European Computer Driving Licence

ECDL Syllabus 5.0

Module 4
Spreadsheets

Contents

■   USING THE APPLICATION

Spreadsheet applications are computer programs that originated in the accounting world. These programs can be used for a wide variety of activities, but most applications of spreadsheets focus on generating numeric information from other numeric information. MS Excel is an example of a spreadsheet program.

MS Excel comes in a variety of versions. Over the years the program has been updated, making it more powerful and easier to use. These course notes are based on MS Excel 2010.

Saving a Workbook as another File Type

You can save a workbook as another file type like: template, text file, specific file extension and version number.

1. Click **File** tab.
2. Click **Save As...** The Save As dialog box is displayed.
3. Select the disk and/or folder where the workbook file will be saved.
4. Type a name for your workbook in the File name: field.
5. Click the drop-down arrow in the Save as type: field.
6. Select the file format that you want the file to be saved in e.g. **Excel 97-2003 Workbook**.
7. Click **Save** button.

Note that:

▪ The facility to save a workbook to another format can be useful so that this can be read by previous versions of MS Excel.

■   FORMULAE & FUNCTIONS

Relative & Absolute Cell Referencing

Consider the example displayed on the next page, you can use the AutoFill feature to copy formulae from one cell to another.

1. Click in the cell where the answer will be placed e.g. **C8**.
2. Type the formula **=C5+C6+C7** to calculate the total expenses.
3. Use AutoFill to replicate the function on cells **D8**.

Note that:

▪ Cell D8 displays the answer. If you click this cell, the formula bar displays the formula used to calculate the answer.

However you need to use the AutoFill with caution when replicating formulas and functions. If you calculate the tax rate in cell C14 and then drag the formula to D14, E14 and F14 you will get strange answers. Click in the cell where the answer will be placed e.g. in C14 and type the formula =C10*B14 to calculate the tax rate on the Profit. Now drag the formula using the AutoFill handle to cell D14. The first answer will be correct (140) but the second one is definitely incorrect (308000). What happened?

	A	B	C	D
1	Income			
2	Total Sales		4000	5000
3				
4	Expenses			
5	Cost of Goods Sold		1500	1800
6	Advertising		300	350
7	Rent		450	650
8	Total Expenses			
9				
10	Profit or Loss			
11				
12	Average Expenses			
13				
14	Tax Rate	8%		
15				

When you dragged the formula =C10*B14 to cell D14, the computer created the formula =D10*C14. MS Excel adjusted the formula according to its new position - this is called <u>relative referencing</u>.

However, in your example you expected MS Excel to continue to refer to the same tax rate. Therefore you have to modify the formula to continue referring to a specific cell called <u>absolute referencing</u>.

Absolute cell references allow you to continue to refer to a cell, no matter where you copy a formula. You create an absolute cell reference by entering dollar signs ($) before each part of a cell reference of a formula you want to copy. The above tax rate formula will be modified to =C10*B14.

Therefore:

- A <u>relative cell reference</u> is a reference to a cell in the format A1. MS Excel changes a relative cell reference when you copy a formula or function containing such a reference.

- An <u>absolute cell reference</u> is a reference to a cell in the format A1. MS Excel does not adjust an absolute cell reference when you copy a calculation containing such a reference.

Arithmetic Functions

Functions, like formulae, allow you to perform calculations using values from any cell/s in a spreadsheet. You will use the following common functions:

sum( )	average( )	count( )
min( )	max( )	round( )

There are some basic rules associated with functions:

- Functions always begins with an equal (=) sign.
- Cells are referenced in a function by their column-row identifier, i.e. A1, B2 etc.
- You do not have to enter capital letters in your function; MS Excel will automatically capitalize them for you.
- Function cannot contain spaces.
- Always press **ENTER** key to confirm your function. The answer to the function displays in the cell into which the function is entered.

Sum Function

Consider the following sheet:

|	A	B	C	D
1	Income			
2	Total Sales		4000	5000
3				
4	Expenses			
5	Cost of Goods Sold		1500	1800
6	Advertising		300	350
7	Rent		450	650
8	Total Expenses			
9				
10	Minimum Expense			
11	Maximum Expense			
12	Average Expenses			
13				

1. Click the cell where the answer will be placed e.g. **C8**
2. Enter the function: **=sum(C5:C7)**
3. Press **ENTER** key.

Note that:

- The answer will be displayed in the cell where you entered the function.
- You can still see the function in the formula bar.
- Using the sum function facilitates the addition of a range of cells. The function in the above example tells the computer to add the contents of cells C5 to C7.

You can use the AutoSum function to add the contents of a range of cells:

1. Click the cell where the answer will be placed e.g. **C8**
2. Click the **Home** tab.
3. In the Editing group, click **AutoSum**.
4. Click **Sum**.
5. Highlight the cells to add their values by dragging the mouse.
6. Press **ENTER** key.
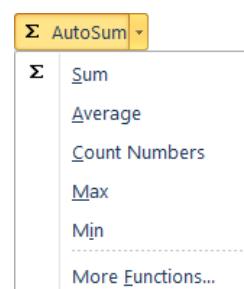
Minimum Function

The Minimum function returns the smallest value in a range of cells.

1. Click the cell where the answer will be placed e.g. **C10**
2. Enter the function: **=min(C5:C7)**
3. Press **ENTER** key.

Maximum Function

The Maximum function returns the largest value in a range of cells.

1. Click the cell where the answer will be placed e.g. **C11**
2. Enter the function: **=max(C5:C7)**
3. Press **ENTER** key.

Average Function

The Average function returns the average (arithmetic mean) of a range of cells.

1. Click the cell where the answer will be placed e.g. **C12**
2. Enter the function **=average(C5:C7)**
3. Press **ENTER** key.

Count Function

Sometimes you may wish to count values or worksheet elements (text, blank cells, specific number or text, etc.) in a spreadhseet. A "counting" function will return the number of cells in a range that meet certain criteria.

The COUNT function works out how many cells in a given range contain numbers (including dates and formulae with numerical answers). It ignores blank cells and cells containing text, logical or error values.

<div align="center">

=COUNT(value1,value2,...)

</div>

where value1, value2,... are 1 to 30 arguments that can contain or refer to a variety of different types of data, but only numbers are counted.

Consider the following example:

	A
1	Data
2	Sales
3	12/08/2008
4	
5	19
6	22.24
7	TRUE
8	#DIV/0!

Formula	Description (Result)
=COUNT(A2:A8)	Counts the number of cells that contain numbers in the list (3).
=COUNT(A5:A8)	Counts the number of cells that contain numbers in the last 4 rows of the list (2).
=COUNT(A2:A8,2)	Counts the number of cells that contain numbers in the list, and the value 2 (4)

Counta Function

The COUNTA function counts the number of cells that contain any type of value - numbers, text, error text etc. It does not include empty cells.

<div align="center">

=COUNTA(value1,value2,...)

</div>

where value1, value2,... are 1 to 30 arguments representing the values you want to count.

Consider the following example.

Formula	Description (Result)
=COUNTA(A2:A8)	Counts the number of nonblank cells in the list (6).
=COUNTA(A5:A8)	Counts the number of nonblank cells in the last 4 rows of the list (4).
=COUNTA(A1:A7,2)	Counts the number of nonblank cells in the list above and the value 2 (7).
=COUNTA(A1:A7,"Two")	Counts the number of nonblank cells in the list above and the value "Two" (7).

Spreadsheet data (column A):

	A
1	Data
2	Sales
3	12/08/2008
4	
5	19
6	22.24
7	TRUE
8	#DIV/0!

Round Function

The ROUND function rounds a number to a specified number of digits.

<div align="center">

=ROUND(number,num_digits)

</div>

where   number is the number you want to round.
               Num_digits specifies the number of digits to which you want to round number.

Note that:

- 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.

Formula	Description (Result)
=ROUND(2.15, 1)	Rounds 2.15 to one decimal place (2.2)
=ROUND(2.149, 1)	Rounds 2.149 to one decimal place (2.1)
=ROUND(-1.475, 2)	Rounds -1.475 to two decimal places (-1.48)
=ROUND(21.5, -1)	Rounds 21.5 to one decimal place to the left of the decimal point (20)

Using the Logical Function IF

The logical function IF (also known as the IF statement) tells MS Excel what to place in a cell (text, number or calculation) if certain defined parameters are either met or not met.

Consider the following values A=5 and B=6. The results of the following logical tests are:

Operators	Symbol	Values for Evaluation	Result
Equal to	=	A=B	FALSE
Not equal to	<>	A<>B	TRUE
Greater than	>	B>A	TRUE
Less than	<	B<A	FALSE
Greater than or equal to	>=	B>=A	TRUE
Less than or equal to	<=	B<=A	FALSE

The IF( ) function decides the contents of a cell on a spreadsheet based on whether a test condition is TRUE or FALSE. It returns a value if a one condition is TRUE, and another value or result if the condition is FALSE.

The IF( ) function is written as:

IF(logical_test, value_if_true, value_if_false)

where: logical_test is any value or expression that can be evaluated to TRUE or FALSE.
value_if_true is the value returned if the logical test is TRUE.
value_if_false is the value returned if the logical test is FALSE.

Example 1:

	A	B	C
1	Part No.	Amount	Available
2	542013B	4	Yes
3	190802A	0	No
4	121271C	10	Yes

The spreadsheet uses the IF() function to display a message in column C depending on the Amount for each part which is recorded in column B. If the Amount is 0 column C displays 'No' otherwise it displays 'Yes'.

The formula in C2 is written as follows: **=IF(B2=0, "No", "Yes")**
The logical_test is B2=0
The value_if_true is "No"
The value_if_false is "Yes"

Example 2:

	A	B	C
1	Part No.	Amount	Ordered
2	542013B	4	On order
3	190802A	0	On order
4	121271C	10	No

The spreadsheet uses the IF() function to display a message in column C depending on the Amount for each part which is recorded in column B. If the Amount is less than 5, column C displays 'On order' otherwise it displays 'No'.

The formula in C2 is written as follows: **=IF(B2<5, "On order", "No")**
The logical_test is B2<5
The value_if_true is "On order"
The value_if_false is "No"

Example 3:

	A	B	C
1	**Student**	**Average Mark**	**Pass/Fail**
2	Borg Jan	55	Pass
3	Callus Mario	44	Fail
4	Portelli Carlo	78	Pass

The spreadsheet uses the IF() function to display a message in column C depending on the Average Mark obtained by a student. If the Average Mark is equal to or greater than 45, column C displays 'Pass' otherwise it displays 'Fail'.

The formula in C2 is written as follows: **=IF(B2>=45, "Pass", "Fail")**
The logical_test is B2>=45
The value_if_true is "Pass"
The value_if_false is "Fail"

Example 4:

	A	B	C
1	**Staff**	**Sales**	**Commission @ 2%**
2	Bartolo Carol	500	10
3	Felice Philip	255	5.1
4	Zammit Lourdes	210	0

The spreadsheet uses the IF() function to display a message in column C depending on the Sales made by each staff. If the Sales is equal to or greater than 250, column C displays a 2% commission of the sales otherwise it displays '0'.

The formula in C2 is written as follows: **=IF(B2>=250, B2*2%, 0)**
The logical_test is B2>=250
The value_if_true is the answer returned by B2*2%
The value_if_false is "0"

■ FORMATTING

Applying Text Wrapping within Cells

You can apply text wrapping to contents within a cell or a cell range:

1. Click the **Home** tab.
2. Select the cell/s that you want to apply text wrapping to.
3. In the Alignment group, click **Wrap Text**.
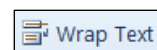
Aligning Cell Content

By default, MS Excel aligns text to the left edge of a cell and values (numbers, dates, time) to the right edge of a cell. There are three horizontal alignment options in MS Excel:

Option	Button	Effect
Align Left		Aligns data to the left edge of the cell. If the data does not fit, excess data is placed in the cell to the right (if that cell is empty). If the cell to the right is not empty, the display of the data ends at the right edge of the cell.
Centre		Aligns data in the centre of the cell. Spill over data appears in the adjoining cells if either or both are empty. Otherwise, the display of the data is truncated.
Align Right		Aligns data to the right edge of the cell. Spill over data appears in the cell to the left if it is empty. Otherwise, the display of the data is truncated.

To change the horizontal alignment (left, centre, right) of data in a cell/s:

1. Click the **Home** tab.
2. Highlight the cell/s.
3. In the Alignment group, click **Align Left**, **Centre** or **Align Right**.

The alignment options indicated above allow you to position cell contents horizontally (left-to-right). MS Excel also allows you to align cells vertically (top-to-bottom):

1. Click the **Home** tab.
2. Highlight the cell/s.
3. In the Alignment group, click **Top Align**, **Middle Align** or **Bottom Align**.

To adjust the cell content orientation:

1. Click the **Home** tab.
2. Highlight the cell/s.
3. In the Alignment group, click **Orientation**.
4. Click the appropriate option or **Format Cell Alignment**. The Format Cells dialog box is displayed.
5. In the Degrees field enter a number.
6. Click **OK** button.
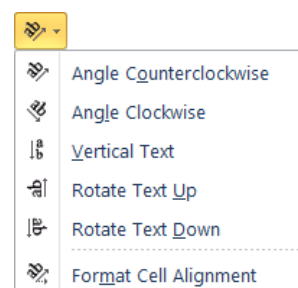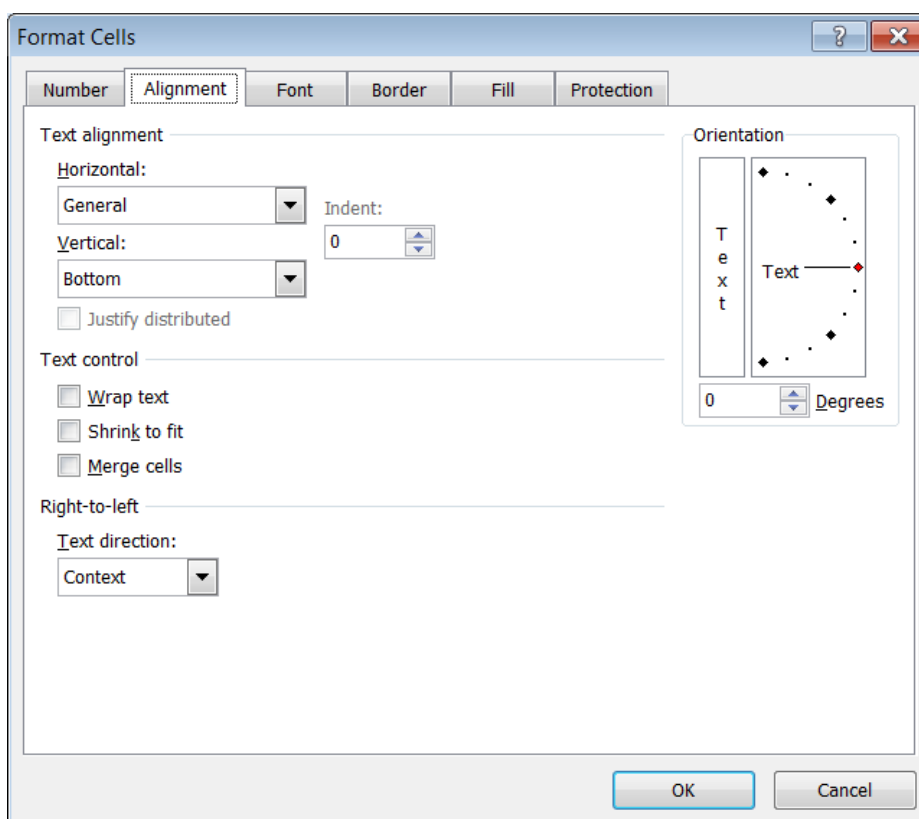
The following table outlines all the available options in the Alignment tab in the Format Cells dialog box.

Option	To Do This
Horizontal	Aligns text to the left, numbers to the right, and centres logical and error values.
Left (Indent)	Aligns cell contents to the left.
Center	Centres cell contents.
Right	Aligns cell contents to the right.
Fill	Repeats the contents of the selected cell until the cell is full. If blank cells to the right also have the Fill alignment, they are filled as well.
Justify	Aligns wrapped text within a cell to the right and left. You must have more than one line of wrapped text to see the justification.
Center Across Selection	Centres a cell entry across the selected cells.
Vertical	
Top	Aligns cell contents along the top of the cell.
Center	Centres cell contents in the middle of the cell.
Bottom	Aligns cell contents along the bottom of the cell.
Justify	Justifies the cell contents up and down within the width of the cell.
Wrap text	Wraps text into multiple lines in a cell. The number of wrapped lines is dependent on the width of the column and the length of the cell contents.

Option	To Do This
Shrink to fit	Reduces the apparent size of font characters so that all data in a selected cell fits within the column. The character size is adjusted automatically if you change the column width. The applied font size is not changed.
Merge cells	Combines two or more selected cells into a single cell. The cell reference for a merged cell is the upper-left cell in the original selected range.
Orientation	Rotates selected cell entries.

Merging Cells

You can join (merge) two or more cells and centre text (e.g. a title) in the merged cells:

1. Click the **Home** tab.
2. Highlight the cells across which the data will be centred.
3. In the Alignment group, click **Merge & Center**.
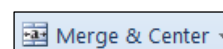
To remove merging:

1. Click the **Home** tab.
2. Highlight the cell to unmerge.
3. In the Alignment group, click **Merge & Center**.
4. Click **Unmerge Cells**.
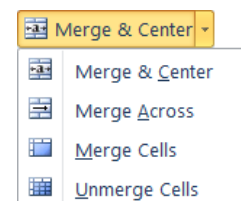
■ CHARTS

Creating & Selecting Charts

A chart/graph is a graphical representation of the numeric data in a worksheet. Each cell (or piece of data) represented in the chart is called a data point. Data points are represented on the chart by bars, columns, lines, or some other graphical device. A group of related data points is called a data series.

Name	English	Maltese	Maths
Anthony	55	80	74
Maria	63	43	84
Philip	62	57	65
Rita	43	7	95
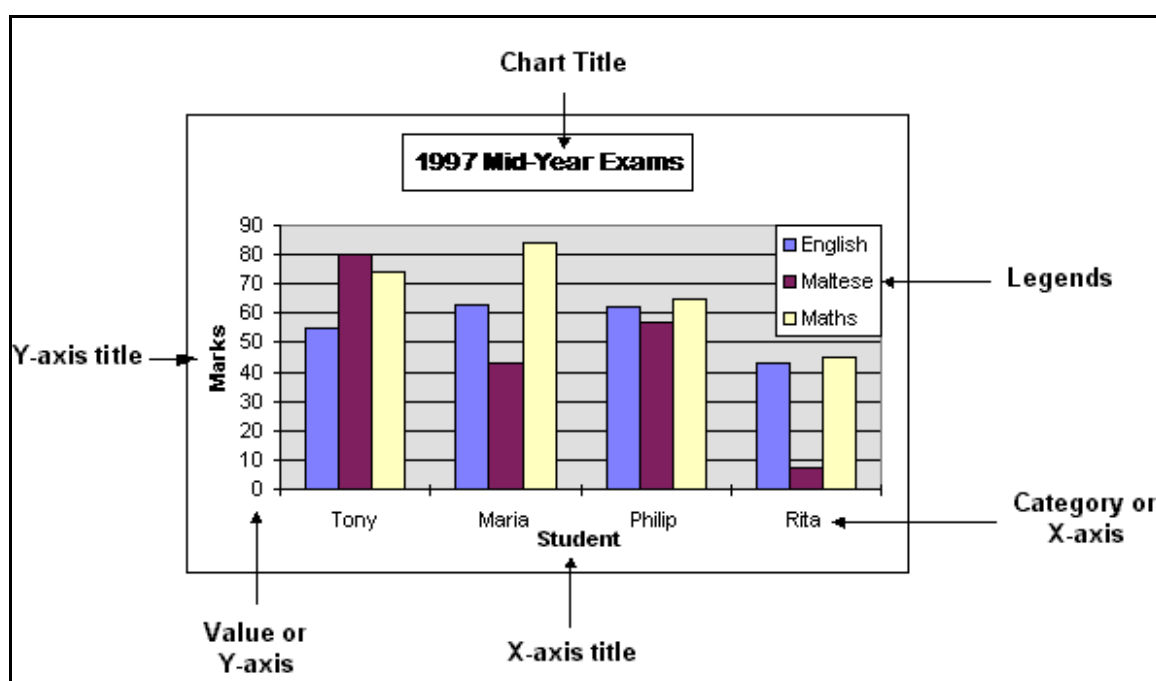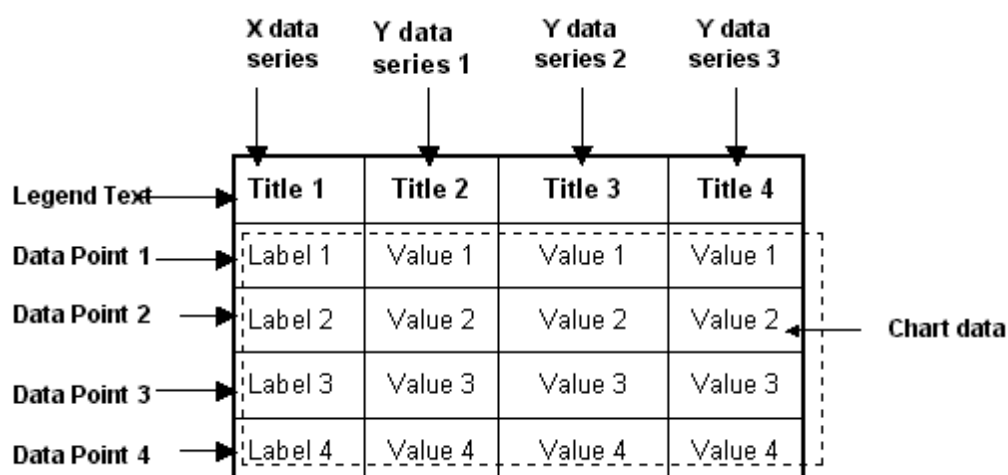
Typically, values are plotted along the vertical plane (y-axis) and categories are plotted along the horizontal plane (x-axis). Labels that run horizontally under the various data series and display the categories represented are x-axis labels. Labels running vertically and listing the value increments are the y-axis labels.

To create a chart:

1. Highlight the data to be included in the graph.
2. Click the **Insert** tab.
3. In the Chart group, click the type of chart to use e.g. **Column**, **Line**, **Pie**, **Bar** etc.
4. Click the sub-type of chart to use.
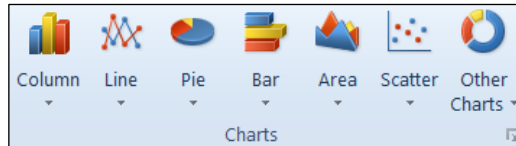
To select a chart:

Click anywhere in the chart. This displays the Chart Tools, adding the Design, Layout, and Format tabs.

Changing the Chart Type

You can change the type of chart in a slide:

1. Click the chart in the slide.
2. Click the **Design** tab, under Chart Tools.
3. In the Type group, click **Change Chart Type**. The Change Chart Type dialog box is displayed.
4. Select the type of chart to use e.g. **Pie**.
5. Click the chart sub-type.
6. Click **OK** button.
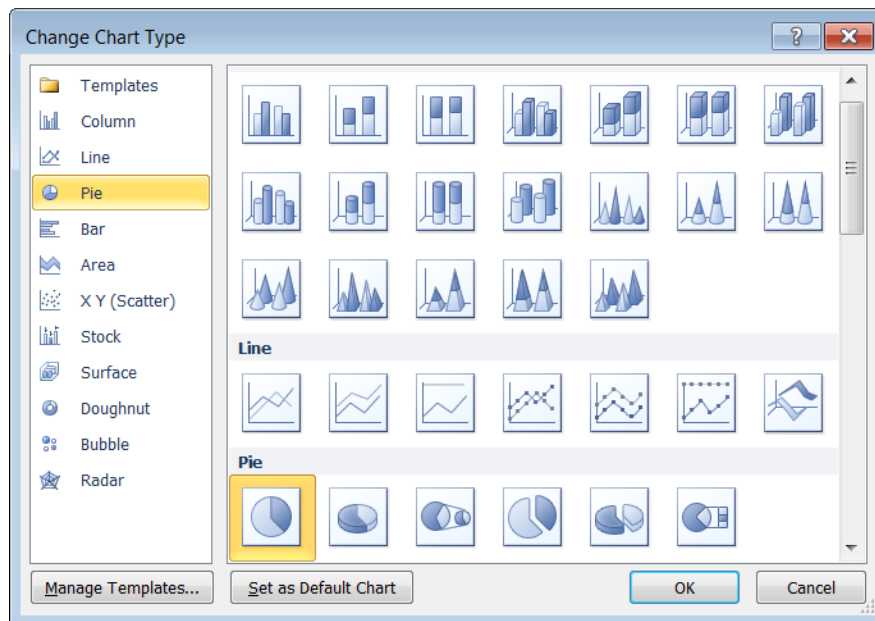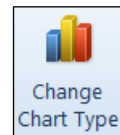
Moving, Resizing & Deleting Charts

To move a chart in a new worksheet:

1. Select the chart to move.
2. Click the **Design tab** below Chart Tools.
3. Click **Move Chart**. The Move Chart dialog box.
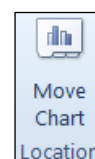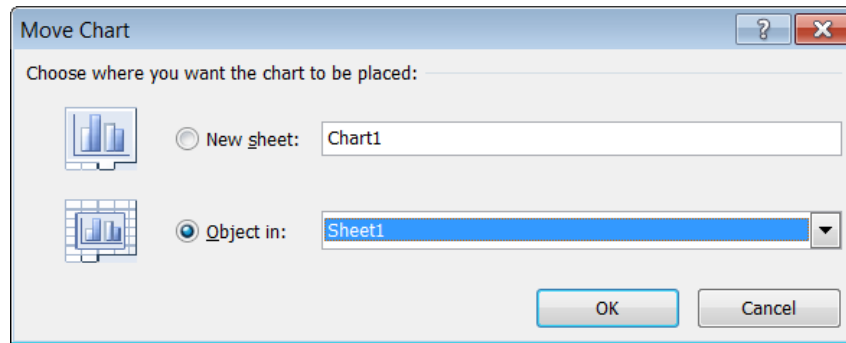
4. Click **New sheet:** option.
5. Enter a title for the sheet in the text box provided.
6. Click **OK** button.

To move a chart to a different sheet or workbook:

1. Click the **Home** tab.
2. Click anywhere in the chart to move.
3. Click **Cut** (to move).
4. Click in the sheet or workbook where the chart will be copied.
5. Click **Paste**.
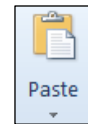
To resize a chart:

1. Click anywhere inside the chart.
2. Position the pointer on one of the corner handles. The pointer changes to a double-headed arrow.
3. Drag the mouse to resize the chart.

To delete a chart:

1. Click anywhere inside the chart.
2. Press **DELETE** key.

Adding, Editing & Removing Chart Titles

To add a chart title:

1. Click the chart to add a title to.
2. Click the **Layout** tab, under Chart Tools.
3. In the Labels group, click **Chart Title**.
4. Click **Above Chart**. A placeholder with the text 'Chart Title' is displayed.
5. Click in the placeholder.
6. Edit the text in the title placeholder.
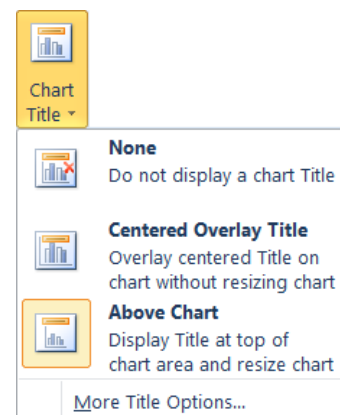
To edit a chart title:

1. Click the chart title placeholder.
2. Edit the text in the title placeholder.

To delete a chart title:

1. Click the chart title placeholder.
2. Press **DELETE** key.

Adding Data Labels

You can add two kinds of labels to a chart:

- Value Labels – these indicate the numerical values of the individual data points.

- Text Labels – these display the names of the data points. By default, Excel already displays these names on an axis.

To add data labels to a chart:

1. Click the chart to add labels to.
2. Click the **Layout** tab, under Chart Tools.
3. In the Labels group, click **Data Labels**.
4. Click the appropriate option.
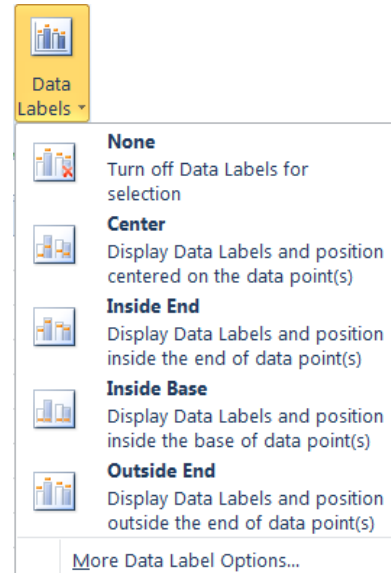
Changing Chart Colours

You can modify the colours of the chart area, plot area and data series:

1. Click the chart.
2. Click the **Format** tab, under Chart Tools.
3. In the Current Selection group, click the drop down arrow and choose **Chart Area**, **Plot Area**, **Legend** or any data series.
4. In the Shape Styles group, click **Shape Fill**.
5. Select a standard colour or choose **More Fill Colours...** The Colors dialog box is displayed.
6. Select a colour.
7. Click **OK** button.
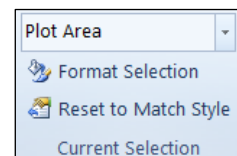
Changing the Font Size & Colour of Chart Text

You can modify the font size and colour of chart title, chart axes and chart legend text:

1. Click the chart.
2. Click the **Format** tab, under Chart Tools.
3. In the Current Selection group, click the drop down arrow and choose **Chart Title**, **Horizontal (Category) Axis** or **Vertical (Value) Axis**.
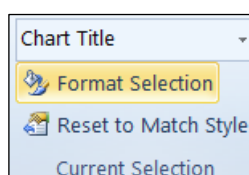
4. Click the **Home** tab.
5. In the Font group:

Click the drop-down arrow of the **Font Size** box.
Select the appropriate size.
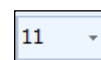
In the Font group, click **Font Colour** drop-down arrow.
Choose the colour to apply OR click **More Colours...** The Colours dialog box is displayed. Click the colour to apply. Click **OK** button.

■ PREPARE OUTPUTS

## Setting the Worksheet Margins

To change the margins of a worksheet:

1. Click the **Page Layout** tab.
2. In the Page Setup group, click **Margins**.
3. Click the appropriate option or **Custom Margins...** The Page Setup dialog box is displayed.
4. In the Margins tab, enter the appropriate measurements in the Top: Bottom: Left: and Right: fields.
5. Click **OK** button.
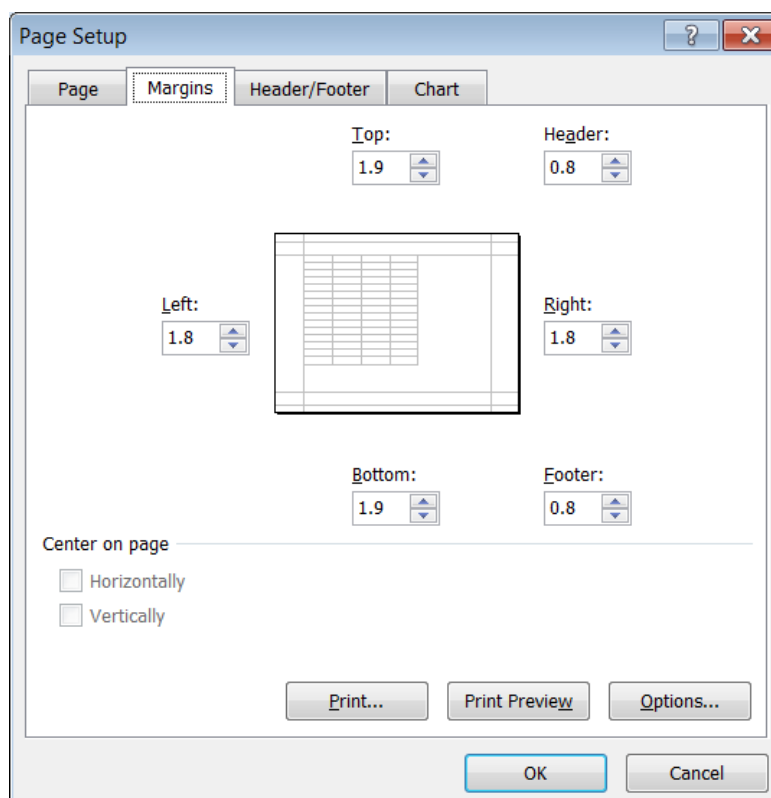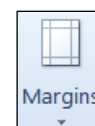
Setting the Worksheet Orientation & Paper Size

To change the orientation of the worksheet to portrait or landscape:

1. Click the **Page Layout** tab.
2. In the Page Setup group, click **Orientation**.
3. Click **Portrait** or **Landscape**.
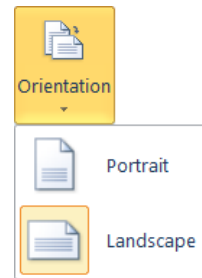
To change the paper size:
1. Click the **Page Layout** tab.
2. In the Page Setup group, click **Size**.
3. Click the appropriate option or **More Paper Sizes...** The Page Setup dialog box is displayed.
4. In the Page tab, select the appropriate option from the Paper size: drop down list e.g. A4.
5. Click **OK** button.
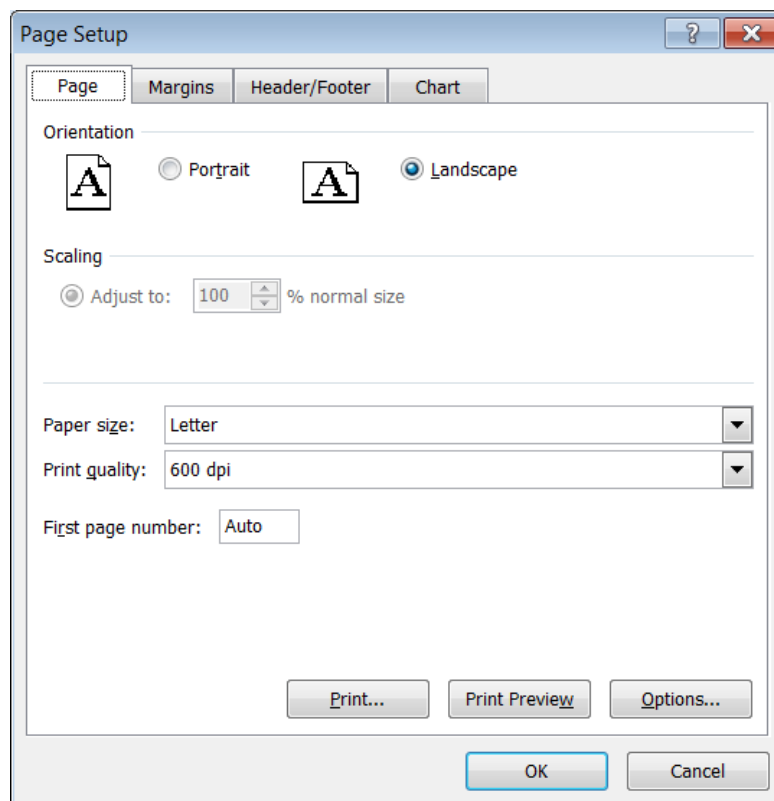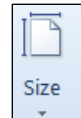
Adjusting Page Setup to Fit Worksheet Contents

You can also adjust the page setup such that worksheet contents fit on a single page or on a specific number of pages:

1. Click the **Page Layout** tab.
2. In the Scale to Fit group: click the **Page Setup Dialog Box Launcher**. The Page Setup dialog box will be displayed.
3. In the Page tab, select **Fit to:** check box.
4. Type a number in the page(s) wide by box.
5. Type a number in the tall box.
6. Click **OK** button.

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Note that:

- ▪ The Fit to: option reduces the worksheet or selection when you print so that it fits on the specified number of pages.

- ▪ To fill the paper width and use as many pages as necessary, type 1 in the pages(s) wide by box and leave the tall box blank.
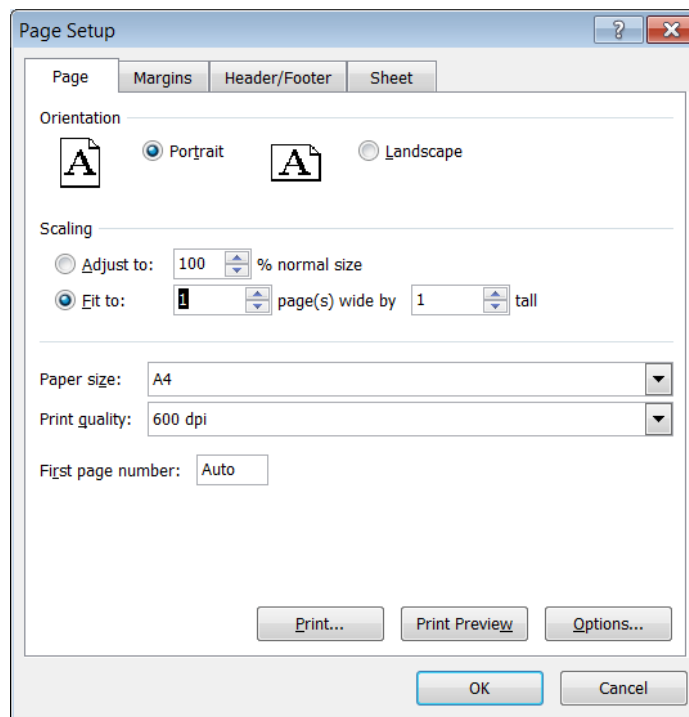
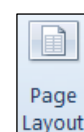## Adding, Editing & Deleting Data in Headers & Footers

To add headers and/or footers to a worksheet:

1. Click the **Insert** tab.

2. In the Text group, click **Header & Footer**. The screen will display a text placeholder in the Header section.

3. Type the header text or insert a field (refer to next section).

4. In the Navigation group, click **Go to Footer**.

5. Type the footer text or insert a field (refer to next section).

6. Click the **View** tab.

7. Click **Normal** to return to the standard MS Excel view.
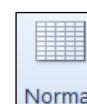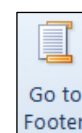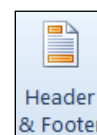
To edit headers and/or footers:

1. Click the **View** tab.
2. In the Workbook Views group, click **Page Layout**.
3. Edit the header and/or footer text.
4. Click the **View** tab.
5. Click **Normal** to return to the standard MS Excel view.
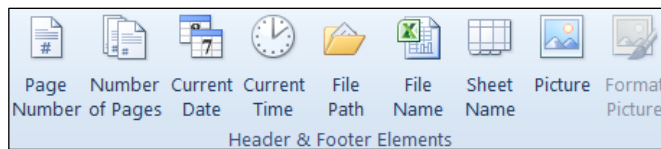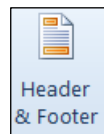
To delete headers and/or footers:

1. Click the **View** tab.
2. In the Workbook Views group, click **Page Layout**.
3. Highlight the header and/or footer text.
4. Press **DELETE** key.
5. Click the **View** tab.
6. Click **Normal** to return to the standard MS Excel view.

Inserting & Deleting Fields in Headers & Footers

You can insert fields such as page numbering information, date, time file name and worksheet name into the headers and footers:

1. Click the **Insert** tab.
2. In the Text group, click **Header & Footer**. The screen will display a text placeholder in the Header section.
3. In the Design tab, below Header & Footer Tools, click the appropriate field in the Header & Footer Elements group to insert fields in the header text placeholder.

4. In the Navigation group, click **Go to Footer**.
5. Click the appropriate field in the Header & Footer Elements group to insert fields in the footer text placeholder.
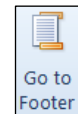
To delete data in headers or footers:

1. Repeat steps 1-2 as above.
2. Edit or delete the data displayed in the header or footer.

Turning On & Off Gridlines and Row & Column Headings

To turn on or off the display of gridlines and the row & column headings for printing purposes:

1. Click the **Page Layout** tab.
2. In the Sheet Options group:

   Click **View Gridlines** to display/hide gridlines.
   Click **Print Gridlines**.
   Click **View Headings** to display/hide headings.
   Click **Print Headings**.
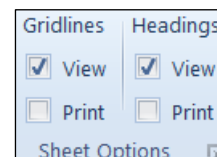
Applying Automatic Title Rows Printing

To set automatic titles to print on every page of a printed worksheet:

1. Click **Page Layout** tab.
2. In the Page Setup group, click **Print Titles**. The Page Setup dialog is displayed.
3. In the Sheet tab, under Print titles, select the **Collapse** button next to the Rows to repeat at top:
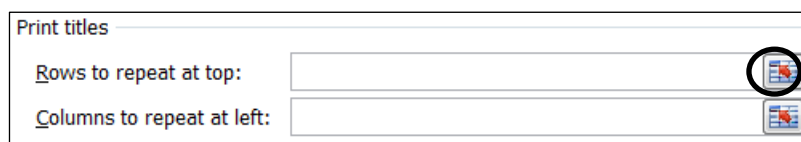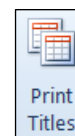
4. Click the row to be printed on every page of the printed worksheet.
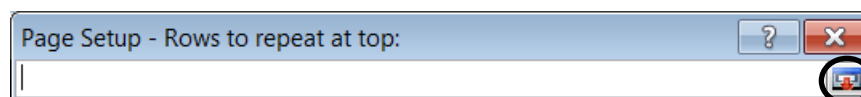
5. Click **Expand** button to display the Page Setup dialog box again.
6. Click **OK** button.

Previewing Worksheets

By previewing the worksheet, you can see each page exactly as it will be printed, with the correct margins and page breaks, and the headers and footers in place.

To preview a worksheet:

1. Click **File** tab.
2. Click **Print**. The Backstage view is displayed. On the right side a preview of the worksheet is displayed.
3. Click the **File** tab to return to the Normal view.

Printing

To print a selected cell range from a worksheet:

1. Highlight the cell range to print.
2. Click **File** tab.
3. Click **Print**. The Backstage view is displayed.
4. In the Settings section, click **Print Selection**.
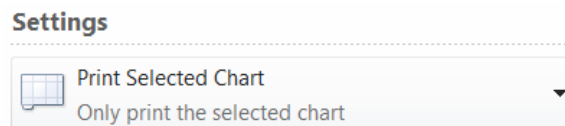5. Click **Print** button.
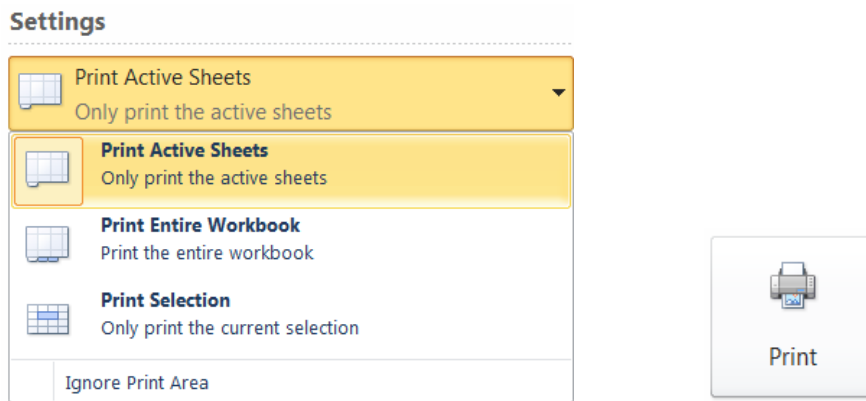
To print an entire worksheet or entire spreadsheet:

1. Click **File** tab.
2. Click **Print**. The Backstage view is displayed.
3. In the Settings section:

    To print the entire worksheet, click **Print Active Sheets**.

    To print the entire spreadsheet file, click **Print Entire Workbook**.

4. Click **Print** button.

To print a selected chart:

1. Select the chart to print.
2. Click **File** tab.
3. Click **Print**. The Backstage view is displayed.
4. In the Settings section, click **Print Selected Chart**.

5. Click **Print** button.

To print multiple copies of a worksheet:

1. Click **File** tab.
2. Click **Print**. The Backstage view is displayed.
3. Next to the Print button, set/type the number of copies in the Copies box.

4. Click **Print** button.
5. Click the **File** tab to return to the Print Layout view.