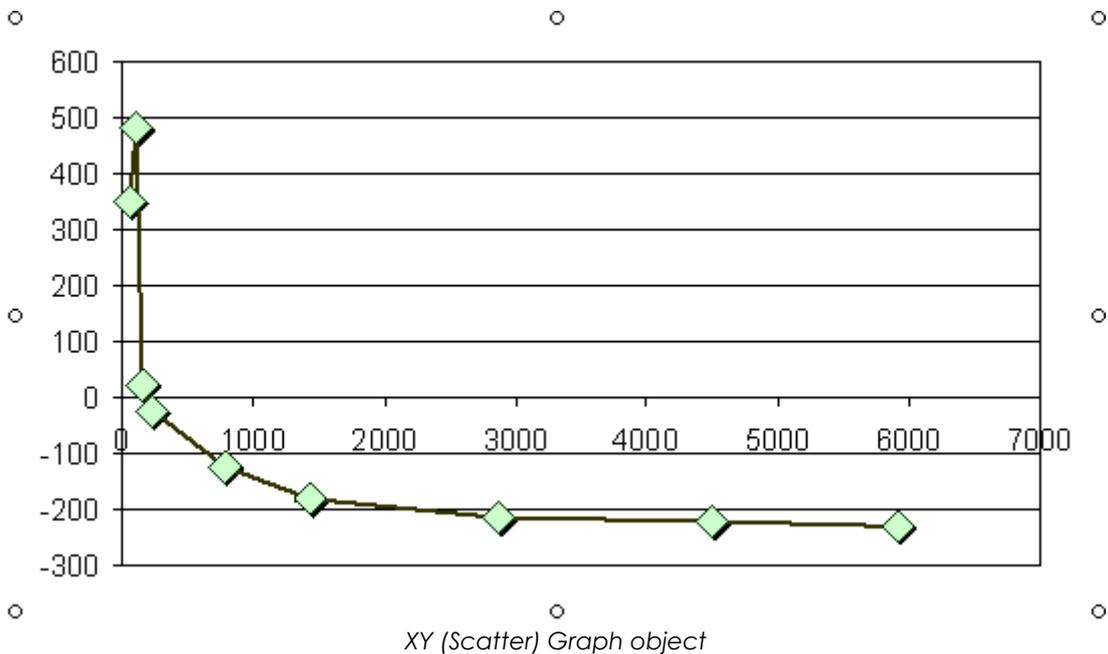
- ✓ Insert a new graph object then clear any existing data from the datasheet
- ✓ From the **Chart** menu, select **Chart Type...**
- ✓ Select the **ZY (Scatter)** type and an appropriate sub-type then click **OK**
- ✓ On the **Graph** toolbar, click **By Columns**  or **By Rows**  as appropriate

	X	A	B
	Distance from	Temperature (OC)	
1	57.91	350	
2	108.21	480	
3	149.6	22	
4	228	-23	
5	778.3	-123	
6	1429.39	-180	
7	2875	-214	
8	4501	-220	
9	5913	-230	
10			

Entering data for an XY (Scatter) graph by column

- ✓ Add the data you want to use to the datasheet, using the first column or row for X values

**Tip** *If the first row or column does not contain values for the X axis, click the row or column that does then from the Data menu, select Plot on X Axis.*



### Add a Trendline to a Chart

A **trendline** can be used to predict future values or to show the trend in actual values more clearly by averaging out very high or low points.

Trendlines are commonly used with scatter graphs to show the trend in the data clearly.

For the line to show an accurate prediction or trend, you must select the best type of trendline for the pattern of the data you are plotting. Six trendline types are available to show different patterns.

Trendline	Use To
Linear	Use to extrapolate values that increase or decrease at a steady rate (in a straight line).
Logarithmic	Use for values that increase or decrease quickly before levelling out.
Polynomial	Use for values that fluctuate. Depending on the range of data, a polynomial trendline will have one or more bends.
Power	Use for values that increase or decrease at a specific rate.
Exponential	Use for values that increase or decrease at increasingly higher rates.

Moving Average	Smooth out fluctuations in data (average out high and low points).
----------------	--

**Tip** *Excel can calculate the reliability of a trendline. The R-Squared value is a value from 0 to 1. The closer to 1 the R-Squared value is, the more reliable the trendline. You can display the R-Squared value on the chart.*

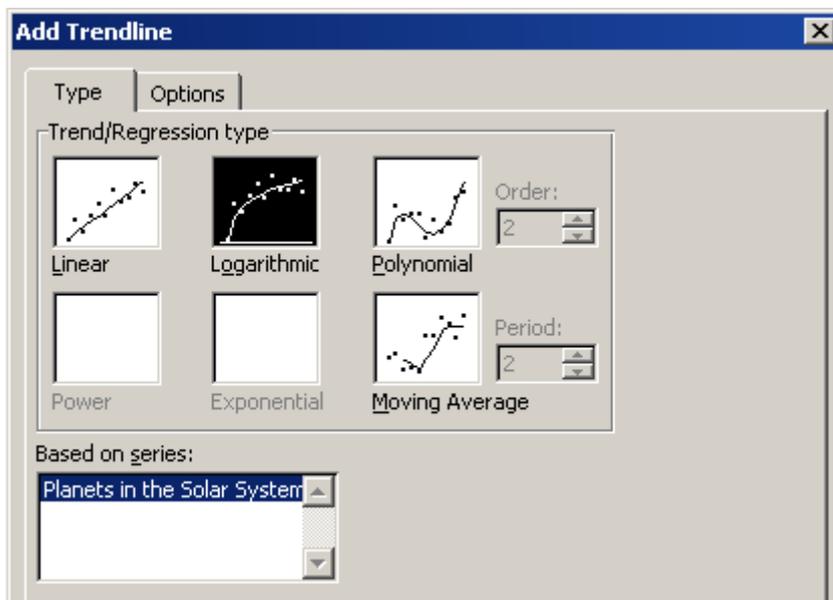
## To add a trendline to a chart

Select the chart

From the **Chart** menu, select **Add Trendline...**

**OR**

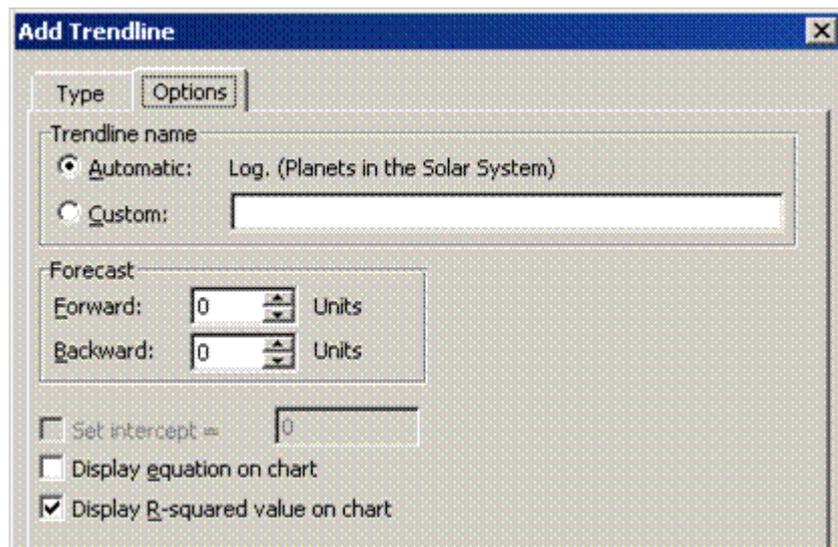
- ✓ Right-click a data series and select **Add Trendline...**
- ✓ The **Add Trendline** dialogue box is displayed.
- ✓ In the **Based on series** box, select a series to calculate from
- ✓ In the **Trend/Regression type** panel, select the trendline to use



Add Trendline dialogue box - Type tab

**Note** *For Polynomial lines, set the Order (this is related to the number of bends in the curve - Order 2 has one bend, 3 has two and so on). For a Moving Average, set the Period (the number of values to average into a point on the trendline).*

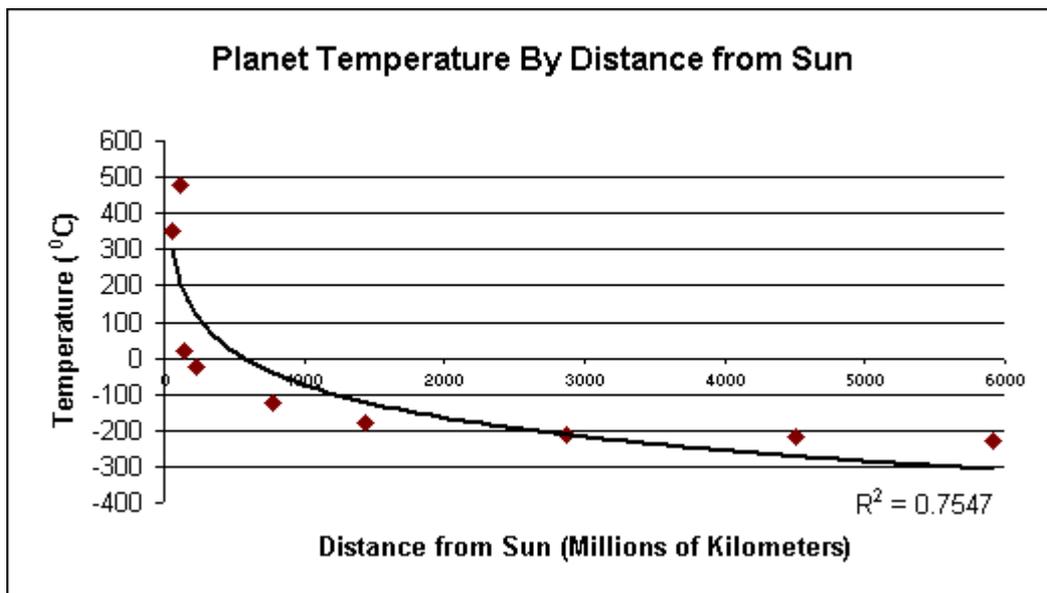
- ✓ Click the **Options** tab



Add Trendline dialogue box - Options tab

The default legend shows the type of trendline and the name of the data series.

- ✓ To change the legend, click the **Custom** option button and enter a label
- ✓ To extrapolate the trendline beyond the values used in the chart, enter a number of periods (**Forward** and/or **Backward**) in the **Forecast** panel
- ✓ Optionally, select the check boxes to **Display equation** (used to calculate the trendline) or the **R-squared value** (the reliability of the trendline)
- ✓ Click **OK**



Example of trendline

Notice that the trendline **does not** connect with all the data points on the chart (the only instance when the line would connect with all data points is where **R<sup>2</sup>=1**).

**Tip** You can add more than one trendline to a chart. You can also add multiple trendlines for the same data series.

### To change options for a trendline

You can apply formatting and change the options used for a trendline as you can for any other chart element.

- ✓ Select the trendline then from the **Format** menu, select **Selected Trendline...** (SpeedKey: **Ctrl** + **1**)

**OR**

- ✓ Right-click the trendline then select **Format Trendline...**

### To remove a trendline

- ✓ Select the trendline then from the **Edit** menu, select **Clear** then **Trendline** (SpeedKey: **Delete**)

## Create a Combination Chart

A **combination** chart displays different and possibly incompatible types of data on the same chart (for example, combining Staffing Levels with Gross Turnover, or Production Volumes with Overhead Costs). Different data series can be displayed in different styles (for example, column and line), and possibly with a different scale for the axes.

The **combination** chart type can be selected when creating the chart or an existing chart can be adapted by adding an extra series and converting it to combination style. A common combination is to plot one series with bars and the other with a line.

### To create a new combination chart in Excel

- ✓ Select a data range for the chart

	A	B	C	D	E
1		2003		2002	
2	Month	Total Order Value	Number of Orders	Total Order Value	Number of Orders
3	January	163,424.66	522	163,546.58	528
4	February	21,750.64	60	18,637.31	54
5	March	107,381.59	324	85,950.24	275
6	April	163,052.64	522	134,180.36	459
7	May	209,239.18	698	126,624.48	423
8	June	116,638.70	398	113,311.46	357
9	July	53,107.81	159	30,875.27	110
10	August	73,767.82	241	40,321.12	124
11	September	192,113.17	642	164,053.44	512
12	October	212,050.70	683	193,240.07	649
13	November	240,942.62	734	182,269.94	565
14	December	153,446.25	489	139,833.27	442

Selecting a range to compare order values in 2003 with 2002

- ✓ On the **Standard** toolbar, click the **Chart Wizard** button 
- ✓ The **Chart Wizard** dialogue box is displayed.

- ✓ Select the **Custom Types** tab

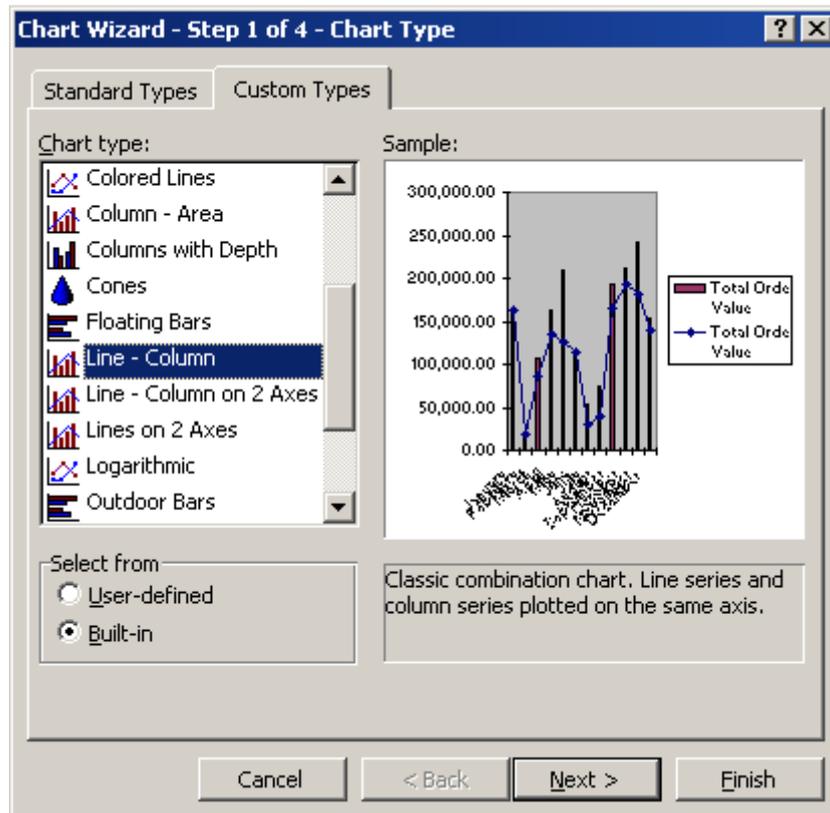
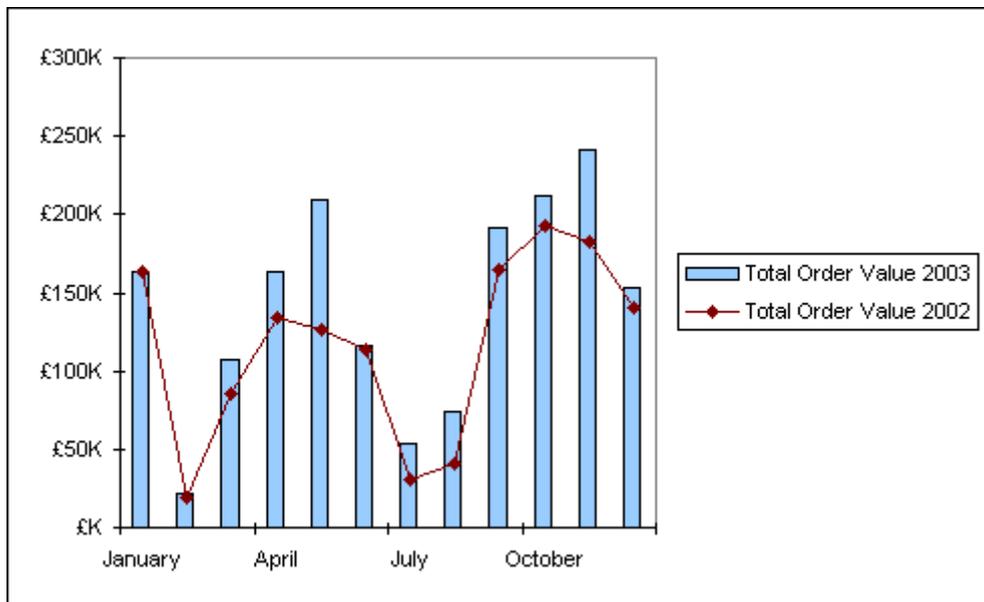


Chart Wizard dialog box - Custom Types tab

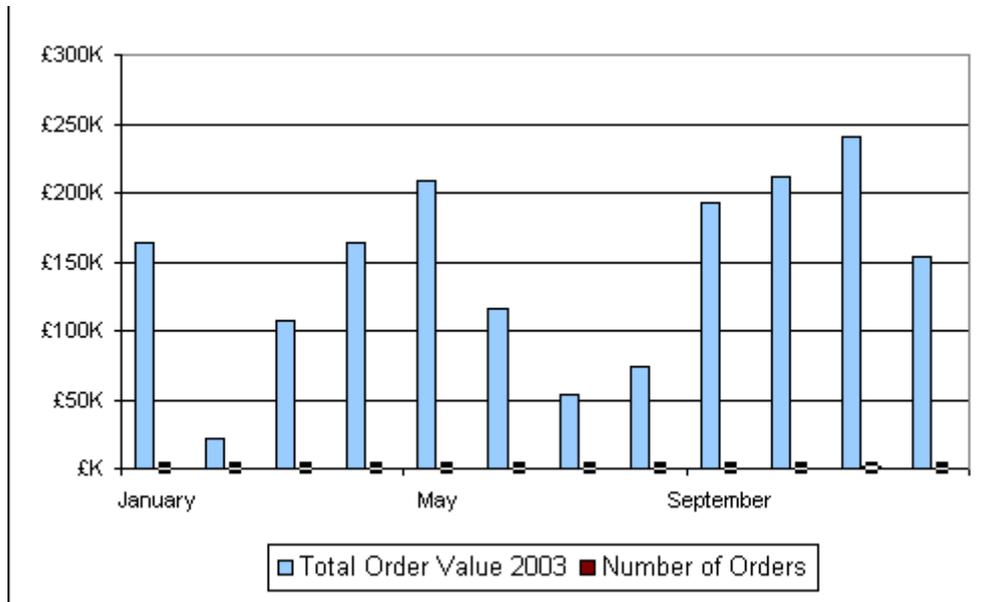
- ✓ From the **Chart Type:** list, select a suitable combination chart
- ✓ Continue with the remaining **Chart Wizard** steps



Line-Column combination chart

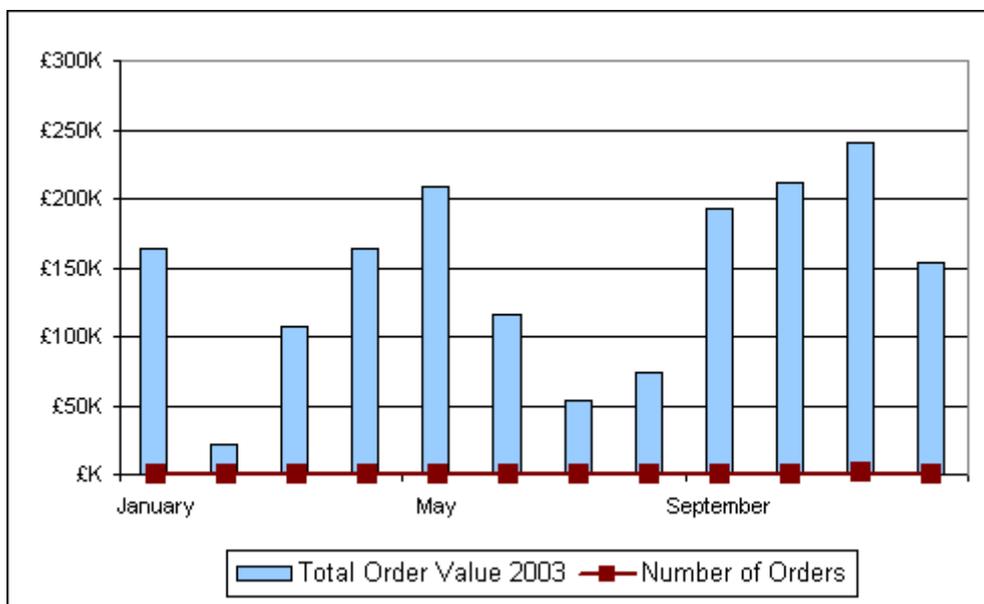
## To convert an existing chart to a combination chart in Excel or Graph

On the chart, click once on the data series to be converted



Selecting the "Number of Orders" data series to convert to a different chart type

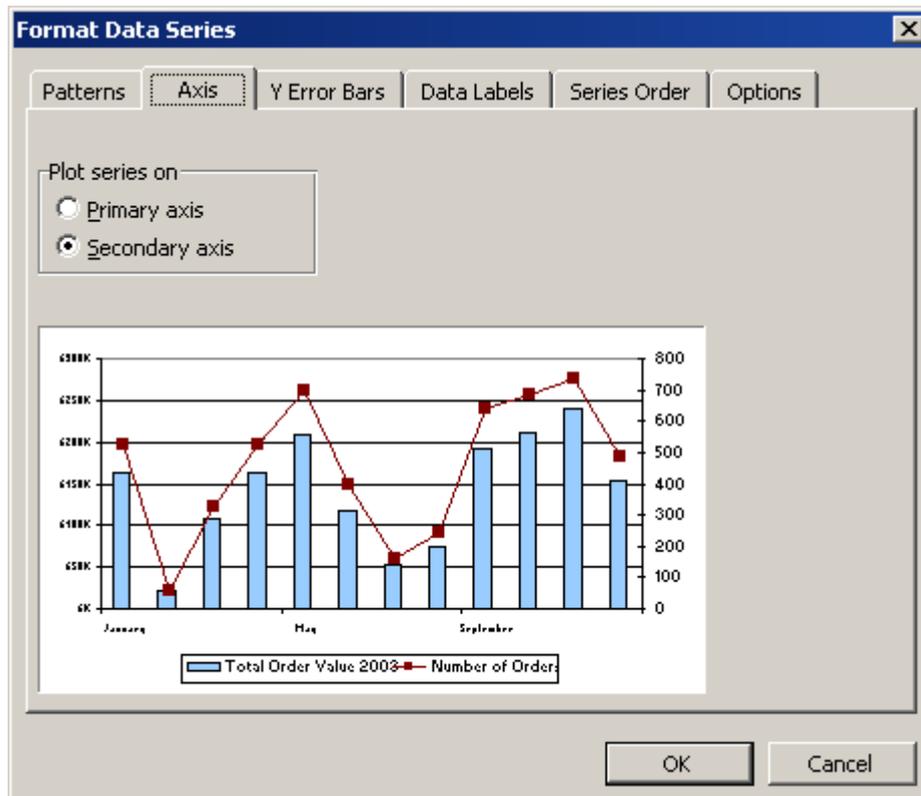
- ✓ From the **Chart** menu, select **Chart Type...**
- ✓ The **Chart Type** dialogue box is displayed.
- ✓ From the **Chart Type** list, select a suitable chart style
- ✓ Click **OK**



Selected series plotted as a line chart

Optionally, you can add a secondary axis for the series. If the range of values is very different from the primary Y axis, you must do this or the second series will not be visible (as above). In the example above, order numbers are counted in a range from 0 to 800, whereas order value ranges from 0 to 300000.

- ✓ On the chart select the same data series again
- ✓ From the **Format** menu, select **Selected Data Series...** (SpeedKey: Ctrl + 1)
- ✓ The **Format Data Series** dialogue box is displayed.



Format Data Series dialogue box - Axis tab

- ✓ Select the **Axis** tab
- ✓ In the **Plot series on** panel, select the **Secondary axis** option button
- ✓ Click **OK**

### Exercise 31

- ✓ Open the workbook **ANNUAL RESULTS**

**Tip** *This exercise will be easiest to complete in Excel. If you prefer to practise using a Graph object in Word or PowerPoint, the same data is available in the document and presentation files named ANNUAL RESULTS.*

- ✓ Select from **B2:C41** then from the **I**nsert menu, select **C**hart...
- ✓ The **Chart Wizard Step 1** dialogue box is displayed.
- ✓ From the **Chart type:** list, select **XY (Scatter)**
- ✓ From the **Chart Sub-type:** box, select **Scatter**
- ✓ Click the **Press and Hold to View Sample** button to see how the selected data will appear as a chart
- ✓ Click **N**ext >
- ✓ Click the **Series** tab and type **Orders** in the **N**ame: box
- ✓ Click **N**ext >
- ✓ In the **Chart Options** dialogue box, change the **Chart title:** to **Order Values by Quantity** and hide the legend
- ✓ Click **N**ext >
- ✓ Create the chart as a new sheet named **ValueByQuantity**
- ✓ When the chart is created, point to some of the data markers to see the value

Notice that values do not appear in the same order as in the worksheet. The first value plotted is the month with the lowest number of orders. The greater the number of orders, the further to the right the marker is positioned; the greater the value, the further up the chart the marker is.

- ✓ From the **C**hart menu, select **A**dd Trendline...
- ✓ In the **Trend/Regression type** panel, select **L**inear
- ✓ Click the **Options** tab and check the **R-squared value** box
- ✓ Click **O**K

You should be able to see that the number of orders is quite a good predictor of the value of sales.

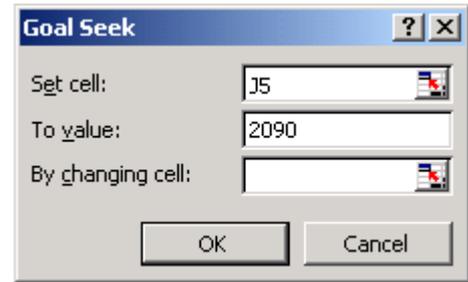
- ✓ Save and close the workbook
- ✓ Open the workbook **TRENDLINES**

**Tip** *This exercise will be easiest to complete in Excel. If you prefer to practise using a Graph object in Word or PowerPoint, the same data is available in the document and presentation files named TRENDLINES. You will not be able to complete the steps where you change values on the chart.*

- ✓ Create a **bar** chart for the first three items on the sheet, but not the Overheads line
- ✓ Add the Overheads line to the chart; set the series as a **line** chart
- ✓ Click-and-drag one of the bars to change the bar value
- ✓ Click-and-drag one of the points on the Overheads line to change the line value

Because the values for overheads are calculated by formulas, the **Goal Seek** dialogue box is displayed, prompting you to select a cell containing a value to change.

- ✓ Select one of the cells in the same column as the data point (in the above example, select J2, J3 or J4)



Goal Seek dialogue box

- ✓ Create a second **bar** chart for the first three items on the sheet, but not the Overheads
- ✓ Add trendlines to the different data series, experimenting with different types and extrapolating to predict future results
- ✓ Reformat the chart appearance, and add it to the list of Custom chart templates with the name **Trendy**
- ✓ Set **Trendy** as the default chart type
- ✓ Create a third chart for the same data as above - **Trendy** should be the default chart
- ✓ Delete the **Trendy** chart template
- ✓ Save and close the file

## What If?

**What-If?** analysis allows you to test how changes in certain variables affect the results of formulas in a worksheet. For example, you could enter values to discover at what sales would be required for a product to recoup its development costs, over a given period or test investment considerations with different rates of return or cash flows. You can also **test** calculations with extremely high or low values.

Several tools are available to accomplish this:

- ✓ **Data Tables** show a range of results obtained by varying one or two variables in a formula.
- ✓ **Goal Seeking** is a way of solving a problem where you know the result you want to achieve but not a variable value required to achieve it. The **Goal Seeker** rapidly iterates different values until it finds one that permits the formula result.
- ✓ The **Solver** operates on more complex goals by analysing all of the formulas associated with the required result. It can change **several** variables at once and test the result for each change until the required result is reached. Constraints or conditions can be created that place limits on what variables can be used, which may disclose that the desired result is in fact unobtainable.
- ✓ **Scenario Manager** is a forecasting tool that generates a result based on given variables. The variables can be changed to project different eventualities and each set of variables stored as a scenario for review and comparison.

## Use a Data Table to Perform What-If? Analysis

You can use a **Data Table** to analyse the effects of different variables (or **inputs**).

### To create a one-input data table

A one-input data table allows you to test a formula with a range of values in one of the formula's inputs. For example, calculating the cost of a loan depends on the amount borrowed,

the interest rate, and the number of payments to make. A one-input data table could look at the effects of varying any one of these three variables.

- ✓ Create the worksheet to solve the problem with the default values
- ✓ Elsewhere on the same worksheet, create a table listing alternative values for the variable you want to test (for example, varying rates of interest)
- ✓ This can be laid out as a column or as a row. In this example, a column of values has been entered in **A8:A13**.
- ✓ In the top row of the data table in the column to the right of the input column (cell B7 in the example), either reference the formula you want to use to obtain the answers or enter a formula directly into the cell

	A	B
1	Principal	14,000.00
2	Rate	0.92%
3	Periods	48
4	Payment	- 361.84
5		
6	<b>Data Table</b>	
7	Rates	- 361.84
8	0.75%	
9	0.83%	
10	0.92%	
11	1.00%	
12	1.08%	
13	1.17%	

The example uses **=B4** in cell B7 because we want to know the effects on the formula we are using to calculate payments.

	A	B
1	Principal	14,000.00
2	Rate	0.92%
3	Periods	48
4	Payment	- 361.84
5		
6	<b>Data Table</b>	
7	Rates	- 361.84
8	0.75%	
9	0.83%	
10	0.92%	
11	1.00%	
12	1.08%	
13	1.17%	

Select the data table including the heading row

Select the cells that are used in the data table including the heading row

In our example, this is **A7:B13**.

From the **Data** menu, select **Table...**

The **Table** dialogue box is displayed.

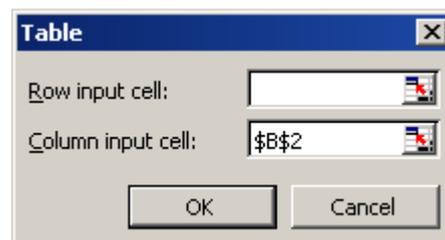


Table dialogue box

- ✓ Enter either a **Row input cell** or a **Column input cell** by clicking on the relevant cell

- ✓ The input cell is the cell in the worksheet solution containing the variable to change. In our example, this is the **Rate** cell **\$B\$2** (entered as an absolute reference). Because the data table is laid out in a column, the input cell is entered into the **Column input cell:** box. If the data table were laid out in a row, the **Row input cell:** box would be used.
- ✓ Click **OK**
- ✓ The right-hand column of the data table fills with the payment figures for each rate of interest.

	A	B
1	Principal	14,000.00
2	Rate	0.92%
3	Periods	48
4	Payment	- 361.84
5		
6	<b>Data Table</b>	
7	Rates	- 361.84
8	0.75% -	348.39
9	0.83% -	355.08
10	0.92% -	361.84
11	1.00% -	368.67
12	1.08% -	375.58
13	1.17% -	382.57

The right-hand column fills with the payment figures

You can alter the values in the left-hand column to see different results

## To create a two-input data table

A two-input table shows different values for two variables. For example, you might want to analyse the payments required for different loan amounts at varying rates of interest.

A two-input data table contains an additional row of values next to the formula to calculate. The formula or reference to the formula **must** be in the top left-hand corner of the table (cell B7 in the example below).

	A	B	C	D	E	F	G
1	Principal	14,000.00					
2	Rate	0.92%					
3	Periods	48					
4	Payment	- 361.84					
5							
6	<b>Data Table</b>					Principal	
7		- 361.84	10,000.00	11,000.00	12,000.00	13,000.00	14,000.00
8		0.75%					
9		0.83%					
10		0.92%					
11		1.00%					
12		1.08%					
13		1.17%					

Two-input data table

- ✓ As for the one-input table, set up the worksheet to solve the problem
- ✓ Create a reference to the formula to use (or the formula itself) in the top left-hand corner of the data table area
- ✓ Add values for the first variable in the column below the formula reference
- ✓ Add values for the second variable in the row to the right of the formula reference
- ✓ Select the cells that are used in the table (in our example this would be from B9:H18)
- ✓ From the **Data** menu, select **Table...**
- ✓ The **Table** dialogue box is displayed.

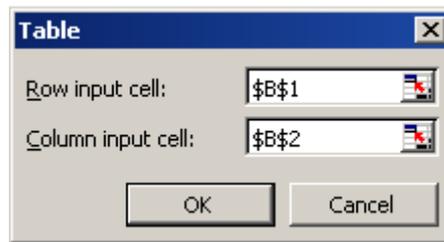


Table dialogue box

- ✓ Enter the **Row input cell** and the **Column input cell**
- ✓ In the example, the row input is the Principal (\$B\$1) and the column input is the Rate (\$B\$2).
- ✓ Click **OK**
- ✓ The data table fills with the payment figures based on the loan amount and the rate of interest.

	A	B	C	D	E	F	G
1	Principal	14,000.00					
2	Rate	0.92%					
3	Periods	48					
4	Payment	- 361.84					
5							
6	<b>Data Table</b>				Principal		
7		- 361.84	10,000.00	11,000.00	12,000.00	13,000.00	14,000.00
8		0.75% -	248.85 -	273.74 -	298.62 -	323.51 -	348.39
9		0.83% -	253.63 -	278.99 -	304.35 -	329.71 -	355.08
10		0.92% -	258.46 -	284.30 -	310.15 -	335.99 -	361.84
11		1.00% -	263.34 -	289.67 -	316.01 -	342.34 -	368.67
12		1.08% -	268.27 -	295.10 -	321.93 -	348.76 -	375.58
13		1.17% -	273.26 -	300.59 -	327.92 -	355.24 -	382.57

Resulting data table

## To modify a data table

You can change the values of inputs to show different results, but to **expand** the table you must clear the existing results and re-create the table using the **Table** dialogue box.

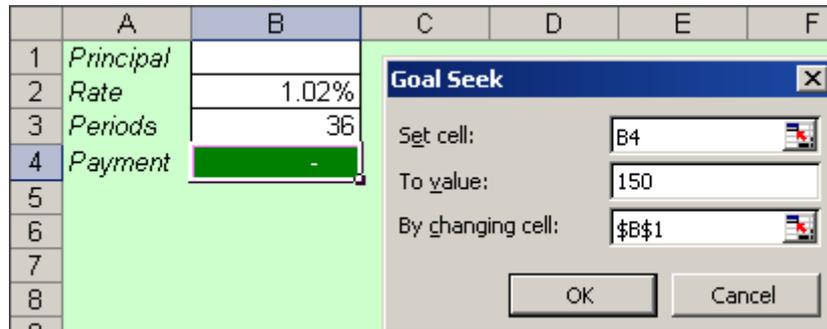
## Use Goal Seek

**Goal Seek** takes the time and guesswork out of repeatedly entering a variable value until a desired result is produced by a calculation. This function enters the value for you automatically, incrementing it until the desired result is achieved. For example, how much can you borrow if you can afford a monthly repayment of £150 for 3 years, with an interest rate of 12.2% per annum?

### To solve a problem using Goal Seek

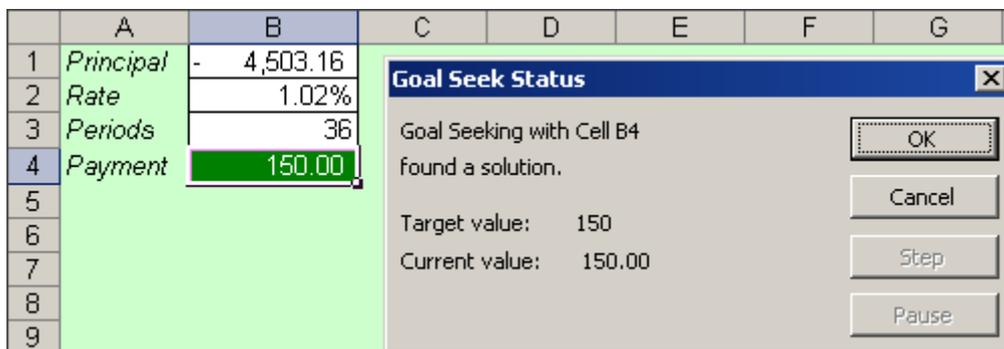
- ✓ Enter a calculation using known values and or guesses
- ✓ From the **Tools** menu, select **Goal Seek...**
- ✓ The **Goal Seek** dialogue box is displayed.

- ✓ In the **Set cell:** box, select the cell containing the result formula
- ✓ In the **To value:** box, enter the target result required
- ✓ In the **By changing cell:** box, select the cell containing the variable to change



Goal Seek example

- ✓ Click **OK**
- ✓ The **Goal Seek Status** message box is displayed with the nearest obtainable result if it can be achieved.



Goal Seek Status example

- ✓ Click **OK**

## Use Solver

The **Solver** calculates complex problems using a number of conditions. It will produce an optimal solution, plus a series of sub-optimal solutions, or decree that there is no workable solution. The following information is required by Solver to provide a solution.

- ✓ **Target Cell**

The cell where Solver will place its result. It may be one of the changing cells, or a cell whose result depends upon a changing cell. The **Target** cell must contain a formula that can be calculated.

- ✓ **Changing Cells**

The cell(s) containing variable values that Solver will update with alternative data while it is trying to calculate the result in the target cell.

- ✓ **Constraints Cells**

Cells containing values used in conditions that must be met for a valid result. If the constraints are too limiting then no solution will be obtainable.

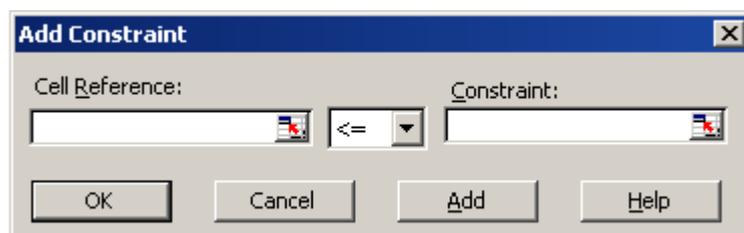
## To find a solution using Solver

In the following example, the line manager of the FlipFlap 24 hour pancake outlet has to assign shifts to his staff for the working week. The number of shifts required is totalled in B12. The question is, given that different members of staff are paid differently per shift, what is the cheapest way to fill the number of shifts required, assuming that members of staff will not work more than 7 shifts in a week?

	A	B	C	D	E	F	G	H	I	J	K
	Salary/										
1	Shift	Staff	Shifts	Cost	Mon	Tue	Wed	Thu	Fri	Sat	Sun
2	£40.00	John		£0.00	5	5	5	5	6	8	7
3	£40.00	Terry		£0.00							
4	£50.00	Sally		£0.00							
5	£40.00	Sunni		£0.00							
6	£30.00	Margaret		£0.00							
7	£30.00	Thomas		£0.00							
8	£40.00	Janine		£0.00							
9	£30.00	Stephanie		£0.00							
10	£40.00	Roderick		£0.00							
11			Total Cost	£0.00							
12			Shifts Required	41							
13			Shifts Worked	0							

Solver example

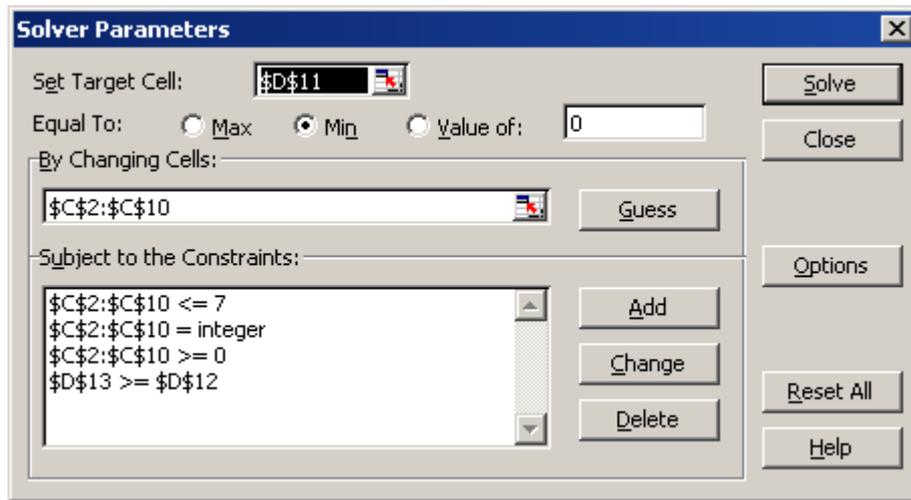
- ✓ Enter the data on the sheet
- ✓ Create a formula in the **Target** cell that will calculate the result when the correct values are entered in the **Changing** cells (in the example, this is cell **D11**)
- ✓ Enter a 0 (zero) or a best guess in the **Changing** cells (these are cells **C2:C10**)
- ✓ Optionally, enter any constraints (this is the number of shifts required, entered in **D12**)
- ✓ From the **Tools** menu, select **Solver...**
- ✓ The **Solver Parameters** dialogue box is displayed.
- ✓ In the **Set Target Cell:** box, select the target cell
- ✓ Select an **Equal to:** option button for the method of achieving the target (in our example, this is **Min** - to find the cheapest cost)
- ✓ If necessary, in the **Value of:** box, enter the value the target cell should finally display
- ✓ In the **By Changing Cells:** box, select the cell(s) whose values must change to calculate the result (this is the range **C2:C10**)
- ✓ Click the **Add...** button to add any constraints



Add Constraint dialogue box

- ✓ Click **Add** to add further constraints or click **OK**

- ✓ The **Solver Parameters** dialogue box is re-displayed.



Solver Parameters dialogue box

In this example, the constraints ensure that the changing cells are whole numbers greater than 0 but less than 7 and that the shifts worked are at least equal to the shifts required.

- ✓ Click **Solve**
- ✓ The **Solver Results** dialogue box is displayed.

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Salary/												
2	Shift	Staff	Shifts	Cost	Mon	Tue	Wed	Thu	Fri	Sat	Sun		
3	£40.00	John	6	£240.00	5	5	5	5	6	8	7		
4	£40.00	Terry	7	£280.00									
5	£50.00	Sally	0	£0.00									
6	£40.00	Sunni	7	£280.00									
7	£30.00	Margaret	7	£210.00									
8	£30.00	Thomas	7	£210.00									
9	£40.00	Janine	0	£0.00									
10	£30.00	Stephanie	7	£210.00									
11	£40.00	Roderick	0	£0.00									
			Total Cost	£1,430.00									
12			Shifts Required	41									
13			Shifts Worked	41									

**Solver Results**

Solver found a solution. All constraints and optimality conditions are satisfied.

Keep Solver Solution  
 Restore Original Values

Reports: Answer, Sensitivity, Limits

Solver example

- ✓ Select either the **Keep Solver Solution** or the **Restore Original Values** option buttons
- ✓ Click **OK**
- ✓ The worksheet display is updated with the **Solver Results**.

**Tip** You can run the Solver several times using different target values and save each solution as a scenario. This allows you to review several different targets without recreating the Solver each time.

## Use the Scenario Manager

**Scenario Manager** is a forecasting tool that generates a result based on given variables. The variables can be changed to project different eventualities and each set of variables stored as a **scenario** for review and comparison.

For example, you are considering buying an annuity that will pay you £5000 each year for the next 10 years plus a lump sum of £10,000 at the end of the annuity. The cost of the annuity is £40,000. The Present Value function is used to display the value of the annuity to you, but that value depends heavily on the rate of return you can expect on other ways of investing £40,000.

At a 3% rate of return, the cost price of £40000 looks exceptional value against the present value of the annuity (£50,091.05). But what would the cost look like if you thought you could obtain a better rate of return? Creating a scenario allows you to compare the effects of different rates.

	A	B
1	Cost Price	40,000.00
2	Rate	3.00%
3	Periods	10
4	Payment	5,000.00
5	Future Value	10,000.00
6	Present Value	- 50,091.95

Example scenario layout

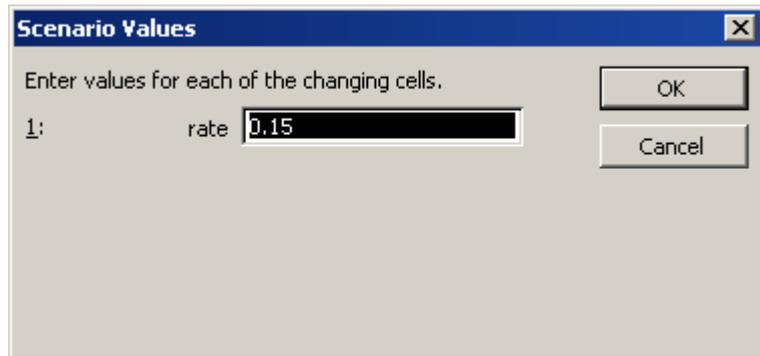
### To create a scenario

Create a forecast spreadsheet with formula(s) that depend on one or more variables that can be changed

Optionally, create range names for each of the variable cells

- ✓ From the **Tools** menu, select **Scenarios...**
- ✓ The **Scenario Manager** dialogue box is displayed. The **Scenario Manager** is blank until you add the first scenario.
- ✓ Click **Add...**
- ✓ The **Add Scenario** dialogue box is displayed.
- ✓ In the **Scenario name:** box, enter a name that clearly identifies the intention of the scenario (Spaces are allowed)
- ✓ In the **Changing cells:** box, select the cells containing the variable data

- ✓ In the **Comment:** box, add a fuller description of the purpose of the scenario
- ✓ Click **OK**
- ✓ The **Scenario Values** dialogue box is displayed.
- ✓ In each of the variables cell boxes, enter a value to use for the named scenario

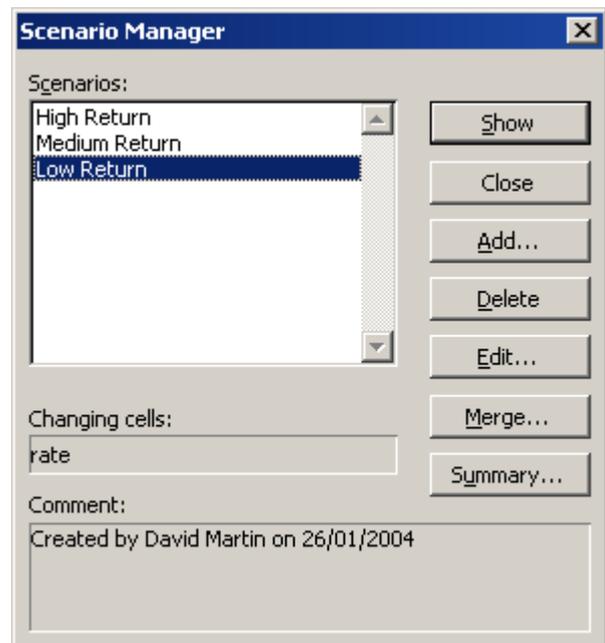


Scenario Values dialogue box

- ✓ To create further scenarios, click **Add**
- ✓ To view the scenarios, click **OK**
- ✓ The **Scenario Manager** dialogue box is displayed and the scenarios can be viewed.

### To view a scenario

- ✓ In the **Scenario Manager** dialogue box, from the **Scenarios:** list, select a scenario to view then click **Show**
- ✓ The scenario variables are entered on the worksheet and the result calculated.
- ✓ Select and **Show** each scenario required
- ✓ After viewing the scenarios click **Close**



Scenario Manager dialogue box

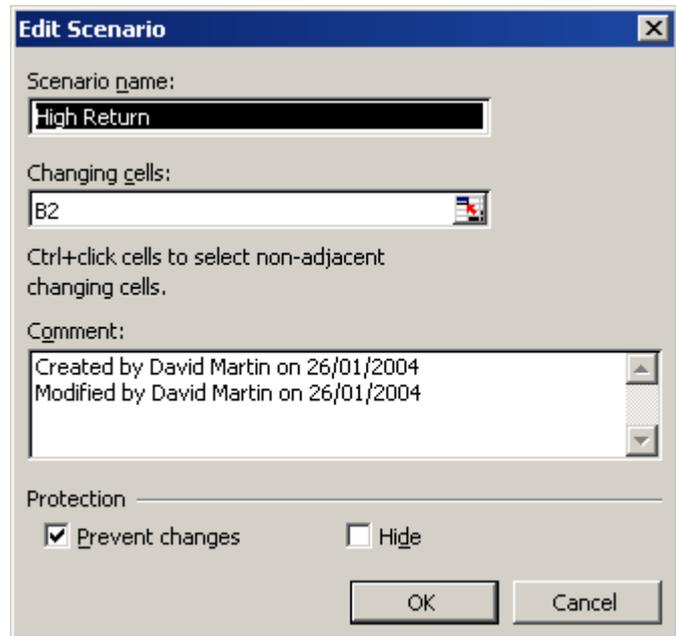
The last scenario viewed remains displayed on the screen.

### To delete a scenario

- ✓ From the **Scenarios** list in the **Scenario Manager** dialogue box, select the scenario to delete
- ✓ Click **Delete**

## To edit a scenario

- ✓ From the **Scenarios** list in the **Scenario Manager** dialogue box, select a scenario
- ✓ Click **Edit...**
- ✓ The **Edit Scenario** dialogue box is displayed.
- ✓ Change the **Scenario name:** or **Comment:**
- ✓ Click **OK** then change the value(s) as appropriate in the **Scenario Values** dialogue box
- ✓ Click **OK**



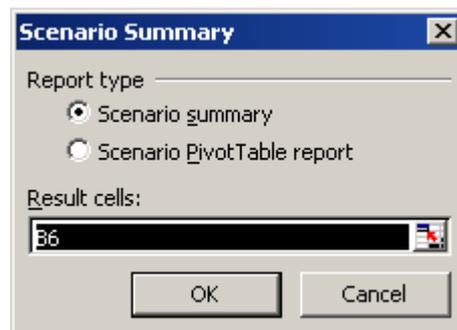
*Edit Scenario dialogue box*

## Create a Scenario Summary

There are two types of scenario summary. A **tabular** view showing each set of scenario variables and the result produced, or a **PivotTable** view showing just the scenario names and the **result** of each scenario.

### To create a scenario summary

- ✓ From the **Tools** menu, select **Scenarios...**
- ✓ The **Scenario Manager** dialogue box is displayed.
- ✓ Click **Summary...**
- ✓ The **Scenario Summary** dialogue box is displayed.
- ✓ From the **Report type** panel, select the summary option to create



*Scenario Summary dialogue box*

- ✓ Click **OK**
- ✓ A new **Scenario** sheet is created in the style selected.

Scenario Summary				
Current Values:	High Return	Medium Return	Low Return	
<b>Changing Cells:</b>				
rate	15.00%	15.00%	9.00%	3.00%
<b>Result Cells:</b>				
pv	- 27,565.69	- 27,565.69	- 36,312.40	- 50,091.95

Notes: Current Values column represents values of changing cells at time Scenario Summary Report was created. Changing cells for each scenario are highlighted in gray.

Scenario worksheet summary

	A	B
1	rate by	(All) ▼
2		
3	pv	
4	rate ▼	Total
5	High Return	- 27,565.69
6	Low Return	- 50,091.95
7	Medium Return	- 36,312.40

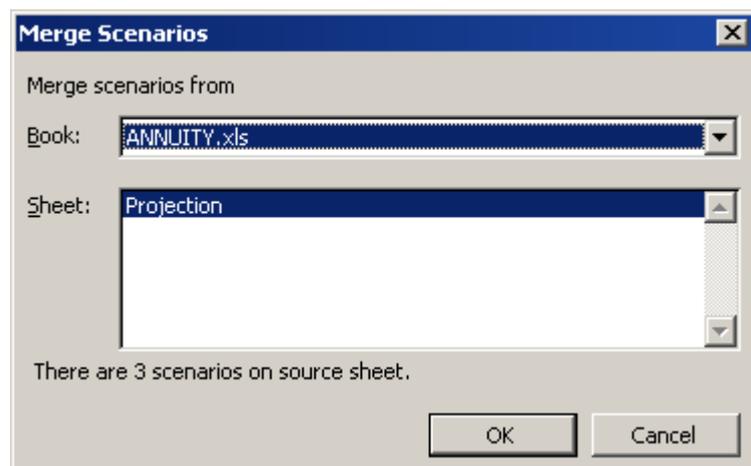
Scenario PivotTable summary

## Merge Scenarios

**Merging** allows the scenario variables stored on another worksheet or workbook to be applied to the data in the current worksheet. The names or cell references of the variables must be the same in the current worksheet and the one being merged from, even if the data or the way it is laid out is different.

### To merge a scenario

- ✓ Open the workbook(s) containing the scenarios to merge
- ✓ From the **Tools** menu, select **Scenarios...**
- ✓ Click **Merge...**
- ✓ The **Merge Scenarios** dialogue box is displayed.
- ✓ In the **Book:** box, select a workbook name
- ✓ In the **Sheet:** box, select the worksheets containing the scenarios to merge



Merge Scenarios dialogue box

- ✓ Click **OK**
- ✓ All of the scenarios on the source sheets are copied to the **Scenario Manager** in the active worksheet.

## Exercise 32

- ✓ Open the workbook **FORECAST RESULTS**
  - ✓ Click in cell **B1** then name the cell **target\_growth**
  - ✓ In **C3:C15**, enter a formula to calculate the target for 2004 (2003's result increased by target growth)
  - ✓ From the **Tools** menu, select **Scenarios...**
  - ✓ Click **Add...**
  - ✓ Enter the **Scenario name:** of **Low Growth**
  - ✓ In **Changing cells:**, type **target\_growth**
  - ✓ Click **OK**
  - ✓ Enter the value as **0.05** and click **Add**
  - ✓ Repeat to add **Medium** and **High Growth** scenarios of **0.01** and **0.02** respectively, clicking **OK** after you add a value for **High Growth**
  - ✓ From the **Scenario Manager**, select **High Growth** and click **Show**
  - ✓ Click **Edit** then change the value for **High Growth** to **0.15**
  - ✓ Click the **Summary** button
  - ✓ For the **Report type**, select **Scenario summary**
  - ✓ For **Result cells**, select **C15**
  - ✓ Click **OK**
  - ✓ View the summary sheet
  - ✓ Save and close the workbook
- 
- ✓ Open the file **SOLVER** and select the **Goal Seek** sheet
  - ✓ Use **Goal Seek** to find the loan amount that can be borrowed over 60 months with a repayment of £200
  - ✓ Select the **Solver** sheet
  - ✓ Use the **Solver** to calculate the quotation for a **Total Load** of 2000 cubic metres
  - ✓ Change the **Load** capacity of the dumpers to see what effect bigger ones would have
  - ✓ Change other parameters (such as Trips per Day; Running Costs; Max Quotation; and Max Working Days) recalculating after each change
  - ✓ Save and close the workbook

Open the file **SCENARIOS**

- ✓ Create a data table below the existing worksheet data to show variable results for **Year 5 Profits** (cell **F15**) with figures for **Sales Growth** (**B6**) ranging from 7-12% in 0.5% increments
- ✓ Modify the data table to show a range of values for **Sales Volume** (**B2**) against **Sales Growth**, with **Sales Volume** values ranging from **50000** to **90000** in **5000** increments
- ✓ Print a copy of the worksheet
- ✓ Delete the data table
- ✓ Create scenarios for High, Low, and Medium growth, changing the values in cells B6, B7, and B8
- ✓ View the scenarios then edit the scenario values

- ✓ Create a **Scenario Summary** sheet
- ✓ Save and close the workbook

## **File Management**

### **Add, delete, or move page breaks**

- ✓ On the View menu, click Page Break Preview.
- ✓ Do one of the following:
  - ✓ **View page breaks:** Manually inserted page breaks appear as solid lines. Dashed lines indicate where Microsoft Excel will break pages automatically.
  - ✓ **Move a page break:** Drag the page break to a new location. Moving an automatic page break changes it to a manual page break.
  - ✓ **Insert vertical or horizontal page breaks:** Select a row or column below or to the right of where you want to insert a horizontal or vertical page break, right-click, and then click Insert Page Break.
  - ✓ **Remove page breaks:** Drag the page break outside of the print area. To remove all manual page breaks, right-click any cell on the worksheet, and then click Reset All Page Breaks.

Worksheets are usually too large to show all the data on one screen and having to scroll repeatedly slow and makes comparing parts of the same sheet difficult. To overcome this, a large worksheet can be split into **panes**, where you can view two different parts of the worksheet at the same time and scroll the panes independently or open a new window for the workbook.

Another tool allows you to **freeze** row and column titles so that they are always shown on-screen. For example, if you are working with a data list, you could freeze row 1 so that the column labels are always shown. Finally, you can hide and unhide rows, columns, worksheets, and workbooks. Hiding data can be useful to make viewing a large sheet easier or to protect sensitive information.

### **Go To a Cell**

You can use the **Name** box or the **Go To** tool to select **named ranges** on a worksheet. You can also use both these tools to move the active cell to a specific cell reference.

**Tip**      *Look up the topic "Name cells in a workbook" in the online help for more information about named ranges.*

### **To select a range using the Name box**

- ✓ Type the cell reference into the **Name** box

**OR**

Type the range name into the **Name** box

**OR**

- ✓ Click the arrow on the **Name** box and select a location from the pull-down list



Name box

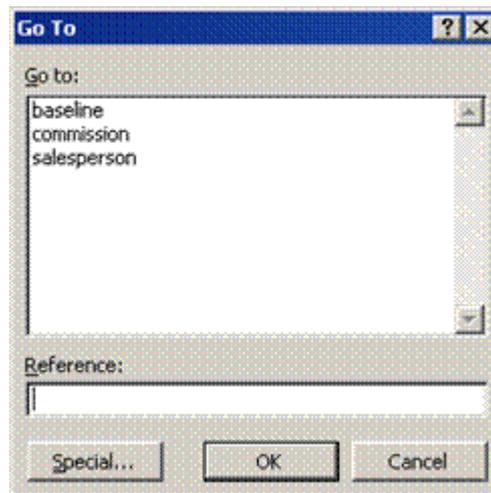
The named cell(s) are selected on the sheet, exactly as they appeared when the name was created.

## To select a range using the Go To dialogue box

- ✓ From the **E**dit menu, select **G**o **T**o...(SpeedKey: **F5** or **Ctrl**+**G**)

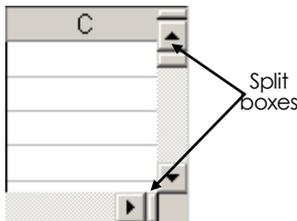
The **G**o **T**o dialogue box is displayed showing a list of named locations in the workbook.

- ✓ Select a name from the list or enter a grid reference in the **R**eference box
- ✓ Click **OK**



Go To dialogue box

## Split a Worksheet into Panes



To make large sheets easier to work with, the window can be split into horizontal and vertical **panes**. **Split boxes** are positioned at the top of the vertical scroll bar and the right of the horizontal scroll bar.

You can use the panes to view, edit, move, and copy data around the sheet more easily.

## To split the window into panes

- ✓ Click-and-drag the horizontal or vertical **split box** to the required location on the sheet

**OR**

- ✓ Position the active cell where the splits are to be located then from the **W**indow menu, select **S**plit

The screen is split into panes that can be scrolled independently.

- ✓ Click the mouse in the pane to activate, or press **F6** to activate each pane in sequence

	A	B	F	G	H
1	Salesperson	Anderson			
2	Baseline	£ 300.00			
3	Total Sales	£ 3,379.51			
4	Qualifying Sales	£ 2,794.40			
5	Commission	£ 250.00			
6					
7	Salesperson	Customer	Quantity	Discount	Line Total
29	Joyce	Hungry Owl All-Night Grocers	£ 3.00	0.00%	£ 159.00
30	Godley	Let's Stop N Shop	£ 10.00	0.00%	£ 155.00
31	Godley	Let's Stop N Shop	£ 21.00	0.00%	£ 162.75
32	Godley	Mère Paillarde	£ 18.00	10.00%	£ 538.65
33	Godley	Mère Paillarde	£ 25.00	10.00%	£ 101.25

Example of worksheet panes

## To clear worksheet panes

- ✓ Double-click on the **split boxes**, or click-and-drag them to the edge of the sheet **OR** from the **Window** menu, select **Remove Split**

## Freeze Row and Column Panes as Titles

It is often useful to keep worksheet titles (entries in the first row or column that identify the data) on-screen all the time. To do this you can **freeze** panes as titles. Unlike normal panes, there are no scroll bars for the frozen area.

## To freeze panes as worksheet titles

- ✓ Click on the cell where the freeze should be applied

Any row(s) above and column(s) to the left of the active cell will be frozen.

- ✓ From the **Window** menu, select **Freeze Panes**

	A	B	F	G	H
1	Salesperson	Anderson			
2	Baseline	£ 300.00			
3	Total Sales	£ 3,379.51			
4	Qualifying Sales	£ 2,794.40			
5	Commission	£ 250.00			
6					
7	Salesperson	Customer	Quantity	Discount	Line Total
11	Anderson	Blondel père et fils	£ 35.00	15.00%	£ 624.75
12	Anderson	Blondel père et fils	£ 18.00	15.00%	£ 956.25
13	Anderson	Blondel père et fils	£ 10.00	0.00%	£ 180.00
14	Anderson	Blondel père et fils	£ 12.00	5.00%	£ 110.01
15	Oshida	Blondel père et fils	£ 50.00	5.00%	£ 593.75
16	Godley	Mère Paillarde	£ 25.00	10.00%	£ 101.25

Example of freezing titles (at cell C8)

Columns to the left and rows above the active cell are frozen. The frozen titles are indicated by black gridlines.

## To unfreeze worksheet titles

- ✓ From the **Window** menu, select **Unfreeze Panes**

## To convert between panes and freeze titles

If you have applied panes to a worksheet, applying freeze panes will convert the panes to freeze titles. Similarly, if you have applied freeze panes, applying normal panes will convert the freeze titles to panes.

## View a Workbook in Two Windows

As an alternative to splitting one window into panes, you can open another window for the active workbook and arrange both on-screen. This means that you can view different worksheets in the same workbook at the same time.

### To view the active workbook in multiple windows

- ✓ From the **Window** menu, select **New Window**

A new window is opened. The title bar shows the name of the workbook with **:2** after it. The windows are still showing exactly the same file. Any changes you make in one window will be updated to the other. When more than one window is visible, select the workbook to work in by clicking on it with the mouse. The first click will activate the window but will not change the active cell. Alternatively, you can use **Ctrl+Tab** to switch between windows or use the

**Window** menu. You can also arrange the windows on-screen:

- ✓ From the **Window** menu, select **Arrange...**

The **Arrange Windows** dialogue box is displayed.

- ✓ From the **Arrange** panel select an arrangement method
- ✓ If you have other workbooks open, and only want to arrange the windows of the active workbook, check the **Windows of active workbook** box
- ✓ Click **OK**



Arrange Windows dialogue box

## Compare Worksheets Side by Side

If you open two workbook windows, you can set both windows to scroll simultaneously (so if you scroll down in one window, the content of the other is redrawn too).

### To compare worksheets side by side

- ✓ With the workbooks you want to compare open and the first workbook selected, from the **Window** menu, select **Compare Side by Side With...**
- ✓ If there are more than two workbooks open, select the file with which you want to compare the current workbook

The windows of the workbooks are displayed together and the **Compare Side by Side** toolbar is displayed. You can edit either workbook by clicking it then editing as normal. When the **Synchronous Scrolling** button  is active, scrolling in one window scrolls the other automatically.

- ✓ From the toolbar or **Window** menu, click **Close Side by Side** to finish (this does not close either workbook)

**Note** *Only scrolling is simultaneous. If you switch to a different worksheet in one window, you must do so manually in the other window.*

## Hide and Unhide Data

You may want to **hide** a part of a worksheet because it contains sensitive information or intermediate calculations that do not need to be seen or printed. The contents of columns, rows, worksheets, and whole workbooks can be hidden. Even though it is not shown, a hidden cell is calculated as normal if it is used in a formula.

You can also hide columns and rows temporarily to make more room on-screen.

### To hide columns, rows, and worksheets using the mouse

- ✓ Select the column(s), row(s), or worksheet(s) to hide
- ✓ From the **Format** menu, select **Row**, **Column**, or **Sheet** then from the submenu, select **Hide**

**OR**

- ✓ Right-click the selection then from the shortcut menu, select **Hide**

### To hide a workbook

You might want to hide a workbook if you create formulas in one book that link to data in a second book that you want to keep confidential.

- ✓ Open the workbook
- ✓ From the **Window** menu, select **Hide**

**Note** *When you exit Excel, you will be prompted to save any changes to the hidden workbook. When you open a hidden workbook, the workbook window remains hidden.*

### To unhide columns or rows using the mouse

- ✓ Select a group of columns or rows that span the hidden columns or rows
- ✓ From the **Format** menu, select **Row** or **Column** then from the submenu, select **Unhide** **OR** right-click the selection then from the shortcut menu, select **Unhide**

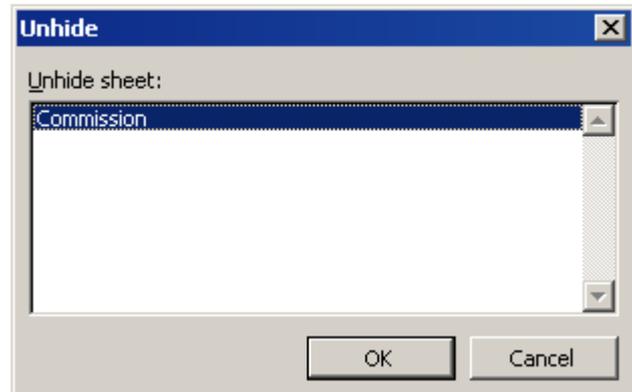
**Tip** *To unhide all columns or rows, select the entire worksheet then from the **Format** menu, select **Row** or **Column** then from the submenu, select **Unhide**.*

## To unhide a worksheet

- ✓ From the **Format** menu, select **Sheet** then select **Unhide...**

The **Unhide** dialogue box is displayed.

- ✓ Select the worksheet to unhide
- ✓ Click **OK**



Unhide dialogue box

## To unhide a workbook

- ✓ From the **Window** menu, select **Unhide**
- ✓ From the **Unhide** dialogue box, select the workbook to unhide and click **OK**

*Note* **You will notice a workbook named PERSONAL in the list of books. This is used to store macros and should not be unhidden.**

## To hide and unhide columns or rows using the keyboard

Press	To
<b>Ctrl</b> + <b>0</b> (zero)	Hide selected column(s)
<b>Ctrl</b> + <b>Shift</b> + <b>)</b>	Unhide selected column(s)
<b>Ctrl</b> + <b>9</b>	Hide selected row(s)
<b>Ctrl</b> + <b>Shift</b> + <b>(</b>	Unhide selected row(s)

### Exercise 33

- ✓ Open the workbook **CONTACTS** then click in cell **C2** then from the **Window** menu, select **Freeze Panes**
- ✓ Scroll around the sheet, noticing that the titles always remain on the screen
- ✓ Select column A then from the **Format** menu, select **Column** then select **Hide**

- ✓ Click the **ContactData** sheet tab to select the worksheet
- ✓ Click in cell **A2** then press **Ctrl** + **Shift** + **↓** to select the range of data
- ✓ Press **Shift** + **→** twice to select the next two columns
- ✓ From the **I**nsert menu, select **N**ames then **C**reate
- ✓ In the dialogue box, make sure that only the **L**eft column box is checked then click **OK**
- ✓ Click in cell **A2** then from the **W**indow menu, select **F**reeze Panes
- ✓ Click the arrow on the **N**ame box then scroll to find **Merchant,Robb** and select it

The appropriate data is selected on the sheet.

- ✓ From the **E**dit menu, select **G**o To then select another name and click **OK**
- ✓ Select the sheet **CompleteData**
- ✓ Select rows **86:92** then right-click the selected row headers and select **H**ide
- ✓ Note the total number of rows with data in **CompleteData** then switch back to **ContactData** then look to see if the hidden rows are still shown

Hiding data does not affect any calculations using the hidden cells. Because all the cells on the **ContactData** sheet use a reference to **CompleteData**, all the rows are still there.

- ✓ Switch back to the **CompleteData** sheet and click-and-drag across rows **85:93**
- ✓ Right-click the row headers and select **U**nhide
- ✓ From the **F**ormat menu, select **S**heet then from the submenu, select **H**ide
- ✓ Save and close the workbook

Open **HOUSE**

Open **HOUSEHOLD**

- ✓ Practise switching between the two workbooks
- ✓ From the **W**indow menu, select **C**ompare Side **b**y Side **W**ith...
- ✓ Practise scrolling around one window and observe the changes in the other window
- ✓ On the **C**ompare Side **b**y Side toolbar, click **C**lose Side **b**y Side
- ✓ Close **HOUSEHOLD**
- ✓ Maximise **HOUSE**
- ✓ Use the horizontal split box to split the screen into two so that you can view the fixed and variable expenses on the screen together
- ✓ Remove the split
- ✓ Use **F**reeze Panes to lock the **M**onth headings for scrolling across the sheet
- ✓ Remove the split
- ✓ Use Zoom to view all data on the worksheet without scrolling
- ✓ Save and close **HOUSE**

## **About places to save files**

Some of the content in this topic may not be applicable to some languages.

You can save the file you're working on, whether it's new or has been saved before, and you can also save a copy of the file with a different name or in a different location. You can save any file as a Single File Web Page (MHTML) so that it can be viewed and used on the Internet.

## My Documents

When you open the Open and Save As dialog boxes after starting a Microsoft Office program, the My Documents folder appears by default. The My Documents folder is a good place to save files you're working on, such as documents, worksheets, or databases.

## My Network Places

My Network Places, which is located on the My Places bar in the Open and Save As dialog boxes, is a good place to save files you want to copy or publish to folders on network file servers or Web servers. Saving files to a server allows others easy access to them.

## Change the default working folder

This procedure sets the default folder for opening and saving Microsoft Excel files.

1. On the **Tools** menu, click **Options**, and then click the **General** tab.
2. In the **Default file location** box, type the path for the folder you want to display as the default working folder.

For example, type c:\work.

## About file properties

Document properties are details about a file that help identify it— for example, a descriptive title, the author name, the subject, and keywords that identify topics or other important information in the file. Use document properties to display information about a file or to help organize your files so that you can find them easily later. You can also search for documents based on document properties.

## Types of document properties

There are four types of document properties:

- ✓ **Automatically updated properties** include statistics that are maintained for you by Microsoft Office applications, such as file size and the dates files are created and last modified. For example, you can search for all files created after March 3, 1999, or for all files last modified yesterday.
- ✓ **Preset properties** already exist (such as author, title, and subject), but you must enter a text value. For example, in Microsoft Word, you can use the **Keywords** property to add the keyword "customers" to your sales files and then search for all sales files with that keyword.
- ✓ **Custom properties** are properties you define. You can assign a text, time, or numeric value to custom properties, and you can also assign them the values "yes" or "no." You can choose from a list of suggested names or define your own. You can optionally link custom document properties to specific items in your file, such as a named cell in Microsoft Excel, a selected item in PowerPoint, or a bookmark in Word. For example, in a contract form created in Word, you can create a custom file property that is linked to a form field that contains the contract's expiration date. Then you can search for all contract files with expiration dates earlier than the date you specify.
- ✓ **Document library properties** are for files in a document library on a Web site or public folder. When you design a document library, you define one or more document library properties and set rules on their values. When users add documents to the document library, they are prompted to fill in a form assigning values to each of these

properties. For example, a document library that collects product ideas could prompt the user for properties such as Submitted By, Date, Category, and Description.

## Setting document properties

You can set document properties for the active file you're working on in any Microsoft Office application. If you want to be reminded to set document properties for every file you create, you can have Microsoft Excel, Word, or PowerPoint automatically display the Properties dialog box when you save files for the first time. When you add a file to a document library, you are automatically prompted for the file's document library properties.

## Viewing document properties

If a document is open, you can view its properties by using the Properties command.

You can view the properties of any document by selecting the document in Windows Explorer or in the Open, Save, or Search dialog boxes. When you view a document library listing in a Web browser, each document name is listed along with its document library properties.

## Create custom file properties

- ✓ On the **File** menu, click **Properties**.
- ✓ Click the **Custom** tab.
- ✓ In the **Name** box, type a name for the custom property, or select a name from the list.
- ✓ In the **Type** box, click the data type for the property you want to add.
- ✓ In the **Value** box, type a value for the property. The value you enter must match the selection in the **Type** box. For example, if you click **Number** in the **Type** box, you must type a number in the **Value** box. Values that don't match the property type are stored as text.
- ✓ Click **Add**.

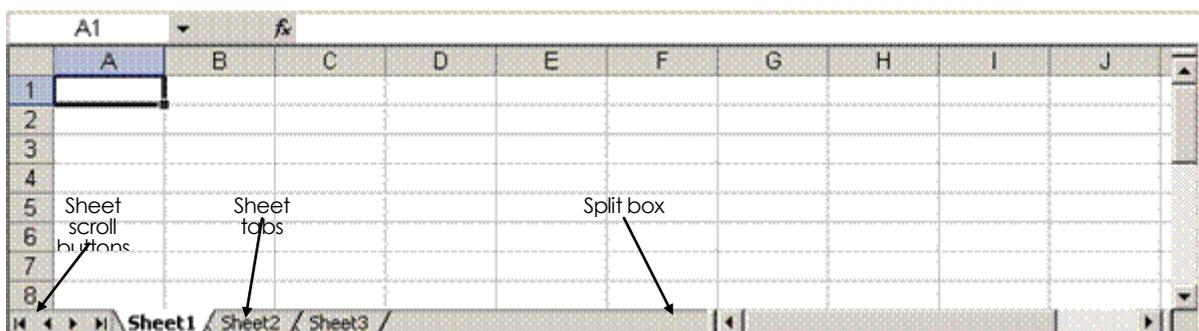
## Switch Between Worksheets

The **Sheet** tab at the bottom of the worksheet window identifies each sheet within the workbook.

### To select a worksheet using the mouse

- ✓ Clicking the worksheet's tab

The **sheet scroll** buttons allow viewing of sheet tabs that extend beyond the tab space.



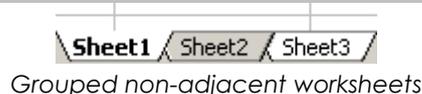
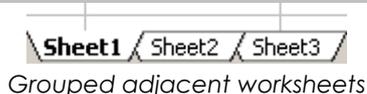
**Tip** To change the size of the area showing sheet tabs, click-and-drag on the split box.

## To group worksheets using the mouse

Some operations require you to select multiple worksheets. When you select additional sheets, the first sheet in the selection remains active. The active worksheet's name is shown in bold.

- ✓ Open the workbook containing the worksheets to be printed
- ✓ To activate and group the worksheets together for printing, do one of the following

To Select	Click
Two or more adjacent worksheets	The worksheet tab of the first worksheet to activate it. Press and hold down the <b>Shift</b> key, and click the last tab in the range of worksheets you want to select.
Two or more non-adjacent worksheets	The worksheet tab of the first worksheet to activate it. Press and hold down the <b>Ctrl</b> key, then click the tabs of the other worksheets you want to select



**Tip** When multiple worksheets are selected, the word [Group] is displayed in the workbook title bar.

## To ungroup worksheets

- ✓ Hold down the **Shift** key, and click on the active worksheet tab to ungroup all the worksheets

## To select and group worksheets using the keyboard

- ✓ Press **Ctrl**+**Page Down** and **Ctrl**+**Page Up** to select the next and previous worksheets respectively
- ✓ Press **Shift**+**Ctrl**+**Page Down** and **Shift**+**Ctrl**+**Page Up** to select multiple worksheets

## To enter data on multiple worksheets

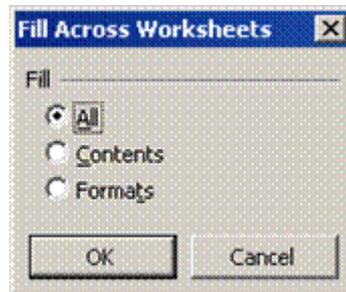
When you have selected multiple sheets, if you type or paste data into a cell, the same data is inserted into each cell on each selected worksheet.

You can also use the AutoFill command to copy a series or existing data onto multiple worksheets.

- ✓ Select the worksheet containing the data or start of the series that you want to copy

- ✓ Select the additional worksheets to copy data to
- ✓ Select the range of cells from which to copy data (or the cell with the series origin and the cells to fill)
- ✓ From the **E**dit menu, select **F**ill then **A**cross Worksheets...

The **Fill Across Worksheets** dialogue box is displayed.



Fill Across Worksheets dialogue box

- ✓ Select whether to copy **A**ll or either **C**ontents or **F**ormats
- ✓ Click **OK**

## Copy Cells and Data between Worksheets and Workbooks

Data can be moved or copied between different worksheets and workbooks using the Cut, Copy, and Paste tools.

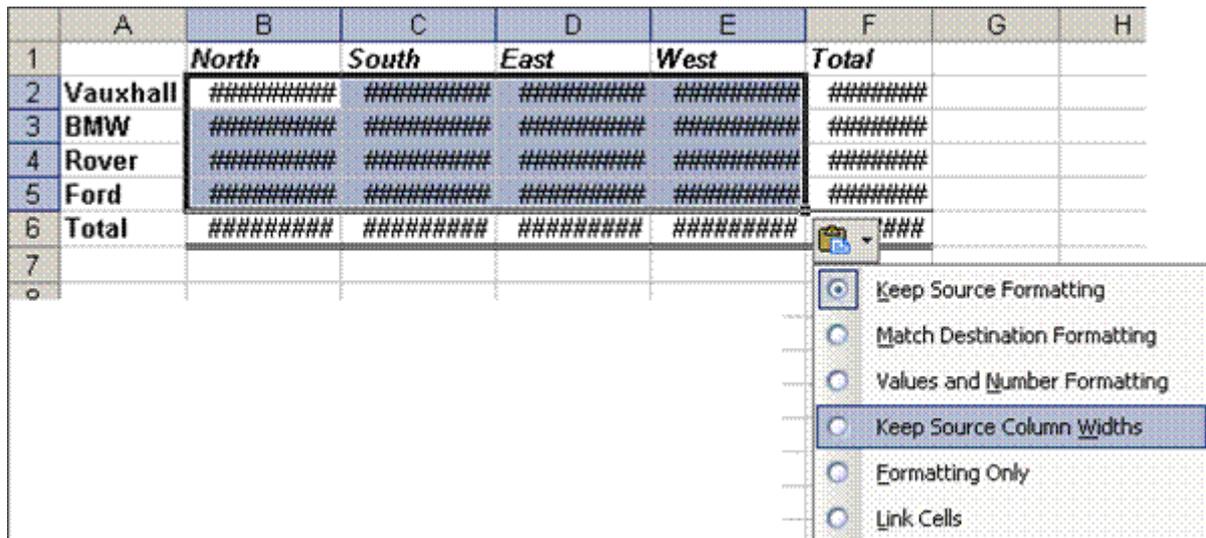
### To move or copy a cell or range to a different worksheet

**Cutting** and pasting is a single action, and the cut cells can only be pasted once. The cell contents can be moved within the same worksheet or to other worksheets. After **copying**, the selection remains highlighted and may be pasted multiple times.

- ✓ Select the range to be move/copy (this can be a single cell, block of cells, column(s) or row(s))
- ✓ From the **E**dit menu, select **C**ut (SpeedKey: **Ctrl** + **X**) or **C**opy (SpeedKey: **Ctrl** + **C**)
- ✓ Click the tab to select the worksheet that you want to move/copy data to
- ✓ On the new worksheet, select a cell to be the new location for the data

If you are moving/copying a range of cells, select the cell that will become the top-left corner of the range.

- ✓ From the **E**dit menu, select **P**aste (SpeedKey: **Ctrl** + **V**)



Copying data from a worksheet to cell B2 and using the Paste Options SmartTag

If you **copied** the range, the **Paste Options** smart tag is displayed. This allows you to choose formatting options (such as pasting values only, pasting formats only, retaining column widths and so on). There is also an option to **link** the cells, which has the same result as the transfer data formula described above or the **Paste Special** option (described below).

### To move or copy a cell or range to another open workbook

- ✓ Open the source and destination workbooks
- ✓ In the source workbook, select the range to be move/copy (this can be a single cell, block of cells, column(s), or row(s))
- ✓ From the **Edit** menu, select **Cut** (SpeedKey: **Ctrl** + **X**) or **Copy** (SpeedKey: **Ctrl** + **C**)
- ✓ Switch to the destination workbook using the **Window** menu or **Taskbar** (SpeedKey: **Alt** + **Tab**)
- ✓ In the destination workbook, click the tab to select the worksheet that you want to move/copy data to
- ✓ Select a cell to be the new location for the data

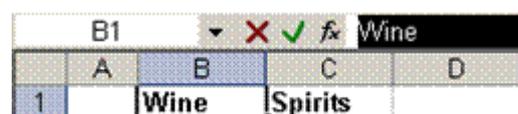
If you are moving/copying a range of cells, select the cell that will become the top-left corner of the range.

- ✓ From the **Edit** menu, select **Paste** (SpeedKey: **Ctrl** + **V**)

If you copied the range, the **Paste Options** smart tag is displayed. This allows you to choose formatting options (such as pasting values only, pasting formats only, retaining column widths, and so on). There is also an option to **link** the cells. This pastes the formula **=CellReference** into the destination cell.

### To move or copy cell contents between worksheets and workbooks

- ✓ If you do not want to move cells, you can click-



Selecting cell contents to cut and paste

and-drag to select text within the cell or formula bar then cut and paste it to another location as normal

## Insert a New Worksheet

A new workbook contains three worksheets named **Sheet1**, **Sheet2**, and **Sheet3**. Additional sheets may be added or existing sheets duplicated up to a total of 255. Sheets not required can be deleted. Sheets can be renamed and colour-coded to identify them clearly. You can move and copy sheets into a different sequence in the workbook.

Worksheets make it easier to store related data together in one file. For example, if you had a series of monthly sales reports, you might store the monthly data for each year on 12 sheets in 1 workbook.

## To add a new worksheet

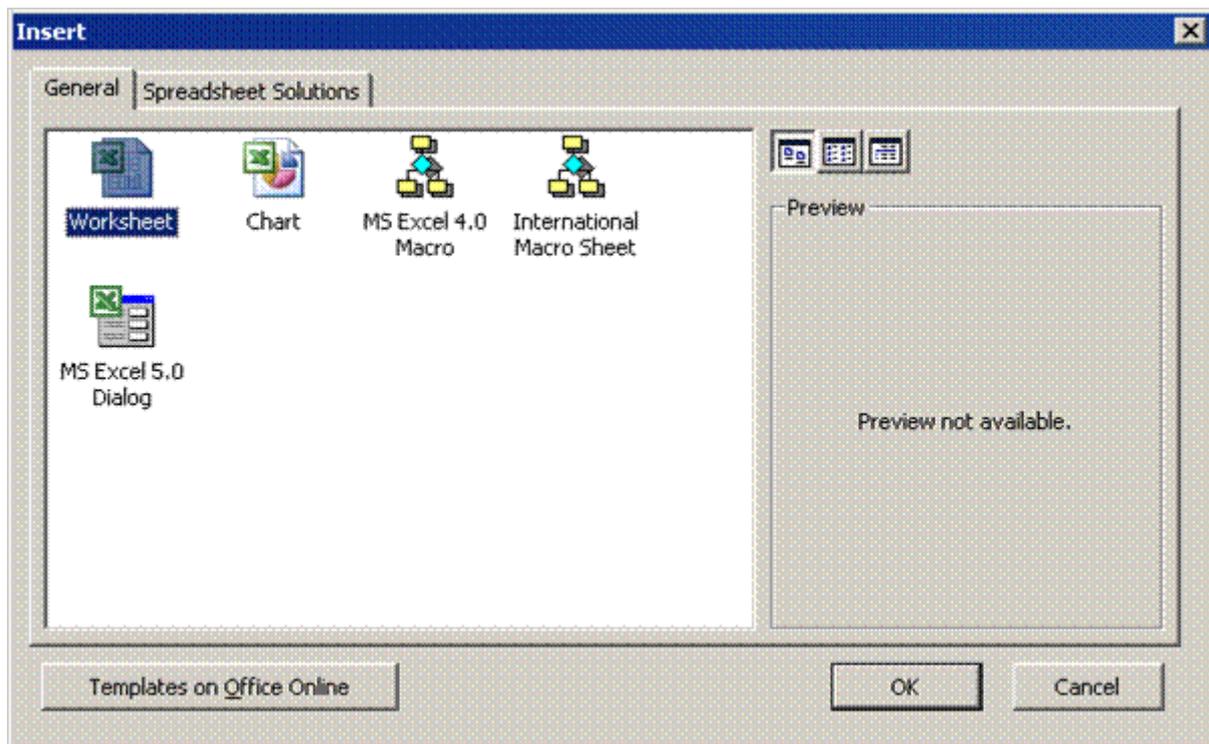
- ✓ From the **I**nsert menu, select **W**orksheet (SpeedKey: Shift + F11)

A new sheet is inserted before the current sheet, and given the next sheet number in sequence.

**OR**

- ✓ Right-click a **Sheet** tab and from the shortcut menu, select **I**nsert...

The **I**nsert dialogue box is displayed.



*Insert dialogue box*

- ✓ Select the **Worksheet** icon
- ✓ Click **OK**

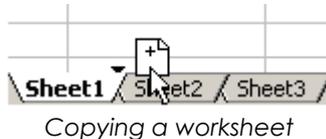
A new sheet is inserted before the current sheet, and given the next sheet number in sequence.

## Move, Copy, Rename, and Delete a Worksheet

### To copy a worksheet using drag-and-drop

- ✓ Point to the sheet tab of the worksheet to move or copy
- ✓ Hold down **Ctrl** then click-and-drag to the left or right

A small arrow appears above the sheet tabs.



- ✓ Release the mouse to insert the duplicate sheet where the arrow is positioned

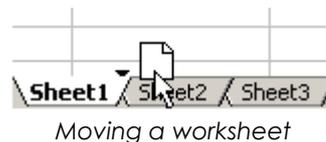
The new sheet has the same name as the original, with a number after it to identify it as a duplicate. For example, if the original sheet is named **Summary**, the duplicate is named **Summary (2)**.

### To move a worksheet using drag-and-drop

- ✓ Position the pointer over the worksheet tab to move then click-and-drag to move the sheet

A small arrow appears above the sheet tabs.

- ✓ Release the mouse to move the sheet to where the arrow is positioned



### To move or copy a worksheet using the Move or Copy dialogue box

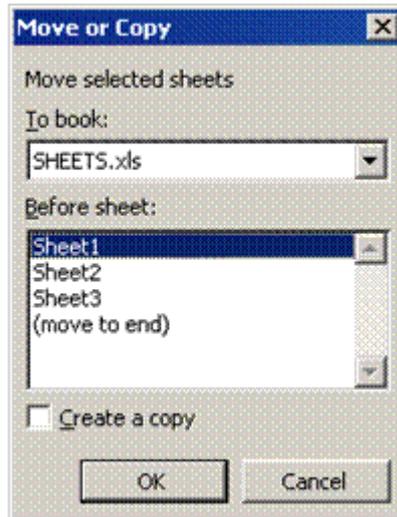
You can move or copy a worksheet within the same workbook, to another open workbook, or to a new workbook.

- ✓ Optionally, open the workbook you want to copy the sheet to then switch back to the source workbook
- ✓ Point to the sheet tab of the worksheet to move or copy
- ✓ From the **Edit** menu, select **Move or Copy Sheet...**

**OR**

- ✓ Right-click the selected tab and from the shortcut menu, select **Move or Copy...**

The **Move or Copy** dialogue box is displayed.



Move or Copy dialog box

- ✓ Optionally, from the **To book:** list box, select the name of another open workbook or select (**new book**) to create a new workbook and move/copy the sheet to it
- ✓ From the **Before sheet:** box, select a location for the sheet
- ✓ To copy the sheet, click the **Create a copy** check box
- ✓ Click **OK**

**Note** When you copy a worksheet, any data on the worksheet is also copied. However, if any cells contain more than 255 characters, only the first 255 characters will be copied. A warning dialogue box is displayed if this is the case.

## To rename a worksheet

- ✓ Select the worksheet tab to rename
- ✓ Double-click on the sheet tab

**OR**

- ✓ From the **Format** menu, select **Sheet** then **Rename**

**OR**

- ✓ Right-click the selected tab and from the shortcut menu, select **Rename**
- ✓ Type the new name on the highlighted sheet tab and press **Enter**

## To change the colour of a worksheet tab

- ✓ Select the worksheet tab
- ✓ From the **Format** menu, select **Sheet** then **Tab Color...**

**OR**

- ✓ Right-click the selected tab and from the shortcut menu, select **Tab Color...**

The **Format Tab Color** dialogue box is displayed.



Format Tab Colour dialogue box

- ✓ Select a colour from the colour palette
- ✓ Click **OK**

To see the colour more clearly once applied, click onto another worksheet tab, as a **selected** worksheet tab is still displayed as white.

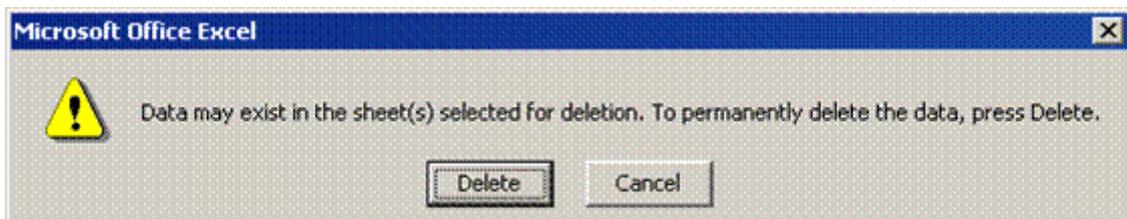
### To delete a worksheet

- ✓ Select the worksheet tab to delete
- ✓ From the **Edit** menu, select **Delete Sheet**

**OR**

- ✓ Right-click the selected tab and from the shortcut menu, select **Delete**

If there is any data on the sheet, a warning dialogue box is displayed.



- ✓ Click **Delete**

**Warning** You cannot undo this command, so data on the sheet will be deleted permanently unless you close the workbook without saving changes.

## Exercise 34

- ✓ Open the workbook **STRUCTURE HOUSE**
- ✓ Insert a new row between **Income** and **Husband** and choose **Format Same As Below** from the **Paste Options** smart tag
- ✓ Insert a new row between **Expenses** and **Mortgage** and choose **Format Same As Below** from the **Paste Options** smart tag
- ✓ Insert a new column between columns **A** and **B** and choose **Format Same As Right** from the **Paste Options** smart tag
- ✓ Delete column **B**
- ✓ Rename **Sheet 1** as **Expenses**
- ✓ Make the sheet **Expenses** colour **Pale Blue**
- ✓ Select rows 1 to 8 then click **Copy** 
- ✓ Click the **Sheet2** tab
- ✓ Click **Paste** 
- ✓ From the **Paste Options** smart tag, select **Keep Source Column Widths**
- ✓ Rename **Sheet2** to **Income** and apply the **Pale Yellow** colour
- ✓ Delete **Sheet 3**
- ✓ Right-click the **Expenses** sheet and select **Move or Copy...**
- ✓ Move to the end of the workbook and make it a copy
- ✓ Click the original **Expenses** sheet and delete rows 2 to 8
- ✓ Save and close the workbook

## Printing

### Set margins for printing

Select the worksheet or worksheets you want to print.

When you enter or change data, the changes affect all selected sheets. These changes may replace data on the active sheet and other selected sheets.

To select	Do this
A single sheet	Click the sheet tab. If you don't see the tab you want, click the tab scrolling buttons to display the tab, and then click the tab.
Two or more adjacent sheets	Click the tab for the first sheet, and then hold down SHIFT and click the tab for the last sheet.
Two or more nonadjacent sheets	Click the tab for the first sheet, and then hold down CTRL and click the tabs for the other sheets.
All sheets in a workbook	Right-click a sheet tab, and then click Select All Sheets on the shortcut menu

**Note** *If sheet tabs have been colour-coded, the sheet tab name will be underlined in a user-specified colour when selected. If the sheet tab is displayed with a background colour, the sheet has not been selected.*

## Set page margins

- ✓ On the **File** menu, click **Page Setup**, and then click the **Margins** tab.
- ✓ In the Top, Bottom, Left, and Right boxes, enter the margin size you want.
- ✓ To apply the same page margins to new worksheets or workbooks, you can create a worksheet or workbook template.

## Set header or footer margins

- ✓ On the **File** menu, click **Page Setup**, and then click the **Margins** tab.
- ✓ To change the distance from the top edge to the header, enter a new margin size in the **Header** box.
- ✓ To change the distance from the bottom edge to the footer, enter a new margin size in the Footer box.

These settings should be smaller than your top and bottom margin settings, and larger than or equal to the minimum printer margins.

**Tip** *To see how the margins will affect the printed document, click Print Preview before the document is printed. To adjust the margins in print preview, click Margins, and then drag the black margin handles on either side and at the top of the page*

## Insert date and time in a header or footer

- ✓ On the **View** menu, click **Header and Footer**.
- ✓ Click **Custom Header** or **Custom Footer**.
- ✓ Click in the **Left section**, **Center section**, or **Right section** box.
- ✓ On the row of buttons in the **Header** or **Footer** dialog box, click **Date** or **Time**.
- ✓ If you want, do one or more of the following:
- ✓ To start a new line, press ENTER.
- ✓ To delete a date or time from a header or footer, select &[Date] or &[Time] and then press DELETE.

**Note** *Make sure the header or footer margin allows enough space for the custom header or footer*

## Add headers and footers for printing

- ✓ Click the worksheet.
- ✓ On the **View** menu, click **Header and Footer**.
- ✓ In the **Header** or **Footer** box, click the header or footer you want.

## Create custom headers and footers

You can have only one custom header and one custom footer on each worksheet. If you create a new custom header or footer, it replaces any other custom header or footer on the worksheet.

- ✓ Click the worksheet.
- ✓ On the **View** menu, click **Header and Footer**.
- ✓ To base a custom header or footer on an existing header or footer, click the header or footer in the **Header** or **Footer** box.
- ✓ Click **Custom Header** or **Custom Footer**.
- ✓ Click in the **Left section**, **Center section**, or **Right section** box, and then click the buttons to insert the header or footer information you want in that section.
- ✓ Do one or more of the following:
  - ✓ To enter additional text for the header or footer, enter the text in the **Left section**, **Center section**, or **Right section** box.
  - ✓ To start a new line in one of the section boxes, press ENTER.
  - ✓ To delete a section of a header or footer, select the section that you want to delete in the section box, and then press BACKSPACE.

**Note** You can use the buttons in the Header or Footer dialog boxes to format or further customize your headers and footers. Make sure the header or footer margin allows enough space for the custom header or footer.

## Print a worksheet to fit a paper width

- ✓ Click the worksheet.
- ✓ On the **File** menu, click **Page Setup**, and then click the **Page** tab.
- ✓ Under **Scaling**, click **Fit to**.
- ✓ In the first box beside **Fit to**, enter **1** (for 1 page wide).
- ✓ In the second box beside **Fit to**, delete the value so that the number of pages tall is unspecified.

## Print a worksheet on a specified number of pages

- ✓ Click the worksheet.
- ✓ On the **File** menu, click **Page Setup**, and then click the **Page** tab.
- ✓ Under **Scaling**, click **Fit to**.
- ✓ In the boxes beside **Fit to**, enter the number of pages on which you want to print the work.

## Notes

- ✓ Microsoft Excel ignores manual page breaks when you use the **Fit to** option.
- ✓ When you change the values for **Fit to**, Excel shrinks the printed image or expands it up to 100 percent, as necessary. To see the how much the image will be adjusted for your new values, click **OK**, and then click **Page Setup** on the **File** menu. The **Adjust to** box on the **Page** tab shows the percentage that the printed size will be adjusted.
- ✓ Printed data does not exceed the specified number of pages. Excel does not enlarge the data to fill the pages

### Print with or without cell gridlines

- ✓ Click the worksheet.
- ✓ On the **File** menu, click **Page Setup**, and then click the **Sheet** tab.
- ✓ Select or clear the **Gridlines** check box.
- ✓ Click **Print**.

**Note** Worksheets print faster if you print without gridlines.

### Print row and column headings or labels on every page

Row headings are the row numbers to the left of the worksheet; column headings are the letters or numbers that appear at the top of the columns on a worksheet.

#### Print row and column headings

- ✓ Click the worksheet.
- ✓ On the **File** menu, click **Page Setup**, and then click the **Sheet** tab.
- ✓ Select the **Row and column headings** check box, and click **Print**.

#### Print row and column labels on every page

- ✓ Click the worksheet.
- ✓ On the **File** menu, click **Page Setup**, and then click the **Sheet** tab.
- ✓ To print column labels on every page, under **Print titles** in the **Rows to repeat at top** box, enter the rows that contain the column labels, and then click **Print**.
- ✓ To print row labels on every page, under **Print titles** in the **Columns to repeat at left** box, enter the columns that contain the row labels, and then click **Print**.

## ***Print Preview***

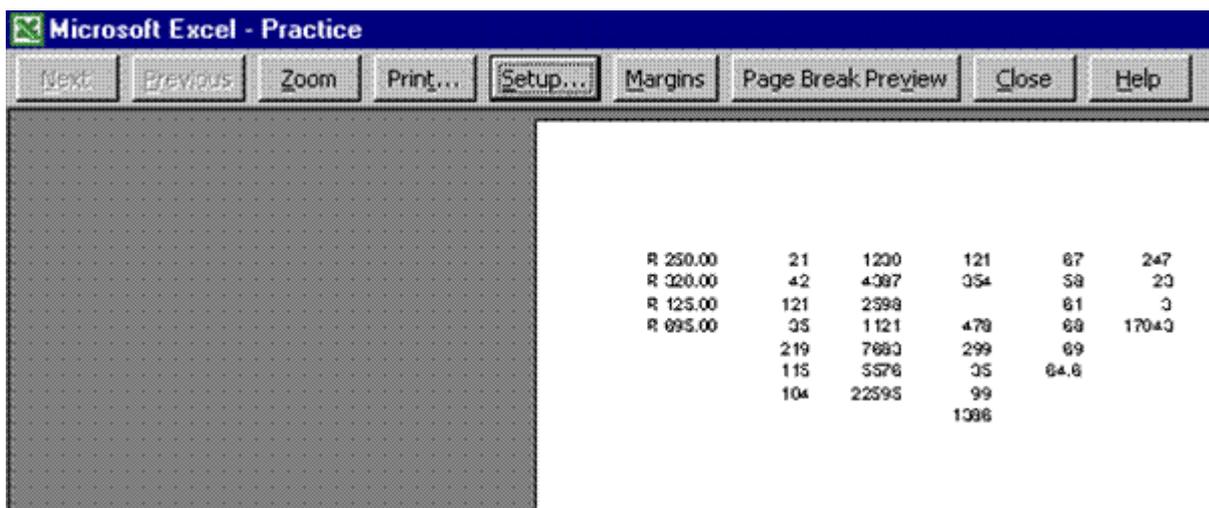
### **Exercises 35**

Whenever you want to print a worksheet, always first go to print preview to see what your worksheet will look like when it is printed.

Save your worksheet and then go to the File, Print Preview menu.

### ***Zoom***

Use this to zoom in and out of your document. Click on **Zoom** and Excel will zoom into your document. When you click on **Zoom** again, Excel will zoom out of the document.



### ***Setup***

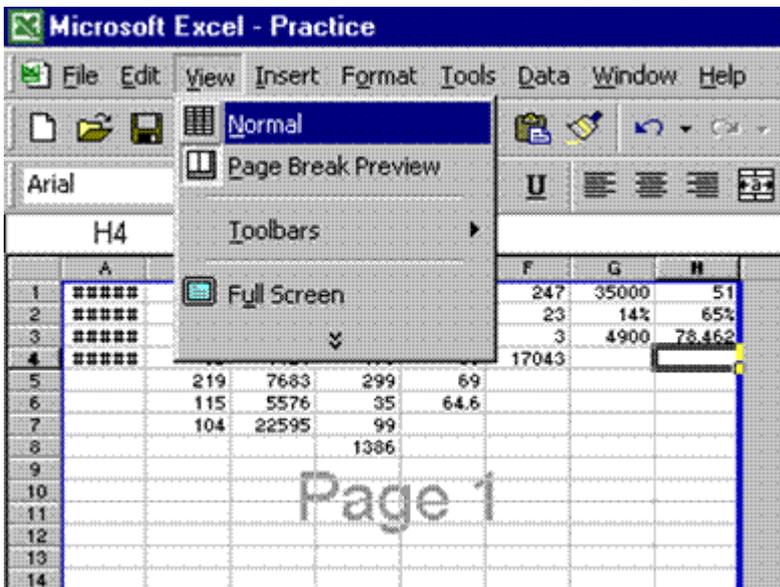
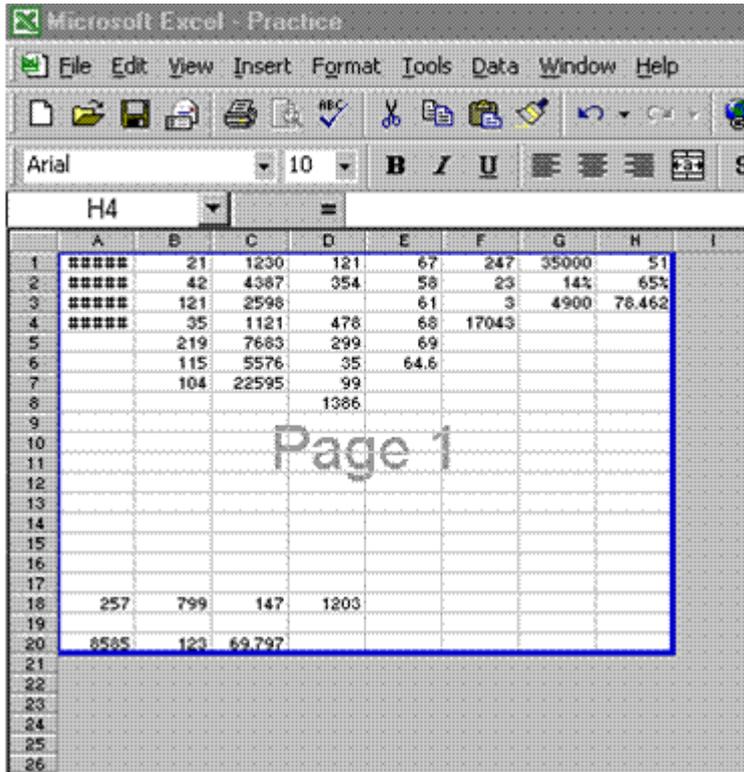
Controls the appearance of the printed document.

- ✓ Click on Setup and change the Page orientation of your worksheet from Portrait to Landscape.
- ✓ You do this by clicking on Landscape and then clicking OK. When you work in Excel you will from time to time have a wide document that you will want to print in Landscape format.

### ***Page Break Preview***

This gives you a view of all the pages of your worksheet and where they will be cut off.

Click on Page Break Preview. You will notice that this option takes you out of Print Preview and back to your worksheet.



## ***Printing The Document***

### **Exercises 36**

- ✓ Choose the File, Print menu. You now have a couple of choices.
- ✓ In the Print Range box you can choose to print either all the pages or only certain pages of the workbook.
- ✓ In the Copies box, you can choose the number of copies of the printing job you want to print.
- ✓ There is also a Print What box, which gives you the following options: the entire workbook or only selected worksheets. If you choose active sheets, the work area of selected sheets only will be printed. If you choose Entire workbook, Excel will print the entire workbook.

# MANIPULATE DATA

## ***Specific Outcome***

Manipulate the data in a spreadsheet

## ***Assessment criteria***

- ✓ The appearance of spreadsheet is modified to user requirements using formatting facilities: Alignment, cell widths, text style, font, colour, number, date and time formats
- ✓ Selected cells within an existing spreadsheet file are sorted numerically and alphabetically

## Set Up a Data List

In addition to performing calculations, spreadsheets can also be used to work with long lists of data.

Two database terms that are useful to know are **Record** and **Field**.

- ✓ A **record** is all of the data on a single row
- ✓ A **field** is each separate column along the record

Fields have column headings (or titles/labels) at the top to identify the type of data that should be entered in the field.

	A	B	C	D	E	F	G
1	Invoice	Date	Number	Company	Amount	VAT	Total
2	11560	11/09/2003	TC/001	Ability	3,472.00	607.60	4,079.60
3	11561	14/09/2003	TC/004	Lectern Systems	782.00	136.85	918.85
4	11562	14/09/2003	TC/024	Adept Computer Technology	690.00	120.75	810.75
5	11563	16/09/2003	TC/004	Lectern Systems	499.00	87.33	586.33
6	11564	18/09/2003	TC/001	Ability	2,890.00	505.75	3,395.75
7	11565	19/09/2003	TC/004	Lectern Systems	1,809.00	316.58	2,125.58
8	11566	19/09/2003	TC/010	Northwind Systems	3,635.00	636.13	4,271.13
9	11567	19/09/2003	TC/024	Adept Computer Technology	804.00	140.70	944.70
10	11568	19/09/2003	TC/001	Ability	1,575.00	275.63	1,850.63
11	11569	22/09/2003	TC/028	Inova Business Services	638.00	111.65	749.65
12	11570	22/09/2003	TC/004	Lectern Systems	597.00	104.48	701.48
13	11571	22/09/2003	TC/010	Northwind Systems	357.00	62.48	419.48
14	11572	22/09/2003	TC/001	Ability	2,556.00	447.30	3,003.30

*Example list containing seven fields and fourteen records*

Lists can be created and used with or without a heading row; Excel will recognise and use it if it is there, but formatting the heading row differently from the rest of the list helps to make it obvious to users. A blank row or column denotes the end of a list.

### To define a range as a list

You can also define an area of a worksheet as a list. This has the advantage of making Excel's list tools available when the list is selected. It also makes it easier to manage multiple lists on a single worksheet. For example, if you store two or more lists next to one another, to protect the lists, Excel prevents you from inserting or deleting a row in the normal way. Instead, you must right-click within a list to select the insert or delete command, which then only inserts or deletes cells in the active list.

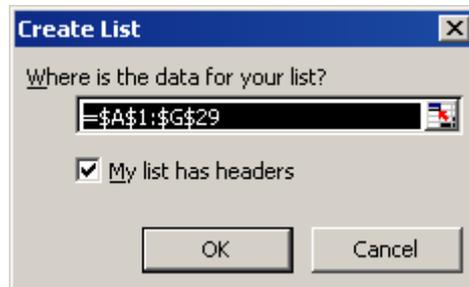
**Note** *This feature is not available in the Basic edition of Excel (the version that ships with Office Basic, Standard, and Small Business editions).*

- ✓ Select the range containing the data for the list

Normally, the list should include labels (or **headers**) in the top row to identify each column (field). If the list does not have headers, Excel will insert default headers (**Column1**, **Column2**, and so on) when you create the list.

- ✓ From the **Data** menu, select **List** then **Create List...** (SpeedKey: Ctrl + L)

The **Create List** dialogue box is displayed.



Create List dialogue box

- ✓ If necessary, adjust the range comprising the list
- ✓ Optionally, uncheck the **My list has headers** box (if your list does not have labels)
- ✓ Click **OK**

The list is shown with a blue border. When the list is selected (**active**), a blank row at the end of the list is shown with an asterisk, which you can use to add rows (records) to the list. Arrows are shown on each header cell. These allow you to apply an **AutoFilter** to the list.

	A	B	C	D	E	F	G
1	Invoice	Date	Number	Company	Amount	VAT	Total
2	11560	11/09/2003	TC/001	Ability	3,472.00	607.60	4,079.60
3	11561	14/09/2003	TC/004	Lectern Systems	782.00	136.85	918.85
4	11562	14/09/2003	TC/024	Adept Computer Technology	690.00	120.75	810.75
5	11563	16/09/2003	TC/004	Lectern Systems	499.00	87.33	586.33
6	11564	18/09/2003	TC/001	Ability	2,890.00	505.75	3,395.75
7	11565	19/09/2003	TC/004	Lectern Systems	1,809.00	316.58	2,125.58
8	11566	19/09/2003	TC/010	Northwind Systems	3,635.00	636.13	4,271.13
9	11567	19/09/2003	TC/024	Adept Computer Technology	804.00	140.70	944.70
10	11568	19/09/2003	TC/001	Ability	1,575.00	275.63	1,850.63
11	11569	22/09/2003	TC/028	Inova Business Services	638.00	111.65	749.65
12	11570	22/09/2003	TC/004	Lectern Systems	597.00	104.48	701.48
13	11571	22/09/2003	TC/010	Northwind Systems	357.00	62.48	419.48
14	11572	22/09/2003	TC/001	Ability	2,556.00	447.30	3,003.30
15	*						

If you click away from the list, it becomes **inactive**. When a list is inactive, the AutoFilter arrows and the new record indicator are hidden. By default, inactive lists are shown with a thin blue border.

**Tip** To show or hide the border around inactive lists, right-click a list and select **Hide Border of Inactive Lists**.

**Tip** You can also create a list by right-clicking a range and selecting **Create List** from the shortcut menu.

## To re-define a list

You can add rows to the same list by typing in the asterisk row. You can also insert rows, columns, or cells within a list using the normal Insert Cells command. Finally, if you type in a blank column to the right of a list, the column will be added to the list automatically (you can change this using the AutoCorrect SmartTag).

- ✓ To change the range used for a list (for example, to make the list smaller), right-click the list and select **List** then **Resize List...**
- ✓ Click-and-drag a new range for the list and click **OK**

## To remove a list

Removing the list property from a range does not delete any data from the cells.

- ✓ Right-click the list and select **List** then **Convert to Range**
- ✓ Click **Yes** to confirm

## Use a Form to Enter and Edit Data

Lists can be displayed on a data form. Records can be viewed, sorted, selected, added, edited, and deleted from the form instead of directly on the worksheet. This can save time and effort in scrolling around long or wide lists. Adding new records on the form adds them to the bottom of the list automatically.

### To edit records using a data form

- ✓ Click any cell in the list
- ✓ From the **Data** menu, select **Form...**

The **Form** dialogue box is displayed for the selected list, showing record number **1**.

Fields that can be edited appear as boxes. Calculated fields (formulas) display a value on the form background, and cannot be edited.

- ✓ Select the record to amend by using the scroll bar or the **Find Prev** or **Find Next** buttons
- ✓ Edit any of the displayed fields
- ✓ Press **Tab** to advance to each field to edit
- ✓ Press **Enter** to save the changes
- ✓ Click **Close** to return to the worksheet

Field	Value
Invoice:	11560
Date:	11/09/2003
Number:	TC/001
Company:	Ability
Amount:	3472
VAT:	607.60
Total:	4,079.60

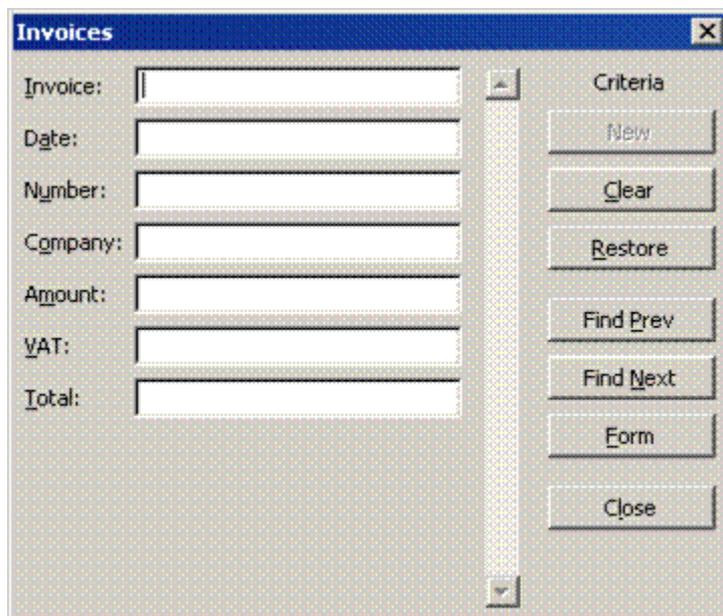
## Form option buttons

Button	Action
New	Add a new record. A blank form is displayed. Enter the details and press <input type="text" value="Enter"/> to save the record and start a new one.
Delete	Delete the displayed record. Confirmation is requested before the record is deleted.
Restore	Cancel changes made to the current record before they are saved.
Find Prev	Move back to the previous record in the list.
Find Next	Advance to the next record in the list.
Criteria	Find a record. Displays a blank form for entering search criteria.
Close	Close the form and return to the worksheet.

### To find a record

- ✓ From the **Form** dialogue box, click the **Criteria** button

A blank form is displayed, with selection boxes for all fields including calculated fields.



The screenshot shows a dialog box titled "Invoices" with a close button (X) in the top right corner. On the left side, there are seven input fields with labels: "Invoice:", "Date:", "Number:", "Company:", "Amount:", "VAT:", and "Total:". On the right side, there is a vertical stack of buttons under the heading "Criteria": "New", "Clear", "Restore", "Find Prev", "Find Next", "Form", and "Close". A vertical scrollbar is located between the input fields and the buttons.

Criteria form

- ✓ Enter the search criteria in each field required
- ✓ Click the **Find Next** or **Find Prev** buttons

The number of records matching the criteria is displayed at the top of the dialogue box, for example **4 of 40**.

### Criteria option buttons

Button	Action
Clear	Clear fields - clears data from all of the fields ready for a new search.
Restore	Cancel changes made to the current criteria selection.
Find Prev	Move back to the previous record that meets the selection criteria.
Find Next	Advance to the next record that meets the selection criteria.
Form	Close the Criteria, and return to the form.
Close	Close the Form and return to the worksheet.

### Sort a List

Lists can be sorted by using the toolbar buttons or the menu. Excel will find and sort any data adjacent to the active cell.

#### To sort by a single column

- ✓ Click **in a single cell** in the column to sort by - for example, click in **B1** to sort by column **B**
- ✓ On the **Standard** toolbar, click **Sort Ascending**  or **Sort Descending** 

The entire list is selected, and then sorted by the chosen column.

	A	B	C	D	E	F	G
1	<b>Invoice</b>	<b>Date</b>	<b>Number</b>	<b>Company</b>	<b>Amount</b>	<b>VAT</b>	<b>Total</b>
2	11560	11/09/2003	TC/001	Ability	3,472.00	607.60	4,079.60
3	11564	18/09/2003	TC/001	Ability	2,890.00	505.75	3,395.75
4	11568	19/09/2003	TC/001	Ability	1,575.00	275.63	1,850.63
5	11572	22/09/2003	TC/001	Ability	2,556.00	447.30	3,003.30
6	11562	14/09/2003	TC/024	Adept Computer Technology	690.00	120.75	810.75
7	11567	19/09/2003	TC/024	Adept Computer Technology	804.00	140.70	944.70
8	11569	22/09/2003	TC/028	Inova Business Services	638.00	111.65	749.65
9	11561	14/09/2003	TC/004	Lectern Systems	782.00	136.85	918.85
10	11563	16/09/2003	TC/004	Lectern Systems	499.00	87.33	586.33
11	11565	19/09/2003	TC/004	Lectern Systems	1,809.00	316.58	2,125.58
12	11570	22/09/2003	TC/004	Lectern Systems	597.00	104.48	701.48
13	11566	19/09/2003	TC/010	Northwind Systems	3,635.00	636.13	4,271.13
14	11571	22/09/2003	TC/010	Northwind Systems	357.00	62.48	419.48

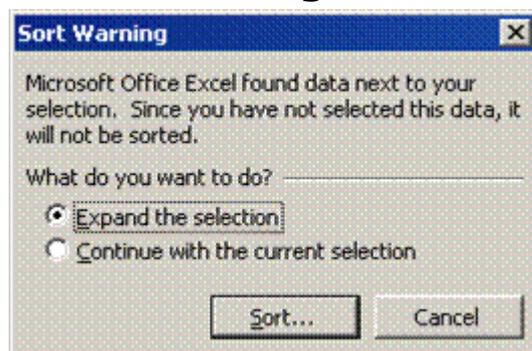
*List sorted by Company in ascending order (alphabetical sort)*

	A	B	C	D	E	F	G
1	Invoice	Date	Number	Company	Amount	VAT	Total
2	11566	19/09/2003	TC/010	Northwind Systems	3,635.00	636.13	4,271.13
3	11560	11/09/2003	TC/001	Ability	3,472.00	607.60	4,079.60
4	11564	18/09/2003	TC/001	Ability	2,890.00	505.75	3,395.75
5	11572	22/09/2003	TC/001	Ability	2,556.00	447.30	3,003.30
6	11565	19/09/2003	TC/004	Lectern Systems	1,809.00	316.58	2,125.58
7	11568	19/09/2003	TC/001	Ability	1,575.00	275.63	1,850.63
8	11567	19/09/2003	TC/024	Adept Computer Technology	804.00	140.70	944.70
9	11561	14/09/2003	TC/004	Lectern Systems	782.00	136.85	918.85
10	11562	14/09/2003	TC/024	Adept Computer Technology	690.00	120.75	810.75
11	11569	22/09/2003	TC/028	Inova Business Services	638.00	111.65	749.65
12	11570	22/09/2003	TC/004	Lectern Systems	597.00	104.48	701.48
13	11563	16/09/2003	TC/004	Lectern Systems	499.00	87.33	586.33
14	11571	22/09/2003	TC/010	Northwind Systems	357.00	62.48	419.48

List sorted by Total in descending order (numeric sort)

**Warning** Selecting more than one cell will limit the sort area to the selection only.  
For example, if you selected column A in the worksheet shown above, column A would be sorted alphabetically but column B would not change. Consequently, the wrong quantity would be shown next to each type of fruit. This would be a very serious error and very difficult to put right without using Undo.

## To sort a range or a list



Do not select a range before applying a sort (unless that is what you intend to do). **If you select a range, only the cells within that range will be sorted.** To sort a column, you only need to click in one cell in that column.

If you do select a range, and there is data in columns or rows adjacent to your selection, Excel will warn you that it thinks you might have made a mistake.

- ✓ If appropriate, click **Expand the selection** to select the whole list then click **Sort...**

**Note** If you select part of a defined list (that is, a list with a blue border), Excel expands the selection to the whole list without prompting you.

## Sort Orders

When a list is sorted in ascending order, Excel sorts the list using the following rules. Blank cells **always** appear at the bottom of the list.

Data Type	Ascending Sort Order
Numeric	Smallest negative number to largest positive number.
Date/Time	Earliest date/time to latest date/time.
Text	Sorted left to right, character by character using the following order of precedence: 0 1 2 3 4 5 6 7 8 9 (space) ! " # \$ % & ( ) * , . / : ; ? @ [ \ ] ^ _ ` {   } ~ + < = > A B C D E F G H I J K L M N O P Q R S T U V W X Y Z Apostrophes and hyphens are ignored unless two cells are identical except for the presence of an apostrophe or hyphen. For example, Co-ordinator follows Coordinator.
Boolean	FALSE then TRUE.

The sort orders listed above are **reversed** in a **descending** sort. However, blank cells still appear at the **bottom** of the list, even in a descending sort.

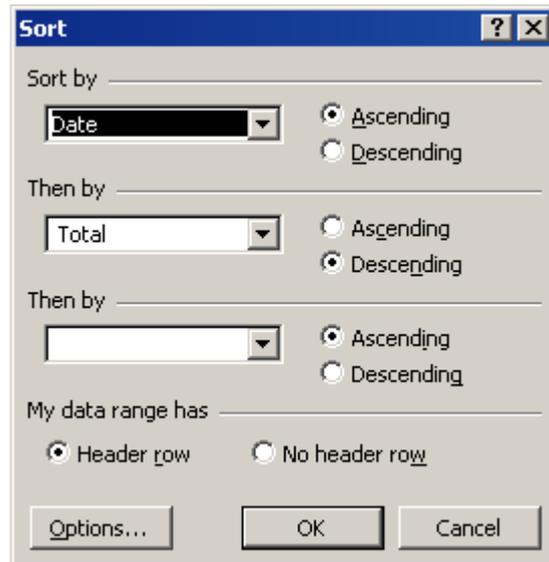
If the range contains mixed data types, it will be sorted in the order shown above (that is, numeric values appear at the top, followed by dates, then text, and finally Boolean values). If your list contains numbers that should be sorted as text, format the cells as **Text** first (**Format, Cells, Number** tab).

## To sort by more than one column

- ✓ Click in a single cell in any column in the list - **do not select more than one cell**
- ✓ From the **Data** menu, select **Sort...**

The **Sort** dialogue box is displayed.

- ✓ Click the arrow and select a column heading for each sort required



Sort dialogue box

**Tip** *If column labels are not displayed in the Sort by boxes, check that the Header row option is selected. Conversely, if your list or selection does not have column labels, make sure the No header row option is selected.*

- ✓ Click the **Ascending** or **Descending** option buttons for each sort selected
- ✓ Click **OK**

**Tip** *If more than three columns need to be sorted on, select and sort on the three least important columns first, then the more important ones next.*

**Tip** *If you want to sort data in a row, make your selection then click the Options button. In the Sort Options dialogue box, select Sort Left to Right then click OK. Complete the Sort dialogue box as normal.*

## Filter a List

Filtering selects and displays only the required records on the screen. Filters can be applied to several columns in succession, reducing the number of records displayed each time. Lists can be sorted before or after filtering, and they print out as they appear on the screen.

### *To filter a list*

Filtering selects only records that meet specific criteria, such as a name, date, or value, and hides the others by setting the row size to 0 (zero). Filter buttons list every different value that can be selected within the column.

- ✓ Click anywhere in the list
- ✓ From the **Data** menu, select **Filter...** then from the submenu select **AutoFilter**

Filter buttons are displayed on every column in the list.

	A	B	C	D	E	F	G
1	<b>Invoice</b> ▼	<b>Date</b> ▼	<b>Number</b> ▼	<b>Company</b> ▼	<b>Amount</b> ▼	<b>VAT</b> ▼	<b>Total</b> ▼
2	11566	19/09/2003	TC/010	Northwind Systems	3,635.00	636.13	4,271.13
3	11560	11/09/2003	TC/001	Ability	3,472.00	607.60	4,079.60
4	11564	18/09/2003	TC/001	Ability	2,890.00	505.75	3,395.75
5	11572	22/09/2003	TC/001	Ability	2,556.00	447.30	3,003.30
6	11565	19/09/2003	TC/004	Lectern Systems	1,809.00	316.58	2,125.58
7	11568	19/09/2003	TC/001	Ability	1,575.00	275.63	1,850.63

*Filter buttons*

**Tip** *If you define a list, AutoFilter buttons are shown automatically when you select the list.*

- ✓ Click a filter button and select a value from the list box



Filter list

The filtered data displays only lines containing the selected item. The filter button turns blue on columns where items are selected.

- ✓ Repeat for each column to select from

**Tip** You can also use the **AutoFilter** menus to sort a list by that column.

### Exercise 37

- ✓ Create a new workbook and save it as **PRODUCT MANIFEST**
- ✓ Type the following field names into separate cells in row A: ID, Category, Product, Amount, Price, Stock Level, Reorder Level, Discontinued
- ✓ Select the ID, Stock Level, and Reorder Level columns then apply **Number** value format with **No Decimal Places** and **No comma separator**, apply **Currency** format, with **£** symbol and **2** decimal places to the **Price** field then apply a **dd/mm/yyyy** format to the **Discontinued** column
- ✓ Right-click A1 and select **Create List...**, check the **My list has headers** box and click **OK**
- ✓ To start, click in A2 then add the following records to the list, taking care to type the data accurately

ID	Category	Product	Amount	Price	Stock Level	Reorder Level
22200	Condiments	Redcurrant Sauce	6 x 150ml	£6.35	86	0
22201	Condiments	Redcurrant Sauce - Extra Jelly	1 x 1kg	£6.30	24	5
22202	Salads	Rice & Vegetable Salad	2kl	£7.35	11	25
2220	Chilli	Roadhouse Hot &	6x147ml	£10.29	20	0

3	Sauces	Spicy				
2220 4	Chilli Sauces	Roadhouse Original	6x147ml	£10.29	61	25
2220 5	Chilli Sauces	Roadhouse Southwest BBQ	6x147ml	£10.29	49	30

- ✓ From the **Data** menu, select **Form...**
- ✓ Use the form to add the following records

ID	Category	Product	Amount	Price	Stock Level	Reorder Level
2220 6	Cold Meats	Roast Beef	Per kilo	£6.30	13	25
2220 7	Bread	Rossini Curls	1 x 280	£14.75	20	10
2220 8	Salads	Russian Salad	2kl	£5.20	15	0
2220 9	Herbs & Spices	Saffron Powder Packets	100 x 0.125g	£53.15	86	0
2221 0	Cold Meats	Salami Milano	Per kilo	£12.40	35	0
2220 6	Cold Meats	Roast Beef	Per kilo	£6.30	13	25

- ✓ Use the scroll bar to move to record #6
- ✓ Change the price to **£8.29**, the **Stock Level** to **10**, and the **Reorder Level** to **5**
- ✓ Click **Criteria**
- ✓ In the **Category** field, type **Chilli Sauces**
- ✓ Click **Find Next**
- ✓ Change the **Amount** to **6x197ml** then select the value and press **Ctrl** + **V** to copy it
- ✓ Change the **Amount** for other products in the **Chilli Sauces** category, using **Ctrl** + **V** to insert the value you copied
- ✓ Click **Close**
- ✓ Click the arrow on the **Category** field and select **Cold Meats**
- ✓ Click the **Stock Level** label
- ✓ On the **Standard** toolbar, click **Sort Ascending** 

- ✓ Click in the **Discontinued** field for the first record in the filtered list
- ✓ Type today's date
- ✓ Use AutoFill to copy the date to the next two records
- ✓ Click the arrow on **Category** and select **(All)** to remove the filter

Notice that AutoFill only operates on the records selected by the filter.

- ✓ Click in a single cell in any column in the list - **do not select more than one cell**
- ✓ From the **Data** menu, select **Sort...**
- ✓ In the first box, select **Category** and **Ascending** order
- ✓ In the second box, select **Price** and **Descending** order

Note that because this is a defined list, Excel greys out the **Header row/No header row** options so that you cannot change them.

- ✓ Click **OK**
- ✓ Save and close the workbook

Open the workbook **DATALIST**

- ✓ Use the **Sort** buttons to order the data in **date** sequence with the most recent **Invoice** first
- ✓ Sort the data alphabetically by **Company**
- ✓ With the cell pointer in any cell within the table, from the **Data** menu, select **Sort...**
- ✓ Sort the data by **Amount** within **Company**
- ✓ Sort the data by **Date** and **Company** putting the oldest invoice at the top of the list
- ✓ Sort the data into **Company** order then, for each company, sort the data into **Total** order
- ✓ Switch to **Form** view
- ✓ Find all orders for **29th September 2003**
- ✓ Find all orders for the company named **Lectern Systems**
- ✓ Save and close the workbook

Open the workbook **PRODUCT DATALIST**

- ✓ Use **Sort** and filter to answer the following questions

Question	Answer
How many product categories are there?	
What is the most expensive product?	
What is the lowest number of units in stock (ignoring zero values)?	
What is the most expensive product in the Dairy category?	
What is the eighth most expensive product?	

How many different products come in ten 500g packets?	
What is the price of Chocolate?	

- ✓ Remove all filters and hide the AutoFilter arrows
- ✓ Sort the list by ProductID in Ascending order
- ✓ Close the workbook

## ***Borders and Shading***

Cell shading and borders can be used to highlight selected areas of the sheet; for example, to identify where you should or should not enter data. Commonly, cells containing formulas (such as row or column totals) are shaded differently or marked by a border from the cells containing the data they calculate.

	A	B	C	D	E	F
1		North	South	East	West	Total
2	<b>Make</b>					
3	Vauxhall	450,000	380,000	450,000	210,000	1,490,000
4	BMW	350,000	645,000	750,000	685,000	2,430,000
5	Rover	425,000	390,000	560,000	415,000	1,790,000
6	Ford	550,000	590,000	440,000	465,000	2,045,000
7						
8	<b>Total</b>	1,775,000	2,005,000	2,200,000	1,775,000	7,755,000

When you design a spreadsheet, you should always bear in mind that you might not be the only person who has to use it. Effective use of borders and shading can improve the usability of a complex worksheet.

If you want to apply formats quickly, the AutoFormat feature gives you the option of simply choosing from a range of predefined formats.

### **Apply Cell Borders**

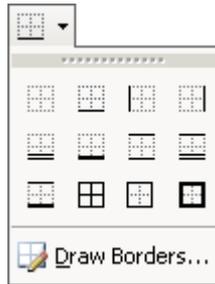
Borders and shading can be used to mark out different areas of the worksheet, making it easier to edit and read data. A variety of different border and shading line styles, colours, and patterns is available.

#### ***To add a border using the Formatting toolbar***

- ✓ Select the cell(s) to which to add borders

You can apply a border to a single cell, a range, or whole rows/columns. If you select a block of cells, you can apply borders to the inside and outside edges of the selection.

- ✓ On the **Formatting** toolbar, click **Border**  to apply the border style shown, or click the arrow on the **Border** button to select a border style from the menu



Border pull-down menu

## To draw a border

The **Borders** toolbar contains a **Draw Borders** tool, much like the **Draw Table** tool in Word.

- ✓ From the **View** menu, select **Toolbars...** then select **Borders** from the submenu

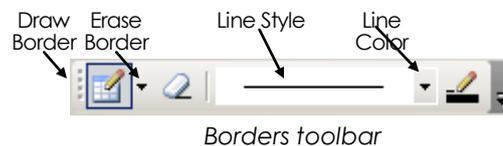
**OR**

- ✓ Right-click any toolbar and select **Borders** from the shortcut menu

**OR**

- ✓ Click the arrow on the **Borders** button and select **Draw Borders...**

The **Borders** toolbar is displayed.



- ✓ Select a line style and colour
- ✓ Click the **Draw Border** button 

The mouse pointer changes to a pen shape .

- ✓ Click-and drag-the mouse pointer to draw borders around a block of cells

450,000	380,000	450,000	210,000	1,490,000
350,000	645,000	750,000	685,000	2,430,000
425,000	390,000	560,000	415,000	1,790,000
550,000	590,000	440,000	465,000	2,045,000

Using the Draw Border button to draw an outside border

- ✓ Click the edge of a cell to add a border to that edge only

**Tip** You can draw diagonal borders within a cell by dragging from one corner to another.

- ✓ Optionally, change the line style and colour to draw different borders

- ✓ To return the cursor to normal, click the **Draw Border** button  again (SpeedKey: **Esc**)
- ✓ To remove a border, click **Erase Border** 

The mouse pointer changes to an eraser shape .

- ✓ Click or click-and-drag over the borders to remove

**Tip** To draw with internal borders, click the arrow on the Draw Border **button and select** Draw Border Grid . The cursor changes to the following shape . You can also switch to the grid cursor by holding down **Ctrl** or to the eraser cursor by holding down **Shift**.

### **To add a border using the Format Cells dialogue box**

- ✓ Select the cell(s) to have borders added
- ✓ From the **Format** menu, select **Ce**lls... (SpeedKey: **Ctrl** + **1**)

#### **OR**

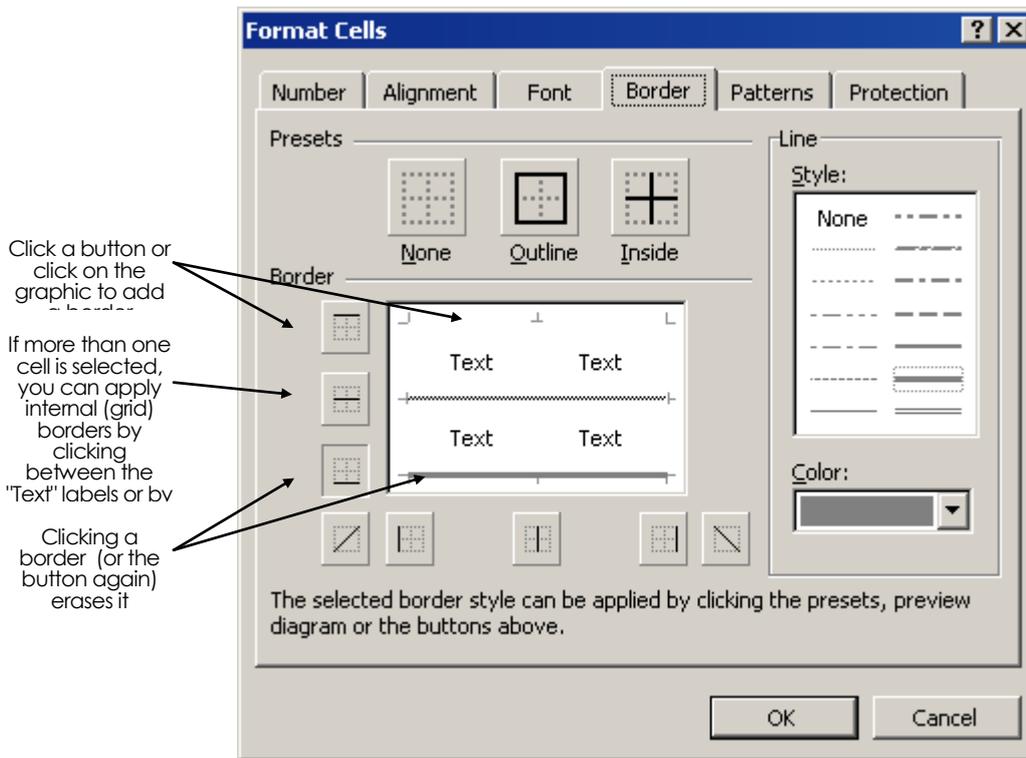
- ✓ Right-click the selection and from the shortcut menu, select **Format Cells...**

The **Format Cells** dialogue box is displayed.

- ✓ Click the **Border** tab
- ✓ From the **Line** panel, select a line **Style**:
- ✓ From the **Line** panel, select a border colour from the **Color**: pull-down list
- ✓ From the **Color**: box, select a colour for the border
- ✓ To apply the selected border, from the **Presets** panel, select an outline style

#### **OR**

- ✓ Click the buttons in the **Border** panel (or click the preview graphic itself) to add and remove borders from particular edges



Format Cells - Border dialogue box

**Tip** The border style applied is the one selected in the **Line panel**. You can change the settings there then click in the **Border panel** to apply different border styles to particular edges.

- ✓ Click **OK**

**Tip** If you have applied borders to a worksheet, you may want to hide the normal sheet gridlines. From the **Tools menu**, select **Options...** then click the **View tab**. Clear the **Gridlines check box** and click **OK**.

## Apply Cell Shading

If you apply shading to a cell, make sure that you also adjust the font colour if necessary. The text and its background should use contrasting colours to ensure legibility.

### To add shading using the **Formatting toolbar**

- ✓ Select the cell(s) to have shading applied
- ✓ On the **Formatting toolbar**, click **Fill Color**  to apply the fill colour shown

**OR**

- ✓ Click the arrow on the **Fill Color** button to select a fill colour from the colour palette



Fill Color palette

### To add shading using the **Format Cells** dialogue box

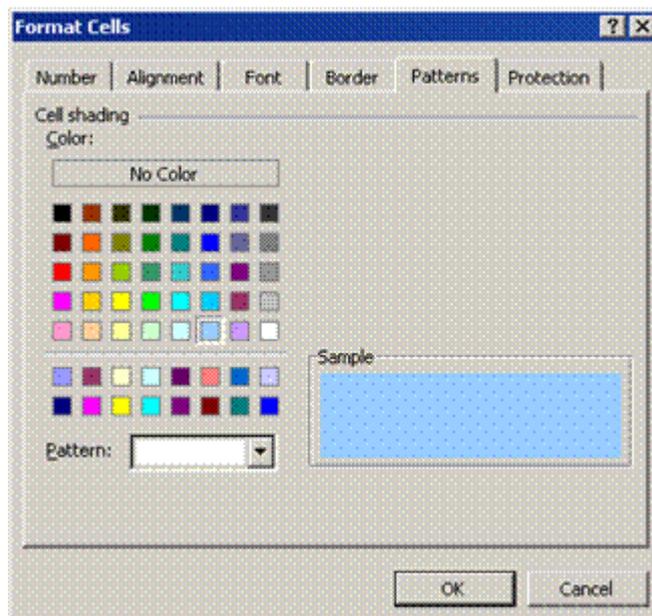
- ✓ Select the cell(s) to which to apply shading
- ✓ From the **Format** menu, select **Ce**lls... (SpeedKey: **Ctrl** + **1**)

### OR

- ✓ Right-click the selection and from the shortcut menu, select **Format Cells...**

The **Format Cells** dialogue box is displayed.

- ✓ Click the **Patterns** tab
- ✓ From the **Cell shading** panel, select a **C**olor:
- ✓ Optionally, from the **P**attern: box, select a pattern style
- ✓ Click **OK**



### To change the font colour

- ✓ Select the cell(s) to which to apply formats

### OR

- ✓ Edit the cell (press **F2** or double-click) then click-and-drag to select the text to which to apply formats
- ✓ On the **Formatting** toolbar, click **Font Color**  to apply the colour displayed on the button

**OR**

- ✓ On the **Formatting** toolbar, click the arrow on the **Font Color** button and select a colour from the pull-down menu

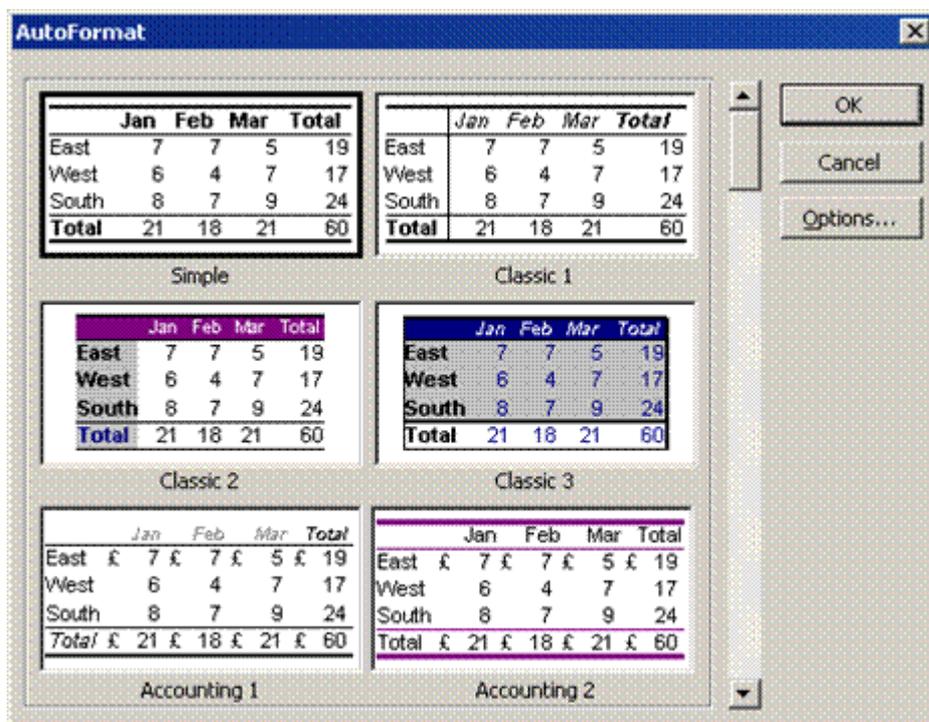
## Apply AutoFormat

**AutoFormats** are a list of predefined formats to make formatting all or part of a worksheet easier.

### To AutoFormat a range of cells

- ✓ Select the range to which to apply **AutoFormatting**
- ✓ From the **Format** menu, select **AutoFormat...**

The **AutoFormat** dialogue box is displayed.



*AutoFormat dialogue box*

- ✓ Scroll down through the options to view all the available AutoFormats
- ✓ Select a formatting style from the list by clicking on it once
- ✓ Click the **Options...** button to display the **Formats to apply** panel
- ✓ From the **Formats to apply** panel, select check boxes to switch elements of the selected style on or off
- ✓ Click **OK**

## Exercise 38

- ✓ Open the workbook **BORDER EXPENSE FORM**
- ✓ If necessary, adjust the **Zoom** control so that you can see all the data
- ✓ Insert a column to the left of column **A**
- ✓ Select column **A** and column **N**
- ✓ From the **Format** menu, select **Column** then **Width** and set it to **1**
- ✓ Insert a row above row **1** then another row above row **9**
- ✓ Resize rows **1**, **8**, and **26** to **10**
- ✓ Change the height of row **7** to **27** and change the vertical alignment to **Top**
- ✓ Display the **Borders** toolbar
- ✓ Select the line colour **Dark Blue** and a thick line then draw a border around **B8:N26**
- ✓ Select a thin dashed line and draw a border on the bottom of cells **D10:M10**
- ✓ Mirror this border along row **21**
- ✓ Select **D22:D25**
- ✓ From the **Format** menu, select **Cells** then click the **Patterns** tab
- ✓ Select the **Pale Orange** colour chip
- ✓ Click the arrow on the **Pattern** box and select the **25% Gray** pattern with **Pale Yellow** colouring
- ✓ Click **OK**
- ✓ Click in cell **M24** then display the **Format Cells** dialogue box
- ✓ Select the **Indigo** colour chip
- ✓ Click the arrow on the **Pattern** box and select the **50% Gray** pattern with **Pale Blue** colouring
- ✓ Click the **Border** tab
- ✓ Select the **Black** colour chip and a thick line weight then click the **Outline** button
- ✓ Click **OK**
- ✓ Change the **Font Colour** of **M24** to **White** and apply **Bold**
- ✓ Save and close the workbook

## Using AutoFormat

- ✓ Open the workbook **CAR SALES**
- ✓ Practise using **AutoFormat** to format the worksheet in different ways

	A	B	C	D	E	F
1		North	South	East	West	Total
2		<b>Make</b>				
3	Vauxhall	450,000	380,000	450,000	210,000	1,490,000
4	BMW	350,000	645,000	750,000	685,000	2,430,000
5	Rover	425,000	390,000	560,000	415,000	1,790,000
6	Ford	550,000	590,000	440,000	465,000	2,045,000
7						
8	<b>Total</b>	1,775,000	2,005,000	2,200,000	1,775,000	7,755,000

- ✓ Save and close **CAR SALES**

Open the workbook **HOUSEHOLD**

- ✓ Indent the items below each subheading
- ✓ Merge the title in cell **A1** so that it spans columns **A:G**
- ✓ Use the buttons on the **Formatting** toolbar to improve the presentation - add borders, shading, change number format, font styles and so on

**Tip** Try using the Borders toolbar to create the borders!

- ✓ Save and close **HOUSEHOLD**

Below is an example of how the worksheet could be formatted.

	A	B	C	D	E	F	G
1	<b>Household Budget</b>						
3		Jan	Feb	Mar	Apr	May	Jun
4	<b>Income</b>						
5							
6	Husband	2,500.00	2,500.00	2,500.00	2,500.00	2,500.00	2,500.00
7	Wife	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00	1,500.00
8	<b>Total</b>	<b>4,000.00</b>	<b>4,000.00</b>	<b>4,000.00</b>	<b>4,000.00</b>	<b>4,000.00</b>	<b>4,000.00</b>
9							
10	<b>Expenses</b>						
11							
12	Mortgage	700.00	700.00	700.00	700.00	700.00	700.00
13	Car Loan	220.00	220.00	220.00	220.00	220.00	220.00
14	Heating	35.00	35.00	35.00	35.00	35.00	35.00
15	Groceries	120.00	100.00	105.00	125.00	130.00	125.00
16	Petrol	15.00	10.00	25.00	30.00	20.00	15.00
17	<b>Total</b>	<b>1,090.00</b>	<b>1,065.00</b>	<b>1,085.00</b>	<b>1,110.00</b>	<b>1,105.00</b>	<b>1,095.00</b>
18							
19		Max	1,110.00				
20		Min	1,065.00				
21		Average	117.50				