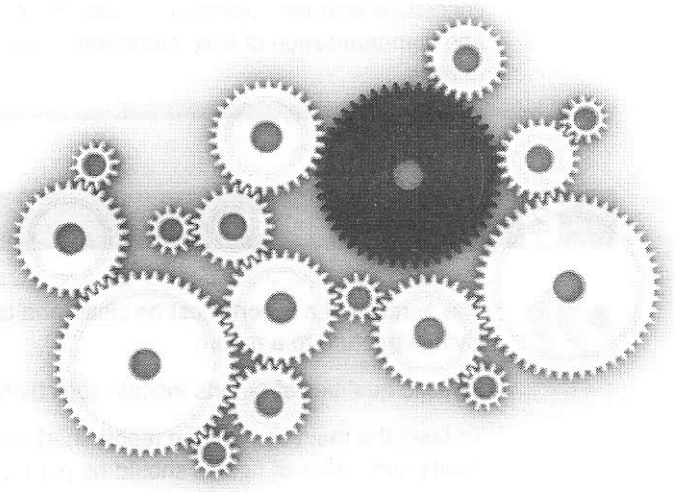
CHAPTER

05

Presenting information

In this chapter we will look at how the management accountant might present management information. Your syllabus requires you to prepare reports, graphs and tables but this is very difficult to examine in a computer based exam. The focus, therefore, should be on **interpreting reports** and understanding what **format** would be suitable depending on the purpose of the report.



Study Guide		Intellectual level
A4(a)	Prepare written reports representing management information in suitable formats according to purpose	S
A4(b)	Present information using tables, charts and graphs (bar charts, line graphs, pie charts and scatter graphs)	S
A4(c)	Interpret information (including the above tables, charts and graphs) presented in management reports	S

1 Presenting, disseminating and interpreting information

As we saw in Chapter 1, the management accountant is involved in the **presentation**, **dissemination** and **interpretation** of information. In this chapter we will be looking at the ways in which information can be presented, disseminated and interpreted.

QUESTION

Information manager

Why might the management accountant be known as the information manager?

ANSWER

The management accountant is called the information manager because management accounting is concerned with the collection of data, its analysis and processing into information, and the interpretation and communication of that information so as to assist management with planning, control and decision making.

2 Written reports

The purpose of a **report** must be clear, and certain general principles should be followed in planning and giving structure to a report.

Stylistic qualities of reports include objectivity and balance and ease of understanding.

To keep the main body of the report short enough to hold the reader's interest, detailed explanations, charts and tables of figures should be put into **appendices**. The main body of the report should make cross-reference to the appendices in appropriate places.

2.1 What is a report?

There are a variety of formats and styles of reports.

(a) You may think of reports as **extensive, complex documents**, but a **single page may be sufficient** in many contexts.

(b) **Routine reports are produced at regular intervals**. An example of a routine report is a budgetary control report, the preparation of which we will be looking at later in this text. **Special reports may be commissioned for 'one-off' planning and decision-making purposes** such as a report on a proposed project or particular issue.

(c) Reports may be **for professional purposes**, or they may be **for a wider audience** who will not all necessarily understand or require the same information.

Reports are meant to be **useful**. The information contained in a business report might be used in several ways.

(a) **To assist management**, as they rarely have time to carry out their own detailed investigations into the matters on which they make decisions; their time, moreover, is extremely expensive.

(b) **As a permanent record and source of reference**, should details need to be confirmed or recalled in the future.

(c) **To convey information** or suggestions/ideas to other interested parties (eg in a report for a committee).

2.2 Reports and their purpose

Reports are usually intended to **initiate a decision or action**. The decisions or actions might be the following types.

(a) **Control action**. If the report describes what has happened in the past, a control action may be taken in an attempt to prevent a repeat of this behaviour.

(b) **Planning decisions**. Reports that are commissioned to advise on a certain course of action will include a **recommendation** about what decision should be taken.

2.3 The report and the report users

(a) A special **'one-off' report** will be **commissioned by a manager**, who will then expect to **make a decision** on the basis of what the report tells him. For example, the board of directors of a company might call for a report on the financial viability of a new product or investment, and they will expect to decide whether or not to undertake the product development or the investment on the basis of the report's findings.

(b) **Routine reports,** such as performance reports, might be **required because they are a part of established procedures.** The managers receiving the reports will not have commissioned them specifically, but they will be expected to act on anything out-of-the-ordinary that the report tells them.

(c) **Some reports arise out of a particular event**, on which regulations prescribe the writing of a report. For example, a leaving report must be written following an employee's resignation.

(d) **Individual responsibilities** often include the requirement to write reports. The secretary at a meeting will have to report to members the procedures and decisions taken.

Whether the report is 'one-off' or routine, there is an **obligation on the part of the person requesting the report to state the use to which it will be put.** In other words, the purpose of the report must be clear to both its writers and its users.

The report writer should communicate information in an unbiased way. Information should be communicated impartially, so that the report user can make his own judgements. This has the following implications.

(a) Any assumptions, evaluations and recommendations by the report writer should be clearly 'signalled' as such.

(b) Points should not be over-weighted (or omitted as irrelevant) without honestly evaluating how **objective** the selection is.

(c) Facts and findings should be **balanced** against each other.

(d) A firm **conclusion** should, if possible, be reached. It should be clear how and why it was reached.

QUESTION

Report writing

When writing a report, what can you do to ensure that the particular needs and abilities of the users of your report will be met?

ANSWER

(a) Avoid 'jargon', overly technical terms and specialist knowledge the user may not share.

(b) Keep vocabulary, sentence and paragraph structures as simple as possible, for clarity (without patronising an intelligent user).

(c) Bear in mind the type and level of detail that will interest the user and be relevant to his/her purpose.

(d) In a business context, the user may range from senior manager to junior supervisor, to non-managerial employee (such as in the case of minutes of a meeting) to complete layman (customer, press and so on). Vocabulary, syntax and presentation, the amount of detail gone into, the technical matter included and the formality of the report structure should all be influenced by such concerns.

2.4 Timeliness

As with all information a report may be of no use at all if it is not produced **on time**. There is no point in presenting a report to influence a decision if the decision has already been made. The timescales within which the report user is working must be known, and the time available to produce the report planned accordingly.

3 Planning a report

QUESTION

Report planning

Which of the following questions should you ask yourself before writing a report?

(a) Who is the user?
(b) What type of report will be most useful to him/her?
(c) What exactly does he/she need to know, and for what purpose?
(d) How much information is required, how quickly and at what cost?
(e) Do you need to give judgements, recommendations etc (or just information)?

A a, b, c
B b, e
C c, d, e
D a, b, c, d, e

ANSWER

D All of these are important and you should know the answers before you embark on writing your report.

4 The format of reports

4.1 General principles

When a **formal request is made by a superior for a report** to be prepared, such as in a formally-worded memorandum or letter, it is likely the **format and style of the report** expected is to be **formal as well.**

An **informal request** for a report – 'Can you jot down a few ideas for me about...' or 'Let me know what happens, will you?' – **will result in an informal report**, in which the structure will be less rigid, and the style slightly more personal (depending on the relationship perceived to exist between the writer and user).

If in doubt, it is better (more courteous and effective) to be too formal than informal.

The purpose of reports and their subject matter vary widely, but there are certain **generally accepted principles of report writing**.

Feature	Detail
Title	The title should be as short as possible whilst indicating clearly what the report is about.
Identification of report writer, report user and date	**If the report is extensive**, it should open with a list of contents.
Contents page	
Terms of reference	The introductory section of the report should include the terms of reference. The terms of reference will explain not only the **purpose** of the report but also any **restrictions** on its **scope**. When **timescale** is important, this too should be specified.
Sources of information	Sources of information should be acknowledged in the report. Alternatively, if the report is based on primary research, the nature of the fact-finding should be explained, perhaps in an appendix to the report.
Sections	The main body of the report should be divided into sections, each with a clear heading. These headings (or sub-headings) should if possible be standardised when reports are produced regularly (such as budgetary control reports). Paragraphs should be numbered, for ease of reference. Each paragraph should be concerned with just one basic idea.
Appendices	To keep the main body of the report short enough to hold the reader's interest, detailed explanations, charts and tables of figures should be put into appendices. The main body of the report should make cross-references to the appendices in appropriate places.
Summary of recommendations	A report will usually contain **conclusions or recommendations** about the **course of action** to be taken by the report user. These conclusions or recommendations should perhaps be stated at the beginning of the report (after the introduction and statement of terms of reference). The main body of the report can then follow and should lead the report user through the considerations that led the report writer to these conclusions. The conclusions or recommendations should then be re-stated at the end of the main body of the report.
Prominence of important items	The most significant items in a report should be given prominence.

We are going to look at three main types of report.

(a) The short formal report
(b) The short informal report
(c) The memorandum report

You should not feel bound to use the following headings in a report in an exam, but the guidelines on report sections may be helpful, should you wish to follow them.

4.2 The short formal report

The short formal report is **used in formal contexts** such as where middle management is reporting to senior management. It should be laid out according to certain basic guidelines. It will be split into logical sections, each referenced and headed appropriately.

SHORT FORMAL REPORT

TITLE — At the top of every report (or on a title page, for lengthy ones) appears the title of the report (its subject) and, as appropriate, *who* has prepared it, *for whom* it is intended, the *date* of completion, and the *status* of the report ('Confidential' or 'Urgent').

I — TERMS OF REFERENCE or INTRODUCTION

Here is laid out the scope and purpose of the report: what is to be investigated, what kind of information is required, whether recommendations are to be made etc.

II — PROCEDURE or METHOD

This outlines the steps taken to make an investigation, collect data etc. Telephone calls or visits made, documents consulted, computations made etc should be briefly described, with the names of other people involved.

III — FINDINGS

In this section the information itself is set out. The content should be clearly structured in chronological order, order of importance, or any other *logical* relationship.

IV — CONCLUSIONS

This section allows for a summary of main findings.

V — RECOMMENDATIONS

Here, if asked to do so in the terms of reference, the writer of the report may suggest the solution to the problem investigated so that the recipient will be able to make a decision if necessary.

4.3 The short informal report

The short informal report is used **for less complex and lower-level information.** You, as assistant management accountant (or similar), could be asked to prepare such a report for the Management Accounts Manager.

The structure of the informal report is less developed: it will be shorter and less complex in any case, so will not require elaborate referencing and layout. There will be three main sections, each of which may be headed in any way appropriate to the context in which the report is written.

SHORT INFORMAL REPORT

To: (the name and title of the person to whom the report is addressed)

From: (the name and title of the report writer)

Date:

Reference: (if necessary)

Subject: (brief description of the reason for or content of the report)

1 **Background or Situation or Introduction**

This sets the context of the report. Include anything that will help the reader to understand the rest of the report: the reason why it was requested, the current situation, and any other background information on people and things that will be mentioned in the following detailed section. This section may also contain the equivalent of 'terms of reference' and 'procedure' ('method').

2 **Findings or Analysis of the situation**

Here is set out the detailed information gathered, narrative of events or other substance of the report as required by the user. This section may or may not require subheadings: concise prose paragraphs may be sufficient.

3 **Action or Solution or Conclusion**

The main thrust of the findings may be summarised in this section and conclusions drawn, together with a note of the outcome of events, or action required, or recommendations as to how a problem might be solved.

4.4 The memorandum report

In informal reporting situations within an organisation, the 'short informal report' may well be presented in A4 memorandum format, which incorporates title headings and can thereafter be laid out at the writer's discretion. An ordinary memorandum **may be used for flexible, informal reports**: aside from the convenient title headings, there **are no particular requirements for structure, headings or layout**. The writer may consider whatever is logical, convenient and attractive for the reader.

5 Presenting and interpreting information in tables

Tables are a simple way of presenting information about two variables.

A table is a matrix of information in rows and columns, with the rows and columns having titles.

KEY TERM

Since a table is **two-dimensional**, it can only show two variables. For example, the resources required to produce items in a factory could be tabulated, with one dimension (rows or columns) representing the items produced and the other dimension representing the resources.

Resources for production: all figures in pounds

	Products				
	Athens	*Benidorm*	*Corfu*	*Dassia*	*Total*
Resources					
Direct material M_1	X	X	X	X	X
Direct material M_2	X	X	X	X	X
Direct labour grade S_1	X	X	X	X	X
Direct labour grade S_2	X	X	X	X	X
Direct expenses	X	X	X	X	X
Overheads	X	X	X	X	X
Total	X	X	X	X	X

5.1 Guidelines for tabulation

Once you have established what the table's two dimensions are, you should apply the following guidelines when presenting information in tabular form.

(a) The table should be given a clear **title**.
(b) All columns should be **clearly labelled**.
(c) Where appropriate, there should be clear **sub-totals**.
(d) A **total column** may be presented (usually the right-hand column.)
(e) A **total figure** is often advisable at the bottom of each column of figures.
(f) Information presented should be easy to read.

5.2 Example: tables

The total sales revenue of a certain trading company in year 8 was $10,000,000. Sales were made to three different regions, central, north and south. $6,000,000 of sales were to the central region and $3,000,000 were to the north region. The organisation makes four products, the L, the U, the C and the Y. Sales of the L totalled $1,100,000, sales of the U also totalled $1,100,000, while sales of the C totalled $2,900,000.

Sales to the central region were $3,500,000 of the Y, $1,500,000 of the C and $500,000 of the L, whilst in the north region, sales of the Y totalled $1,000,000, sales of the C totalled $1,100,000 and sales of the L $500,000.

Required

Draw up a table to show all the details of sales in the organisation and interpret the data by providing suitable secondary statistics to describe the distribution of sales across the three regions.

5.3 Solution

The basic table required has the following two dimensions.

(a) Regions
(b) Products

Secondary statistics are supporting figures that are **supplementary,** and which clarify or amplify the main pieces of information. A major example of secondary statistics is **percentages**. In this example, we could show one of the following.

(a) The percentage of the total sales in each region of each product
(b) The percentage of the total sales of each product made in each region

In this example, (a) has been selected but you might consider that (b) would be more suitable. Either could be suitable, depending of course on what purposes the information is being collected and presented for.

Analysis of sales

Products	*Region*							
	Central		*North*		*South*		*Total*	
	$m	%	$m	%	$m	%	$m	%
L	0.5	8.3	0.5	16.7	0.1**	10	1.1	11
U	0.5*	8.3	0.4*	13.3	0.2**	20	1.1	11
C	1.5	25.0	1.1	36.7	0.3**	30	2.9	29
Y	3.5	58.4	1.0	33.3	0.4**	40	4.9*	49
Total	6.0	100.0	3.0	100.0	1.0	100	10.0	100

* Balancing figure to make up the column total
** Balancing figure then needed to make up the row total

The percentages calculated allow us to **interpret** the information in the table. For example, we can see that nearly 50% of the organisation's sales are of product Y, and that 25% of the Central region's sales are of product C. The percentages highlight additional information which was not readily discernible from the absolute figures.

If we had selected approach (b) however, different features would have been highlighted. We would have known, for example, the percentage of sales of the L made to the Southern region.

QUESTION

Table

Draw up a table using the information in the example but this time interpret the information by adopting approach (b).

ANSWER

Analysis of sales

Regions	*Products*									
	L		*U*		*C*		*Y*		*Total*	
	$m	%	$m	%	$m	%	$m	%	$m	%
Central	0.5	0.455	0.5	0.454	1.5	0.517	3.5	0.714	6.0	60
North	0.5	0.455	0.4	0.364	1.1	0.379	1.0	0.204	3.0	30
South	0.1	0.090	0.2	0.182	0.3	0.104	0.4	0.082	1.0	10
	1.1	1.000	1.1	1.000	2.9	1.000	4.9	1.000	10.0	100

6 Presenting and interpreting information in charts

Bar charts often convey the meaning or significance of data more clearly than would a table. Make sure that you are able to construct **bar charts**.

There are three main types of bar chart: **simple**, **component** (including percentage component) and **multiple** (or compound).

Instead of presenting information in a table, it might be preferable to give a visual display in the form of a **chart**.

The purpose of a chart is to convey the information in a way that will demonstrate its meaning or significance more clearly than a table would. Charts are not always more appropriate than tables. The **most suitable way of presenting information** will depend on the following.

(a) **What the information is intended to show**. Visual displays usually make one or two points quite forcefully, whereas tables usually give more detailed information.

(b) **Who is going to use the information**. Some individuals might understand visual displays more readily than tables.

6.1 Bar charts

KEY TERM

A **bar chart** is a method of presenting information in which quantities are shown in the form of bars on a chart, the length of the bars being proportional to the quantities.

The bar chart is one of the most common methods of presenting information in a visual form. There are three main types of bar chart.

(a) **Simple** bar charts
(b) **Component** bar charts, including **percentage component** bar charts
(c) **Multiple** (or compound) bar charts

6.2 Simple bar charts

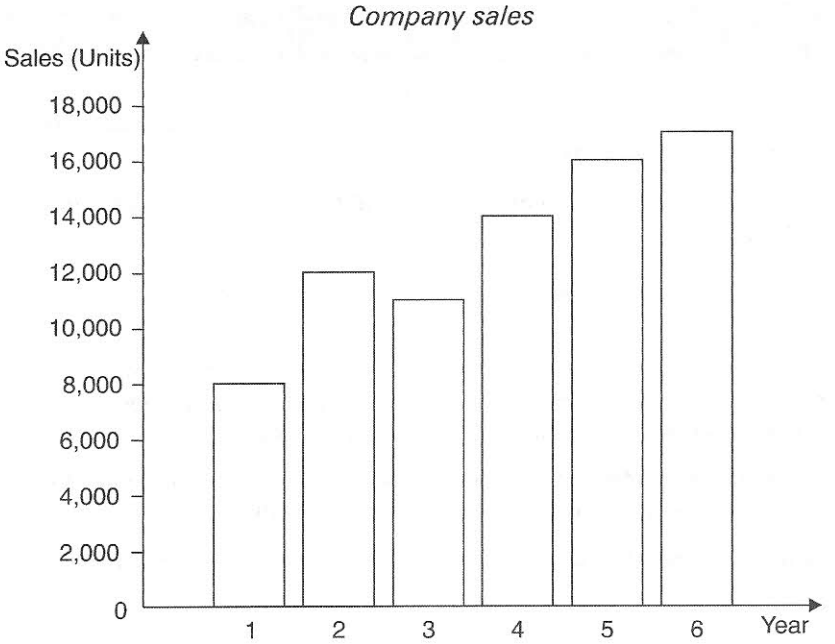
A **simple bar chart** is a chart consisting of one or more bars, in which the length of each bar indicates the magnitude of the corresponding information.

6.3 Example: a simple bar chart

Barker Ltd's total sales for the years from year 1 to year 6 are as follows.

Year	*Sales*
	Units
1	8,000
2	12,000
3	11,000
4	14,000
5	16,000
6	17,000

The information could be shown on a simple bar chart as follows.



Each axis of the chart must be clearly **labelled**, and there must be a **scale**. This is vital when the reader comes to interpret the bar chart. Here, the y axis includes a scale for the level of sales, and so readers of the bar chart can see not only that sales levels have been **rising** year by year (with year 3 being an exception) but also **what** the actual sales levels have been each year.

Simple bar charts serve two interpretation purposes.

(a) They show the actual magnitude of each item.
(b) They enable one to compare magnitudes, by comparing the lengths of bars on the chart.

6.4 Component bar charts

A **component bar chart** is a bar chart that gives a breakdown of each total into its components.

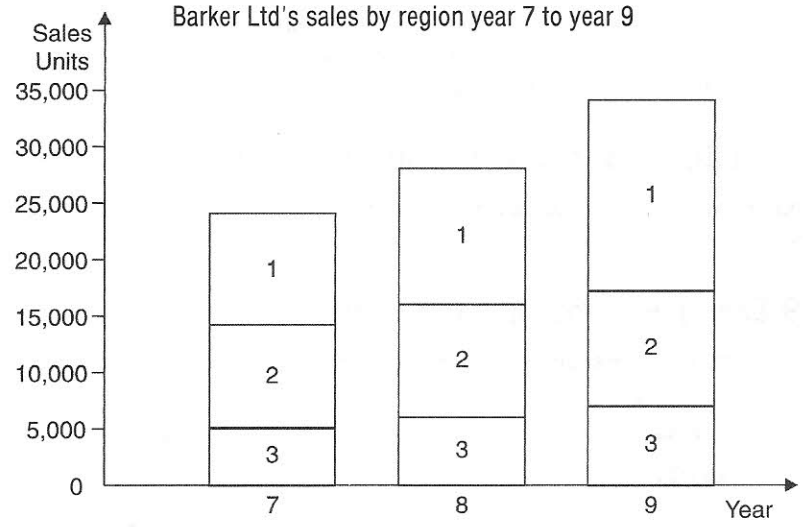
6.5 Example: a component bar chart

Barker's sales for years 7 to 9 are as follows.

	Year 7 Units	*Year 8* Units	*Year 9* Units
Region 1	10,000	12,000	17,000
Region 2	9,000	10,000	10,000
Region 3	5,000	6,000	7,000
Total	24,000	28,000	34,000

An interpretation of a component bar chart would show the following.

(a) How total sales have changed from year to year
(b) The components of each year's total



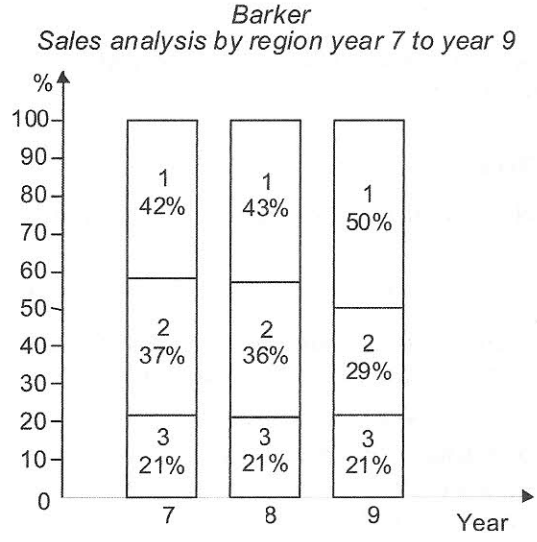
In this diagram the growth in sales is illustrated and the significance of growth in region 1 sales as the reason for the total sales growth is also fairly clear. The growth in region 1 sales would have been even clearer if region 1 had been drawn as the bottom element in each bar instead of the top one.

6.6 Percentage component bar charts

The **difference** between a **component bar chart** and a **percentage component bar chart** is that with a **component bar chart**, the total length of **each bar** (and the length of each component in it) **indicates magnitude**. A bigger amount is shown by a longer bar. With a **percentage component bar chart, total magnitudes are not shown**. If two or more bars are drawn on the chart, the total length of each bar is the same. The only varying lengths in a percentage component bar chart are the lengths of the sections of a bar, which vary according to the relative sizes of the components.

6.7 Example: a percentage component bar chart

The information in the previous example of sales of Barker could have been shown in a percentage component bar chart as follows.



Working

	Year 7		*Year 8*		*Year 9*	
	$'000	%	$'000	%	$'000	%
Region 1	10,000	42	12,000	43	17,000	50
Region 2	9,000	37	10,000	36	10,000	29
Region 3	5,000	21	6,000	21	7,000	21
Total	24,000	100	28,000	100	34,000	100

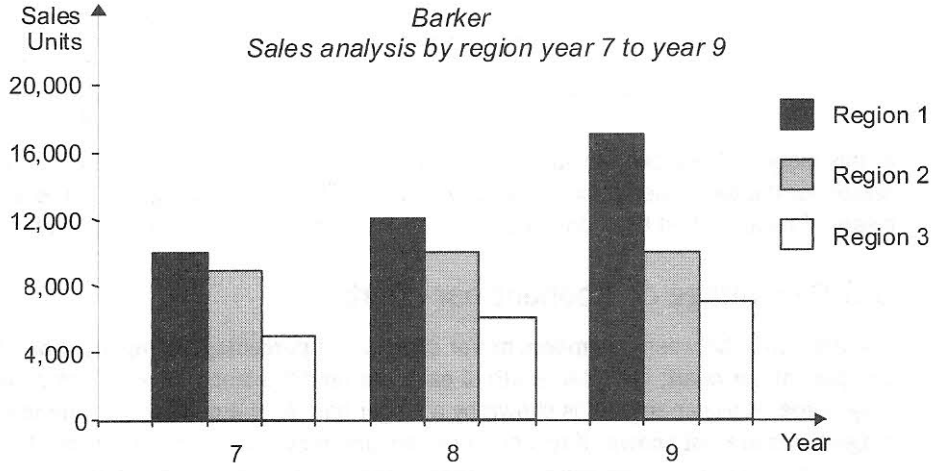
This chart shows that sales in region 3 have remained a steady proportion of total sales, but the proportion of sales in region 1 in total sales has gone up quite considerably, while the proportion of sales in region 2 has fallen correspondingly.

6.8 Multiple bar charts (compound bar charts)

A **multiple bar chart** (or **compound bar chart**) is a bar chart in which two or more separate bars are used to present sub-divisions of information.

6.9 Example: a multiple bar chart

The information on Barker's sales could be shown in a multiple bar chart as follows.



A multiple bar chart uses several bars for each total. In the above example, the sales in each year are shown as three separate bars, one for each region 1, 2 and 3.

Multiple bar charts are sometimes drawn with the bars horizontal instead of vertical.

Multiple bar charts present similar information to component bar charts, except for the following.

(a) Multiple bar charts do not show the grand total (in the above example, the total sales each year) whereas component bar charts do.

(b) Multiple bar charts illustrate the comparative magnitudes of the components more clearly than component bar charts.

6.10 Pie charts

A **pie chart** is a chart which is used to show pictorially the relative size of component elements of a total.

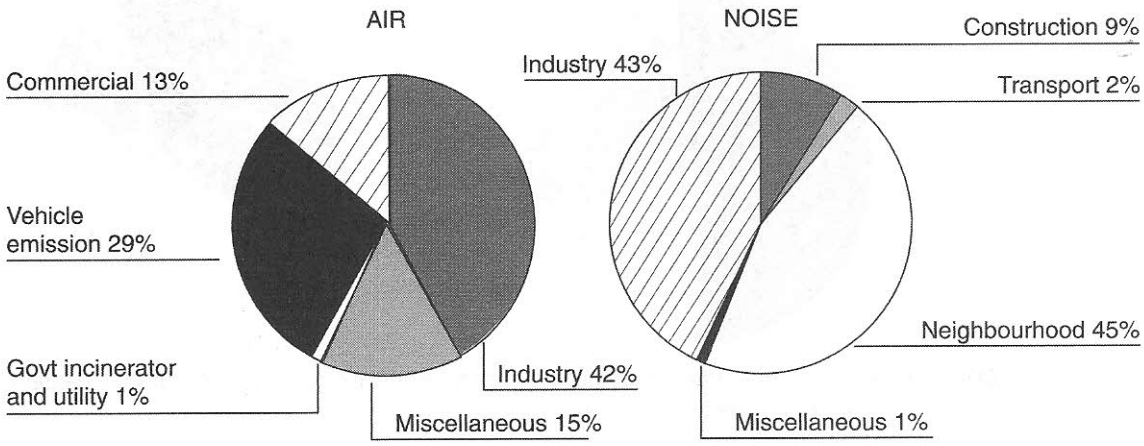
It is called a pie chart because it is **circular**, and so has the **shape of a pie** in a round pie dish. The 'pie' is then cut into slices with each slice representing part of the total.

Pie charts have sectors of varying sizes, and you need to be able to draw sectors fairly accurately. To do this, you need a **protractor**. Working out sector sizes involves converting parts of the total into **equivalent degrees of a circle**. A complete 'pie' = 360°: the number of degrees in a circle = 100% of whatever you are showing. An element which is 50% of your total will therefore occupy a segment of 180°, and so on.

6.10.1 Using shading and colour

Two pie charts are shown as follows.

Breakdown of air and noise pollution complaints, 1



- **Shading** distinguishes the segments from each other
- **Colour** can also be used to distinguish segments

6.10.2 Example: Pie charts

The costs of materials at the Cardiff Factory and the Swansea Factory during January 20X0 were as follows.

	Cardiff factory		*Swansea factory*	
	$'000	%	$'000	%
Material W	70	35	50	20
Material A	30	15	125	50
Material L	90	45	50	20
Material E	10	5	25	10
	200	100	250	100

Show the costs for the factories in pie charts.

Solution

To convert the components into degrees of a circle, we can use either the **percentage figures** or the **actual cost figures**.

Using the percentage figures

The total percentage is 100%, and the total number of degrees in a circle is 360°. To convert from one to the other, we multiply each percentage value by 360/100% = 3.6.

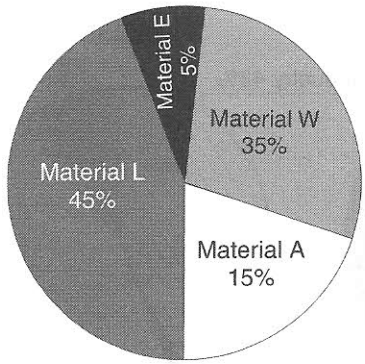
	Cardiff factory		*Swansea factory*	
	%	Degrees	%	Degrees
Material W	35	126	20	72
Material A	15	54	50	180
Material L	45	162	20	72
Material E	5	18	10	36
	100	360	100	360

Using the actual cost figures

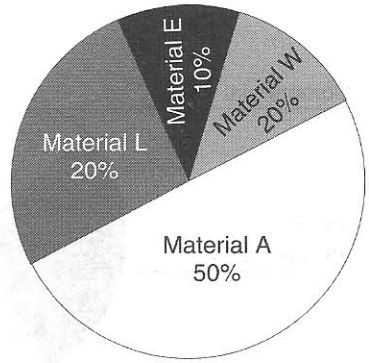
	Cardiff factory		*Swansea factory*	
	$'000	Degrees	$'000	Degrees
Material W (70/200 × 360°)	70	126	50	72
Material A	30	54	125	180
Material L	90	162	50	72
Material E	10	18	25	36
	200	360	250	360

A pie chart could be drawn for each factory.

Cardiff Factory



Swansea Factory



(a) If the pie chart is drawn manually, a protractor must be used to measure the degrees accurately to obtain the correct sector sizes.

(b) Using a computer makes the process much simpler, especially using a spreadsheet. You just draw up the data in a spreadsheet and click on the chart button to create a visual representation of what you want. Note that you can only use colour effectively if you have a colour printer!

6.10.3 Advantages of pie charts

- They give a simple pictorial display of the relative sizes of elements of a total
- They show clearly when one element is much bigger than others
- They can clearly show differences in the elements of two different totals

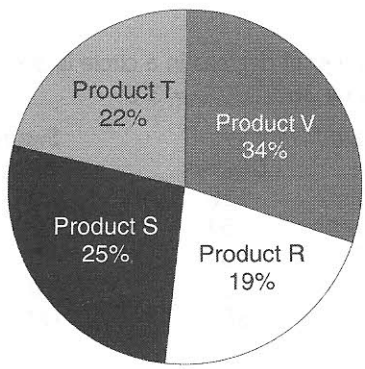
6.10.4 Disadvantages of pie charts

(a) They only show the relative sizes of elements. In the example of the two factories, for instance, the pie charts do not show that costs at the Swansea factory were $50,000 higher in total than at the Cardiff factory.

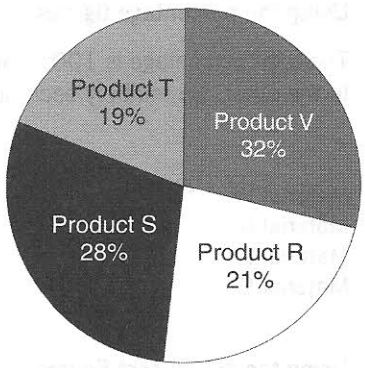
(b) They involve **calculating degrees of a circle** and drawing sectors accurately, and this can be time consuming unless computer software is used.

(c) It is often **difficult to compare sector sizes** easily. For example, suppose that the following two pie charts are used to show the elements of a company's sales.

20X0



20X1



Without the percentage figures, it would not be easy to see how the distribution of sales had changed between 20X0 and 20X1.

QUESTION

Pie charts

The European division of Scent to You, a flower delivery service has just published its accounts for the year ended 30 June 20X0. The sales director made the following comments.

'Our total sales for the year were $1,751,000, of which $787,000 were made in the United Kingdom, $219,000 in Italy, $285,000 in France and $92,000 in Germany. Sales in Spain and Holland

amounted to $189,000 and $34,000 respectively, whilst the rest of Europe collectively had sales of $145,000 in the twelve months to 30 June 20X0.'

Required

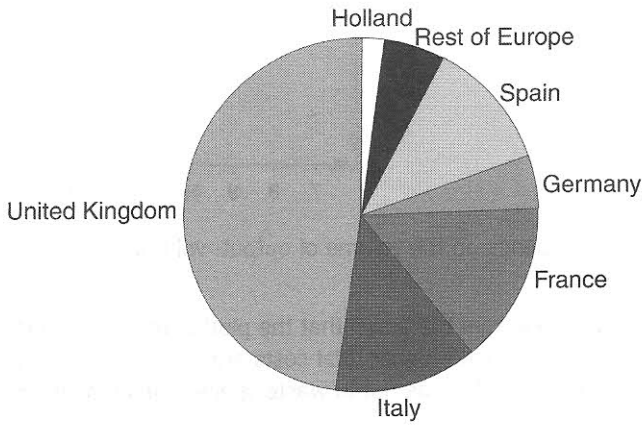
Present the above information in the form of a pie chart. Show all of your workings.

ANSWER

Workings

	Sales $'000		Degrees
United Kingdom	787	(787/1,751 × 360)	162
Italy	219		45
France	285		58
Germany	92		19
Spain	189		39
Rest of Europe	145		30
Holland	34		7
	1,751		360

Scent to You
Sales for the year ended 30 June 20X0



EXAM FOCUS POINT

A computer based exam cannot require you to draw charts so questions will focus on labelling, calculating values, choosing an appropriate chart and coming to conclusions using charts.

6.11 Scatter diagrams

Scatter diagrams are graphs which are used to exhibit data, (rather than equations) in order to compare the way in which two variables vary with each other.

6.12 Constructing a scatter diagram

The x axis of a scatter diagram is used to represent the independent variable and the y axis represents the dependent variable.

To construct a scatter diagram or scattergraph, we must have several pairs of data, with each pair showing the value of one variable and the corresponding value of the other variable. Each pair is plotted on a graph. The resulting graph will show a number of pairs, scattered over the graph. The scattered points might or might not appear to follow a trend.

6.13 Example: Scatter diagram

The output at a factory each week for the last ten weeks, and the cost of that output, were as follows.

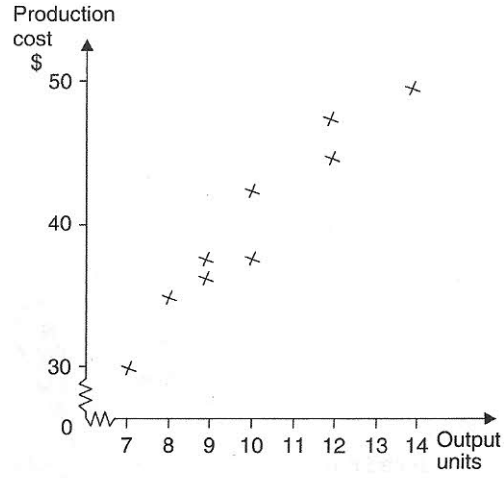
Week	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
Output (units)	10	12	10	8	9	11	7	12	9	14
Cost ($)	42	44	38	34	38	43	30	47	37	50

Required

Plot the data given on a scatter diagram.

Solution

The data could be shown on a scatter diagram as follows.



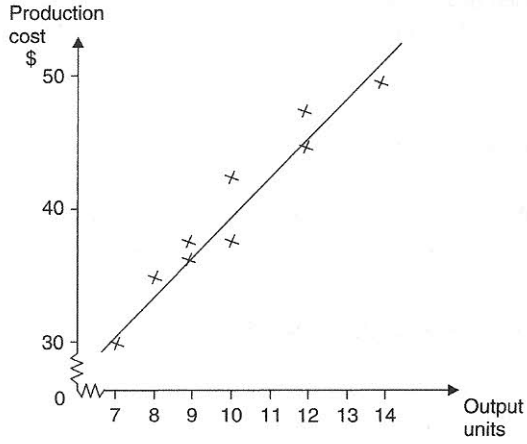
(a) The cost depends on the volume of output: volume is the independent variable and is shown on the x axis.

(b) You will notice from the graph that the plotted data, although scattered, lie approximately on a rising trend line, with higher total costs at higher output volumes. (The lower part of the axes have been omitted, so as not to waste space. The break in the axes is indicated by the jagged lines.)

6.14 The trend line

For the most part, scatter diagrams are used to try to identify **trend lines**.

If a trend can be seen in a scatter diagram, the next step is to try to draw a trend line.



6.14.1 Using trend lines to make predictions

(a) In the previous example, we have drawn a trend line from the scatter diagram of output units and production cost. This trend line might turn out to be, say, $y = 10 + 3x$. We could then use this

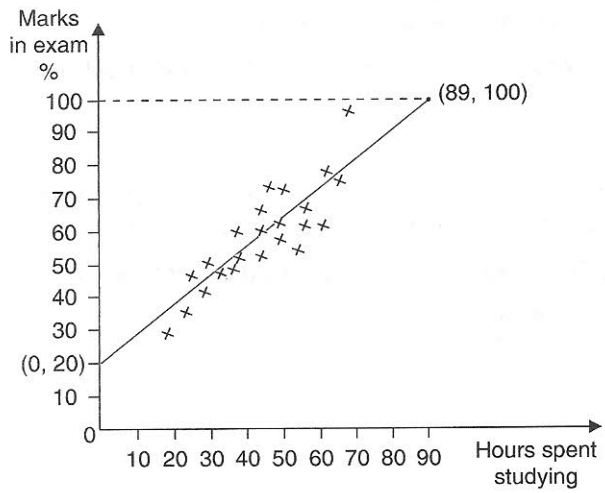
trend line to establish what we think costs ought to be, approximately, if output were, say, 10 units or 15 units in any week. (These 'expected' costs could subsequently be compared with the actual costs, so that managers could judge whether actual costs were higher or lower than they ought to be.)

(b) If a scatter diagram is used to record sales over time, we could draw a trend line, and use this to forecast sales for next year.

6.14.2 Adding trend lines to scatter diagrams

The trend line could be a straight line, or a curved line. The simplest technique for drawing a trend line is to make a visual judgement about what the closest-fitting trend line seems to be, the 'line of best fit'.

Here is another example of a scatter diagram with a trend line added.



The equation of a straight line is given by **y = a + bx**, where **a** is the **intercept** on the y axis and **b** is the **gradient**.

The line passes through the point x = 0, y = 20, so a = 20. The line also passes through x = 89, y = 100, so:

$$100 = 20 + (b \times 89)$$

$$b = \frac{(100-20)}{89}$$

$$= 0.9$$

The line is y = 20 + 0.9x

We will look at this in more detail in Chapter 14 on forecasting.

QUESTION

The quantities of widgets produced by WDG Co during the year ended 31 October 20X9 and the related costs were as follows.

Month	*Production* Thousands	*Factory cost* $'000
20X8		
November	7	45
December	10	59
20X9		
January	13	75
February	14	80
March	11	65
April	7	46
May	5	35
June	4	30

Month	*Production* Thousands	*Factory cost* $'000
July	3	25
August	2	20
September	1	15
October	5	35

You may assume that the value of money remained stable throughout the year.

Required

(a) Draw a scatter diagram related to the data provided above, and plot on it the line of best fit.

(b) Now answer the following questions.

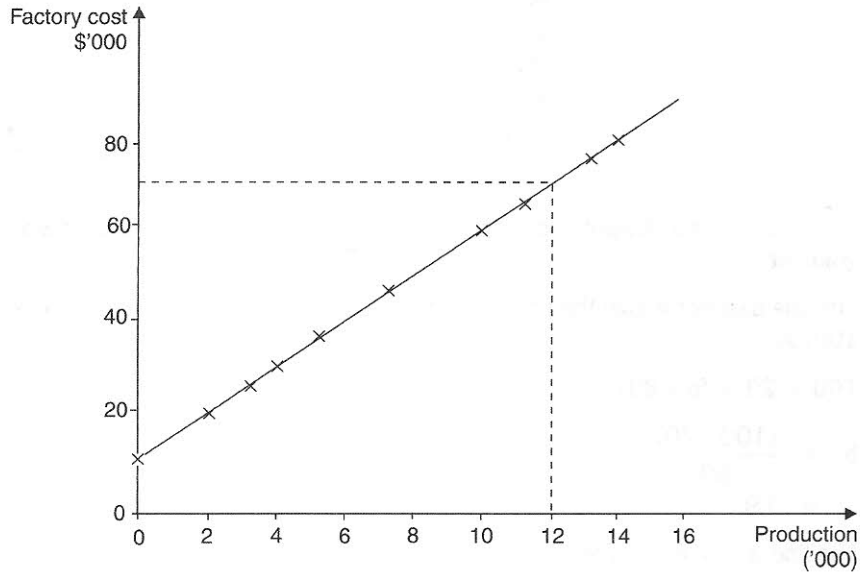
(i) What would you expect the factory cost to have been if 12,000 widgets had been produced in a particular month?

(ii) What is your estimate of WDG's monthly fixed cost?

ANSWER

Your answers to parts (b)(i) and (ii) may have been slightly different from those given here, but they should not have been very different, because the data points lay very nearly along a straight line.

(a) WDG Co – Scatter diagram of production and factory costs, November 20X8-October 20X9



(b) (i) The estimated factory cost for a production of 12,000 widgets is $70,000.

(ii) The monthly fixed costs are indicated by the point where the line of best fit meets the vertical axis (costs at zero production). The fixed costs are estimated as $10,000 a month.

CHAPTER ROUNDUP

- The purpose of a **report** must be clear, and certain general principles should be followed in planning and giving structure to a report.
- Stylistic qualities of reports include objectivity and balance and ease of understanding.
- To keep the main body of the report short enough to hold the reader's interest, detailed explanations, charts and tables of figures should be put into **appendices**. The main body of the report should make cross-reference to the appendices in appropriate places.
- **Tables** are a simple way of presenting information about two variables.
- Bar charts often convey the meaning or significance of data more clearly than would a table. Make sure that you are able to construct **bar charts**.
- There are three main types of bar chart: **simple**, **component** (including percentage component) and **multiple** (or compound).
- Scatter diagrams are graphs which are used to exhibit data, (rather than equations) in order to compare the way in which two variables vary with each other.

QUICK QUIZ

1. Why is it important to space out a report?
2. When should appendices be used in reports?
3. When would a memorandum report be used?
4. What are the main guidelines for tabulation?
5. Name the three main types of bar chart.

ANSWERS TO QUICK QUIZ

1 Intelligent use of spacing separates headings from the body of the text for easy scanning, and also makes a large block more attractive and 'digestible'.

2 Appendices should be used if the report will be too long and detailed to hold the reader's interest.

3 A memorandum would be used for flexible, informal reports.

4
(a) The table should be given a clear title.
(b) All columns should be clearly labelled.
(c) The information should be inserted into the appropriate places in the table.
(d) Where appropriate, there should be clear sub-totals.
(e) A total column may be presented; this would usually be the right-hand column.
(f) A total figure is often advisable at the bottom of each column of figures.
(g) Tables should not be packed with too much information so that reading the table is difficult.

5
(a) Simple bar charts
(b) Component bar charts, including percentage component bar charts
(c) Multiple (or compound) bar charts

Now try ...

Attempt the questions below from the **Exam Question Bank**

Number

Q20 – Q22