In this chapter we commence our examination of using performance indicators to monitor and control businesses. In this chapter we mainly concentrate on the use of financial ratios, and then look at other forms of performance measurement in the next chapter.

We start by examining what performance indicators can tell us and learn some of the ‘ground rules’ that will help. We will see how making comparisons is invaluable, and how benchmarking can play its part in making sense of the data.

Next we will start our examination of ratios by looking at those connected with the Income Statement (Profit & Loss Account). From there we continue our study of ratios by examining some ratios that link the Income Statement with information displayed in the Statement of Financial Position (Balance Sheet). These ratios are typically concerned with how the resources of the business are used to generate profit. The last groups of ratios are those concerned with examining the Statement of Financial Position to understand issues like liquidity and financial stability.

We will then learn how to interpret ratios, and their limitations. Finally we will start to examine the numerical manipulation of ratios to answer some ‘what if’ questions that will help us in our studies.
MEASURING THE PERFORMANCE OF ORGANISATIONS

**Performance indicators**

It is important to be able to measure the performance of an organisation in a way which allows managers to see where improvements can be made. In Chapters 2, 3 and 4 we have studied the analysis of cost variances. These are examples of performance measurements which can be used:

- to monitor the use of resources
- to help with control of the business
- to help with planning for the future

A list of variances for one cost centre for one period is not particularly informative. The usefulness of variances depends on being able to compare them with target levels, with the variances for other time periods or with those for other similar cost centres.

In this chapter we will consider different ways of measuring the performance of an organisation (or of a part of an organisation). For example, we can calculate profit as a percentage of sales, sales revenue per employee, the percentage of orders which are delivered late, and many other measures. An individual measurement is called a *performance indicator*. What we have seen above for variance analysis applies to any performance indicator.

A performance indicator may be used for:

- identifying problems
- controlling costs
- measuring the utilisation of resources
- measuring an individual’s performance
- planning

Examples of performance indicators include:

- the direct materials usage variance, which may identify a problem relating to wastage of materials
- the administration cost as a percentage of turnover, which may help with control of costs
- the number of hours of machine down time, which is relevant to how well resources are being used
- profit as a percentage of turnover, which may indicate how well a company has been managed
- the number of product units rejected on inspection, which may help with planning production levels
The usefulness of a performance indicator depends on:

- comparing with standards, budgets or targets
- comparing with other periods of time
- comparing with other similar organisations

making comparisons – benchmarking

Comparing performance indicators with standards or targets includes benchmarking.

Benchmarks are standards or targets set for one or more areas of activity and should be related to what is important to the organisation.

Benchmarks may be:

- set internally and relate to a single aspect of the work, for example: all correspondence to be answered within three working days
- set by external bodies, for example government targets relating to pollution of the environment
- set (either internally or externally) with reference to similar organisations, for example the expected level of profitability calculated as an average for the industry

A single organisation may have a number of benchmarks, including all three types described above:

Measurement of how well an organisation (or part of an organisation) has performed in achieving these aims means that it has to record the necessary data to compare with the benchmark.
making comparisons – time series

Comparing the same indicator over a number of periods of time gives a Time Series. In Chapter 1 (pages 30-43) it has been shown how a time series may show a trend and possibly a pattern of variations around the trend. A performance indicator may show these features over a number of time periods, adding to the usefulness of the information.

For example, the number of customer complaints can be a useful performance indicator for an organisation. An overall downward trend in the number of complaints shows improvement, even if there are some fluctuations. An overall upward trend would indicate a problem to be investigated.

When items measured in money terms, such as Sales Revenue or Profit, are being compared over a number of years, it may be necessary to take out the effect of inflation. This can be done using index numbers, as shown in Chapter 1 and in Chapter 7.

making comparisons – consistency

Comparisons can give very useful information. However, we must be sure that figures being compared really are ‘comparable’. In other words, they must have been prepared in a consistent way, so that we are comparing ‘like with like’.

For example, the Net Profit figures for a business over a number of years can be compared provided that the same accounting policies have been applied throughout. A change in the policy for depreciation, for example, would affect the profit figures and they would not be comparable.

data for performance measurement

The diagram on the next page shows that there are different kinds of data that may be used for performance measurement.

Quantitative data is data which can be stated in numbers, and this can be split into:

- Financial or Monetary data which is in terms of money and
- Non-financial or non-monetary data, which is in terms of units other than money, such as numbers of hours for example.

Qualitative data is data which cannot be put in numerical terms. It can consist of people’s opinions or judgements, for example the views of students about a teacher. Such data is used for performance measurement, particularly in appraisal schemes for types of work where there is no clearcut numerical measure of performance. A combination of quantitative and qualitative data is often used.
The examples shown in the diagram above include variances as an example of financial data. You have seen in your earlier studies that variances are given in money terms. The other point to note about variances is that each variance comes from two pieces of information and is the difference between them. An alternative way of comparing two pieces of information is to calculate a ratio or percentage, and this is one of the most common ways of arriving at a useful measure of performance. Percentages are particularly useful when comparisons are being made.

**tutorial note – dealing with percentages**

In order to express a ratio as a percentage, it is necessary to multiply by 100. This can be done using the % function on a calculator.

In all the formulas which follow, we have shown ‘x 100’ as well as indicating that the answer is a percentage by using the % sign.

When using these formulas:

*either* multiply by 100

*or* use the % button on your calculator.
Little Ltd and Large Ltd are companies which operate in the same industry. For a given period, we have the following data:

<table>
<thead>
<tr>
<th></th>
<th>Little Ltd</th>
<th>Large Ltd</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turnover (Sales Revenue)</td>
<td>465 £000s</td>
<td>2,550 £000s</td>
</tr>
<tr>
<td>Gross Profit</td>
<td>185</td>
<td>895</td>
</tr>
</tbody>
</table>

At a glance, it is not easy to compare these figures because of the difference in size. If we calculate the gross profit as a percentage of turnover, we obtain more useful information for comparison:

\[
\text{Little Ltd Gross profit percentage} = \frac{185}{465} \times 100\% = 39.8\%
\]

\[
\text{Large Ltd Gross profit percentage} = \frac{895}{2,550} \times 100\% = 35.1\%
\]

We can then see that Little Ltd is translating a greater proportion of its turnover into gross profit than Large Ltd. This is an example of a performance indicator.

**RATIO ANALYSIS**

Ratio analysis generally refers to the calculation of a set of ratios or percentages using data from the financial and management accounts of a business. The income statement (profit and loss account) and the statement of financial position (balance sheet) are used in the analysis, which can then be used to evaluate the performance of the business, particularly by:

- comparing with budgets or targets
- comparing with other periods of time
- comparing with other similar organisations

In the case of limited companies, people outside the company can look at the final accounts and calculate ratios, for example when deciding whether to buy shares in the company. This analysis will add to the available information, but should not be used on its own.

In order to make meaningful comparisons between organisations or between time periods, the accounts must have been prepared on the same basis – applying the principle of consistency by comparing like with like. It is very
difficult to achieve this, especially when using published accounts. In this case, it is essential to study the notes to the accounts, which may give important information about accounting policies and the breakdown of certain figures. Even so, details of the methods used may not be given and therefore the ratios calculated must be used with care.

The aim should always be to provide useful information for the purpose for which it is required. It is not sufficient to put figures into formulas (or into a computer program) without thinking of the factors that may affect them.

**sources of data for ratios**

In this chapter we consider the ratios which can be calculated from the Statement of Profit or Loss (Income Statement) and the Statement of Financial Position of a business. We will do this in a number of stages:

1. We will consider first the ratios calculated from the Statement of Profit or Loss separately, before linking sales and profits with the Statement of Financial Position.
2. The key measure of profit in relation to the assets shown on the Statement of Financial Position is Return on Capital Employed.
3. Our third section on ratio analysis will include ratios relating to the current assets and current liabilities of the organisation.

The diagram below illustrates these groups of ratios and the sources of data for their calculation, and the stages in which we will look at them.
CALCULATION OF RATIOS: THE STATEMENT OF PROFIT OR LOSS

In the Case Study comparing Little Limited and Large Limited, the calculation of gross profit as a percentage of turnover gives useful information. It shows what proportion of the turnover remains as gross profit, after the cost of sales is taken out. Little Ltd’s gross profit percentage of 39.8%, for example, means that, out of every £100 of sales revenue, there is £39.80 gross profit. Large Ltd keeps only £35.10 gross profit out of every £100 of sales revenue.

Similar percentages can be calculated comparing each of the figures on an income statement with the turnover. These show what proportion or ‘slice’ of sales revenue is being used for each type of cost and how big a slice is kept in profits. (See the pie chart on page 204, which shows the breakdown of sales revenue in percentage terms for the Case Study Ayebridge Limited.)

Profit percentages are calculated on the basis of Turnover (Sales Revenue). This can be done for Gross Profit and Net Profit. In the accounts of a company, several versions of profit are given, before and after interest and tax. To measure the performance of the company, the ‘Operating Profit’ or ‘Profit before interest and tax’ is used for many ratios, because this is the profit from the main trading activities of the company. If management performance is being evaluated, the profit figure used should reflect the manager’s area of responsibility. ‘Controllable profit’ is appropriate, and ‘Revenue’. In the formulas below, the terms ‘Sales’ and ‘Turnover’ mean the same thing.

In assessment tasks, ‘Sales Returns’ are sometimes shown. In this case, the figure to be used for ‘sales’ in the calculation of ratios is the one after sales returns have been deducted, because this represents the actual sales achieved.

\[
\text{gross profit margin (percentage)} = \frac{\text{gross profit}}{\text{sales}} \times 100\%
\]

\[
\text{net profit margin} = \frac{\text{net profit}}{\text{sales}} \times 100\%
\]

\[
\text{or operating profit margin} = \frac{\text{operating profit}}{\text{sales}} \times 100\%
\]

Profit percentages are indicators of the profitability of the business.

It must be remembered that the choice of methods for depreciation of assets and for inventory valuation can make a difference to profit figures.
Any other figure from the statement of profit or loss can also be calculated as a percentage of sales, particularly if it appears to need investigation. For example, if selling expenses have increased from one period to the next, it may be useful to calculate for each period:

- selling expenses as a percentage of sales = \( \frac{\text{selling expenses}}{\text{sales}} \times 100\% \)
- or any type of expense as a percentage of sales = \( \frac{\text{expense}}{\text{sales}} \times 100\% \)

Similarly, if details of the costs of materials and wages are available, we can calculate, for any type of cost:

- cost as a percentage of sales = \( \frac{\text{cost}}{\text{sales}} \times 100\% \)

Whether costs behave as fixed or variable costs in relation to activity levels (see Chapter 1) makes a difference to how we would expect the ratios to behave. A higher turnover figure often results from a higher volume of sales, which would mean that total variable costs would also be higher. Total fixed costs, however, would not be expected to change with the volume. In percentage terms, this means that we would expect:

- a variable cost to remain relatively stable as a percentage of turnover
- a fixed cost as a percentage of turnover to decrease as turnover increases

For example, the direct materials cost of a product may be expected to be 12% of the sales revenue and this percentage would stay approximately the same for different numbers of units. On the other hand, if a fixed cost is £90,000 per year:

- compared with annual turnover of £900,000, the fixed cost would be 10%
- but compared with annual turnover of £1,200,000, it would be only 7.5%.

Calculation of the income statement ratios will show how the revenue from sales has been split between the elements of cost and the profit. The following Case Study illustrates this.

**Ayebridge Limited: Ratio Analysis of the Statement of Profit or Loss**

Ayebridge Limited is a manufacturer of electronic circuits used in domestic products. The following income statement for the year ended 30 June 20-3 includes some detail of the cost of sales.
Ayebridge Ltd: Statement of Profit or Loss for the year ended 30 June 20-3

<table>
<thead>
<tr>
<th></th>
<th>£000s</th>
<th>£000s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>6,000</td>
<td></td>
</tr>
<tr>
<td>Less: Cost of Sales:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Materials</td>
<td>800</td>
<td></td>
</tr>
<tr>
<td>Labour</td>
<td>900</td>
<td></td>
</tr>
<tr>
<td>Production overheads</td>
<td>1,700</td>
<td></td>
</tr>
<tr>
<td>Cost of Sales</td>
<td>3,400</td>
<td></td>
</tr>
<tr>
<td>GROSS PROFIT</td>
<td>2,600</td>
<td></td>
</tr>
<tr>
<td>Selling and Distribution</td>
<td>813</td>
<td></td>
</tr>
<tr>
<td>Administration</td>
<td>967</td>
<td>1,780</td>
</tr>
<tr>
<td>OPERATING PROFIT</td>
<td>820</td>
<td></td>
</tr>
</tbody>
</table>

**required**

Analyse the Ayebridge Limited statement given above, using ratio analysis.

**solution**

Using the formulas listed on page 201, we obtain:

Gross profit margin (percentage) = \( \frac{\text{Gross profit}}{\text{Sales}} \times 100\% = \frac{2,600}{6,000} \times 100\% = 43.3\% \)

This shows that 43.3% of the Sales Revenue remains as Gross Profit after the Cost of Sales has been deducted (see diagram on the next page).

The Cost of Sales therefore represents 100% – 43.3% = 56.7% of the Sales Revenue. In this example it is possible to calculate percentages for the three elements of the cost of sales, as follows:

- materials cost as a percentage of sales = \( \frac{800}{6,000} \times 100\% = 13.3\% \)
- labour cost as a percentage of sales = \( \frac{900}{6,000} \times 100\% = 15.0\% \)
- production overheads as a percentage of sales = \( \frac{1,700}{6,000} \times 100\% = 28.3\% \)

(Allowing for a rounding difference, these total the cost of sales percentage of 56.7%)

In order to draw any conclusions from these calculations, we would need more information for comparison. We would need the same format of income statement for Ayebridge Limited for other years, or as a budget for the year ended 30 June 20-3. Alternatively, we could compare Ayebridge’s figures with averages for the industry or with those for other similar businesses, if available. The same applies to the remaining percentages:
• operating profit percentage = \( \frac{820 \times 100}{6,000} = 13.7\% \)

Each of the two categories of expense could also be calculated as a percentage of sales:

• selling and distribution as a percentage of sales = 13.6%

• administration as a percentage of sales = 16.1%

(Check that you can calculate these).

### Case Study continued – comparison with the previous year

Consider the table below, which shows information for Ayebridge Limited for the year ended 30 June 20-2, together with answers from our calculations for the year ended 30 June 20-3.

<table>
<thead>
<tr>
<th></th>
<th>30 June 20-2</th>
<th>30 June 20-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross profit percentage</td>
<td>41.0%</td>
<td>43.3%</td>
</tr>
<tr>
<td>Operating profit percentage</td>
<td>15.4%</td>
<td>13.7%</td>
</tr>
</tbody>
</table>

The Gross Profit percentage has therefore increased from 41% in the previous year, to 43.3% in the year ended 30 June 20-3. This improvement means that a lower proportion of the Sales Revenue has been used for Cost of Sales. This could result from increasing selling prices or from reducing costs. With more detailed information for the previous year this could be analysed further. Notice that we do not know whether the actual amount of gross profit has increased or decreased.
The Operating Profit percentage, however, has decreased from 15.4% in the previous year to 13.7% in the year ended 30 June 20-3. This means that a greater slice of the gross profit has been taken out in expenses. (Look again at the pie chart opposite). This could be because the expenses have increased, but it could also be due to a reduction in the total sales revenue, or both. Increased selling prices may reduce demand for the products, and this could result in lower total sales revenue, and a lower total amount of gross profit.

These comments show that the calculated percentages alone are not enough. To see exactly what has happened, we would need to look back at the original data as well.

BEETON LIMITED: RATIO ANALYSIS OF THE STATEMENT OF PROFIT OR LOSS

The following information relates to Beeton Ltd, a chain of retail stationery shops. Note: whenever you are given data for different time periods, make sure you check which is the earlier and which the later time period. Here the earlier year is on the right, but this is not always so. If you do not check, you may discuss a completely opposite case!

<table>
<thead>
<tr>
<th>Beeton Ltd: Income Statement for the year ended:</th>
<th>31 March 20-3</th>
<th>31 March 20-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>£000s</td>
<td>£000s</td>
</tr>
<tr>
<td>Less: Returns</td>
<td>(300)</td>
<td>(200)</td>
</tr>
<tr>
<td>Cost of Sales</td>
<td>4,200</td>
<td>3,400</td>
</tr>
<tr>
<td>Opening Inventory</td>
<td>450</td>
<td>410</td>
</tr>
<tr>
<td>Purchases</td>
<td>2,896</td>
<td>2,250</td>
</tr>
<tr>
<td>Less: Closing Inventory</td>
<td>(490)</td>
<td>(2,856)</td>
</tr>
<tr>
<td>GROSS PROFIT</td>
<td>1,344</td>
<td>1,190</td>
</tr>
<tr>
<td>Expenses:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Selling and Distribution</td>
<td>157</td>
<td>128</td>
</tr>
<tr>
<td>Administration</td>
<td>200</td>
<td>357</td>
</tr>
<tr>
<td>OPERATING PROFIT</td>
<td>987</td>
<td>782</td>
</tr>
</tbody>
</table>

required

Analyse the statement, for each of the given years, by calculating (correct to one decimal place)

- the gross profit margin on sales
- the operating profit as a percentage of sales (operating profit margin)
- two other percentages to aid your analysis

Identify where possible the reasons for changes in the profitability of Beeton Ltd.
solution

<table>
<thead>
<tr>
<th>Year ended:</th>
<th>31 March 20-3</th>
<th>31 March 20-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross Profit Margin on Sales</td>
<td>32%</td>
<td>35%</td>
</tr>
<tr>
<td>Operating Profit margin</td>
<td>23.5%</td>
<td>23%</td>
</tr>
<tr>
<td>Expenses as % of Sales:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Selling and Distribution</td>
<td>3.7%</td>
<td>3.8%</td>
</tr>
<tr>
<td>Administration</td>
<td>4.8%</td>
<td>8.2%</td>
</tr>
</tbody>
</table>

The **Gross Profit margin** on sales has decreased in the year to 31 March 20-3. This may be due to having to reduce selling prices in order to increase sales demand. It could also be caused by increases in purchasing costs, or a combination of these reasons. (Notice that we use the Sales figure after the Sales Returns have been deducted.)

The **Operating Profit margin** has increased slightly. It can be seen from the Income Statements and from the expense percentages that this level of operating profit margin has been maintained by a considerable reduction of Administration costs. This cost has been reduced by £80,000, even though sales have increased. The effect is to cut the Administration as a percentage of sales from 8.2% to 4.8%. The Selling and Distribution costs are at a similar level in relation to sales in both years.

**RATIOS LINKING TURNOVER AND PROFITS TO THE STATEMENT OF FINANCIAL POSITION**

So far, in this chapter, we have looked at sales and profits without considering the way that the business is being financed and the value of the assets being used. Managers need to ensure that the money invested in the business as capital is being used efficiently to generate sales and profits. We now consider ratios that can be used to assess how well they are doing this.

From your studies of financial accounting, you will be familiar with the idea that the Statement of Financial Position of an organisation represents the equation:

\[
\text{assets} - \text{liabilities} = \text{capital}
\]

and that the Capital represents the owners’ interest in the business. We can therefore look at the Statement of Financial Position from either side – as the net assets or as the capital provided by the owners.

- ‘Assets’ include both non-current (fixed) and current assets
- ‘Liabilities’ include current and long-term liabilities
Long-term liabilities, such as loans, can be viewed as a long-term source of finance for the organisation by rearranging the equation as:

\[
\text{non-current and current assets} - \text{current liabilities} = \text{long-term liabilities} + \text{capital}
\]

This version of the equation will be used in calculating the Return on Capital Employed on the next page and examples will show how it works.

**tutorial note**

The Statement of Financial Position of an organisation shows its assets, liabilities and owners’ capital on a specific date.

It is important to remember, when using a Statement of Financial Position for ratio analysis, and when interpreting the ratios, that the position shown on that date may not be typical. Transactions on the next day, such as a large payment to a Payable or the raising of a bank loan, will alter the position significantly. Always bear this in mind when calculating ratios using the Statement of Financial Position.

**return on capital employed (ROCE)**

By ‘capital employed’ we mean the money being used to finance the running of a business. This is normally represented by the owners’ capital, together with any long-term liabilities such as loans that make more money available. We have seen above that the statement of financial position shows another way of looking at this, as the value of the non-current and current assets less the current liabilities.

Capital employed is the essential funding used by managers for the fixed assets, for keeping the business going and therefore for making sales and profits. It is important for investors to see that this funding is being put to good use. ‘Return on Capital Employed’ is a performance indicator that compares the profit with the amount of long-term finance being used by management.

Return on Capital Employed is a key ratio which therefore shows how well the management of an organisation has used the assets (or the resources shown on the statement of financial position) to generate profits.

To calculate ROCE, the profit is expressed as a percentage of the capital employed in the business.

The difficulty comes in deciding which ‘profit’ figure to use, and what is meant by ‘capital employed’. If comparisons are being made, between companies for example, then the ROCE must be calculated in the same way for each company (as far as is possible from the available information).

The principle of comparing ‘like with like’ also means that the assets included in the capital employed must be those relevant to the profit being
measured. Usually, the measurement of management performance would mean that the Operating Profit is used, and the Capital Employed would take account of the assets used in the main activities of the organisation.

For instance, if there is any income from investments, this would be excluded from the profit figure and the investment assets themselves would be excluded from the capital employed.

Allowing for such adjustments, the capital employed figure to use in straightforward cases is equal to the Non-Current Assets plus the Net Current Assets. By ‘net current assets’ we mean ‘current assets less current liabilities’.

Referring back to the Statement of Financial Position equation on the previous page:

\[
\text{non-current assets plus net current assets} = \text{non-current and current assets} - \text{current liabilities} = \text{long-term liabilities} + \text{capital}
\]

We are looking at the ‘capital employed’ either as the assets being used to generate profits or the funds which are being used to finance those assets.

For our purposes in this unit, we therefore have the formulas:

\[
\text{ROCE} = \frac{\text{operating profit}}{\text{non-current assets + net current assets}} \times 100\%
\]

or

\[
\text{ROCE} = \frac{\text{operating profit}}{\text{capital on statement of financial position + long-term liabilities}} \times 100\%
\]

You may find the term ‘Profit before interest and tax’ instead of Operating Profit in some examples. A bank overdraft is normally shown as a current liability and, unless told otherwise, this is how you would treat it in an Assessment task. Some analysts, however, might argue that it is used as a semi-permanent form of finance and they would treat it as a long-term liability. This is an example of how a choice of method can make a big difference to the ratios. It is advisable to make your methods clear when calculating ROCE, because of the possible variations in the definitions.

You may be asked to calculate the ‘return on net assets’ instead of ROCE. This ratio is similar to ROCE, and you may be given a figure for ‘net assets’ to use.
JOHN KENT: RETURN ON CAPITAL EMPLOYED

John Kent is a sole trader who runs a plumbing business employing two other people. He financed part of the purchase of his vans with a long-term loan from his father. We have the following simplified statement of financial position:

<table>
<thead>
<tr>
<th>Statement of Financial Position of John Kent as at 31 March 20-3</th>
<th>£</th>
<th>£</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-current Assets:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vehicles at cost</td>
<td>50,000</td>
<td></td>
</tr>
<tr>
<td>Less: provision for depreciation</td>
<td>12,500</td>
<td>37,500</td>
</tr>
<tr>
<td>Equipment at cost</td>
<td>6,800</td>
<td></td>
</tr>
<tr>
<td>Less: provision for depreciation</td>
<td>1,200</td>
<td>5,600</td>
</tr>
<tr>
<td></td>
<td>43,100</td>
<td>43,100</td>
</tr>
<tr>
<td>Current Assets</td>
<td>8,400</td>
<td></td>
</tr>
<tr>
<td>Current Liabilities</td>
<td>(3,900)</td>
<td></td>
</tr>
<tr>
<td>Net current assets</td>
<td>4,500</td>
<td></td>
</tr>
<tr>
<td>Long term loan</td>
<td>(30,000)</td>
<td>17,600</td>
</tr>
<tr>
<td>Capital as at 31 March 20-3</td>
<td></td>
<td>17,600</td>
</tr>
</tbody>
</table>

required

Show the calculation of the Capital Employed as at 31 March 20-3 for John Kent from the above Statement of Financial Position using:

- Non-current assets plus net current assets
- Capital on Statement of Financial Position plus long-term liabilities

solution

- Non-current assets plus net current assets = £43,100 + £4,500 = £47,600
- Capital on Statement of Financial Position plus long-term liabilities
  = £17,600 + £30,000 = £47,600

Note: These two views of the statement of financial position give the same figure for Capital Employed (at 31 March 20-3).
WING LIMITED: ROCE AND THE STATEMENT OF FINANCIAL POSITION OF A LIMITED COMPANY

This Case Study illustrates some of the features of a limited company statement of financial position, using a simplified version.

### Statement of Financial Position of Wing Ltd as at 31 March 20-3

<table>
<thead>
<tr>
<th>£000s</th>
<th>£000s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-current Assets (Net Book Value)</td>
<td>750</td>
</tr>
<tr>
<td>Current Assets</td>
<td>95</td>
</tr>
<tr>
<td>Current Liabilities</td>
<td>68</td>
</tr>
<tr>
<td>Net current assets</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>777</td>
</tr>
<tr>
<td>Long term loans</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td>627</td>
</tr>
<tr>
<td>Capital and Reserves:</td>
<td></td>
</tr>
<tr>
<td>£1 Ordinary Shares issued and fully paid</td>
<td>350</td>
</tr>
<tr>
<td>Reserves</td>
<td>200</td>
</tr>
<tr>
<td>Retained Earnings</td>
<td>77</td>
</tr>
<tr>
<td></td>
<td>627</td>
</tr>
</tbody>
</table>

Note that the Statement of Financial Position total of £627,000 represents for Capital and Reserves:

- Share Capital which has been introduced into the company (by investors buying shares)
- Reserves, which represent amounts of capital or profits which have been set aside to be used in future
- Retained Earnings, which represents accumulated profits retained within the business (other than those set aside in reserves)

**required**

Determine the Capital Employed for Wing Ltd as at 31 March 20-3 and calculate the Return on Capital Employed. (Note: Operating Profit for the year was £233,100).

**solution**

Wing Ltd has long-term loans of £150,000 which are being used, along with the accumulated total capital, to finance the operating activities of the company. Therefore the Capital Employed is:

Statement of Financial Position total + Long term loans = £627,000 + £150,000 = £777,000

or Non-current Assets + Net Current Assets = £750,000 + £27,000 = £777,000

Applying the formula:

\[
\text{Return on Capital Employed} = \frac{\text{Operating profit}}{\text{Capital employed}} \times 100\%
\]

\[
= \frac{\text{£233,100}}{\text{£777,000}} \times 100\% = 30\%
\]
**Asset Turnover**

Asset Turnover is another important ratio which links the statement of financial position with the income statement. It measures how well the assets have been used during a period to generate sales revenue.

*Asset Turnover is the number of times the value of the assets has been obtained in Turnover (Sales).*

For example, an asset turnover ratio of 3 times would mean that, for every £1 of value in the assets, there had been £3 of sales revenue. Any improvement in asset turnover means that more sales revenue is being obtained per £1 value of the assets used. This can lead to improvements in the amount of profit and in ROCE, provided that the profit margin is not cut too much. We see below how asset turnover, operating profit margin and ROCE are linked.

Again there may be different definitions of the value of the assets, but we will use the non-current assets plus net current assets as above.

\[
\text{Asset Turnover} = \frac{\text{Turnover}}{\text{Non-current assets + Net current assets}}
\]

**WING LIMITED: ASSET TURNOVER**

In the Wing Limited Case Study (see opposite), if the Turnover for the year ended 31 March 20-3 was £1,165,500, then:

\[
\text{Asset Turnover} = \frac{£1,165,500}{£750,000 + £27,000} = 1.5 \text{ times}
\]

**ROCE and Operating Profit Margin**

There is an important link between ROCE, Asset Turnover and the Operating Profit margin (ie Operating Profit as a percentage of Sales):

\[
\text{ROCE} = \text{Operating profit margin} \times \text{Asset turnover}
\]

because

\[
\frac{\text{Operating Profit}}{\text{Non-current & net current assets}} = \frac{\text{Operating Profit}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Non-current & net current assets}}
\]

The sales (turnover) figure can be cancelled in the calculation of the right hand side of this equation (see lines).

The following diagram illustrates these connections:
It is easiest to see this using the figures from the Wing Limited Case Study:

\[
\frac{£233,100 \times 100\%}{£777,000} \times \frac{£1,165,500}{£777,000} = 20\% \times 1.5 = 30\%
\]

This relationship means that the ROCE can be increased either by improving the asset turnover or by increasing the Operating Profit Margin, or both. In other words, using the assets more effectively to generate sales or spending less of the sales revenue on operating costs can both improve ROCE.

Of course, if the asset turnover improves and the operating profit margin decreases, or vice versa, we need to investigate the effect on the ROCE. For Wing Limited, increasing the asset turnover to 2 times and keeping the operating profit margin at 20% gives:

\[
ROCE = 20\% \times 2 = 40\%.
\]

If the operating profit margin dropped to 14%, however, the ROCE would go below its previous level of 30%, because 14\% \times 2 = 28\%.

There is a further illustration of the calculation and interpretation of the ROCE and Asset Turnover in a Case Study later in this chapter (page 223).

**CALCULATION OF RATIOS: CURRENT ASSETS AND LIABILITIES**

An important aspect of the management of a business is the control of the current assets of inventory, receivables and cash.

Usually a certain level of inventory is necessary in order to avoid running out of inventory and losing production and sales. Keeping too much inventory, however, incurs additional costs of storage and means that the money tied up in inventory cannot be used for other purposes. Offering customers credit may boost sales, but it is important to collect the money from receivables within a reasonable time. Similarly, cash is needed on a day-to-day basis, but surplus cash should be invested in order to earn extra income. In each case a suitable balance must be achieved.
Control of the current liability of payables means taking advantage of the credit terms offered by suppliers, but making sure they can be paid on time.

The ratios usually calculated relating to the control of current assets and current liabilities are often referred to as ‘working capital ratios’.

Working Capital is the part of the capital of the business which circulates between the inventory, receivables, cash and trade payables. These current assets and liabilities are constantly changing, unlike the non-current assets which change only occasionally.

The circulation of working capital is often illustrated by the Cash Cycle:

The diagram of the cash cycle above represents how suppliers provide inventory. When inventory is sold it results in an increase in receivables. When receivables pay, the cash increases. When suppliers are paid, the cash moves along to the payables. This decreases the payables’ balance, but it will increase again when more inventory is provided . . . and so on.

**calculation of working capital ratios: the current ratio**

The current ratio compares the current assets with the current liabilities, to give an indication as to whether it should be possible to pay the current liabilities on time. We discuss below why it is important to consider how the balances of current assets and liabilities may be affected by the type of business, before drawing conclusions from the current ratio on its own.

\[
\text{The current ratio} = \frac{\text{current assets}}{\text{current liabilities}}
\]

This is kept as a ratio and written in the form $x:1$, where $x$ is the answer obtained above. It shows the **number of times that the current liabilities are covered by the current assets**.

It is often said that the current ratio should be about $2:1$, and this may be
appropriate for some organisations. However, in certain types of business, the current assets are not expected to be so high in relation to the current liabilities. In a supermarket, for example, the level of receivables will be low in comparison to payables, and inventories are not held for long periods.

The ratio of 2 : 1 can be used as a guide for organisations where inventory does not sell so quickly and where sales as well as purchases are likely to be on credit. In a given case, look for comparisons (with other time periods or other similar organisations) rather than judging a single figure against this guideline.

Remember that the Statement of Financial Position shows the current assets and current liabilities on a particular date. A single transaction may change them considerably. More cash may or may not come in before current liabilities fall due. The guideline ratio of 2:1 allows some leeway for these uncertainties of timing.

The current ratio is affected by the level of inventory included in the current assets. Inventory is usually considered to be the least ‘liquid’ of the current assets, because it is further from becoming cash in most businesses. In the diagram of the cash cycle above, it can be seen that trade receivables are one step nearer to cash. Cash itself is the most ‘liquid’ current asset, because it can be used immediately to pay the suppliers (trade payables). The measurement of ‘Liquidity’ is important, because it indicates the ability of the organisation to pay its current liabilities when they fall due.

### A LTD, B LTD, C LTD: CURRENT RATIO

A Ltd, B Ltd and C Ltd are similar companies, which have current assets as shown:

<table>
<thead>
<tr>
<th></th>
<th>A Ltd (£000)</th>
<th>B Ltd (£000)</th>
<th>C Ltd (£000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inventory</td>
<td>170</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>Receivables</td>
<td>90</td>
<td>140</td>
<td>110</td>
</tr>
<tr>
<td>Cash at bank and in hand</td>
<td>40</td>
<td>60</td>
<td>140</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>300</strong></td>
<td><strong>300</strong></td>
<td><strong>300</strong></td>
</tr>
</tbody>
</table>

Each of the three companies has current liabilities of £150,000.

**required**

Calculate the current ratio for each of the three companies and compare the liquidity position of the three companies.

**solution**

For each company,

- current assets = £300,000 and current liabilities = £150,000.
- Each of the three companies therefore has a current ratio of 2 : 1.
However, A Ltd has built up inventory to a high level and we cannot be sure that these can easily be sold, in order to convert them into receivables and then into cash. When the inventory is taken out, A Ltd’s current assets do not cover its current liabilities. B Ltd has a better liquidity position, provided the receivables are well controlled. C Ltd has the most liquid current assets and could pay most of its payables immediately.

**Calculation of Working Capital Ratios: The Quick Ratio**

The ratio which is usually used to measure liquidity compares the current assets *other than inventory* with the current liabilities, as follows:

\[
\text{Quick Ratio or Acid Test Ratio} = \frac{\text{current assets} - \text{inventory}}{\text{current liabilities}}
\]

This is based on the idea that inventory is the least liquid current asset. In some businesses such as supermarkets, however, inventory is very quickly turned into cash. As with all the ratios, the formula should not be applied as it stands without considering the particular situation.

As a guide, a level of 1 : 1 for the quick ratio is quoted, but a business with frequent cash inflows may operate satisfactorily on a lower quick ratio.

The aim is to check that the current liabilities are likely to be covered by cash or by current assets quickly convertible to cash.

Comparison with similar businesses gives more useful information, but it must be remembered that a single large transaction can alter the position significantly and the Statement of Financial Position may not be typical.

In most cases, the timing of cashflows in and out will be a vital factor. The quick ratio only indicates whether enough cash should ‘normally’ be available to pay the current liabilities when they fall due.

---

**A Ltd, B Ltd, C Ltd: Calculation of the Quick Ratio**

Referring to the data given for A Ltd, B Ltd and C Ltd in the last Case Study, we can calculate their quick ratios:

- **A Ltd:** \(\frac{300 - 170}{150} = 0.87\), giving a quick ratio of 0.87 : 1
- **B Ltd:** \(\frac{300 - 100}{150} = 1.33\), giving a quick ratio of 1.33 : 1
- **C Ltd:** \(\frac{300 - 50}{150} = 1.67\), giving a quick ratio of 1.67 : 1

These calculations illustrate the discussion of the liquidity of the companies above.
WORKING CAPITAL RATIOS LINKING THE INCOME STATEMENT & STATEMENT OF FINANCIAL POSITION

We have seen above that an organisation needs to keep levels of receivables, payables and inventory that are appropriate for the type of business. Ratios used to measure these levels are usually calculated in terms of numbers of days or months, to estimate:

- the average time taken to collect money from trade receivables
- the average time taken to pay trade payables
- the average time that goods or materials remain in inventory

The limitations of these estimates are discussed below. The usefulness of the ratios is in making comparisons and identifying trends. For example, if the average time taken to collect money from receivables decreases over several time periods, this suggests that control of receivables is improving.

**Receivable collection**

In the last Case Study, B Ltd has a high proportion of receivables and we noted that these should be well controlled. This means that the cash should be received within the time allowed by the normal credit terms for customers. It is possible to estimate the time being taken for customers to pay, by using the formula:

\[
\text{receivables' collection period} = \frac{\text{trade receivables}}{\text{credit sales}} \times 365 \text{ days}
\]

A separate figure for ‘Credit Sales’ may not be available, and Total Sales would have to be used, although this is not appropriate if cash sales are a significant part of the total. Notice that the formula gives an average time, based on the closing receivables.

If customers are normally allowed two months’ credit, for example, the receivables’ collection period should not be much above 60 days (remembering that the closing receivables figure may not be typical). As usual, comparison over time is more useful and may show whether control of receivables is improving or not.

When making comparisons between organisations, remember that some businesses allow customers longer credit periods in order to increase sales.

In effect, customers are borrowing from the business, because sending goods without receiving payment is like lending money. Conversely, suppliers are lending to the business. It makes sense, therefore, to try to collect the money back from customers more quickly than paying amounts due to suppliers. However, suppliers who are not paid on time may refuse to supply goods or services in future.
payables' payment period

The Payables' Payment Period can be estimated in a similar way to the Receivables' Collection Period, but here it is credit purchases which are relevant.

\[
\text{payables' payment period} = \frac{\text{trade payables}}{\text{credit purchases}} \times 365 \text{ days}
\]

A separate figure for Credit Purchases may not be available, in which case Total Purchases or (less appropriately) Cost of Sales may have to be used.

Again, the formula gives an average, based on the closing trade payables figure, which may not be typical.

inventory holding ratios

Another step in the Cash Cycle can be estimated in terms of days: this is the length of time taken for inventory to be sold, or the average age of inventory. The inventory figure used in the formula may be the average of the opening and closing inventory, which is calculated in the usual way for an average (mean) of two items, by adding them together and dividing the total by 2:

\[
\text{average inventory} = 0.5 \times (\text{opening inventory} + \text{closing inventory})
\]

If the opening inventory is not known, the closing inventory figure is used.

\[
\text{average age of inventory} = \frac{\text{average inventory}}{\text{cost of sales}} \times 365 \text{ days}
\]

or,

\[
\text{average age of inventory} = \frac{\text{closing inventory}}{\text{cost of sales}} \times 365 \text{ days}
\]

It can be argued that the closing inventory gives an equally good estimate. The average based on the opening and closing inventory may not be a fairer reflection, especially if the trade is seasonal. (See the discussion below.)

Note the correspondence between the pairs of figures used in the last three ratios:

- trade receivables are related to credit sales
- trade payables are related to credit purchases
- inventory is related to cost of sales

As an alternative to calculating the average age of inventory, we can look at the number of times per year that the inventory is ‘turned over’ or sold. This is called inventory turnover or inventory turn and is calculated as:

\[
\text{Inventory Turnover} = \frac{\text{cost of sales}}{\text{average inventory}} \quad \text{or} \quad \frac{\text{cost of sales}}{\text{closing inventory}}
\]
The result of this calculation gives the **Inventory Turnover as a ‘number of times per year’**.

A higher inventory turnover indicates that inventory is moving more quickly, and this corresponds to a lower average age of inventory. The speed with which inventory should be sold depends on the type of business. For example, fresh fruit must be sold within a few days, whereas non-perishable goods may be kept for longer periods. In some businesses, such as manufacturing ice cream, toys or fireworks, the level of inventories will vary considerably with the seasons. The statement of financial position date may happen to coincide with particularly high (or low) inventories and the inventory turnover will appear to be very slow (or fast) moving. Once more, we need more information about the business to be able to comment further.

**Ratios: The Whole Picture**

We now look at a Case Study which incorporates a number of the ratios described so far in this Chapter. It shows how ratios can be used in business decision making.

---

**TUBS AND POTS LIMITED: RATIO ANALYSIS**

Tubs and Pots Ltd supply plant holders to local garden centres. The company has now been offered a contract to supply a national chain of home and garden superstores. The following information shows extracts from the Statement of Financial Position and the Income Statement as forecast for the next year:

- on the basis of continuing with the current local trade (‘Current Trade’)
- on the basis of acceptance of the contract (‘With Contract’)

<table>
<thead>
<tr>
<th></th>
<th>Current Trade</th>
<th>With Contract</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Current Assets:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inventory</td>
<td>6,000</td>
<td>20,000</td>
</tr>
<tr>
<td>Trade Receivables</td>
<td>14,000</td>
<td>52,000</td>
</tr>
<tr>
<td>Cash at Bank</td>
<td>4,000</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>24,000</td>
<td>72,000</td>
</tr>
<tr>
<td><strong>Current Liabilities</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trade Payables</td>
<td>12,000</td>
<td>70,000</td>
</tr>
<tr>
<td>Bank Overdraft</td>
<td></td>
<td>7,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>12,000</td>
<td>77,000</td>
</tr>
<tr>
<td>Sales (all Credit Sales)</td>
<td>70,000</td>
<td>204,000</td>
</tr>
<tr>
<td>Opening inventory</td>
<td>4,000</td>
<td>4,000</td>
</tr>
<tr>
<td>Purchases (all Credit Purchases)</td>
<td>40,000</td>
<td>140,000</td>
</tr>
<tr>
<td><strong>Less: Closing inventory</strong></td>
<td>(6,000)</td>
<td>(20,000)</td>
</tr>
<tr>
<td>Cost of Sales</td>
<td>38,000</td>
<td>124,000</td>
</tr>
</tbody>
</table>
**required:**

**Task 1**
Using the above information, calculate the following ratios for the current trade and for the acceptance of the contract:

1. **Current Ratio**
2. **Quick Ratio**
3. **Receivables’ Collection Period**
4. **Payables’ Payment Period**
5. **Average age of inventory (using the closing inventory)**
6. **Gross Profit**
7. **Gross Profit percentage (on Sales)**

**Task 2**
Identify the changes which will take place in the business of Tubs and Pots Ltd if the contract is accepted and comment on the findings.

**solution**

**Task 1: calculation of ratios**
Check that you can carry out these calculations, before looking at the workings at the end of the solution.

<table>
<thead>
<tr>
<th></th>
<th>current trade</th>
<th>with contract</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Current Ratio</td>
<td>2.0 : 1.0</td>
<td>0.9 : 1.0</td>
</tr>
<tr>
<td>2 Quick Ratio</td>
<td>1.5 : 1.0</td>
<td>0.7 : 1.0</td>
</tr>
<tr>
<td>3 Receivables’ Collection Period</td>
<td>73 days</td>
<td>93 days</td>
</tr>
<tr>
<td>4 Payables’ Payment Period</td>
<td>110 days</td>
<td>183 days</td>
</tr>
<tr>
<td>5 Average age of inventory</td>
<td>58 days</td>
<td>59 days</td>
</tr>
<tr>
<td>6 Gross Profit</td>
<td>£32,000</td>
<td>£80,000</td>
</tr>
<tr>
<td>7 Gross Profit percentage (on Sales)</td>
<td>45.7%</td>
<td>39.2%</td>
</tr>
</tbody>
</table>

**Task 2: analysis of ratios**
The forecasts show that, with the contract, sales would increase to nearly three times the current level and the management of the company would need to consider whether such expansion within one year is feasible. There would also be higher inventory levels and the company would go into an overdraft situation. Building up inventories means that purchases are increased to more than three times the current level, which could have contributed to the need for an overdraft. Another reason for the overdraft could be purchases of non-current assets.

The indicators we have calculated show that both the current and quick ratios would be adversely affected by the contract, such that the current liabilities are not covered by the current assets. The Receivables’ Collection Period increases to about 3
months with the contract, and the Payables’ Payment Period to about 6 months. The adjustment to inventory levels would keep the average age of inventory about the same. With the contract, there is a decrease in the Gross Profit Margin (Gross Profit as a percentage of Sales).

The managers of Tubs and Pots Ltd need to investigate the risks attached to acceptance of this contract. If non-current assets are purchased, longer-term finance would be more suitable than an overdraft. They also need more working capital to avoid the problems with liquidity. The increased collection period indicates that the national chain would take longer to pay for the goods than the current customers. It appears risky to plan for a 6 month payables’ payment period unless such terms have been agreed with the suppliers.

It would be important to consider the length and security of the contract. The forecasts given are for one year only and show that Gross Profit Margin would decrease. This could be caused by the national chain insisting on paying lower prices for the goods. Over a number of years it may be possible to improve on this, by reducing costs. Expansion on this scale would not be worthwhile unless the contract was secure for the long term. The management of Tubs and Pots Ltd should also consider the effect on their current trade with their local customers.

<table>
<thead>
<tr>
<th>Workings</th>
<th>current trade</th>
<th>with contract</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Current assets</td>
<td>£24,000</td>
<td>£72,000</td>
</tr>
<tr>
<td>Current liabilities</td>
<td>£12,000</td>
<td>£77,000</td>
</tr>
<tr>
<td>2 Current assets – Inventory</td>
<td>£18,000</td>
<td>£52,000</td>
</tr>
<tr>
<td>Current liabilities</td>
<td>£12,000</td>
<td>£77,000</td>
</tr>
<tr>
<td>3 Receivables x 365</td>
<td>£14,000 x 365</td>
<td>£52,000 x 365</td>
</tr>
<tr>
<td>Credit sales</td>
<td>£70,000</td>
<td>£204,000</td>
</tr>
<tr>
<td>4 Payables x 365</td>
<td>£12,000 x 365</td>
<td>£70,000 x 365</td>
</tr>
<tr>
<td>Credit purchases</td>
<td>£40,000</td>
<td>£140,000</td>
</tr>
<tr>
<td>5 Closing inventory x 365</td>
<td>£6,000 x 365</td>
<td>£20,000 x 365</td>
</tr>
<tr>
<td>Cost of sales</td>
<td>£38,000</td>
<td>£124,000</td>
</tr>
<tr>
<td>6 Sales – Cost of sales</td>
<td>£70,000 – £38,000</td>
<td>£204,000 – £124,000</td>
</tr>
<tr>
<td>7 Gross Profit x 100%</td>
<td>£32,000 x 100%</td>
<td>£80,000 x 100%</td>
</tr>
<tr>
<td>Sales</td>
<td>£70,000</td>
<td>£204,000</td>
</tr>
</tbody>
</table>

**FINANCIAL STRUCTURE RATIOS**

The final group of ratios that we need to examine in this chapter relate to the financial structure of a business. This is about the way that the business is funded – how much of the capital employed is funded by the ‘equity’ of the business and how much is funded by loans (or similar) from outside the business. The equity of a limited company is the value owned by the shareholders.
Equity is shown in the statement of financial position (balance sheet) as the total of:

- ordinary share capital (the nominal value of the ordinary shares), plus
- the accumulated profit and other reserves that are owned by the ordinary shareholders

On some statements this forms a sub-total shown as equity, but on others you may need to calculate it yourself.

Some businesses may be funded entirely by equity, and this provides a very safe form of finance. All the profits generated will be owned by the shareholders, and they don’t have to share it with anyone else. If profits are good then dividends can be paid, but there is no compulsion to do so.

Other businesses may obtain some of their finance from short term and/or long term loans. While such loans may provide a cheap form of funding, interest will need to be paid regularly whether profits are made or not. Therefore too much finance in the form of loans can be a risky strategy, especially when profits are uncertain. A large amount of preference shares (whose holders are entitled to dividends regardless of profit) can also be risky for the same reason. The term ‘fixed interest capital’ is sometimes used to encompass both loans and preference shares.

There are two ratios that help us to examine the financial structure of businesses.

If we think of the sources of finance in the form of a simple pie chart, this will help us understand both these ratios.

Suppose the capital employed by a company is £1m, made up of loans of £0.4m and equity of £0.6m, as follows:


gearing ratio

This ratio (calculated as a percentage) shows how much of the total funding comes from sources that demand regular payments of interest or dividends.

It is calculated as: \( \frac{(\text{Loans + Preference Share Capital}) \times 100}{(\text{Loans + Preference Share Capital + Equity})} \)

The higher the percentage, the higher the ‘gearing’ is said to be. A high gearing ratio will also mean that a low proportion of the capital employed is invested by the ordinary shareholders.

The gearing ratio based on the example above would be

\[
\frac{\£0.4m \times 100}{\£1.0m} = 40\%
\]

This means that 40% of the finance comes from loans or preference shares (although there are no preference shares in this example).


gearing (debt to equity) ratio

This ratio uses the same logic, but compares the ‘fixed interest capital’ directly to the equity instead of the total capital employed. It is also calculated as a percentage.

It is calculated as: \( \frac{(\text{Loans + Preference Share Capital}) \times 100}{(\text{Ordinary Share Capital + Reserves})} \)

The debt to equity ratio based on the above example would be

\[
\frac{\£0.4m \times 100}{\£0.6m} = 67\%
\]

The debt to equity ratio will always result in a higher percentage than the gearing ratio when based on the same data.

For both these ratios, the higher the percentage the more fixed interest capital is being used. While many businesses will want to use some finance of this type, if the amount becomes excessive then it will make the structure very risky. This is because if operating profits fell below a certain level then the company would find it difficult to pay the large amounts of interest, and this could ultimately result in the collapse of the company.

We will now look at a long Case Study which gives practice in calculating and interpreting all the ratios. In assessments, it is usual for the tasks to concentrate on one aspect of performance, such as profitability or liquidity.
BAMBERDALE PLC:
COMPREHENSIVE RATIO ANALYSIS

Bamberdale plc is a large manufacturing company in the chemicals industry producing a range of different products. The following information is available for the years ended 30 September 20-2 and 20-3. (Note as before that the earlier year is shown on the right).

The term ‘Debentures’ under long-term liabilities in this example refers to long term loans, (which are often secured on the assets in a similar way to a domestic mortgage). For ease of working the information is shown in a simplified format.

Bamberdale plc Statement of Profit or Loss for the year ended 30 September

<table>
<thead>
<tr>
<th></th>
<th>20-3</th>
<th>20-2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>£m</td>
<td>£m</td>
</tr>
<tr>
<td>Turnover</td>
<td>2,660</td>
<td>2,200</td>
</tr>
<tr>
<td>Opening Inventory</td>
<td>400</td>
<td>277</td>
</tr>
<tr>
<td>Purchases</td>
<td>1,945</td>
<td>1,723</td>
</tr>
<tr>
<td>Less: Closing Inventory</td>
<td>350</td>
<td>400</td>
</tr>
<tr>
<td>Cost of Sales</td>
<td>1,995</td>
<td>1,600</td>
</tr>
<tr>
<td>Gross Profit</td>
<td>665</td>
<td>600</td>
</tr>
<tr>
<td>Selling and Distribution</td>
<td>120</td>
<td>105</td>
</tr>
<tr>
<td>Administration</td>
<td>240</td>
<td>360</td>
</tr>
<tr>
<td>Operating Profit</td>
<td>305</td>
<td>285</td>
</tr>
<tr>
<td>Interest charges</td>
<td>25</td>
<td>20</td>
</tr>
<tr>
<td>Profit before taxation</td>
<td>280</td>
<td>265</td>
</tr>
<tr>
<td>Taxation</td>
<td>84</td>
<td>62</td>
</tr>
<tr>
<td>Profit after taxation</td>
<td>196</td>
<td>203</td>
</tr>
</tbody>
</table>
Bamberdale plc Statement of Financial Position as at 30 September:

<table>
<thead>
<tr>
<th></th>
<th>20-3</th>
<th>£m</th>
<th>20-2</th>
<th>£m</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-current Assets at Cost</td>
<td>1,370</td>
<td></td>
<td>763</td>
<td></td>
</tr>
<tr>
<td>Provision for Depreciation</td>
<td>770</td>
<td>600</td>
<td>500</td>
<td>263</td>
</tr>
<tr>
<td>Current Assets:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inventory</td>
<td>350</td>
<td></td>
<td>400</td>
<td></td>
</tr>
<tr>
<td>Receivables</td>
<td>200</td>
<td></td>
<td>210</td>
<td></td>
</tr>
<tr>
<td>Cash at Bank</td>
<td>26</td>
<td></td>
<td>97</td>
<td></td>
</tr>
<tr>
<td></td>
<td>576</td>
<td></td>
<td>707</td>
<td></td>
</tr>
<tr>
<td>Current Liabilities:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trade Payables</td>
<td>236</td>
<td></td>
<td>224</td>
<td></td>
</tr>
<tr>
<td>Short Term Loans</td>
<td>84</td>
<td></td>
<td>62</td>
<td></td>
</tr>
<tr>
<td></td>
<td>320</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net current assets</td>
<td>256</td>
<td></td>
<td>421</td>
<td></td>
</tr>
<tr>
<td>Long term liabilities:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Debentures</td>
<td>200</td>
<td></td>
<td>160</td>
<td></td>
</tr>
<tr>
<td></td>
<td>656</td>
<td></td>
<td>524</td>
<td></td>
</tr>
<tr>
<td>Financed by:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ordinary shares issued and fully paid</td>
<td>300</td>
<td></td>
<td>300</td>
<td></td>
</tr>
<tr>
<td>Retained Profits (reserves)</td>
<td>356</td>
<td></td>
<td>224</td>
<td></td>
</tr>
<tr>
<td></td>
<td>656</td>
<td></td>
<td>524</td>
<td></td>
</tr>
</tbody>
</table>

**required**

Carry out an analysis of the ratios studied in this chapter (listed below) for Bamberdale plc and comment on the results.

The ratios to be analysed are:

1. Gross Profit Margin
2. Operating Profit %
3. Selling and Distribution % (of Sales)
4. Administration % (of Sales)
5. ROCE
6. Asset Turnover
7. Current Ratio
8. Acid Test Ratio
9. Receivables’ Collection Period
10. Payables’ Payment Period
11. Average age of inventory (use average inventory)
12. Gearing ratio
13. Debt to equity ratio

**solution**

The following indicators are calculated from the information given, using the formulas in this chapter. (Check that you can carry out these calculations, before looking at the workings at the end of the solution).
### Ratio Analysis

<table>
<thead>
<tr>
<th>Description</th>
<th>30 Sept 20-3</th>
<th>30 Sept 20-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross Profit Margin</td>
<td>25.0%</td>
<td>27.3%</td>
</tr>
<tr>
<td>Operating Profit %</td>
<td>11.5%</td>
<td>13.0%</td>
</tr>
<tr>
<td>Selling and Distribution % (of Sales)</td>
<td>4.5%</td>
<td>4.8%</td>
</tr>
<tr>
<td>Administration % (of Sales)</td>
<td>9.0%</td>
<td>9.5%</td>
</tr>
<tr>
<td>ROCE</td>
<td>35.6%</td>
<td>41.7%</td>
</tr>
<tr>
<td>Asset Turnover</td>
<td>3.11 times</td>
<td>3.22 times</td>
</tr>
<tr>
<td>Current Ratio</td>
<td>1.8 : 1</td>
<td>2.5 : 1</td>
</tr>
<tr>
<td>Acid Test Ratio</td>
<td>0.7 : 1</td>
<td>1.1 : 1</td>
</tr>
<tr>
<td>Receivables’ Collection Period</td>
<td>27 days</td>
<td>35 days</td>
</tr>
<tr>
<td>Payables’ Payment Period</td>
<td>44 days</td>
<td>47 days</td>
</tr>
<tr>
<td>Average age of inventory</td>
<td>69 days</td>
<td>77 days</td>
</tr>
<tr>
<td>Gearing ratio</td>
<td>30.2%</td>
<td>29.8%</td>
</tr>
<tr>
<td>Debt to equity ratio</td>
<td>43.3%</td>
<td>42.4%</td>
</tr>
</tbody>
</table>

### Comments

We can look first at the original figures, before considering the ratios. It is clear that, in the year ended 30 September 20-3, **Turnover** has increased, and so have the **Gross Profit** and **Operating Profit** figures. On the Statement of Financial Position, we can see that non-current assets have been purchased during the year, and there are also additional **long term loans** (debentures). Current assets have decreased, particularly the **Cash at Bank**. It seems that the extra loans have partly financed the new non-current assets, but cash has also been used for this. These assets have helped to generate higher sales and this has resulted in higher profits. However, the ratios will show how well the company has used its assets in comparison to the previous year, and what percentage of the higher sales has been translated into profits.

### Ratio Analysis

1. **Gross profit margin** has decreased, which suggests that selling prices have been reduced (this could result in more demand for the products and therefore higher turnover). Alternatively, purchase costs may have gone up, or both.

2, 3 & 4 The **expenses** have increased approximately in line with turnover, being at similar percentage levels. Together with the lower gross profit margin, this has resulted in a decrease in the **operating profit percentage**. The increase in the amount of **administration** expenses could be investigated, as it might be expected that the majority of these costs would be fixed.

5. **ROCE** has decreased from 41.7% to 35.6%. This is due to the fact that the **capital employed** has increased. (The **operating profit** has also increased, but because we are dividing it by a much larger number, the resulting percentage has gone down). We saw that we can look at the capital employed from the point of view of the non-current and net current assets being used or the financing of those assets. The non-current assets being used in the year ended 30 September 20-2 were probably older and therefore the accumulated depreciation had
considerably reduced their value on the statement of financial position. In the following year, a significant factor is that there are new non-current assets included on the Statement of Financial Position as at 30 September. There is no information as to whether these were acquired early or late in the year, which would make a difference to the amount of profit they could generate.

Looking at the increase in capital employed from the finance point of view, it is due to the £40m increase in debentures and the £132m increase in retained profit for the year ended 30 September 20-3.

6 The asset turnover has decreased slightly, but considering the effect of the additional non-current assets as discussed above, it seems that the company has continued to use its assets to generate sales at a similar level.

7 & 8 The current and acid test ratios have both deteriorated and may cause concern at these levels. The main reasons are the decrease in cash and the increase in current liabilities, particularly tax and trade payables. Some of the cash may have been used for the purchase of non-current assets. Cash will be required to pay the tax and dividends when they fall due and this could prove to be a problem.

9, 10 & 11 There has been an improvement in the collection of receivables and inventory is being turned over slightly more quickly. The payment period for trade payables has changed only slightly and the net effect is that the circulation of working capital has been speeded up.

12 & 13 The gearing ratio and the debt to equity ratio have both remained fairly static, because the additional loans have been broadly matched by additional equity through retained profits. These levels are not high enough to increase risk, and this is confirmed by noting that the interest is a very small proportion of operating profit.

More general discussion of this case study could include some of the following points:

- In general, the year ended 30 September 20-3 has been one of expansion for Bamberdale plc.
- Sales have increased at a rate which corresponds with the expansion, and therefore to reverse the decline in profitability, opportunities for cost reduction should be investigated.
- It will be important to review the ROCE in the next year, ending 30 September 20-4, to check that it does not continue a downward trend. The current year’s decrease can be explained by the effect of increased capital employed and next year should see an improvement if the new assets generate sufficient profits.
- The main problem at 30 September 20-3 is liquidity. At that date the company appears to need more cash. The improvement in collection of receivables is helpful, but the company may still have difficulty in paying its suppliers.
<table>
<thead>
<tr>
<th>Workings (£m)</th>
<th>30 Sept 20-3</th>
<th>30 Sept 20-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Gross Profit x 100% Sales</td>
<td>665 x 100% 2660</td>
<td>600 x 100% 2200</td>
</tr>
<tr>
<td>2 Operating profit x 100% Sales</td>
<td>305 x 100% 2660</td>
<td>285 x 100% 2200</td>
</tr>
<tr>
<td>3 Selling &amp; Dist. x 100% Sales</td>
<td>120 x 100% 2660</td>
<td>105 x 100% 2200</td>
</tr>
<tr>
<td>4 Administration x 100% Sales</td>
<td>240 x 100% 2660</td>
<td>210 x 100% 2200</td>
</tr>
<tr>
<td>5 Operating profit x 100% Capital employed</td>
<td>305 x 100% 656 + 200</td>
<td>285 x 100% 524 + 160</td>
</tr>
<tr>
<td>6 Turnover Non-current &amp; net current assets</td>
<td>2660 600 + 256</td>
<td>2200 263 + 421</td>
</tr>
<tr>
<td>7 Current assets</td>
<td>576</td>
<td>707</td>
</tr>
<tr>
<td>Current liabilities</td>
<td>320</td>
<td>286</td>
</tr>
<tr>
<td>8 Current assets – Inventory Current liabilities</td>
<td>226 320</td>
<td>307 286</td>
</tr>
<tr>
<td>9 Receivables x 365 Credit sales</td>
<td>200 x 365 2660</td>
<td>210 x 365 2200</td>
</tr>
<tr>
<td>10 Trade Payables x 365 Credit purchases</td>
<td>236 x 365 1945</td>
<td>224 x 365 1723</td>
</tr>
<tr>
<td>11 Average inventory x 365 Cost of sales</td>
<td>0.5 x (400+350) x 365 1995</td>
<td>0.5 x (277+400) x 365 1600</td>
</tr>
<tr>
<td>12 Loans x 100 (Loans + Equity)</td>
<td>(200 + 84) x 100% (200 + 84 + 656)</td>
<td>(160 + 62) x 100% (160 + 62 + 524)</td>
</tr>
<tr>
<td>13 Loans x 100 Equity</td>
<td>(200 + 84) x 100% 656</td>
<td>(160 + 62) x 100% 524</td>
</tr>
</tbody>
</table>

NOTES ON CALCULATION AND INTERPRETATION OF RATIOS

behaviour of ratios

The comments on the last Case Study are very detailed, but they are based on a few basic properties of ratios. It is important to be able to analyse the ratios by this method, as shown on the next page.
A ratio or percentage is calculated from two figures and shows how one amount relates to the other. There may be some other link between the two figures, for example:

**Gross Profit = Sales – Cost of Sales**

The gross profit margin shows what percentage of the sales is left after cost of sales is taken out. If the gross profit margin decreases, it means that the cost of sales is taking out a bigger part of the sales and therefore we conclude that either selling prices have been reduced or costs of sales have increased or both.

Each percentage is calculated by dividing one figure by another. Using the usual terms for fractions we could write this as:

\[
\text{Numerator} \times \frac{100\%}{\text{Denominator}}
\]

The percentage will **increase**:

*either if the numerator increases* relative to the denominator
*or if the denominator decreases* relative to the numerator.

The percentage will **decrease**:

*either if the numerator decreases* relative to the denominator
*or if the denominator increases* relative to the numerator.

In the Bamberdale Case Study, the ROCE decreased from

\[
\frac{285 \times 100\%}{684} = 41.7\% \quad \text{to} \quad \frac{305 \times 100\%}{856} = 35.6\%
\]

Although the numerator has increased, the much greater increase in the denominator has had the dominant effect and this is what has been highlighted in the discussion. If you find making comments on ratios difficult, try to see how this method applies to the other ratios in the Bamberdale Case Study.

Further examples of how percentages change:

- \[
\frac{120 \times 100\%}{200} = 60\% \quad \text{and} \quad \frac{130 \times 100\%}{200} = 65\%
\]
  
  Here the numerator (on top) increases, the denominator (on the bottom) is unchanged, and the percentage increases.

- \[
\frac{120 \times 100\%}{200} = 60\% \quad \text{and} \quad \frac{114 \times 100\%}{180} = 63\%
\]
  
  All figures decrease, but the decrease in the denominator dominates, causing the percentage to increase.
In an assessment on this unit, it is not likely that you would be expected to calculate and comment in detail on all the ratios as in the last Case Study. This is a comprehensive example to practise all aspects, but whichever aspect is examined, the basic method of interpretation can be used.

HINTS ON USING FORMULAS

In assessment tasks, you may be given information including, for example, a company’s statement of financial position and have to answer such questions as:

- ‘what would the turnover have been if the asset turnover increased to 2 times?’
- ‘what would the operating profit have been if the ROCE reached a target level of 30%?’

We show below the method for carrying out these tasks, which are simple cases of ‘What if?’ analysis. This means calculating what will happen if certain conditions are satisfied.

In Chapter 8, there are more complex Case Studies illustrating ‘What if?’ analysis, where a number of conditions have to be satisfied at the same time.

In assessment tasks involving questions like those above, you often have to use two items of data to calculate one figure which you need. With ratio analysis, such calculations may involve using a given ratio and one of its parts to calculate the other part.

A general method to use for such questions is to write down the formula and insert the figures you are given. You should then be able to deduce the required amount.

Note: If you are not used to using equations, remember that you can move figures from one side of the ‘=’ sign to the other, provided that you change

- addition into subtraction and vice versa
- division into multiplication and vice versa.

For example, in the Bamberdale Case Study, we could ask ‘What would the Operating Profit have been in the year ended 30 September 20-3 if the ROCE had remained at 41.7%?’

First, write down the formula:

\[
ROCE = \frac{\text{operating profit} \times 100\%}{\text{capital employed}}
\]
Then insert the known figures:

\[ \frac{41.7\%}{\text{operating profit}} \times 100\% = \frac{\text{£856m}}{} \]

Then, moving £856m to the top left-hand side of the equation changes division to multiplication. The required Operating Profit is therefore:

\[ 41.7\% \times \text{£856m} = \text{£356.95m} \]

Your answer can always be checked by seeing that it satisfies the required condition. To check this answer: \( \text{£356.95m ÷ £856m \times 100\% = 41.7\%} \).

**practical examples**

See if you can work out the following:

1. If the Turnover is £98,000, what Gross Profit is required to give a Gross Profit Margin of 40%?
2. If the Operating Profit is £45,000 and this is 25% of Turnover, what is the Turnover?
3. If the Current Ratio is 2.2 : 1, and the Current Assets total £88,000, what is the total of the current liabilities?

**solutions to examples**

1. Gross Profit Margin = Gross Profit x 100% = 40% £98,000
   
   Therefore Gross Profit = 40% x £98,000 = £39,200.

2. Operating Profit = £45,000 = 25% x Turnover
   
   Therefore Turnover = £45,000 x 100 ÷ 25 = £180,000

3. Current Assets Current liabilities = 2.2
   
   £88,000 Current liabilities = 2.2
   
   Therefore £88,000 ÷ 2.2 = Current Liabilities = £40,000.

(In each case the answer can be checked).

**LIMITATIONS OF RATIO ANALYSIS**

In the introduction to this section, it was emphasised that one set of ratios alone does not give very useful information. Ratios for other time periods or other organisations are useful for comparison, as are target ratios.

The principle of **comparing like with like** should be applied in ratio analysis, but this is not always straightforward. Some of the ratios can be defined in different ways, so the particular definition used should be made clear. Even so, detailed information may not be given, for example to split sales into cash sales and credit sales.
When using the published accounts of companies, it is not possible to guarantee that we are comparing like with like, as different policies (including those regarding depreciation, inventory valuation and goodwill, for example) will affect the results.

For any organisation, there is also the possibility that the Statement of Financial Position does not show a typical position, intentionally or otherwise. A single transaction the next day may make it look quite different. The Statement of Financial Position reflects the conditions for a particular season of the year and in trades with seasonal variations, this can make a big difference to the ratios.

Discussion of a particular case may include looking for ways in which the ratios could have been distorted. For example, high levels of spending on research, training or marketing may reduce profits in one period, but bring much greater benefits in a later period. The reverse is also true: cutting these costs may improve the profit ratios in the short term, but in the long term sales and profits would suffer.

When making comparisons over different time periods, the ratios are based on historical costs as shown in the accounts. If there has been inflation during the time periods, a better comparison can be made by making adjustments for this before calculating the ratios. (See Chapter 7, page 237).

Before drawing firm conclusions from ratio analysis, these limitations should be borne in mind. However, the analysis can give useful information, particularly in showing how items in the financial statements relate to each other and in identifying trends. In the next chapter, we consider other types of performance indicator, but again their usefulness depends on comparability.

- Numerical (quantitative) data can be used when measuring performance: this data may be in terms of money or other units.
- Opinions and judgements which are not numerical (qualitative) are also important when measuring performance.
- Comparisons are more useful than single sets of data, provided the data being compared has been prepared on a consistent basis, to compare like with like. Comparison may be made with standards, budgets or targets; with other periods of time; with other similar organisations.
- The methods and techniques used for performance measurement include Ratio Analysis – i.e. the calculation of percentages and ratios from the financial accounts.
The techniques discussed in this chapter can give useful information, provided that the limitations of ratio analysis are kept in mind.

The next chapter continues the study of performance measurement, with examples of alternative forms of performance indicator and consideration of methods applicable to various types of organisation.

### Key Terms

- **Performance indicator**: an individual measurement used to evaluate the performance of an organisation or part of an organisation.
- **Benchmarking**: the setting of standards or targets for the activities of an organisation.
- **Trend**: the underlying behaviour of a series of figures over time.
- **Comparability**: the principle of comparing like with like, that is comparing data prepared on consistent bases.
- **Quantitative data**: data which can be measured in numerical terms, including financial and non-financial data.
- **Qualitative data**: data which cannot be measured in numerical terms, such as opinions and attitudes.
- **Ratio analysis**: the analysis of the financial accounts of an organisation by calculating ratios and percentages.

### Financial Ratios

- **Gross profit margin (percentage)**: \( \frac{\text{Gross Profit}}{\text{Sales}} \times 100\% \)
- **Net profit margin**: \( \frac{\text{Net Profit}}{\text{Sales}} \times 100\% \)
- **Operating profit margin**: \( \frac{\text{Operating Profit}}{\text{Sales}} \times 100\% \)
- **ROCE (return on capital employed)**: \( \frac{\text{Operating profit}}{\text{Non-current assets} + \text{net current assets}} \times 100\% \)
- **Asset turnover (number of times)**: \( \frac{\text{Turnover}}{\text{Non-current assets} + \text{net current assets}} \)
- **Current ratio**: \( \frac{\text{Current assets}}{\text{Current liabilities}} \)
### Activities

6.1 Explain briefly what is meant by the following terms relating to performance measurement:

(a) Consistency
(b) Benchmarking
(c) Qualitative data

6.2 The following information relates to Raven Ltd for a given period:

Sales revenue = £500,000,
Gross profit margin = 24%,
Operating profit = £50,000

Which of the following four statements is correct for Raven Ltd for the given period?

(a) Cost of sales = £620,000, Expenses = £170,000
(b) Cost of sales = £70,000, Expenses = £380,000
(c) Cost of sales = £380,000, Expenses = £70,000
(d) Cost of sales = £330,000, Expenses = £170,000

6.3 The following income statements relate to a small retail shop selling stationery and gifts:

Toni Jones Income Statements for the year ended:

<table>
<thead>
<tr>
<th></th>
<th>31 May 20-3</th>
<th>31 May 20-2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>£000s</td>
<td>£000s</td>
</tr>
<tr>
<td>Sales</td>
<td>525</td>
<td>450</td>
</tr>
<tr>
<td>Less: Cost of Sales</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Opening inventory</td>
<td>50</td>
<td>30</td>
</tr>
<tr>
<td>Purchases</td>
<td>408</td>
<td>335</td>
</tr>
<tr>
<td>Less: Closing Inventory</td>
<td>(80)</td>
<td>378</td>
</tr>
<tr>
<td>Gross Profit</td>
<td>147</td>
<td>135</td>
</tr>
<tr>
<td>Less: Expenses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Administration</td>
<td>25</td>
<td>24</td>
</tr>
<tr>
<td>Selling</td>
<td>38</td>
<td>63</td>
</tr>
<tr>
<td>Net Profit</td>
<td>84</td>
<td>81</td>
</tr>
</tbody>
</table>

Required

For Toni Jones for the given years, calculate:

(a) Gross Profit percentage
(b) Net Profit percentage
(c) each expense as a percentage of Sales

Comment briefly on the original figures and on the percentages calculated.

6.4 Ace plc is an electrical goods manufacturing group and the information below relates to one of its subsidiaries, Jack Limited.

Jack Ltd: Summary Income Statement for the year ended 30 June 20-3

<table>
<thead>
<tr>
<th></th>
<th>£000s</th>
<th>£000s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turnover</td>
<td>2,500</td>
<td></td>
</tr>
<tr>
<td>Less: Cost of Sales</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Opening Inventory</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Cost of Production</td>
<td>650</td>
<td></td>
</tr>
<tr>
<td>Less: Closing Inventory</td>
<td>(90)</td>
<td>590</td>
</tr>
<tr>
<td>Gross Profit</td>
<td></td>
<td>1,910</td>
</tr>
<tr>
<td>Administration</td>
<td>780</td>
<td></td>
</tr>
<tr>
<td>Selling and Distribution</td>
<td>505</td>
<td>1,285</td>
</tr>
<tr>
<td>Operating Profit</td>
<td></td>
<td>625</td>
</tr>
</tbody>
</table>
Jack Ltd: extract from Statement of Financial Position as at 30 June 20-3:

<table>
<thead>
<tr>
<th>Non-current assets</th>
<th>£000s</th>
<th>£000s</th>
<th>£000s</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Land</td>
<td>Buildings</td>
<td>Plant</td>
</tr>
<tr>
<td>At cost</td>
<td>900</td>
<td>2,000</td>
<td>2,900</td>
</tr>
<tr>
<td>Additions</td>
<td>-</td>
<td>1,000</td>
<td>1,000</td>
</tr>
<tr>
<td></td>
<td>900</td>
<td>3,000</td>
<td>3,900</td>
</tr>
<tr>
<td>Accumulated depreciation</td>
<td>-</td>
<td>1,380</td>
<td>1,380</td>
</tr>
<tr>
<td></td>
<td>900</td>
<td>1,620</td>
<td>2,520</td>
</tr>
</tbody>
</table>

Current Assets:
- Raw materials inventory: 10
- Finished goods inventory: 90
- Receivables: 160
- Cash at bank: 110
- Total current assets: 370

Current liabilities: (50) 320

Net Assets: 2,840

Required

(a) Calculate the following ratios for Subsidiary Jack Ltd for the financial year
   - Gross Profit margin
   - Operating profit margin
   - Return on Capital Employed (ROCE)
   - Asset turnover
   - The average age of receivables
   - The average age of finished goods inventory (using average inventory)

(b) The directors of Ace plc consider that ROCE and Asset Turnover are important performance measures, and Subsidiary Jack Ltd has failed to meet the group targets, which are:

   Target ROCE: 26%
   Target Asset turnover: 1.5 times

Identify one factor which may have affected the performance of Subsidiary Jack Ltd in relation to these targets in the year ended 30 June 20-3.

(c) Calculate the Turnover which Subsidiary Jack Ltd would have obtained if it had achieved the target level of Asset turnover, using the Statement of Financial Position as given.

(d) Assuming Subsidiary Jack Ltd maintained the same operating profit margin, calculate the ROCE which would have resulted from the Turnover calculated in (c) above. Assume that the Capital Employed is unchanged for Jack Ltd, as it is controlled at that level by Ace plc.

6.5 Using formulas, calculate the answers to the following:

(a) If the Gross Profit Margin is 35% and the Turnover is £200,000, what is the Cost of Sales?

(b) If the Inventory is £4,200, the Current Liabilities total £7,000, and the Acid Test Ratio is 0.9 : 1, what is the Current Ratio?