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# Answers to Exercises

## Chapter 2

### Exercise 2.1

The types of assets held are shown in Table A2.1.

TABLE A2.1

BUSINESS ASSETS		
Ice cream manufacturer	Building society	Fairground ride operator
Stock of ice cream	Building	Caravan
Machinery	Computer	Ride
Refrigerator	Photocopier	Stock of tickets

### Exercise 2.2

Table A2.2 lists the assets found in the KoolKurls hairdressing salon, sorted into fixed and current.

TABLE A2.2

KOOLKURLS HAIRDRESSING SALON: FIXED AND CURRENT ASSETS	
Set of professional styling scissors	Fixed
Shampoo	Current
Electric hairdryers	Fixed
Electronic till	Fixed
£10 owed by a customer	Current
£15 in the till	Current

### Exercise 2.3

The following is an assessment of the liabilities of Paws&Claws Petshop:

- £50 wages of Lenny, the part-time shop assistant, for work he did during the previous week

This is listed as a prepayment under the heading Current Liabilities. It is for work that has already been completed, that means the business has had the benefit of that work. Now the business owes this to Lenny and must pay him in the short run.

- £300 owed to the wholesaler for cages and petfood purchased and delivered last month

This is listed as a trade creditor under Current Liabilities. The business has already received the goods and therefore potentially had the benefits, but still owes the £300 to the supplier, which must be paid in the short run.

- £15 for stationery ordered but not yet delivered

This is not a Current Liability as the business has not yet received any benefit, neither have the goods been delivered nor has an invoice been received.

- £300 overdraft facility agreed with the bank manager but not yet used.

This is not a Current Liability, as none of the potential benefit agreed has been made use of. An overdraft only becomes a liability when it is actually used and only to the extent to which it is used.

### Exercise 2.4

#### Explanation

The capital of £82 000 represents the value of the owner's original investment in the business. This has long been spent on computer equipment, vans, stock of goods for resale and other things and at the balance sheet date only £2000 of the net worth of the business is actually represented by cash. However, that does not mean that the rest of the money has been wasted. It is not really gone. It has just taken on a different form, that of the various assets.

### Exercise 2.5

Figure A2.1 shows the balance sheet as at 5 March 199X.

**FIGURE A2.1**

ALLIED DOMEQ PLC: BALANCE SHEET AS AT 5 MARCH 199X		
	£m	£m
<b>Fixed Assets</b>		
Buildings	2400	
Plant and Machinery	1300	
Furniture and Fittings	300	
	<hr/>	4000
<b>Current Assets</b>		
Stock	1000	
Debtors	1000	
Cash	150	
	<hr/>	2150
<b>Creditors: due within one year</b>		
Trade Creditors	1700	
<b>Net Current Assets</b>		450 (1)
<b>Total Assets less Current Liabilities</b>		4450 (2)
<b>Creditors: due after one year</b>		
Long-term Bank Loan	2700	
	<hr/>	1750 (3)
<b>Capital</b>		
Share Capital	1500	
Retained Profit	250	
	<hr/>	1750

#### Explanation

- (1) Net current assets = Current assets – Creditors (due within one year)
- (2) Total assets less Current liabilities = Fixed assets + Current assets – Creditors (due within one year)
- (3) This is the Net assets figure.

Net assets = Fixed assets + Current assets – Creditors (due within one year) – Creditors (due after one year)

### Exercise 2.6

- (a) The correct answer is (B).

#### Explanation

There is a new entry 'Creditors: due after one year £1000' on the balance sheet. This is matched by a £1000 increase in the 'Bank and cash' entry.

- (b) The correct answer is (D).

#### Explanation

The entry for 'Stock' has increased by £1000. This is matched by a corresponding increase of £1000 in the entry under 'Trade Creditors'.

- (c) The correct answer is (C).

#### Explanation

The entry for 'Stock' decreases by £1000. At the same time, the entry for 'Bank and cash' increases by £1500. The surplus is shown in the capital section as 'Retained profit' £500.

## Chapter 3

### Exercise 3.1

The completed cash flow statement is shown in Figure A3.1.

### FIGURE A3.1

JONATHAN'S SWEETS: CASH FLOW STATEMENT 1 MAY TO 31 MAY 199X	
	£
Opening Balance	50
+ Receipts	
Cash Sales	1100
- Payments	
New Supplier	500
Rent Warehouse	300
Wages Staff	360
Salary Director	500
= Closing Balance	(510)

### Exercise 3.2

Stakeholder group	Benefit
Customers	If the business holds sufficient cash, it can make sure there is enough ice cream in stock If the business makes sufficient profit, it can invest in developing new exciting flavours
Staff	If the business holds sufficient cash, it can pay staff promptly If the business makes sufficient profit, it can offer good benefits, for instance pensions and private health insurance
The wider community	If the business holds sufficient cash, it can meet its bills for rates promptly If the business makes sufficient profit, it can afford to support local charities

### Exercise 3.3

The completed profit and loss account is shown in Figure A3.2.

### FIGURE A3.2

#### JONATHAN'S SWEETS: PROFIT AND LOSS ACCOUNT 1 MAY TO 31 MAY 199X

	£
Sales	2600
- Cost of Goods Sold	1100
= Gross Profit	1500
- Expenses	
Rent	300
Wages Staff	360
Salary Director	500
= Trading Profit	340

### Exercise 3.4

(a) The correct answer is (C).

The calculations are shown in Figure A3.3.

### FIGURE A3.3

#### JANINE SWIFT'S DRIVING SCHOOL: CASH FLOW STATEMENT 1 SEPTEMBER TO 3 SEPTEMBER 199X

	£
Opening Balance	300
+ Receipts	
Sale of Highway Code	10
Cash for Lessons	100
- Payments	
Purchase of Highway Code	5
Petrol	55
Advertisement	15
= Closing Balance	335

(b) The correct answer is (B).

The calculations are shown in Figure A3.4.

### FIGURE A3.4

#### JANINE SWIFT'S DRIVING SCHOOL: PROFIT AND LOSS ACCOUNT 1 SEPTEMBER TO 3 SEPTEMBER 199X

	£
Sales	110
- Expenses	
Highway Code	5
Petrol	25
= Net Trading Profit	80

Note that the *matching concept* is applied. Only the petrol actually used up to the end of 3 September 199X is included as an expense. Also the advertisement is not yet included as it will only be running the following week, therefore it cannot be matched up with the current week's sales.

## Chapter 4

### Exercise 4.1

The calculations of cost of goods sold and gross profit are shown in Figures A4.1 and A4.2, respectively.

FIGURE A4.1

'WHITE LION': COST OF GOODS SOLD 1 JULY TO 31 JULY, WORKINGS	
	£
Opening Stock (at valuation)	1100
+ Purchases (at cost)	5640
- Closing Stock (at valuation)	576
= Cost of Goods Sold	6164

FIGURE A4.2

'WHITE LION': GROSS PROFIT 1 JULY TO 31 JULY, WORKINGS	
	£
Sales (at selling price)	7520
- Cost of Goods Sold (Figure A4.1)	6164
= Gross Profit	1356

TABLE A4.1

### VINELEAVES LTD: FIFO

Month	Purchases (at cost)	Stock issued for sale (at valuation)	Stock after transaction (at valuation)
July	900 @ £6.00		900 @ £6.00
August		700 @ £6.00	200 @ £6.00
September	500 @ £8.00		200 @ £6.00 500 @ £8.00
October		200 @ £6.00 200 @ £8.00	300 @ £8.00

$$\text{Closing Stock} = 300 * £8.00 = £2400$$

Under the FIFO method, the closing stock is valued at £2400

TABLE A4.2

### VINELEAVES LTD: WAC

Month	Purchases (at cost)	Stock issued for sale (at valuation)	Stock after transaction (at valuation)
July	900 @ £6.00		900 @ £6.00
August		700 @ £6.00	200 @ £6.00
September	500 @ £8.00	700 @ $\frac{200 * 6.00 + 500 * 8.00}{700}$ or 700 @ £7.43	
October		400 @ £7.43	300 @ £7.43

$$\text{Closing Stock} = 300 * £7.43 = £2229$$

Under the WAC method, the closing stock is valued at £2229

### Exercise 4.2

#### Vineleaves Ltd Videos

- (a) The closing stock calculations, using FIFO, WAC and LIFO are shown in Tables A4.1, A4.2 and A4.3, respectively.
- (b) The impact of the choice of stock valuation method on gross profit is shown in Figure A4.3.

TABLE A4.3

VINELEAVES LTD: LIFO

Month	Purchases (at cost)	Stock issued for sale (at valuation)	Stock after transaction (at valuation)
July	900 @ £6.00		900 @ £6.00
August		700 @ £6.00	200 @ £6.00
September	500 @ £8.00		200 @ £6.00 500 @ £8.00
October		400 @ £8.00	200 @ £6.00 100 @ £8.00

$$\text{Closing Stock} = 200 * £6.00 + 100 * £8.00 = £2000$$

Under the LIFO method, the closing stock is valued at £2000

FIGURE A4.3

VINELEAVES LTD:

TRADING ACCOUNT 1 JULY TO 31 OCTOBER 199X

	FIFO	WAC	LIFO
	£	£	£
Sales	18 300	18 300	18 300
Opening Stock	0	0	0
+ Purchases	9 400	9 400	9 400
- Closing Stock	2 400	2 229	2 000
= Cost of Goods Sold	7 000	7 171	7 400
Gross Profit	11 300	11 129	10 900

**Exercise 4.3**

(a) The correct answer is (C).

The workings are shown in Table A4.4 and Figure A4.4.

(b) The correct answer is (A).

The workings are shown in Table A4.5.

(c) The correct answer is (B).

TABLE A4.4

CARDSRUS: FIFO STOCK CALCULATIONS

Date	Purchases (at cost)	Stock issued for sale (at valuation)	Stock after transaction (at valuation)
1 Jan			400 @ £0.50
2 Jan	650 @ £0.65		400 @ £0.50 650 @ £0.65
3 Jan		100 @ £0.50	300 @ £0.50 650 @ £0.65
Closing Stock is valued at			$300 * £0.50 + 650 * £0.65 = £572.50$

FIGURE A4.4

CARDSRUS: COST OF GOODS SOLD, WORKINGS

Opening Stock	£200.00
+	Purchases
-	Closing Stock
=	Cost of Goods Sold

TABLE A4.5

CARDSRUS: WAC STOCK CALCULATIONS

Month	Purchases (at cost)	Stock issued for sale (at valuation)	Stock after transaction (at valuation)
1 Jan			400 @ £0.50
2 Jan	650 @ £0.65	1050 @ $\frac{400 * 0.5 + 650 * 0.65}{1050}$ or 1050 @ £0.59	1050
3 Jan		100 @ £0.59	950 @ £0.59
Closing Stock is valued at $950 * £0.59 = £560.50$			

**Exercise 4.4**

The calculations are shown in Table A4.6.

For both methods, the book value at the end of year 6 is accurately reflected as £2000. The slight difference between the two methods is due to rounding error. For the reducing balance method, most of the depreciation is charged during the

early years of the asset's life. This seems more appropriate for this kind of asset, as the new technology involved is more likely to give the company a competitive edge during the early years.

TABLE A4.6

BREWERY: COMPARISON OF DEPRECIATION METHODS					
	Straight line		Reducing balance		
	Depreciation	Balance	Depreciation	Balance	
Initial Cost					
Year 1	2 000	12 000	3 878.00	10 122.00	
Year 2	2 000	10 000	2 803.79	7 318.21	
Year 3	2 000	8 000	2 027.14	5 291.07	
Year 4	2 000	6 000	1 465.63	3 825.44	
Year 5	2 000	4 000	1 059.65	2 765.79	
Year 6	2 000	2 000	766.12	1 999.67	

TABLE A4.7

TANIA'S BUSINESS:  
FIFO CLOSING STOCK CALCULATIONS

Month	Purchases (at cost)	Stock issued for sale (at valuation)	Stock after transaction (at valuation)
January	1500 @ £3.50		1500 @ £3.50
February	4000 @ £4.00		1500 @ £3.50 4000 @ £4.00
April		1500 @ £3.50 1500 @ £4.00	2500 @ £4.00
July	3500 @ £4.10		2500 @ £4.00 3500 @ £4.10
November		2500 @ £4.00 1500 @ £4.10	2000 @ £4.10
Closing Stock is valued at 2000 * £4.10 = £8200			

### Exercise 4.5

The correct answer is (C).

#### Calculations:

##### Reducing Balance Method

$$\text{Depreciation Charge for Year 1: } \£3000 * 30.1\% = \£903$$

##### Straight Line Method

$$\text{Depreciation Charge for Year 1: } \frac{\£3000 - \£500}{5} = \£500$$

FIGURE A4.5

TANIA'S BUSINESS:  
COST OF GOODS SOLD CALCULATIONS

	£
Opening Stock	0
+ Purchases	35 600
- Closing Stock	8 200
= Cost of Goods Sold	27 400

FIGURE A4.6

TANIA'S BUSINESS: CASH FLOW STATEMENT FOR THE YEAR 1 JANUARY TO 31 DECEMBER 199X

	£
Opening Balance	20 000
+ Receipts:	
Sales	52 500
- Payments:	
Heat-embossing Machine	3 000
Purchases of Stock	35 600
Wages	9 000
Rent	15 000
= Closing Balance	9 900

### Exercise 4.6

The necessary calculations are shown in Table A4.7 and Figures A4.5–A4.8.

**FIGURE A4.7**

TANIA'S BUSINESS: PROFIT AND LOSS ACCOUNT FOR THE YEAR 1 JANUARY TO 31 DECEMBER 199X	
	£
Sales	52 500
- Cost of Goods Sold	27 400
= Gross Profit	25 100
- Expenses	
Depreciation	500
Wages	9 000
Rent	15 000
= Net Trading Profit	600

**FIGURE A4.8**

TANIA'S BUSINESS: BALANCE SHEET AS AT 31 DECEMBER 199X			
	Cost	Depreciation	Net Book Value
	£	£	£
<b>Fixed Assets:</b>			
Heat-embossing Machine	3 000	500	2 500
<b>Current Assets:</b>			
Stock			8 200
Cash			9 900
<b>Net Total Assets</b>			<u>20 600</u>
<b>Capital</b>			<u>20 000</u>
<b>Retained Profit</b>			<u>600</u>
			<u>20 600</u>

## Chapter 5

### Exercise 5.1

- (a) The depreciation charge for the first year is worked out for the two methods as shown in Figure A5.1.  
The correct answer therefore is:  
**(B)** £325 higher than under the straight line method
- (b) The closing stock calculations are shown in Table A5.1.  
The cash flow statement, profit and loss account and balance sheet are presented in Figures A5.2–A5.4.

**FIGURE A5.1**
**JOEY'S BUSINESS: DEPRECIATION CALCULATIONS**
**Straight Line Method:**

$$\text{Annual depreciation charge} = \frac{\text{£2500} - \text{£400}}{7} = \text{£300}$$

**Reducing Balance Method:**

$$\begin{aligned} \text{Depreciation charge for first year} \\ = \text{£2500} * 25/100 = \text{£625} \end{aligned}$$

**TABLE A5.1**
**JOEY'S BUSINESS: CLOSING STOCK CALCULATIONS**
**FIFO**

Month	Purchases	Stock Issued for Sale	Stock After Each Transaction
Jan	1000 @ £3.00		1000 @ £3.00
March	3000 @ £3.30		1000 @ £3.00 3000 @ £3.30
May		1000 @ £3.00 1000 @ £3.30	2000 @ £3.30
Oct	4000 @ £3.20		2000 @ £3.30 4000 @ £3.20
Dec		2000 @ £3.30 1500 @ £3.20	2500 @ £3.20
Closing Stock is valued at $2500 * £3.20 = £8000$			

**FIGURE A5.2**
**JOEY'S BUSINESS: CASH FLOW STATEMENT FOR THE PERIOD 1 JANUARY TO 31 DECEMBER 199X**

	£
Opening Balance	20 000
+ Receipts:	
Sales	55 000
- Payments:	
Van	2 500
Stock	25 700
Wages	10 000
Rent	9 000
= Closing Balance	27 800

FIGURE A5.3

JOEY'S BUSINESS: PROFIT AND LOSS ACCOUNT FOR THE PERIOD 1 JANUARY TO 31 DECEMBER 199X	
	£
Sales	55 000
- Cost of Goods Sold	17 700
= Gross Profit	37 300
- Expenses	
Depreciation	
Van	300
Wages	10 000
Rent	9 000
= Net Trading Profit	18 000

FIGURE A5.4

JOEY'S BUSINESS: BALANCE SHEET AS AT 31 DECEMBER 199X			
	Cost	Depreciation to Date	Net Book Value
	£	£	£
Fixed Assets			
Van	2 500	300	2 200
Current Assets			
Stock			8 000
Cash			27 800
Net Total Assets			38 000
Capital			20 000
Retained Profit			18 000
			38 000

entered 50 in cell D7. If we move to D8 and enter =D7, whatever is in cell D7 will appear in D8. Initially, the basic wage is 50 so that appears but if the basic wage is changed to 60, all we would need to do is to change the entry in D7 and the entry in D8 would automatically be changed as well. We can copy this formula down using the **Edit Fill Down** command or the **Copy** icon.

### Exercise 6.2

A print-out of the spreadsheet template is shown in Figure A6.3.

### Exercise 6.3

You will need to highlight rows 2, 3, 4 and 5 of Table 6.1 before clicking on the **ChartWizard** icon. Select the **Column** bar chart option 1. Include a legend this time so as to distinguish between the two values each year.

From Figure 6.9, we can see that, overall, turnover increased from 1988 to 1994 but there were setbacks in 1990 and 1993. The highest trading profit was achieved in 1989 with poorer results in 1990, 1991 and 1993.

## Chapter 6

### Exercise 6.1

The final worksheet is shown in Figure A6.1. The version showing the formulae is in Figure A6.2.

It is worth noting that we could have designed the worksheet differently if we had thought there was a possibility that the basic wage might change from £50. It would have been advantageous to allow for this. In setting up the initial table, we

FIGURE A6.1

FINAL WORKSHEET FOR EXERCISE 6.1 (NUMERICAL VERSION)

<b>FAST FORWARD VIDEO COMPANY</b>				
<b>COMMISSION PAYROLL</b>				
<b>Calculations of gross pay</b>				
EMPLOYEE	SALES (£)	COMMISSION	BASIC PAY(£)	GROSS PAY (£)
		RATE		
Arnold	5,700	3%	60	231.00
Chalmers	7,500	4%	60	360.00
Hobart	6,500	4%	60	320.00
Michaelson	8,500	3%	60	315.00
Pratt	8,000	4%	60	380.00
Smith	7,600	2%	60	212.00
Wilson	4,200	3%	60	186.00
<b>TOTALS</b>	<b>43,800</b>			<b>1818.00</b>

FIGURE A6.2

FINAL WORKSHEET FOR EXERCISE 6.1 (VIEW FORMULA VERSION)

	A	B	C	D	E
1	<b>FAST FORWARD VIDEO COMPANY</b>				
2	<b>COMMISSION PAYROLL</b>				
3	<b>Calculations of gross pay</b>				
4					
5	EMPLOYEE	SALES (£)	COMMISSION	BASIC PAY(£)	GROSS PAY (£)
6			RATE		
7	Arnold	5700	0.03	60	=B7*C7+D7
8	Chalmers	7500	0.04	=\$D\$7	=B8*C8+D8
9	Hobart	6500	0.04	=\$D\$7	=B9*C9+D9
10	Michaelson	8500	0.03	=\$D\$7	=B10*C10+D10
11	Pratt	8000	0.04	=\$D\$7	=B11*C11+D11
12	Smith	7600	0.02	=\$D\$7	=B12*C12+D12
13	Wilson	4200	0.03	=\$D\$7	=B13*C13+D13
14	<b>TOTALS</b>	=SUM(B7:B12)			=SUM(E7:E12)

**FIGURE A6.3** TEMPLATE FOR FINANCIAL STATEMENTS CALCULATIONS

## Chapter 7

### Exercise 7.1

(a) If the figures are taken at face value, the following comments can be made. The company appears to have succeeded in achieving overall growth in terms of sales. This is made up of a steady growth in Germany, relatively strong year-on-year increases in the UK and initially strong growth in France, but stagnation from Year 2 to Year 3 in this market. In terms of net profit, there was some growth in the German and French market between Year 1 and Year 2, whilst there was a decline in the UK market. Between Year 2 and Year 3, the UK market recovered to its original net profit figure, the German market remained at the same level and net profit in the French market declined slightly.

From this description, the overall impression might be one of a competitive market in which profitability had to be sacrificed to some extent in order to maintain and build sales over the three year period.

(b) Clearly, the above interpretation of the figures is rather limited, and hampered by a lack of additional information. Simply taking the figures at face value would be naive and misleading. If you wished to compile accurate aggregate figures for the company as a whole, you would need to know the appropriate exchange rates to apply. Also, a knowledge of inflation rates would help you assess whether the apparent growth in sales is really due to selling more or whether it is simply a reflection of rising prices. The comparison of the results in the three countries could have been further distorted if different rates of inflation applied in the three markets. Furthermore, a knowledge of gross profit and cost data would help you assess whether the sales growth was brought about by a deliberate penetration strategy, involving dropping prices. Alternatively you might find that the stagnant or falling net profit figures were the result of escalating costs.

The asset turnover here means that the value of sales was 6 times the value of net total assets. This tells us that for every £1 invested in the business, £6 worth of sales were generated during the financial year.

### Exercise 8.2

The answers for all three parts of this exercise are summarised in Table A8.1.

TABLE A8.1

COMPARISON OF COMPANY LIQUIDITY		
Company A	Company B	Company C
(a)		
Working-capital comparison:		
£1 000	£9 000	£12 000
(b)		
Current ratio comparison:		
Current ratio 1.03	Current ratio 1.75	Current ratio 1.8
Least liquid	Medium	Most liquid
(c)		
Acid test comparison:		
Acid test 0.28	Acid test 0.91	Acid test 0.8
Least liquid	Most liquid	Medium

The ratios in Table A8.1 can be interpreted as follows. All three companies have a positive working capital figure. They are therefore liquid. Should the three companies be forced to pay off all their creditors at once by turning their current assets into cash, for every £1 owed to creditors, Company C would be able to raise £1.80, Company B £1.75 and Company A £1.03.

In terms of the acid test the ranking order is slightly different from that indicated by the current ratios. If the three companies found that they could not sell off their stock, then for every £1 owed to creditors, Company B would still be able to raise £0.91, Company C £0.8 and Company A only £0.28. Clearly not being able to use stock would make quite a difference. This is particularly true for Company C, which has more money tied up in stock than Company B if seen in relation to the total amount of money invested in current assets. As a result the ranking order has been reversed.

### Exercise 8.3

Examples of two advantages of high liquidity, as well as two advantages of low liquidity are noted in Table A8.2.

## Chapter 8

### Exercise 8.1

The calculation is:

#### Calculation of asset turnover

$$\text{Asset turnover} = \frac{\text{£900 000}}{\text{£150 000}} = 6 \text{ times}$$

TABLE A8.2

## ADVANTAGES AND DISADVANTAGES OF LIQUIDITY

High Liquidity	Low Liquidity
(1) Cash readily available to meet debts and take up special offers	(1) Effective use of trade credit as a source of 'free' short-term business finance
(2) Security and independence from bank and suppliers	(2) Valuable resources are freed up and used elsewhere

FIGURE A8.1

## CHANGES IN WORKING CAPITAL OVER TIME

Extract from Balance Sheet at End of Year 1	Extract from Balance Sheet at End of Year 2
Current Assets	£ Current Assets
Stock	2000 Stock
Debtors	150 Debtors
Cash	500 Cash
Current Liabilities	Current Liabilities
Creditors	Creditors
Working Capital	Working Capital

- (b) Table A8.4 matches the changes in the ratios with the appropriate causes.

## Exercise 8.4

- (a) The ratios for stock turnover, debtors' collection period and creditors' payment period for the two years are shown in Table A8.3.

TABLE A8.3

## COMPARISON OF RATIOS OVER TIME

	Year 1	Year 2
Stock turnover	5 times	6.67 times
Debtors' collection period	55 days	61 days
Creditors' payment period	91 days	51 days

The ratios shown in Table A8.3 can be interpreted as follows. Stock control has been improved, resulting in an increase in the stock turnover ratio. However, debtors' collection period has increased by an additional 6 days. This should be monitored to see whether this reflects a genuine industry trend which makes it necessary to offer such long credit periods to debtors in order to remain competitive, or whether it is due to a lack of control. There was also quite a drop in creditors' payment period, by 40 days. Whilst 91 days seems rather long for any industry, the sharp drop does mean a much larger working capital requirement, which may be hard to finance in the short term.

Working-capital calculations are shown in Figure A8.1.

You can see from Figure A8.1 that the overall working capital requirement has increased considerably in year 2. This is the result of a combination of events, partly beyond the control of the business.

TABLE A8.4

## INTERPRETATION OF THE RATIOS

Cause	Ratio Affected
Implementation of new sales based ordering system	Stock turnover
Acquisition of large new wholesale account	Debtors' collection period
Unexpected bankruptcy of a key supplier	Creditors' payment period

## Exercise 8.5

Figure A8.2 shows an assessment of profitability for the two businesses.

This information can be interpreted as follows. Business X is the discounter, achieving a high sales volume through low mark-ups, but implementing excellent cost controls. Overall, the net margin of Business X is much lower. Business Y has a different pricing policy, as reflected in a mark-up of 50 per cent. However, the maintenance of a high quality image and premium prices also imply higher costs of running the business, and sales volumes have to be sacrificed to a certain extent.

FIGURE A8.2

COMPARISON OF PROFITABILITY			
Business X		Business Y	
	£000		£000
Sales	800	Sales	600
Cost of Goods Sold	700	Cost of Goods Sold	400
Gross Profit	100	Gross Profit	200
Expenses	80	Expenses	150
Net Profit	20	Net Profit	50
	£20 = £800 * 100 = 2.5%	£50 = £600 * 100 = 8.33%	
Gross margin	£100 = £800 * 100 = 12.5%	Gross margin	£200 = £600 * 100 = 33.33%
Mark-up	£100 = £700 * 100 = 14.29%	Mark-up	£200 = £400 * 100 = 50%

### Exercise 8.6

Figure A8.3 provides an assessment of the comparative profitability of the two businesses.

- (a) The figures shown in Figure A8.3 indicate that despite the striking differences between the two companies, both yield the same ROCE.

Manufacturer B has the higher gross margin and the higher net margin and is therefore more profitable overall.

To answer the question, which firm has the higher capital investment, you need to calculate net total assets which, bearing in mind the balance sheet equation, must equal capital employed. Manufacturer B has a higher capital investment.

To assess resource utilisation, the asset turnover ratio must be calculated. Retailer A has the higher asset turnover figure which indicates a more effective utilisation of resources.

A comparison of both the current ratio and the acid test indicates that the manufacturer is a lot more liquid than the retailer.

- (b) From an investor's point of view, there is little to choose between the two companies, as both achieve the same ROCE, which indicates the same level of overall performance. However, there is a great difference in their

FIGURE A8.3

INTER-FIRM COMPARISON			
Retailer A		Manufacturer B	
	£		£
Sales	100 000	Sales	100 000
Cost of Goods Sold	80 000	Cost of Goods Sold	50 000
Gross Profit	20 000	Gross Profit	50 000
Expenses	10 000	Expenses	30 000
Net Profit	10 000	Net Profit	20 000
Net margin	= $\frac{10 000}{100 000} = 10\%$	Gross margin	= $\frac{50 000}{100 000} = 50\%$
Gross margin	= $\frac{20 000}{100 000} = 20\%$	Net margin	= $\frac{20 000}{100 000} = 20\%$
Asset turnover	= $\frac{100 000}{23 000} = 4.35$	Asset turnover	= $\frac{100 000}{45 000} = 2.22$
Current ratio	= $\frac{5 000}{7 000} = 0.71$	Current ratio	= $\frac{11 000}{6 000} = 1.8$
Acid test	= $\frac{2 000}{7 000} = 0.28$	Acid test	= $\frac{6 000}{6 000} = 1$
ROCE	= $0.1 * 4.35 = 0.44$	ROCE	= $0.2 * 2.22 = 0.44$

respective profitability and resource utilisation ratios, illustrating a typical trade-off between those two areas.

Typically, a manufacturer has to invest quite a lot of capital in plant and machinery. This requirement is less pronounced for a retailer. As a result, the retailer can succeed in generating quite a large amount of sales on the basis of rather more limited resources. The retailer is likely to turn stock round more quickly than the manufacturer and to get generous trade credit terms from suppliers, whilst customers pay cash. On the other hand, the manufacturer has to offer credit terms to customers, and stock will be tied up longer, due to the manufacturing process. This means that the manufacturer has to generate higher margins to make up for these differences. This is normally quite acceptable, as the manufacturer transforms raw materials into complex finished products, whereas the retailer only sells on finished goods purchased elsewhere.

## Chapter 9

### Exercise 9.1

Table A9.1 shows the results of the calculations.

TABLE A9.1

PORTFOLIO PERFORMANCE			
	Dividend Cover	Dividend Yield	P/E Ratio
Wimpey	1.20	5.4%	15.5
Barratt	1.75	4.2%	13.6
Banner Homes	2.86	2.4%	14.7
Beazer Homes	1.9	4.5%	11.7

### Exercise 9.3

- (a) Figure A9.1 summarises the calculations.

FIGURE A9.1

#### IMPACT OF GEARING ON PERFORMANCE

Profit Forecast	Company A	Company B
£20 000		
	$EPS = \frac{\text{£}20\,000}{\text{£}200\,000}$	$EPS = \frac{\text{£}20\,000 + \text{£}14\,000}{\text{£}60\,000}$
	$EPS = \text{£}0.10$	$EPS = \text{£}0.10$
	$ROSF = \frac{\text{£}20\,000}{\text{£}200\,000}$	$ROSF = \frac{\text{£}20\,000 - \text{£}14\,000}{\text{£}60\,000}$
	$ROSF = 0.10$	$ROSF = 0.10$
£10 000		
	$EPS = \frac{\text{£}10\,000}{\text{£}200\,000}$	$EPS = \frac{\text{£}10\,000 - \text{£}14\,000}{\text{£}60\,000}$
	$EPS = \text{£}0.05$	$EPS = (-\text{£}0.07)$ (rounded)
	$ROSF = \frac{\text{£}10\,000}{\text{£}200\,000}$	$ROSF = \frac{\text{£}10\,000 - \text{£}14\,000}{\text{£}60\,000}$
	$ROSF = 0.05$	$ROSF = (-0.07)$
	$Gearing = \frac{\text{£}200\,000}{\text{£}200\,000}$	$Gearing = \frac{\text{£}200\,000}{\text{£}60\,000}$
	$= 1$	$= 3.3$ (rounded)

### Exercise 9.2

- (a) Table A9.2 shows the ratios for Sainsbury and Kwik Save.

TABLE A9.2

COMPARISON OF INVESTMENT RATIOS						
	Dividend Current	Yield Hi	P/E Ratio Lo	Dividend Current	Yield Hi	Dividend Cover
Sainsbury	3.4%	3.4	3.7	14.49	14.52	13.3 2.03
Kwik Save	4.2%	4.0	4.7	10.5	10.99	9.3 2.27

(b) The two companies are located at opposite ends of the spectrum of grocery retailing. Sainsbury is a premium priced retailer, increasingly moving towards large out-of-town developments. In contrast, Kwik Save is a UK discount operator with strong historical roots in the field of discounting. As the square footage figures show, both expanded, but Sainsbury more strongly. In 1994, pressures on site values, combined with the rumoured impending saturation of grocery retailing in the UK necessitated some revaluation of property which depressed Sainsbury's EPS and DPS figures.

However, in 1995 Sainsbury's EPS and DPS appeared to have recovered and they even slightly exceeded 1993 values. Kwik Save's performance on those figures was consistently strong, but there was a slight decline in EPS in 1995. Both companies had comparable dividend cover around a level of 2, leaving a strong margin of safety. Market confidence as reflected in the P/E ratio appeared to favour Sainsbury's in May 1995.

(b), (c) At the higher profit level of £40 000 the higher gearing level for Company B resulted in a boost of the returns available to be distributed amongst the shares of the company. The profit forecast of £20 000 reflects the level of profitability at which investors would be indifferent between investing in the two companies. For the pessimistic profit forecast of £10 000, the investors in shares of Company A still have a moderate amount of profit to be distributed amongst shareholders, whereas the shareholders of Company B are forced to absorb a loss, as the profits are insufficient to cover the interest payments on the long-term loan. This example illustrates the relationship between risk and return: higher gearing implies higher risk, but also potentially greater returns at higher profit levels.

**Exercise 9.4**

- (a) The ratios for this answer are set out in Table A9.3.

TABLE A9.3

COMPARISON OF COMPANIES X AND Y		
	Company X	Company Y
Net total assets	£100 000	£100 000
Net margin	0.075	0.10
Asset turnover	1.6	1.5
ROCE	0.12	0.15

Company Y has the higher net margin

The companies have the same capital investment

Company X has the higher asset turnover

Company Y has the higher return on capital employed

- (b) Earnings per share = £0.12

Table A9.4 sets out a comparison of projected returns for the three scenarios depending on whether share or loan finance is chosen.

TABLE A9.4

LOAN FINANCE VERSUS SHARE FINANCE				
Company X: Use of Share Finance				
	EPS	Gearing	ROCE	ROSF
Recession	0.05	1	0.05	0.05
Indifferent	0.125	1	0.125	0.125
Boom	0.20	1	0.2	0.2
Company X: Use of Loan Finance				
	EPS	Gearing	ROCE	ROSF
Recession	(−0.05)	2	(−0.025)	(−0.05)
Indifferent	0.1	2	0.05	0.1
Boom	0.25	2	0.125	0.25

It becomes clear from the figures in Table A9.4 that the use of loan finance is more risky, as it would result in a loss-making situation in times of recession. However, it also promises potentially greater gains during a boom period. In other words, there is a clear trade-off between risk and potential returns.

**Exercise 10.3**

- (a)–(c) Figure A10.1 uses the profit tree model to illustrate the comparison of the 1994 results for Allied Domecq plc and J Sainsbury plc.

As we already know from Exercise 10.2, Sainsbury's 1994 results were depressed because of the devaluation of property and higher depreciation charge for the year. The 1994 Allied Domecq results compare favourably, with a ROSF of 22.4 per cent. This was the result of a ROCE of 13.4 per cent, which was further enhanced by a gearing of 1.68, which is somewhat higher than Sainsbury's figure. An investigation of the branches of the Allied Domecq profit tree illustrates that this is a very different company with a strong manufacturing component to the business. It may help to know that Allied Domecq is the parent company of Carlsberg-Tetley, Dunkin' Donuts and Baskin-Robbins, a large number of UK public houses and a strong wines and spirits division.

The manufacturing element is reflected on the profitability side in a high gross margin of 37.2 per cent, as compared to Sainsbury's 9.5 per cent. This is due to the fact that a manufacturer adds value by making things out of raw materials and can therefore charge for this. The higher costs associated with running a manufacturing operation are reflected in the relatively high level of expenses. As a result net margin, whilst higher than Sainsbury's, is not as far above it as gross margin.

Looking at resource utilisation, Allied Domecq has a substantially lower asset turnover figure than Sainsbury's. This is mostly due to the much lower liquidity of the company, as shown by a current ratio of 1.32 and an acid test of 0.67. Again, this is due to the difference in business focus. A manufacturing company invariably has to be more liquid than a retailer. More money is tied up in stock; stock is harder to sell in the short run, as there are raw materials and work-in-progress as well as finished goods in stock at any one point in time, and it takes time to pass items through the production process. A low stock turnover figure results. Also, manufacturers are expected to give credit to their customers, resulting in a higher debtor figure.

However, in summary, for 1994, the higher profitability of Allied Domecq more than made up for the lower asset turnover and therefore Allied Domecq's performance surpassed that of Sainsbury's. It should be noted that in 1994 Sainsbury's had a high level of exceptional one-off costs which may have distorted the comparative performances for that year.

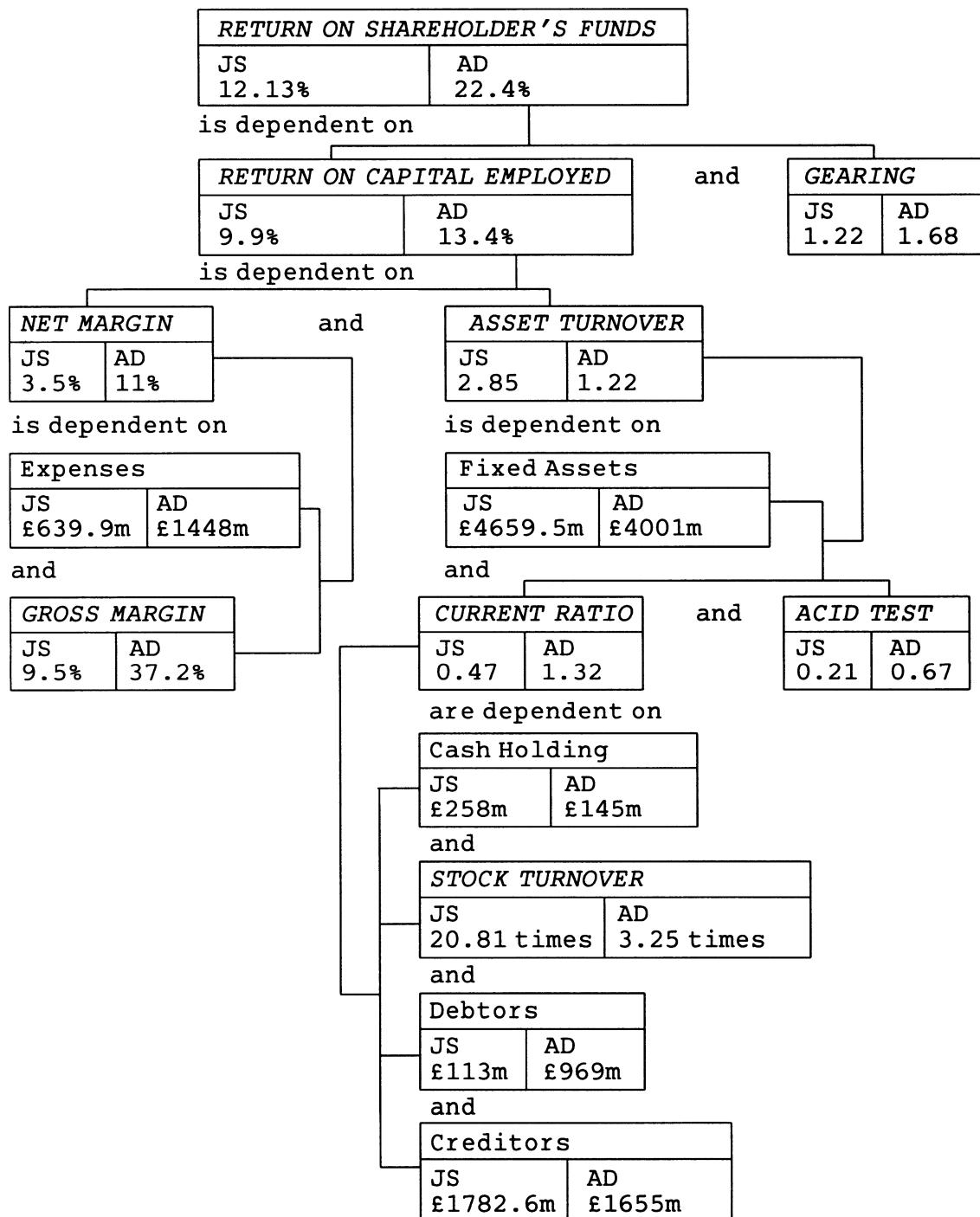
**Chapter 10**

Answers for Exercises 10.1 and 10.2 are provided in the main text.

FIGURE A10.1

THE PROFIT TREE MODEL:

COMPARISON OF THE RESULTS OF J SAINSBURY PLC AND ALLIED DOMEQ PLC 1994



**FIGURE A10.2**  
TEMPLATE FOR PROFIT TREE

A	B	C	D	E
<b>1</b>				
<b>2 Data Section:</b>				
<b>3 Sales</b>	Fixed assets			
<b>4 Cost of goods sold</b>	Stock			
<b>5 Gross profit</b>	Debtors			
<b>6 Total expenses</b>	Cash			
<b>7 Net profit</b>	Total current assets			
	Creditors (due within one year)			
<b>9</b>	Net total assets			
<b>10</b>	Share capital			
<b>11</b>	Creditors (due after one year)			
<b>12</b>				
<b>13 Profit Tree Model:</b>				
<b>14</b>	ROSF			
<b>15</b>	=B18*E18*100			
<b>16</b>				
<b>17</b>	ROCE			
<b>18</b>	=B7/D9*100			
<b>19</b>				
<b>20 NET MARGIN</b>	ASSET TURNOVER			
<b>21 =B7/B3*100</b>	=B3/D9*100			
<b>22</b>				
<b>23 Expenses</b>	Fixed assets			
<b>24 =B6</b>	=D3			
<b>25</b>				
<b>26 GROSS MARGIN</b>	CURRENT RATIO			
<b>27 =B5/B3*100</b>	=D7/D8			
<b>28</b>				
<b>29</b>	Cash holding			
<b>30</b>	=D6			
<b>31</b>				
<b>32</b>	STOCK TURNOVER			
<b>33</b>	=B4/D4			
<b>34</b>				
<b>35</b>	Debtors			
<b>36</b>	=D5			
<b>37</b>				
<b>38 Creditors (due within one year)</b>	=D8			
<b>39</b>				

**Exercise 10.4**

The answer is shown in Table A10.1.

TABLE A10.1

IMPACT OF DIFFERENT SCENARIOS ON KEY RATIOS		
Scenario	Ratio Affected	Increase/Decrease
A key supplier reduces the period for trade credit	Creditors' payment therefore	Decrease
	Asset turnover therefore	Decrease
	ROCE and ROSF	Decrease
The price of raw materials rises, resulting in higher cost of goods sold	Gross margin therefore	Decrease
	Net margin therefore	Decrease
	ROCE and ROSF	Decrease
Stock control is improved, resulting in lower average stock	Stock turnover therefore	Increase
	Asset turnover therefore	Increase
	ROCE and ROSF	Increase

**Exercise 10.5**

Figure A10.2 is a print-out of the spreadsheet template.

**Exercise 10.6****Scenario 1**

**Result:** Gross margin is depressed, which in turn results in a lower net margin and reduced ROCE and ROSF.

**Scenario 2**

**Result:** Higher expenses feed into a lower net margin and therefore lower ROCE and ROSF.

**Scenario 3**

**Result:** Creditors' payment period increases, resulting in lower liquidity and therefore higher asset turnover. An increase in ROCE and ROSF results.

**Scenario 4**

**Result:** There is a trade-off between the two main effects. Higher stock holding means lower stock turnover, which depresses asset turnover. However, the higher gross margin available results in an improved net margin. These two effects more or less balance each other.

**Scenario 5**

**Result:** Initially, asset turnover is depressed, as there is a lag between the investment in fixed assets and the sales generated from that investment. Lower ROCE results. However, this illustrates one of the limitations of ratio analysis. It only focuses on the historical performance and current figures. In this sense it encourages a certain amount of short-termism, ignoring potential long-term future returns.

**Chapter 11****Exercise 11.1**

Reasons why a business needs to forecast demand for its products:

- To reduce uncertainty
- To assist with future planning
- To make the best use of available information
- To keep ahead of the competition
- To estimate what might happen if a particular course of action is taken

**Exercise 11.2**

Examples are:

- Financial statements
- Sales records
- Industry reports
- Consumer information

**Exercise 11.3**

The answer is presented in Table A11.1.

TABLE A11.1

PLANNING HORIZONS	
Variable	Time Period
Share price of a quoted company	Minute-by-minute End of trading day
Profit	Monthly, annual
Sales	Daily, weekly, monthly, quarterly, annual
Stock levels	Daily, annual

**Exercise 11.4**

Some of the more striking features in Figure 11.1 are the regular pattern of sales from year to year and the overall upward movement in the sales over the years.

**Exercise 11.5**

Table A11.2 shows the time series analysis of UK consumers' expenditure on clothing: Some numbers in Table A11.2 are

TABLE A11.2

PERIOD (Yr/Qtr)	EXPENDITURE (£m)	4-QUARTERLY MOVING AVERAGE	ADD IN PAIRS	CENTRED AVERAGE (TREND) £m	EXP/TREND * 100
1988/1	3034				
/2	3284				
/3	3486	3658.75	7328.3	3664.1	95.1
/4	4831	3669.50	7349.8	3674.9	131.5
1989/1	3077	3680.25	7353.5	3676.8	83.7
/2	3327	3673.25	7330.8	3665.4	90.8
/3	3458	3657.50	7312.8	3656.4	94.6
/4	4768	3655.25	7318.3	3659.1	130.3
1990/1	3068	3663.00	7338.3	3669.1	83.6
/2	3358	3675.25	7322.8	3661.4	91.7
/3	3507	3647.50	7288.8	3644.4	96.2
/4	4657	3641.25	7261.5	3630.8	128.3
1991/1	3043	3620.25	7226.8	3613.4	84.2
/2	3274	3606.50	7223.5	3611.8	90.6
/3	3452	3617.00			
/4	4699				
YEAR	QTR 1	QTR 2	QTR 3	QTR 4	
1988			95.1	131.5	
1989	83.7	90.8	94.6	130.3	
1990	83.6	91.7	96.2	128.3	
1991	84.2	90.6			TOTAL
Unadjusted ave	83.8	91.0	95.3	130.0	400.2
Adjusted ave	83.8	91.0	95.3	129.9	400.0

Using Figure A11.1, we can estimate the trend for 1992 by extending the trend line.

	QUARTER 1	QUARTER 2	QUARTER 3	QUARTER 4
Trend £m	3580	3560	3540	3520

Multiplying by the seasonal variation we can predict the actual expenditure in 1992

Seasonal factor %	83.8	91	95.3	129.9
Forecast expenditure £m	3000	3240	3374	4572

Discrepancies between the actual and forecasted expenditure in this instance may be attributed to cyclical variations.

FIGURE A11.1

UK CONSUMERS' EXPENDITURE ON CLOTHING

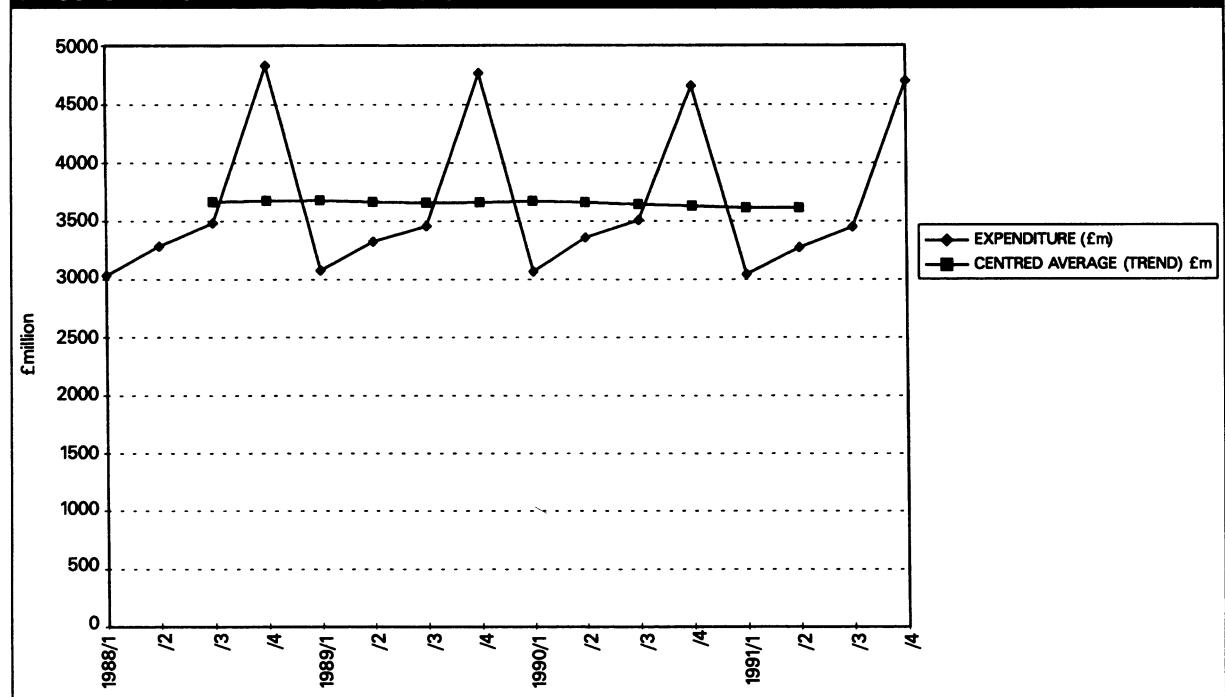
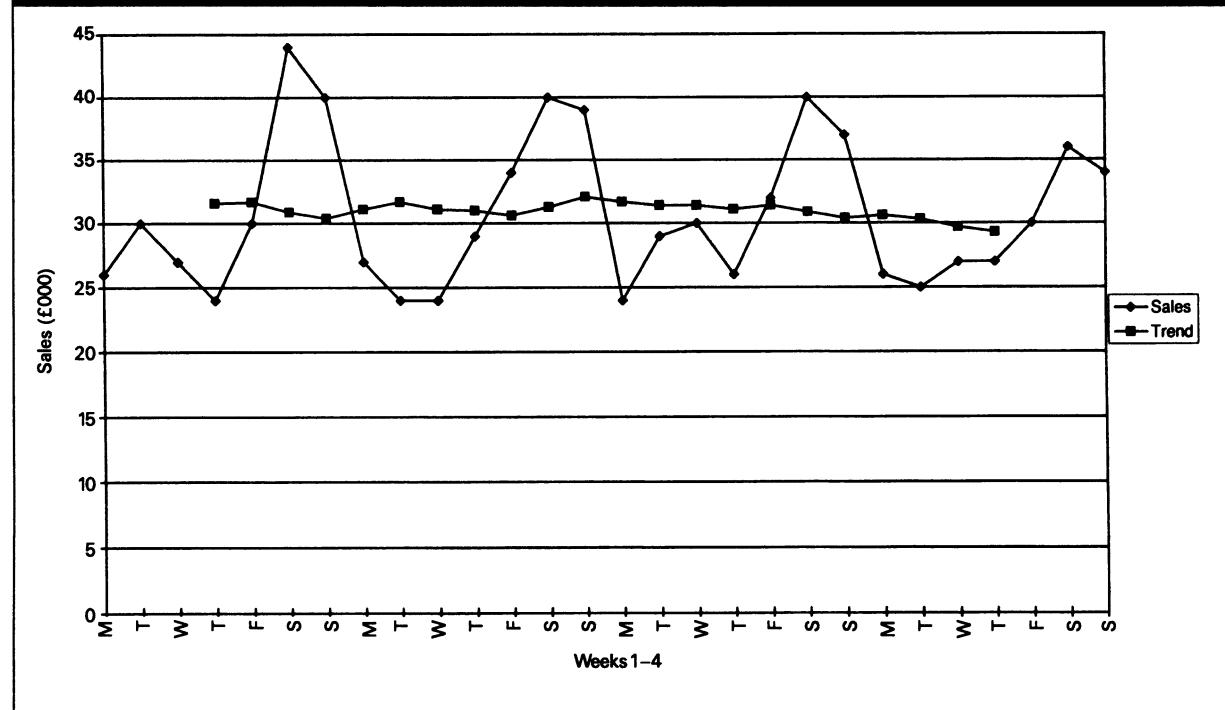


FIGURE A11.2

SCRUMTELLO'S DIY SUPERSTORE: HISTORIGRAM OF SALES



displayed rounded to one decimal place. Figure A11.1 shows the graph of the trend.

### Exercise 11.6

Figure A11.2 shows the histogram. The trend is more or less constant but is tending to move downwards. Predictions are shown in Table A11.3.

TABLE A11.3

SCRUMTELLO'S DIY SUPERSTORE: PREDICTIONS OF TREND (£000) FOR WEEK 5 (TO NEAREST THOUSAND)						
Mon	Tue	Wed	Thu	Fri	Sat	Sun
30	30	30	30	29	29	29

### Exercise 11.7

Table A11.4 shows the sales forecast.

TABLE A11.4

SCRUMTELLO'S DIY SUPERSTORE: FORECAST SALES (£000) FOR WEEK 5 (TO NEAREST THOUSAND)		
Mon	30 * 82.4% = 25	
Tue	30 * 83.4% = 25	
Wed	30 * 87.7% = 26	
Thu	30 * 86.2% = 26	
Fri	29 * 102.4% = 30	
Sat	29 * 133.2% = 39	
Sun	29 * 124.7% = 36	

## Chapter 12

### Exercise 12.1

Table A12.1 shows the spreadsheet layout.

## Chapter 13

### Exercise 13.1

The demand forecast calculation for the off-licence chain is:

### Demand forecast for spirits

$$\begin{aligned}\text{Forecast demand} &= 0.7 \times 12 + (1 - 0.7) \times 14 \\ &= 8.4 + 4.2 \\ &= 12.6\end{aligned}$$

This is 13 cases when rounded to the nearest whole case

Of course, when ordering stock, any minimum-order quantities will need to be taken into account but the method indicates the desired order figure.

### Exercise 13.2

See Table A13.1. All forecasts have been rounded to the nearest whole number and the rounded value used in the subsequent calculation.

TABLE A13.1

CYCLE SHOP: DEMAND DURING 19X3

Month	Actual Demand	Forecast Demand
January	32	32
February	20	32
March	36	28
April	43	30
May	47	34
June	50	38
July	56	42
August	46	46
September	65	46
October	37	52
November	35	48
December	75	44

The exponential smoothing has resulted in a series that fluctuates less than the actual monthly demands. Only in August has it predicted the demand accurately. The exponentially smoothed series shows the trend of sales but it appears likely that there are seasonal variations so a time series analysis might be more helpful to predict the monthly demand.

### Exercise 13.3

Mean daily demand

$$= (6 + 7 + 7 + 8 + 10 + 10 + 8)/7 = 56/7 = 8$$

TABLE A12.1

SPREADSHEET LAYOUT WITH FORMULAE FOR EXERCISE 12.1

## 252 ANSWERS TO EXERCISES

A PERIOD (Yr/Qtr)	B EXPENDITURE (£m)	C 4 QUARTERLY MOVING AVERAGE	D ADD IN PAIRS	E CENTRED AVERAGE (TREND) £m	F EXP/TREND*100
1					
2					
3					
4	1988/1	3034			
5	/2	3284			
6	/3	3486	=SUM(B4:B7)/4 =SUM(B5:B8)/4 =SUM(B6:B9)/4 =SUM(B7:B10)/4	=C6+C7 =C7+C8 =C8+C9 =C9+C10	=B6/E6*100 =B7/E7*100 =B8/E8*100 =B9/E9*100
7	/4	4831			
8	1989/1	3077			
9	/2	3327			
10	/3	3458	=SUM(B8:B11)/4 =SUM(B9:B12)/4 =SUM(B10:B13)/4	=C10+C11 =C11+C12 =C12+C13	=B10/E10*100 =B11/E11*100 =B12/E12*100
11	/4	4768			
12	1990/1	3068			
13	/2	3358	=SUM(B11:B14)/4 =SUM(B12:B15)/4 =SUM(B13:B16)/4 =SUM(B14:B17)/4	=C13+C14 =C14+C15 =C15+C16 =C16+C17	=B13/E13*100 =B14/E14*100 =B15/E15*100 =B16/E16*100
14	/3	3507			
15	/4	4657			
16	1991/1	3043			
17	/2	3274			
18	/3	3452	=SUM(B15:B18)/4	=C17+C18	=B17/E17*100
19	/4	4699			
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30	YEAR	QTR 1	QTR 2	QTR 3	QTR 4
31	1988			=F6	=F7
32	1989	=F8	=F9	=F10	=F11
33	1990	=F12	=F13	=F14	=F15
34	1991	=F16	=F17		TOTAL
35	Unadjusted ave	=AVERAGE(B32:B34)	=AVERAGE(C32:C34)	=AVERAGE(D31:D33)	=SUM(B35:E35)
36	Adjusted ave	=B35*400/\$F\$35	=C35*400/\$F\$35	=D35*400/\$F\$35	=E35*400/\$F\$35

**Exercise 13.4**

See Table A13.2. The smoothed mean absolute deviations have been rounded at every stage.

TABLE A13.2

SOFTLIGHT VERTICAL BLINDS: FORECAST ERRORS ( $\alpha = 0.8$ )						
Week	Demand	Forecast £	Forecast $\alpha = 0.8$	Error	Absolute Deviation	Smoothed MAD
1	9540	—	—	—	—	—
2	10350	9540	—810	810	810	810
3	9760	10188	+428	428	504	504
4	9250	9846	+596	596	578	578
5	10960	9369	-1591	1591	1388	1388
6	10650	10642	-8	8	284	284
7	10040	10648	+608	608	543	543
8	9870	10162	+292	292	342	342
9	9890	9928	+38	38	99	99
10	9430	9898	+468	468	394	394
11	9130	9524	+394	394	394	394
12	9980	9209	-771	771	696	696

Once again the forecast is above the actual demand in seven weeks and below the actual demand in four weeks but the absolute deviations are much more varied in size. In weeks 6 and 9 the forecasts were very close to the actual values but in week 5 there was a much greater discrepancy than when  $\alpha$  equals 0.4.

The smoothed mean absolute deviations are smaller on the whole than for  $\alpha = 0.4$  but there is a large value in Week 5. It might be wise to consider an intermediate value of  $\alpha$  to see whether that gives a closer fit.

**Exercise 13.5**

- (a) See Table A13.3.  $\alpha = 0.3$  gives the most accurate forecast.  
The prediction for January 19X4 is 244 cases.
- (b) See Table A13.4. The forecasts for  $\alpha = 0.5$  and  $\alpha = 0.7$  give similar accuracy overall but the higher value responds more rapidly to the sudden increase in July. Using  $\alpha = 0.7$ , prediction for January 19X4 is 272 cases.
- (c) See Table A13.5. None of the forecasts is particularly good as they consistently tend to underestimate this series.  $\alpha = 0.7$  is most accurate. Prediction for January 19X4 is 228 cases.

TABLE A13.3

WASHING-UP LIQUID: MONTHLY DEMAND 19X3. DATA SET (a)				
		Forecast	$\alpha = 0.3$	$\alpha = 0.5$
Jan	242	—	—	—
Feb	215	242	242	242
Mar	215	234	229	223
Apr	257	228	222	217
May	232	237	240	245
Jun	245	236	236	236
Jul	225	239	241	242
Aug	242	235	233	230
Sep	246	237	238	238
Oct	223	240	242	244
Nov	232	235	233	229
Dec	267	234	233	231

TABLE A13.4

WASHING-UP LIQUID: MONTHLY DEMAND 19X3. DATA SET (b)				
		Forecast	$\alpha = 0.3$	$\alpha = 0.5$
Jan	186	—	—	—
Feb	205	186	186	186
Mar	223	192	196	199
Apr	189	201	210	216
May	175	197	200	197
Jun	208	190	188	182
Jul	296	195	198	200
Aug	279	225	247	267
Sep	260	241	263	275
Oct	285	247	262	265
Nov	276	258	274	279
Dec	270	263	275	277

In (a) the demand was fluctuating randomly about a constant mean and a low value of the smoothing constant was adequate. In (b) there was a sudden increase in demand and a large value of the smoothing constant was preferred. In (c) there appears to be random fluctuations about a rising trend and in this case none of the values suggested for the smoothing constant seems appropriate. In such cases a more elaborate exponential smoothing model is required.

TABLE A13.5

WASHING-UP LIQUID:  
MONTHLY DEMAND 19X3. DATA SET (c)

		Forecast		
		$\alpha = 0.3$	$\alpha = 0.5$	$\alpha = 0.7$
		—	—	—
Jan	152	—	—	—
Feb	145	152	152	152
Mar	145	150	149	147
Apr	156	149	147	146
May	186	151	152	153
Jun	194	162	169	176
Jul	190	172	182	189
Aug	225	177	186	190
Sep	217	191	206	215
Oct	206	199	212	216
Nov	231	201	209	209
Dec	229	210	220	224

## Chapter 14

### Exercise 14.1

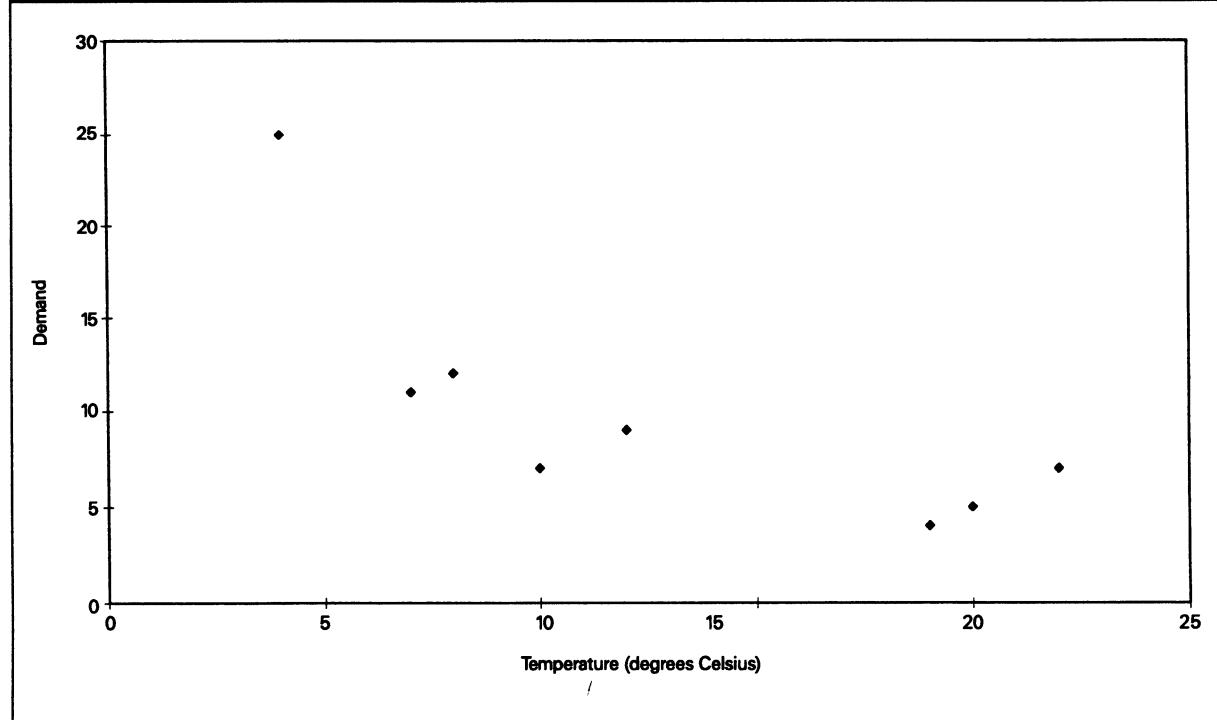
A glance at the data leaves the impression that larger values of turnover are associated with higher population values. This suggests that as the population numbers in the vicinity of a store increase so does the turnover in the store.

### Exercise 14.2

There are unlimited possibilities here. Try collecting data on pairs of variables you think may be related and plot the corresponding scatter diagrams.

FIGURE A14.1

EXERCISE 14.3. SCATTER DIAGRAM



**Exercise 14.3**

$$\Sigma x = 102 \quad \Sigma y = 80 \quad \Sigma x^2 = 1618 \quad \Sigma y^2 = 1110 \quad \Sigma xy = 781$$

$$\begin{aligned} r &= \frac{n\Sigma xy - \Sigma x \Sigma y}{\sqrt{(n\Sigma x^2 - (\Sigma x)^2)} * \sqrt{(n\Sigma y^2 - (\Sigma y)^2)}} \\ &= \frac{8 * 781 - 102 * 80}{\sqrt{8 * 1618 - (102)^2} * \sqrt{8 * 1110 - (80)^2}} \\ &= \frac{-1912}{\sqrt{2540} * \sqrt{2480}} \\ &= \frac{-1912}{50.398 * 49.800} \\ &= \frac{-1912}{2509.82} \\ &= -0.76. \end{aligned}$$

A correlation coefficient  $r = -0.76$  indicates a strong negative relationship. As the temperature increases, the number of sweaters sold decreases. The scatter diagram is shown in Figure A14.1.

**Chapter 15****Exercise 15.1**

The answer is shown in Table A15.1 and Figure A15.1.

TABLE A15.1

SLOPE AND INTERCEPT: RESULTS	
(a) Slope = 3	Intercept = 10
(b) Slope = -10	Intercept = 250
(c) Slope = -1	Intercept = 0.256
(d) Slope = 4	Intercept = 0

- (c) The value of the intercept tells us that even if the factory produces nothing, there will be a cost of £150 per day. This cost arises, for example, from providing equipment and utilities regardless of whether these are in use or not. (This is called a *fixed cost* and will be discussed in Chapter 22.)

**Exercise 15.3**

The equation of the regression line is  $y = 19.6 - 0.753x$ . This tells us that for every degree rise in temperature we can expect the demand for wool sweaters to drop by 0.75. The scatter diagram is shown in Figure A15.2.

**Exercise 15.4**

- (a) When  $x = 13$ ,  $y = 9.8$   
 (b) When  $x = 1$ ,  $y = 18.8$

We would predict sales of 10 sweaters when the temperature is 13 degrees and 19 sweaters when the temperature is 1 degree.

As we found in Exercise 14.3, the correlation coefficient is -0.76 indicating a strong negative relationship for the data. A temperature of 13 degrees is within the range of the data so we can feel reasonably confident about the estimate in (a). On the other hand, a temperature of 1 degree is lower than any of our data values so we should treat the estimate in (b) with caution. The weather in this case is so cold that a much larger demand might be expected and this is supported by a demand of 25 sweaters in the coldest week recorded in the data when the temperature was 4 degrees.

**Exercise 15.2**

- (a) Cost = £(150 + 12 \* 200) = £(150 + 2400) = £2550  
 (b) Every extra PCB produced adds £12 to the daily production cost. (This is called a *variable cost* and will be discussed in more detail in Chapter 22.)

FIGURE A15.1(a)

$$y = 10 + 3x$$

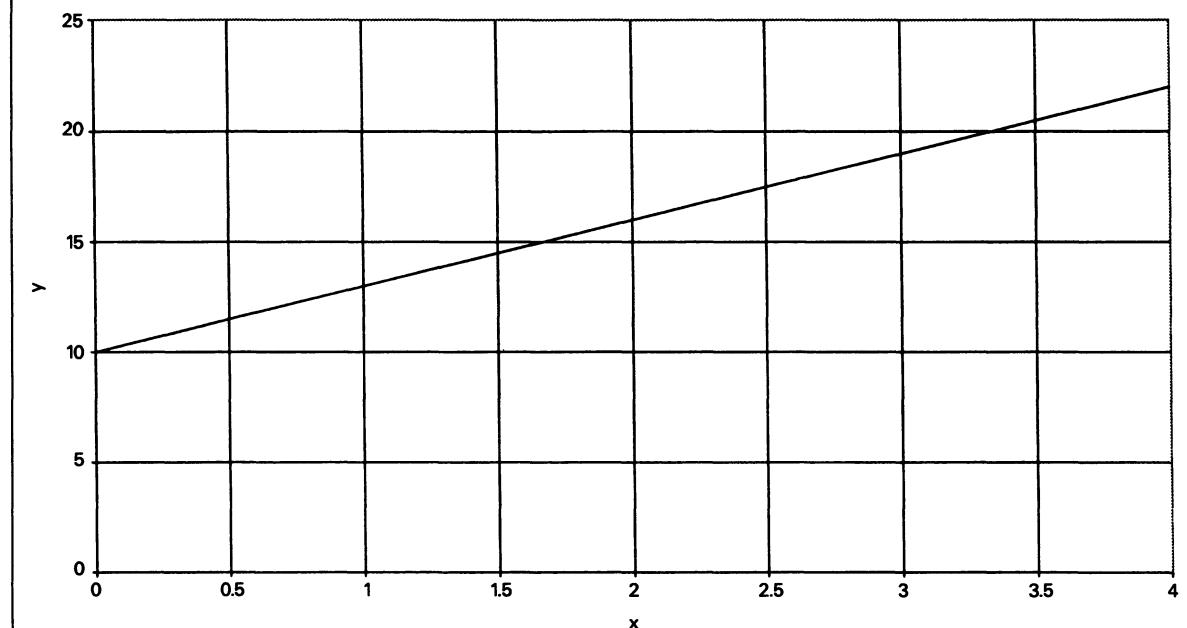


FIGURE A15.1(b)

$$y = 250 - 10x$$

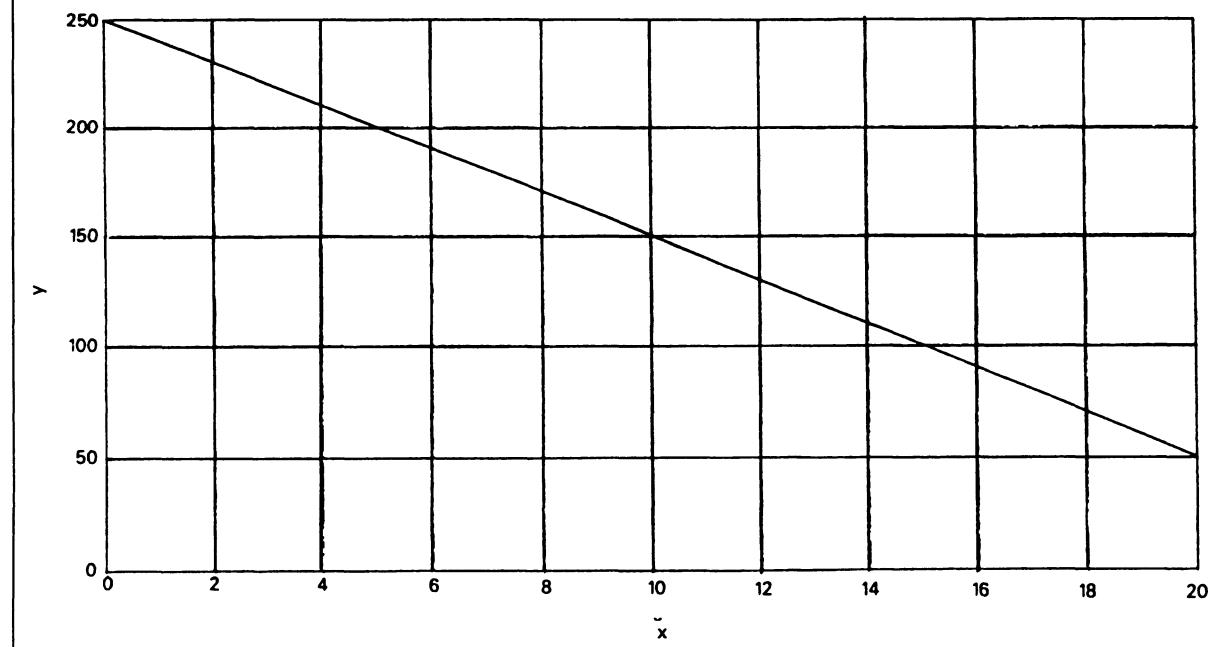


FIGURE A15.1(c)

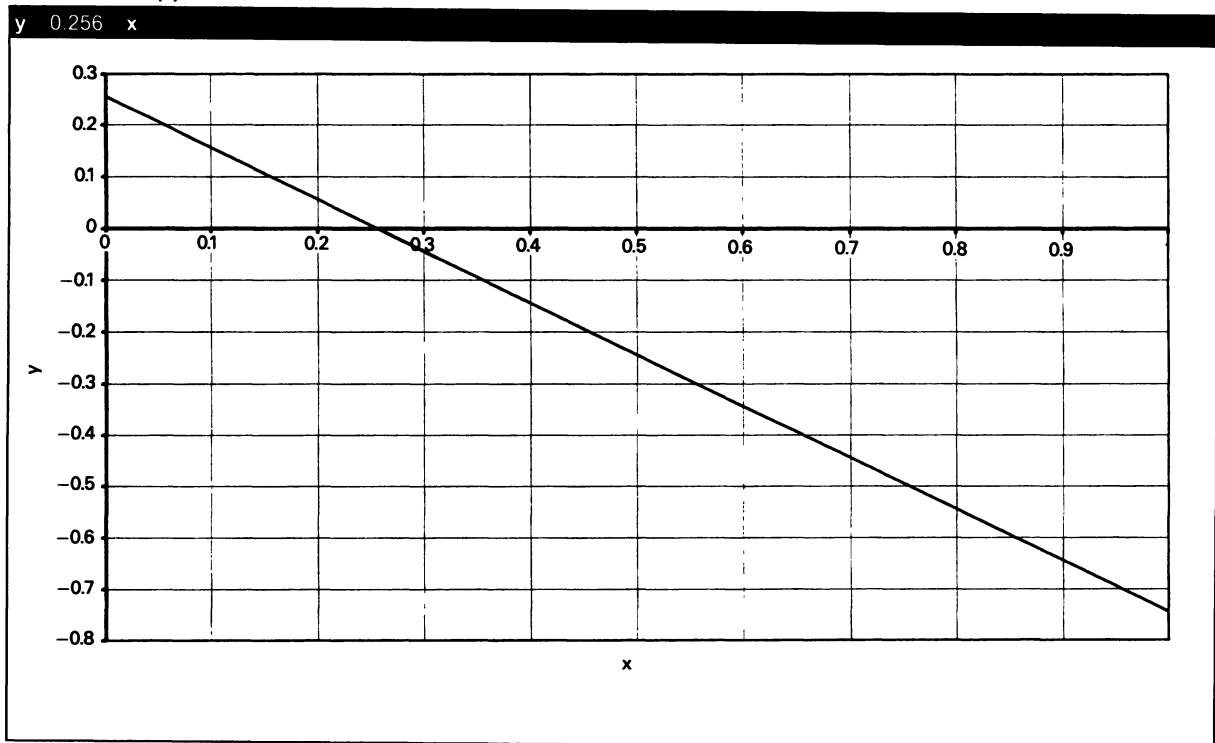


FIGURE A15.1(d)

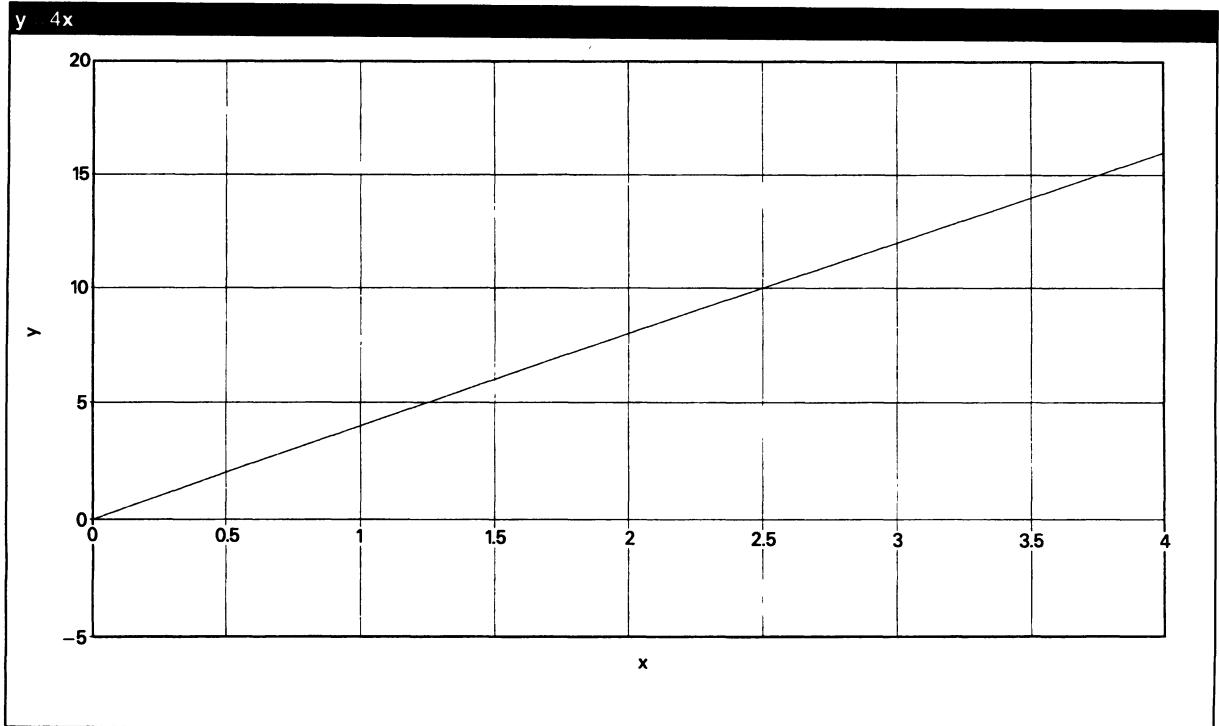
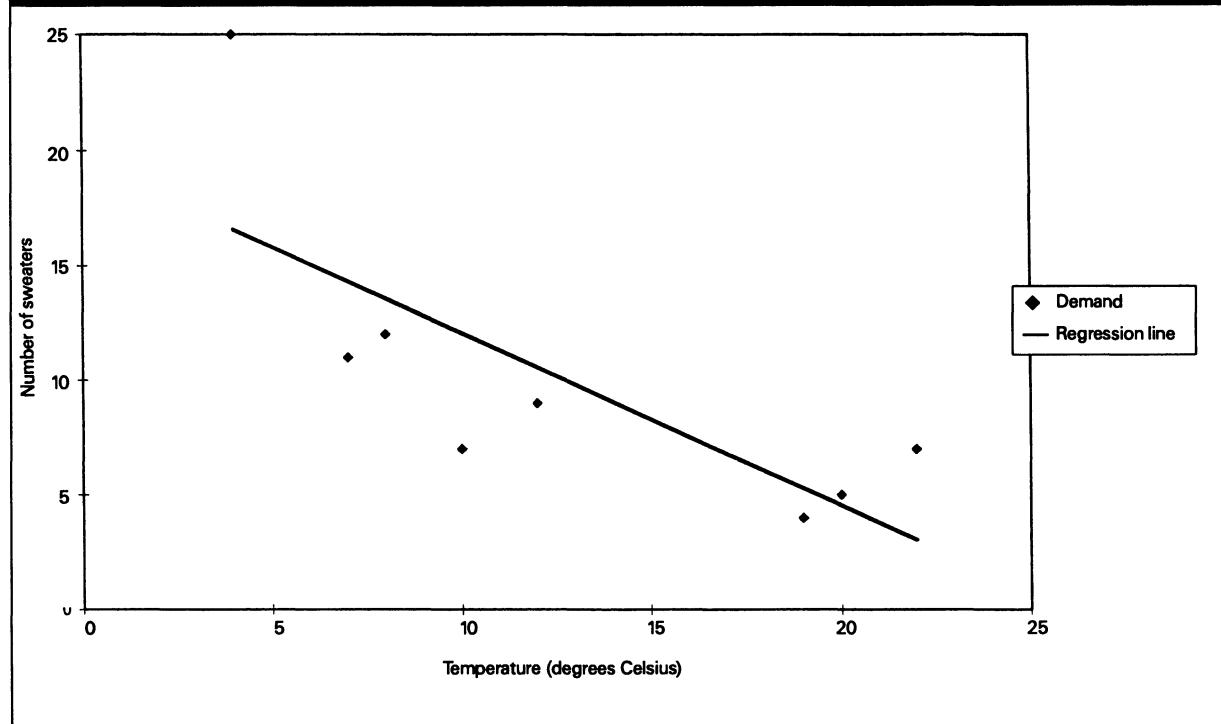


FIGURE A15.2

SCATTER DIAGRAM WITH REGRESSION LINE



## Chapter 16

### Exercise 16.1

The finished chart should be similar to Figure 14.1 (p. 114).

### Exercise 16.2

We can say that 74.4 per cent of the changes in household expenditure on clothing can be explained by changes in household income but only 54.5 per cent of the changes in household expenditure on clothing can be explained by changes in household size. We conclude that the stronger relationship is the one between expenditure and income.

### Exercise 16.3

The regression equation is

$$y = 16.00 + 0.0154x$$

where  $x$  is the floor area in square feet

$y$  is the monthly sales in £000

Correlation coefficient = 0.819

Coefficient of determination = 0.670

P-value of X Variable 1 = 0.006968

When  $x = 2500$ ,  $y = 16.00 + 0.0154 \times 2500 = 54.5$

Predicted value of sales = £54 500

Provided there are no sudden changes in sales conditions and coefficient is close to +1, indicating strong positive correlation. The coefficient of determination indicates that 67 per cent of the changes in sales can be explained by the changes in floor area using this regression equation. The sales area in the prediction is within the range of the data.

### Exercise 16.4

- (a) The regression equation is  $y = 19.6 - 0.753x$
- (b) The correlation coefficient is -0.762. Note that Excel does not give the sign of  $r$ ; you can tell that it is negative correlation from inspection of the scatter diagram or by

FIGURE A16.1

EXERCISE 16.4: REGRESSION PRINT-OUT

<b>SUMMARY OUTPUT</b>						
<b>Regression Statistics</b>						
Multiple R						
0.762						
R Square	0.580					
Adjusted R Square	0.510					
Standard Error	4.656					
Observations	8					
<b>ANOVA</b>						
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>	
Regression	1	179.9087	179.9087	8.2976	0.0280	
Residual	6	130.0913	21.6819			
Total	7	310				
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	19.5976	3.7164	5.2733	0.0019	10.5040	28.6913
X Variable 1	-0.7528	0.2613	-2.8806	0.0280	-1.3922	-0.1133

noting that the X Variable 1 coefficient in the regression equation is negative

(c) The coefficient of determination is 0.580

(d) The P-value corresponding to X Variable 1 is 0.0280

The regression equation is a good fit because the P-value is less than 0.05. The coefficient of determination tells us that 58 per cent of the variation in demand for sweaters can be explained by changes in temperature through this regression equation.

When  $x = 12$ ,  $y = 19.6 - 0.753 \times 12 = 10.564$ . We estimate that 10 or 11 sweaters will be sold when the temperature is 12 degrees. The regression print-out is shown in Figure A16.1.

Alternatively, we can write the model as

$$\text{Sales (£000)} = -49.42 + 24.54 * \text{Number of employees}$$

The other values of interest to us from the output are

the correlation coefficient (multiple R)	0.471
the coefficient of determination (R square)	0.222
the X Variable 1 (Employees) P-value	0.1698

We conclude that we have fairly weak positive correlation and that only 22.2 per cent of the variation in Sales can be explained by this linear relationship with Number of employees. The P-value for the Employees variable is greater than 0.05 so we cannot be confident that there is a linear relationship with Number of employees.

Your diagram should show a wide scatter of points about the regression line.

## Chapter 17

### Exercise 17.1

Your scatter diagram should indicate fairly strong positive correlation; look at Figure A17.1.

### Exercise 17.2

Interpreting the output, we see the linear regression model is

$$y = -49.42 + 24.54x$$

where  $y$  = Sales (£000) and  $x$  = Number of employees

### Exercise 17.3

$$\text{Sales (£000)} = 129.8 + 3.493 * \text{Floorspace (000 sq ft)}$$

When Floorspace = 35 (000 sq ft)

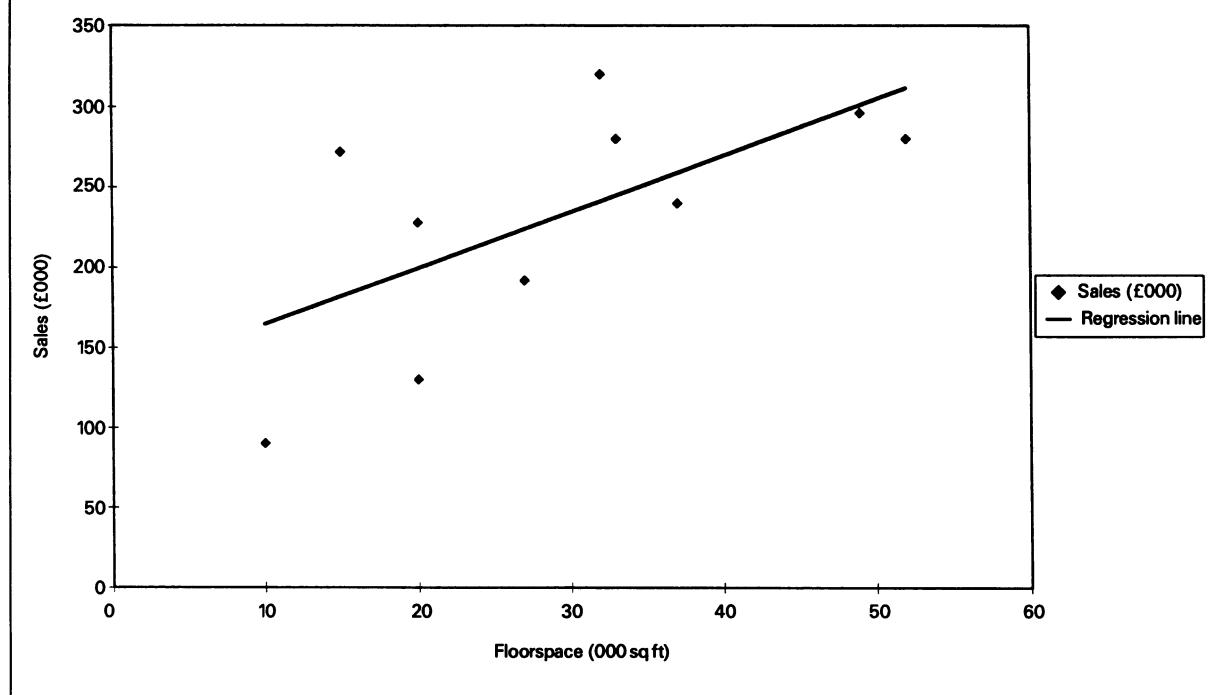
$$\text{Sales (£000)} = 129.8 + 3.493 * 35 = 252.055$$

Estimated sales = £252 000

$$\text{Sales (£000)} = -49.42 + 24.54 * \text{Number of employees}$$

FIGURE A17.1

RELATIONSHIP BETWEEN SALES AND FLOORSPACE



When Number of employees = 14

$$\text{Sales (£000)} = -49.42 + 24.54 * 14 = 294.14$$

Estimated sales = £294 000

These two estimates are less than the multiple regression estimate. As a test of the model, we should try to find a store of this size and number of employees and see which of the three estimates is closest. If the multiple regression model does perform better than the other two, then this would be additional evidence in its favour.

#### Exercise 17.4

The regression analysis is given in Figure A17.2.

From the output it can be seen that the best fit is given by the linear regression model of expenditure on income, as this is the only model where the P-value is less than 0.05. In this model, however, only 37.6 per cent of the variation in expenditure is explained by the changes in income. The R square value in the multiple regression model at 0.473 is higher but the P-values and the Significance F value are all above 0.05 so we would not have as much confidence in the predictions made with this equation.

The regression equation is

$$\text{Expenditure (£000)} = 24.95 + 0.529 * \text{Income (£000)}$$

When Income = 25 (£000)

$$\text{Expenditure (£000)} = 24.95 + 0.529 * 25 = 38.175$$

We predict that, if a customer of Lively Oldies Travel Company has an after-tax income of £25 000, their annual expenditure on travel will be approximately £3800.

## Chapter 18

The answer to Exercise 18.1 is provided in the text.

#### Exercise 18.2

##### Allocate

Counter staff wages, £20 worth of perishable items which have passed their sell-by date, and must be destroyed, Electronic scales, Plastic bags, Set of knives.

##### Apportion

Rent, Store manager's salary, Cleaner's wage.

FIGURE A17.2

LIVELY OLDIES TRAVEL COMPANY: REGRESSION OUTPUT

SUMMARY REGRESSION OUTPUT						
		EXPENDITURE on AGE				
<i>Regression Statistics</i>						
Multiple R	0.4636					
R Square	0.2149					
Adjusted R Square	0.1364					
Standard Error	8.3790					
Observations	12					
 ANOVA						
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>	
Regression	1	192.182	192.182	2.737	0.129	
Residual	10	702.068	70.207			
Total	11	894.25				
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	4.1086	21.0770	0.1949	0.8494	-42.8539	51.0710
X Variable 1	0.5222	0.3156	1.6545	0.1290	-0.1811	1.2255
 EXPENDITURE on INCOME						
<i>Regression Statistics</i>						
Multiple R	0.6130					
R Square	0.3758					
Adjusted R Square	0.3133					
Standard Error	7.4714					
Observations	12					
 ANOVA						
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>	
Regression	1	336.029	336.029	6.020	0.034	
Residual	10	558.221	55.822			
Total	11	894.25				
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	24.9527	6.0230	4.1429	0.0020	11.5327	38.3727
X Variable 1	0.5290	0.2156	2.4535	0.0341	0.0486	1.0094
 EXPENDITURE on AGE and INCOME						
<i>Regression Statistics</i>						
Multiple R	0.6877					
R Square	0.4730					
Adjusted R Square	0.3559					
Standard Error	7.2365					
Observations	12					
 ANOVA						
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>	
Regression	2	422.953	211.476	4.038	0.056	
Residual	9	471.297	52.366			
Total	11	894.25				
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	2.7208	18.2151	0.1494	0.8846	-38.4846	43.9262
X Variable 1	0.3643	0.2828	1.2884	0.2297	-0.2754	1.0041
X Variable 2	0.4547	0.2166	2.0993	0.0652	-0.0353	0.9448

**Exercise 18.3**

The answer is shown in Figure A18.1.

**FIGURE A18.1****PURELY TRAVEL LTD: COST APPORTIONMENT**

<b>Cost</b>	<b>Base for Apportionment</b>
Heat and Light	Floor Space
Rates	Floor Space
Clerical Expenses	Turnover
Computer System, Depreciation and Maintenance	Turnover
Canteen	Number of Employees

*Depreciation  
Fixtures and  
Fittings, Rent  
and Rates,*

**Heat and Light** Apportion Base: sq ft  
**Reason:** charges relate to proportion of space used

**Bags** Apportion Base: Sales  
**Reason:** the more sold, the more wrapped (assuming take-away trade in cafe)

**Salary Manager** Apportion Base: Gross profit  
**Reason:** manager responsible for profit

(b) Figure A18.2 shows the restated profit and loss accounts.

(c) Based on the approach used above, it would seem that the coffee shop is the more profitable part of the business and shows good potential for expansion. Other considerations to be included are the likely customer demand patterns, expected reactions from the competition and the staff skills and training required if the coffee shop is expanded.

**Exercise 18.4**

(a) **Grocery, Provisions, Bakery, Wines and Spirits, Kiosk, Produce, Hard Goods, Soft Goods.**

Checkouts, Warehouse, Service, Canteen are service cost centres.

(b) This can be done by making broad product groups into cost centres. The ultimate step is to treat each individual product line as a cost centre in its own right.

(c) It enables management to assess the profitability of the different parts of the organisation. This facilitates a rational approach to decision-making. If profit can be assumed to be an important objective of the organisation, then a knowledge of the contribution to profit made by the different parts of the organisation allows you to boost the profitable aspects of the business and to investigate and, if necessary, eliminate the unprofitable ones. In addition, a breakdown of the organisation into profit and cost centres means that the responsibility for cost control can be given to individual managers who are then held accountable.

**Exercise 18.5**

- (a) **Staff Wages** Apportion Base: Sales  
**Reason:** staff switched to busy areas
- Salary Cook** Allocate  
**Reason:** cook works for coffee shop only

**FIGURE A18.2****LORRAINE'S BREAD SHOP AND COFFEE SHOP: PROFIT AND LOSS ACCOUNT  
9 OCTOBER TO 15 OCTOBER 199X**

	<b>Bread Shop</b>	<b>Coffee Shop</b>
	£	£
Sales	6000	4000
Cost of Goods Sold	4500	2000
Gross Profit	1500	2000
Expenses		
Staff Wages	480	320
Salary Cook		150
Depreciation		
Fixtures and		
Fittings	54	34
Rent and Rates	314	196
Heat and Light	25	15
Bags	21	14
Salary Manager	122	163
	1016	892
Net Profit	484	1108

## Chapter 19

### Exercise 19.1

The best match between the cost items and the organisational level at which they can be controlled is (1) and (C), (2) and (A), (3) and (B).

### Exercise 19.2

(a) A detailed cash budget is shown in Figure A19.1.

### FIGURE A19.1

JOHN BLOGGS: CASH BUDGET OCTOBER TO DECEMBER			
	October	November	December
	£	£	£
Opening Balance	50 000	(-18 117)	(-8 084)
Cash Receipts			
Bank Loan	10 000		
Cash Sales	12 500	22 500	42 500
Total Receipts	22 500	22 500	42 500
Cash Payments			
Lease Shop	50 000		
Fixtures and Fittings	10 000		
Stock	20 000		
Payments Creditors	0	5 000	9 000
Rent	4 000		
Rates	1 750		
Water	200		
Wages Staff	2 250	4 050	7 650
Salary	1 167	1 167	1 167
Promotions	1 250	2 250	4 250
Total Payments	90 617	12 467	22 067
Closing Balance	(-18 117)	(-8 084)	12 349

(b), (c) Figures A19.2 and A19.3 show summaries of the budgets for the whole three months; for a more detailed approach to monthly planning these can be broken down into monthly budgets.

### FIGURE A19.2

JOHN BLOGGS: BUDGETED PROFIT AND LOSS ACCOUNT FOR THE PERIOD OCTOBER TO DECEMBER

	£	£
Sales		77 500
Gross Profit (60% of Sales)		46 500
<b>Expenses:</b>		
Depreciation	1 500	
Rent	4 000	
Rates	1 750	
Water	200	
Promotions	7 750	
Salary	3 501	
Wages	13 950	
		32 651
<b>Net Profit</b>		<b>13 849</b>

### FIGURE A19.3

JOHN BLOGGS: BUDGETED BALANCE SHEET FOR END OF DECEMBER

	Cost	Deprec- ation	Net Book Value
	£	£	£
Fixed Assets			
Premises	50 000		
Fixtures and Fittings	10 000		
	60 000	1 500	58 500
Current Assets			
Stock	20 000		
Cash	12 349		
	32 349		
Creditors:			
due within one year			
Trade Creditors		17 000	
Net Current Assets			15 349
Net Total Assets			73 849
Creditors:			
due after one year			
Long-term Loan Capital		10 000	
	63 849		
Owner's Capital	50 000		
Retained Profit	13 849		
	63 849		

## Chapter 20

### Exercise 20.1

The answer is presented in Figure A20.1.

**FIGURE A20.1**

TOY MANUFACTURER: BUDGETED PROFIT AND LOSS STATEMENT FOR THE PERIOD 1 JANUARY 19X5 TO 31 DECEMBER 19X5	
£	£
Sales	330 000
- Cost of Goods Sold	220 000
= Gross Profit	<u>110 000</u>
- Expenses:	
Wages	33 000
Advertising	33 000
Rent and Rates	<u>26 250</u>
	92 250
= Net Profit	<u>17 750</u>

### Exercise 20.2

- (a) *Grocer* – For example, packing customer bags at the checkout, dealing with complaints
- (b) *Public house* – For example, organising a darts team, greeting regular customers
- (c) *University* – For example, marking dissertations, writing research papers

### Exercise 20.3

Figure A20.2 provides the full variance analysis.

**FIGURE A20.2**

JINX LTD: VARIANCE ANALYSIS

	Budget	Actual	Variance	Adverse/ Favourable
	£	£	£	
Sales	10 000	9 000	(1 000)	Adverse
Cost of				
Goods Sold	6 000	5 800	200	Favourable
Gross Profit	4 000	3 200	(800)	Adverse
Expenses	<u>3 000</u>	<u>2 800</u>	<u>200</u>	Favourable
Net Profit	<u>1 000</u>	<u>400</u>	<u>(600)</u>	Adverse

#### Rule for calculating variances

$$\begin{array}{ll} \text{Sales and Profit:} & \text{Actual} - \text{Budgeted} = \text{Variance} \\ \text{Cost:} & \text{Budgeted} - \text{Actual} = \text{Variance} \end{array}$$

### Exercise 20.4

At a glance it is noticeable that actual sales were considerably lower than planned. The question arises why the sales forecast turned out to be so inaccurate. Maybe there were a lot of unforeseen and unpredictable factors in the environment, which could not have been anticipated. It is also surprising that rent and rates show an adverse variance, as any review in this area should have been anticipated at the time the budget was set.

However, the remainder of the cost variances appear to be favourable. If no further analysis was carried out, this could lead to the erroneous conclusion that all was well. Further calculations quickly show, that whilst the cost items were lower than the budget, this is of course only to be expected in view of the much lower sales level. Unfortunately the costs were not reduced in line with the sales, so that overall a rather large adverse variance on the net profit results.

### Exercise 20.5

The full variance analysis is shown in Figure A20.3.

FIGURE A20.3

	Budget Boom	Budget Recession	Actual Recession	Variance
	£	£	£	£
Sales	112 000	56 000	55 500	(500)
Cost of Goods Sold	67 200	33 600	42 180	(8 580)
Gross Profit	44 800	22 400	13 320	(9 080)
Expenses				
Staff	15 680	7 840	5 550	2 290
Wrapping Material	2 240	1 120	832.50	287.50
Storage and Handling	7 840	3 920	4 162.50	(242.50)
Rent	5 000	5 000	5 200	(200)
Depreciation	1 000	1 000	1 000	0
Total Expenses	31 760	18 880	16 745	2 135
Net Profit	13 040	3 520	(3 425)	(6 945)

**Exercise 20.6**

Figure A20.4 is a print-out of the spreadsheet template.

**Chapter 21****Exercise 21.1**

Land, labour, machinery, buildings, raw materials, energy, vehicles, capital, and other similar items.

**Exercise 21.2****(a) Fixed factors:**

Head office, aeroplanes, permanent workforce

**Variable factors:**

In-flight meals, fuel, casual labour

FIGURE A20.4

DIY RETAILER: TEMPLATE FOR BRANCH BUDGETED PROFIT AND LOSS ACCOUNT

A	B	C	D	E	F
1 Budgeted Profit and Loss Account	2 £	3 %	4 Budgeted	5 Sales	6 Variance
7 Actual	8 Sales	9 Budgeted	10 Sales	11 Variance	12
4 Sales					=B4-D4
5 Cost of Sales		=B5/B\$4*100		=D5/D\$4*100	=D5-B5
6 Gross Profit	=B4-B5	=B6/B\$4*100	=D4-D5	=D6/D\$4*100	=B6-D6
7					
8 Selling Expenses:					
9 Wages		=B9/B\$4*100		=D9/D\$4*100	=D9-B9
10 Heat and light		=B10/B\$4*100		=D10/D\$4*100	=D10-B10
11 Maintenance		=B11/B\$4*100		=D11/D\$4*100	=D11-B11
12 Telephone		=B12/B\$4*100		=D12/D\$4*100	=D12-B12
13 Credit charges		=B13/B\$4*100		=D13/D\$4*100	=D13-B13
14 Till discrepancies		=B14/B\$4*100		=D14/D\$4*100	=D14-B14
15 Travel		=B15/B\$4*100		=D15/D\$4*100	=D15-B15
16 Printing and postage		=B16/B\$4*100		=D16/D\$4*100	=D16-B16
17 Other		=B17/B\$4*100		=D17/D\$4*100	=D17-B17
18 Total Selling Expenses	=SUM(B9:B17)	=B18/B\$4*100	=SUM(D9:D17)	=D18/D\$4*100	=D18-B18
19					
20 Other branch expenses		=B20/B\$4*100		=D20/D\$4*100	=D20-B20
21 Concession income		=B21/B\$4*100		=D21/D\$4*100	=B21-D21
22					
23 Store Contribution	=B6-B18-B20+B21	=B23/B\$4*100	=D6-D18-D20+D21	=D23/D\$4*100	=B23-D23

**(b) Fixed factors:**

Premises, tables, chairs, crockery, permanent workforce, kitchen equipment

**Variable factors:**

Food, drink, energy for cooking, paper goods, casual labour

**(c) Fixed factors:**

Premises, fixtures and fittings, heat and light

**Variable factors:**

Sales wrapping

**(d) Fixed factors:**

Factory, canning machinery, permanent workforce

**Variable factors:**

Fruit, sugar, metal for cans, casual labour, power for operating production line

**Proposed operation****Fixed factors:**

Very small number of highly skilled staff (in the central production unit), expensive central ovens, chilled distribution, chilled storage in each store

**Variable factors:**

Large number of semi-skilled staff, fuel for ovens in store.

**(b)** In both situations there is high dependence on fixed factors, namely highly skilled staff and cheap ovens in the current method or expensive central oven and chilled distribution in the proposed method. In the proposed method, the majority of labour costs are variable.

**(c)** The central ovens allow for economies of scale because very large batches will be able to be processed together before being despatched to the separate stores. This will reduce setting-up times and minimise down-time between processing different products. There may be diseconomies of scale if the distribution system cannot operate efficiently due to congested roads or poor siting of central bakery.

**Exercise 21.3****(a) Fixed costs:**

Rent or mortgage repayments on premises, rates, depreciation of fixtures, insurance, wages of permanent workforce

**Variable costs:**

Wrapping materials, purchase of shoes for re-sale

**Semi-variable costs:**

Telephone bill, electricity bill, cleaning and maintenance

**(b) Fixed costs:**

Rent or loan repayments on premises, rates, depreciation of machinery, insurance, wages of permanent workforce

**Variable costs:**

Purchase of fruit and other ingredients, metal for cans, labels, cartons for packaging, wages of casual labour

**Semi-variable costs:**

Gas or electricity bill, cleaning and maintenance

**Exercise 21.4****(a) Current operation****Fixed factors:**

Large number of highly skilled staff, relatively cheap ovens

**Variable factors:**

Ingredients, fuel for ovens in store

**Exercise 21.5**

The customer perceives all the outlets as part of the same organisation and the franchisee gains the benefit of nationwide and international advertising campaigns (and their attendant publicity).

The franchisor can negotiate bulk-discounts from manufacturers resulting in lower prices to the franchisee.

Because the franchisor is well known and respected, there is less risk to the franchisee when the outlet opens. Financial institutions may be more willing to make funds available to potential franchisees and on better terms.

**Exercise 21.6**

The major supermarket chains use information technology in many ways: electronic point of sale (EPOS), electronic funds transfer at point of sale (EFTPOS), electronic data interchange (EDI) to order from suppliers, electronic mail to communicate with employees within the organisation, electronic stock control.

These all involve high fixed costs at installation but once in place allow for economies of scale such as greater speed at checkouts, paperless transactions, instantaneous transfer of funds, analysis of performance by product group or by product

line, knowledge of customer buying habits, less wastage of produce, greater ability to meet demand and many more advantages like these.

## Chapter 22

### Exercise 22.1

The calculations are:

#### Bracken Ltd: Calculation of break-even point

Total fixed costs = £5000 per year

Total variable costs = £2.50 per unit

Unit contribution = £4 – £2.50 = £1.50

Break-even point (units) = £5000/£1.50 = 3333.33

Break-even point (£) = 3334 \* £4 = £13 336

Bracken Ltd needs to sell 3334 gnomes each year to break even. This represents a sales revenue of £13 336. Note that rather than dealing with a fraction of a gnome, we have rounded up to the next whole number.

### Exercise 22.2

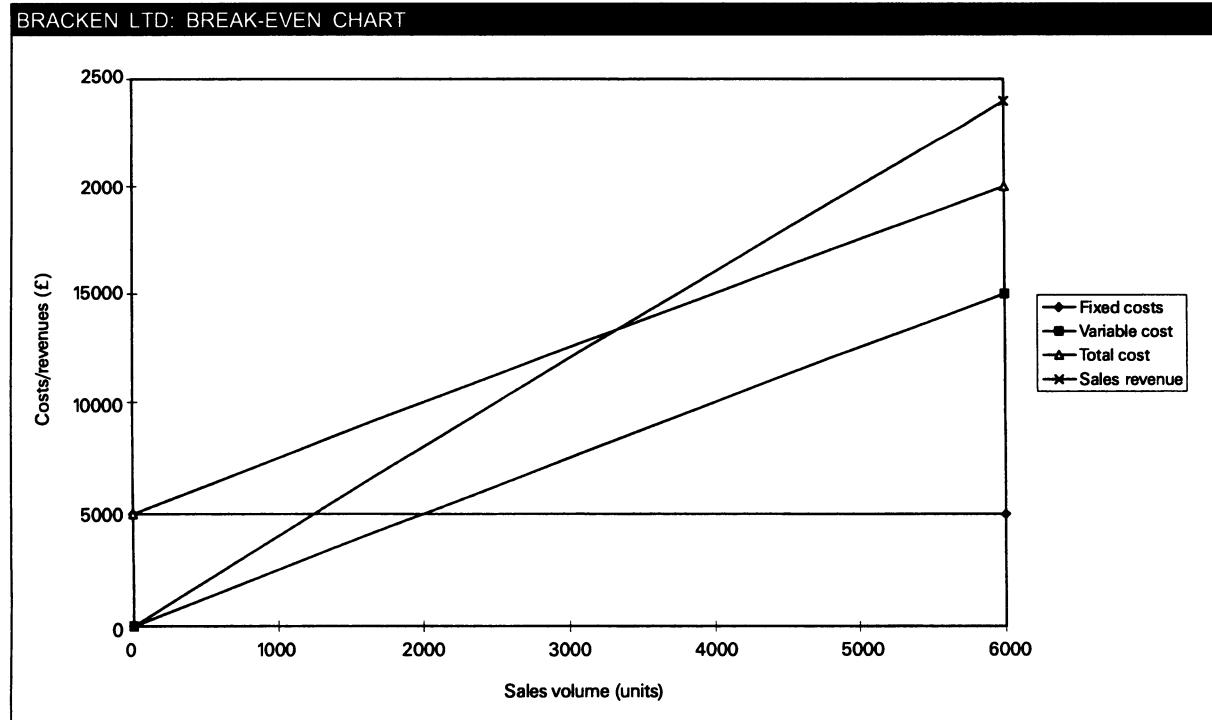
- (a) If Maria recruits only 250 members, she will be 40 contributions short of her break-even level; she will suffer a loss of  $40 * £50$  or £2000
- (b) The most likely scenario is a membership of 400 giving a profit of  $(400 - 290) * £50 = £5500$

### Exercise 22.3

For the break-even chart (Figure A22.1), observe the following workings.

- The X-scale goes from 0 to 6000 units.
- The points on the revenue line are worked out like this:
  - When sales volume = 0, sales revenue = 0
  - When sales volume = 6000 units, sales revenue =  $6000 * £4 = £24\,000$
- The Y-scale goes from 0 to £24 000.
- The fixed cost line is at £5000 regardless of the sales volume.

FIGURE A22.1



- The points on the variable cost line are worked out as follows:

When sales volume = 0, variable cost = 0

When sales volume = 6000 units,

variable cost =  $6000 * £2.50 = £15\,000$

- Finally, the total cost is computed by adding the fixed and variable cost together at the different sales volumes:

When sales volume = 0, total cost = £5000

When sales volume = 6000, total cost = £20 000

Drawing these revenue and cost lines on the graph enables the break-even point to be found. You will be able to obtain an approximate value only from your graph, about 3300 gnomes giving a sales revenue of around £13 400.

Profit at 5000 gnomes = £2500

Loss at 3000 gnomes = £500

### Exercise 22.4

The calculations are:

#### Calculations for Exercise 22.4

Unit contribution =  $£120 - £100 = £20$

Break-even point =  $£14\,500/20 = 725$  units

This corresponds to a sales revenue of £87 000

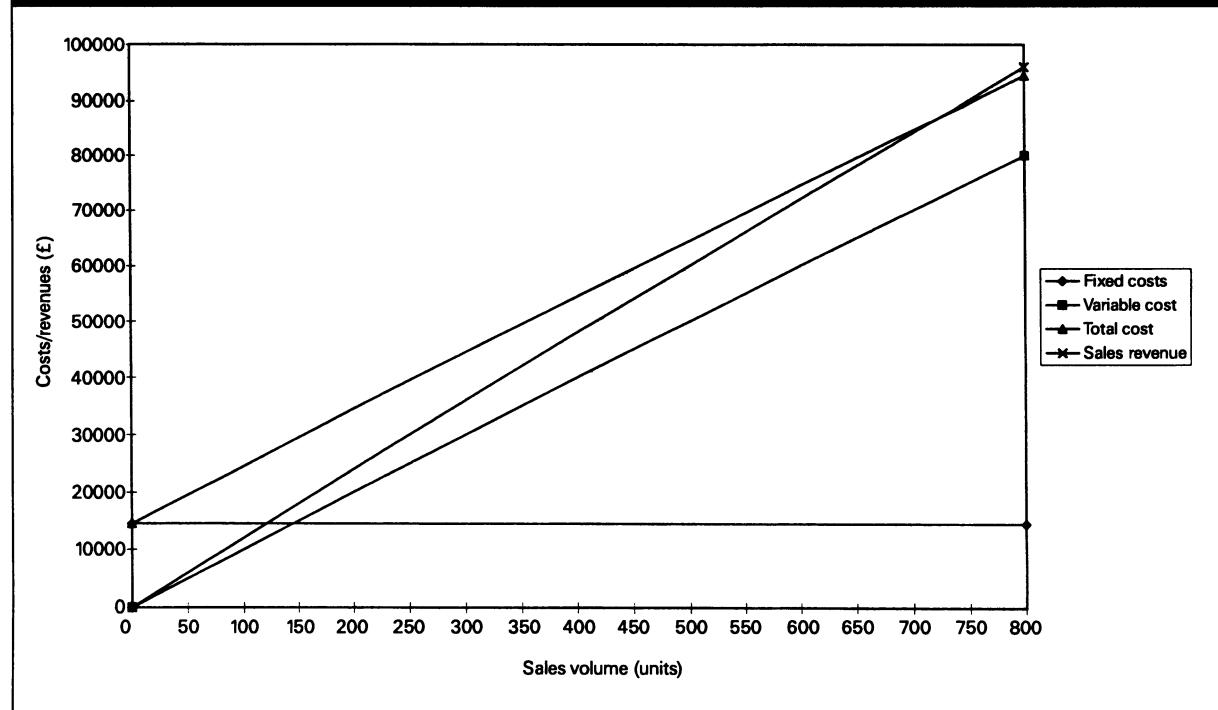
Profit if there are 750 members =  $25 * £20 = £500$

The break-even chart is shown in Figure A22.2.

Maria does not make as much profit as before. She is better keeping the membership fee at £150 and looking after her current 400 members well so that there is no fall off in membership.

FIGURE A22.2

MARIA'S STUDIO: NEW BREAK-EVEN CHART



**Exercise 22.5**

The calculation is:

**Kevin's Gym: Calculations for Exercise 22.5****Fixed Annual Costs**

Depreciation Charge £150 000/6	= £25 000
Maintenance	= £ 4 000
Insurance	= £ 4 000
Total	= £33 000

Variable costs = £56 per member per year

Selling price = £150 per member per year

$$\text{Unit contribution} = £150 - 56 = £94$$

Break-even point (BEP) = £33 000/£94 = 351.1 members or £52 660 in revenue.

We can see that Kevin needs a considerably higher membership than Maria in order to break even. This is to pay for his higher fixed costs. However, once he has broken even, every new member brings him £94 extra profit as compared to the £50 that Maria gains. If Kevin's membership stabilises at 400, the same value as Maria, his profit will be  $(400 - \text{BEP}) * £94 = £4600$ . We saw in Section 22.3 that Maria's profit was £5500 at this membership level.

Break-even point = £9300/£8.50 = 1 094 sessions per year  
This equates to  $1094/50 = 22$  sessions per week

Float tank:

Annual fixed costs

$$\text{Depreciation charge} = £30 000/6 = £5000$$

$$\text{Staffing and cleaning} = £100 * 50 = £5000$$

$$\text{Total fixed costs} = £10 000$$

Variable costs = £2.50 per customer

Selling price = £20 per customer

$$\text{Unit contribution} = £17.50$$

Break-even point = £10 000/£17.50 = 571.4 sessions per year

This equates to  $571.4/50 = 11.4$  sessions per week

The float tank has a lower break-even point. There are 320 members at present. It seems likely that as the facilities are open for a maximum of 60 sessions per week that they would be fully utilised. Based on this assumption, a comparison of potential annual profits can be carried out:

**Maria's Studio: Comparison of projected profits**

$$\begin{aligned}\text{Annual profit from massage parlour} \\ &= (60 * 50 - 1094) * £8.50 \\ &= £16 200\end{aligned}$$

$$\begin{aligned}\text{Annual profit from float tank} \\ &= (60 * 50 - 571.4) * £17.50 \\ &= £42 500\end{aligned}$$

Both these profits are much higher than the slendertone concession income. The float tank appears to be the best option. However, naturally other factors, such as the initial capital investment and the risk associated with the options should also be taken into consideration before making a final decision.

**Chapter 23****Exercise 23.1**

This answer is discussed in the text.

**Exercise 23.2**

The sensitivity analysis is shown in Figure A23.1.

**Exercise 22.6**

The calculations are:

**Maria's Studio: Comparison of alternative projects****Slendertone consultant**

$$\text{Extra income} = 50 * £150 = £7500 \text{ per year}$$

**Massage parlour:****Annual fixed costs**

$$\text{Depreciation charge} = £1800/6 = £300$$

$$\text{Staff} = £9000$$

$$\text{Total fixed costs} = £9300$$

$$\text{Variable costs} = £1.50 \text{ per customer}$$

$$\text{Selling price} = £10 \text{ per customer}$$

$$\text{Unit contribution} = £8.50$$

FIGURE A23.1

## KUMFEE BED COMPANY: SENSITIVITY ANALYSIS

INPUT		Bunkee	Luxuree	Sofee	Foldee	SENSITIVITY ANALYSIS		SCENARIO 0		SCENARIO 1		SCENARIO 2		SCENARIO 3		SCENARIO 4	
Description of change	No change																
Adjusted input						Fixed costs	23000	75000	45000	15000							
Variable cost per unit	54	120	62	40													
Selling price per unit	350	1650	750	120													
Minimum sales volume(units)	100	50	200	300													
Maximum sales volume(units)	400	250	400	800													
Most likely sales volume(units)	300	150	350	600													
OUTPUT						SENSITIVITY ANALYSIS		SCENARIO 0		SCENARIO 1		SCENARIO 2		SCENARIO 3		SCENARIO 4	
Unit contribution		296	1530	688	80												
Break-even point (units)		77.70	49.02	65.41	187.50												
Break-even point (£)		27195.95	80882.35	49055.23	22500.00												
Profit/Loss at minimum sales volume		6600	1500	92600	9000												
Profit/Loss at maximum sales volume		95400	307500	230200	49000												
Profit/Loss at most likely sales volume		65800	154500	195800	33000												
INPUT						SENSITIVITY ANALYSIS		SCENARIO 0		SCENARIO 1		SCENARIO 2		SCENARIO 3		SCENARIO 4	
Description of change	Demand down by 15%																
Adjusted input						Fixed costs	23000	75000	45000	15000							
Variable cost per unit	54	120	62	40													
Selling price per unit	350	1650	750	120													
Minimum sales volume(units)	85	42.5	170	255													
Maximum sales volume(units)	340	212.5	340	680													
Most likely sales volume(units)	255	127.5	297.5	510													
OUTPUT						SENSITIVITY ANALYSIS		SCENARIO 0		SCENARIO 1		SCENARIO 2		SCENARIO 3		SCENARIO 4	
Unit contribution		296	1530	688	80												
Break-even point (units)		77.70	49.02	65.41	187.50												
Break-even point (£)		27195.95	80882.35	49055.23	22500.00												
Profit/Loss at minimum sales volume		2160	-9975	71960	5400												
Profit/Loss at maximum sales volume		77640	250125	188920	39400												
Profit/Loss at most likely sales volume		52480	120075	159680	25800												
INPUT						SENSITIVITY ANALYSIS		SCENARIO 0		SCENARIO 1		SCENARIO 2		SCENARIO 3		SCENARIO 4	
Description of change	Selling price down by 5%																
Adjusted input						Fixed costs	23000	75000	45000	15000							
Variable cost per unit	54	120	62	40													
Selling price per unit	332.5	1567.5	712.5	114													
Minimum sales volume(units)	100	50	200	300													
Maximum sales volume(units)	400	250	400	800													
Most likely sales volume(units)	300	150	350	600													
OUTPUT						SENSITIVITY ANALYSIS		SCENARIO 0		SCENARIO 1		SCENARIO 2		SCENARIO 3		SCENARIO 4	
Unit contribution		278.5	1447.5	650.5	74												
Break-even point (units)		82.59	51.81	69.18	202.70												
Break-even point (£)		27459.61	81217.62	49289.01	23108.11												
Profit/Loss at minimum sales volume		4850	-2625	85100	7200												
Profit/Loss at maximum sales volume		88400	286875	215200	44200												
Profit/Loss at most likely sales volume		60550	142125	182675	29400												
INPUT						SENSITIVITY ANALYSIS		SCENARIO 0		SCENARIO 1		SCENARIO 2		SCENARIO 3		SCENARIO 4	
Description of change	Fixed costs up by 5%																
Adjusted input						Fixed costs	24150	78750	47250	15750							
Variable cost per unit	54	120	62	40													
Selling price per unit	350	1650	750	120													
Minimum sales volume(units)	100	50	200	300													
Maximum sales volume(units)	400	250	400	800													
Most likely sales volume(units)	300	150	350	600													
OUTPUT						SENSITIVITY ANALYSIS		SCENARIO 0		SCENARIO 1		SCENARIO 2		SCENARIO 3		SCENARIO 4	
Unit contribution		296	1530	688	80												
Break-even point (units)		81.59	51.47	68.68	196.88												
Break-even point (£)		28555.74	84926.47	51507.99	23825.00												
Profit/Loss at minimum sales volume		5450	-2250	90350	8250												
Profit/Loss at maximum sales volume		94250	303750	227950	48250												
Profit/Loss at most likely sales volume		64650	150750	193550	32250												

All the beds are profitable at the most likely sales volumes. Luxuree is vulnerable to all scenarios, making a loss at lower sales volumes, except in the case of increased variable costs. Luxuree has a high selling price and the highest unit contribution, so if it were possible to stimulate demand to the high end of the range, it would offer very high profits.

Although Bunkee and Foldee have lower fixed costs, they fail to deliver high profits because the selling price is relatively low, resulting in low unit contribution. Their sales would need to be unrealistically high before their profits approached those of Sofee. If the company is confident of its demand predictions, it

should choose Sofee. It has moderately high fixed costs and a mid-range price but sells reasonably well.

### Exercise 23.3

Looking at Figure 23.6, we see that the video offering is a high fixed cost, low variable cost, low selling price and high sales volume operation as compared with the telephone option which, in relative terms, has a low fixed cost, high variable cost, high selling price and low sales volume.

In Scenario 0, at the most likely sales levels, the profits in the video and telephone options are £380 000 and £317 500 respectively. Although the telephone option has a higher unit contribution, the much higher sales volume of the video option pulls up the profit.

If the selling price has to be reduced, as in Scenario 1, the telephone offering is more severely affected. The two options now have a similar unit contribution but the video option generates a higher sales volume.

Again, if variable costs increase, Scenario 2, the telephone option, with its highly qualified staff is affected more.

If the demand falls off, Scenario 3, both are relatively little affected. The video profit is reduced by a greater money amount than the telephone but is still higher.

A change in fixed costs, Scenario 4, also has relatively little effect because of the high sales volumes.

It appears that the video option is the more profitable, whatever the scenario but it is vulnerable to a lower selling price. A reduction of 5 per cent in the selling price, leads to a 16 per cent decrease in profit. Provided the store is not forced into price-cutting by competitors, it should generate good profits from the video option.

## Chapter 24

The answers to Exercises 24.1 and 24.2 are dealt with in the text.

### Exercise 24.3

(a) The £1000 contributed to the brewery's campaign is a sunk cost and therefore does not come into this decision.

The same goes for the £150 for damages.

The £80 per week for additional bar staff is a differential cost and should be considered when taking this decision. It must be offset against the additional gross profit.

The workings for finding the additional gross profit are:

#### 'Spread Eagle': Workings for Exercise 24.3

Extra Sales = £400 per week

$$\text{Average gross margin} = \frac{1900}{4500} = 42\%$$

Additional gross profit generated = £400 \* 42% = £168

Additional net profit = £168 - £80 = £88

From a purely financial point of view it is worth keeping the pub open in the afternoon, but only just.

(b) The fact that the afternoon opening seems to have attracted undesirable clientele must be taken seriously, as it could affect the overall customer profile in the long run and down-grade the pub.

The landlord and landlady should evaluate what the overall customer profile they are aiming to attract actually is. Is there anything they can do to make the pub more attractive to families and shoppers, for instance?

It is also worth investigating whether the above calculations include any reward for the extra time spent by the landlady supervising activities from the flat above the pub premises. Often landladies are only paid a token amount and it is taken for granted that they will not object to changes in opening hours such as this, even though it could imply extra work.

### Exercise 24.4

The relevant costs for taking this decision are:

Car Manufacturer: Relevant costs	
	£
Raw Materials	20
Direct Labour	15
Additional Overhead	5
Opportunity Cost	60
	100

This compares favourably to the supplier's quote of £110 each

### Exercise 24.5

(a) *Ignore*

Cost of rent and rates = Common costs

Cost of advertisement = Sunk cost

- (b) *Relevant costs*, to be taken into account when making the decision are:

**Johnson's: Relevant costs and revenues**

Additional fixed cost £100

Additional revenue per week £200

Additional variable cost per week £80 = Differential cost

Marginal gain £120

Loss of weekly revenue £90

Loss of weekly variable cost £40 = Opportunity cost

Marginal loss £50

The introduction of the new product line appears to be a good idea, provided it remains popular for more than one week.

## Chapter 25

### Exercise 25.1

- (a) Reasons for choice of pricing strategies are given in Table A25.1.

TABLE A25.1

OWN BRAND PRODUCT LINES: COMPARISON OF STRATEGIC OBJECTIVES	
ALDI	J Sainsbury
(1) Inexpensive image	High quality image
(2) Market penetration	Very large product range
(3) Very high stock turnover	Investment in service and technology

In your discussion of the most important influences, you have probably argued that ALDI is aiming for a high market share in the grocery discount sector and is therefore selling a limited product range and keeping prices as low as possible. In contrast, J Sainsbury plc is aiming to provide a much broader product range to a consumer from the higher socio-economic groups who is likely to have a preference for completing the full weekly shopping trip under one roof and who is therefore prepared to pay a little extra in exchange.

- (b) Both companies are constrained by the costs of operations. In the long run, all costs must be recovered, otherwise the business is not viable and will go into liquidation. However, in other respects the two retailers are very different. The management of J Sainsbury plc not only have to recover costs, but they also have to achieve adequate profits which will be in line with shareholder expectations. If they fail to do so, the shareholders will take their money elsewhere. By comparison, ALDI has no shareholders but is financed through a trust fund. It is the stated objective of the fund to pursue the long-term wealth of the company. The management of the trust fund can therefore be very patient, whereas the management of J Sainsbury plc have to satisfy often impatient shareholders. This means that in the short run, a much lower ROCE is acceptable to ALDI than to J Sainsbury.

### Exercise 25.2

The answer is summarised in Table A25.2.

TABLE A25.2

#### EVALUATION OF COST-PLUS PRICING

Strengths	Weaknesses
All costs are recovered	Inaccurate
Easy to use	Potentially profitable opportunities may be forgone

The answer to Exercise 25.3 is provided in the main text.

### Exercise 25.4

First of all, do not worry if you found it quite difficult to decide how to approach this exercise. So far, most of the other exercises were very specific, only requiring the use of one technique at a time – this one is complex and requires the use of several techniques to illuminate the different angles of the problem.

#### (1) Break-even analysis

Rather than determining the BEP for an annual set of costs and revenues, here the objective is to find out how many units need to be sold for the project to break even and to see

TABLE A25.3

DELANEY'S: BREAK-EVEN ANALYSIS BASED ON PROJECTION	
<b>Project fixed costs</b>	
	£
Cold Storage	650
Display Cabinet	1 800
Advertising	500
Survey	400
Promotion	500
Total	<u>3 850</u>
Variable Costs	£1.20/unit
Mark-up	25%
Selling Price	£1.50/unit
Contribution	£0.30/unit
BEP = $\frac{£3850}{£0.30}$	= 12 833 units

whether break-even has actually been achieved and a contribution to profit been made.

The calculations are set out in Table A25.3.

If the target mark-up had been achieved, break-even would have been reached once 12 833 units had been sold. As the forecast for the first six months only comes to 4250 units, the project still has some way to go before it breaks even.

Using the actual figures, the margins really achieved are summarised in Table A25.4.

TABLE A25.4

DELANEY'S: ACTUAL GROSS MARGINS						
Month	1	2	3	4	5	6
Gross Margin	13.3%	8.5%	14.1%	8.4%	8.9%	14.9%

In other words, the average gross margin achieved was 11.35 per cent. Assuming, that a price of £1.50 per unit was charged as planned, and that the only variable costs are the purchase price, mark-downs and wastage, the actual unit contribution can be calculated and the break-even point computed on that basis, as shown in Table A25.5.

TABLE A25.5

DELANEY'S: BREAK-EVEN ANALYSIS BASED ON ACTUAL RESULTS	
<b>Contribution = £1.50 * 11.35% = £0.17</b>	
BEP = $\frac{£3850}{£0.17}$	= 22 647 units

This means that as a result of the higher variable costs, and therefore lower unit contribution, the BEP in units has nearly doubled. This is indeed cause for concern, especially since during the first six months only 1001 units have been sold (calculation: sum of sales revenue for the first six months divided by selling price, which was £1.50).

If the current trend continues it will take more than 10 years before the project breaks even.

### (2) Short-term decision-making

Should the project be discontinued then?

An evaluation from the viewpoint of short-term decision-making is based on the figures set out in Table A25.6.

Unfortunately, if looked at from a short-term decision-making point of view, all the above costs are *sunk costs*, with the possible exception of that part of the cost of the cold storage and display equipment which could still be recovered if the equipment were sold now (or transferred to another

TABLE A25.6

DELANEY'S: PROJECT COSTS AFFECTING SHORT-TERM DECISIONS	
	£
Cold Storage	650
Display Cabinet	1 800
Advertising	500
Survey	400
Promotion	500
Total	<u>3 850</u>

department – that would have much the same effect, as far as this decision is concerned). As the equipment is relatively new, it seems reasonable to assume that some of this cost can be recovered – this is something that needs investigating immediately.

### (3) Marginal costing

Clearly the target margins have not been achieved. However, in each of the six months, the project has made a contribution to fixed costs. It should therefore not be discontinued unless it can be replaced with an alternative which guarantees a higher contribution.

### (4) Variance analysis and responsibility accounting

When working through this exercise, it may also be useful to do a cash budget and a variance analysis.

This is shown in Figure A25.1.

FIGURE A25.1

DELANEY'S CASH BUDGET AND VARIANCE ANALYSIS			
	Budget	Actual	Variance
	£	£	£
Opening Balance	0	0	0
Receipts			
Sales	6375	1502	-4873
Payments			
Cold Storage	650	650	0
Display Cabinet	1800	1800	0
Advertising	500	500	0
Survey	400	400	0
Promotions	500	500	0
Cost of Goods Sold			
Mark-downs and			
Wastage	5100	1336	3764
Closing Balance	-2575	-3684	-1109

This information can be used as a starting point in any discussion with the project manager. The next step would be to treat it as a *flexible budget* and adjust the budgeted figures for the actual sales volume, this would once again highlight the real problem area, which is lack of demand and resulting waste. This should then lead to an analysis including other areas of expertise.

Further analysis may assess the results of the advertising campaign and the in-store promotion, trying to get some clues as to what went wrong. Clearly Delaney's management are none too sure which niche of the market their product is aimed at and what demand, if any, exists. Further research is needed, if this project is to have a future.

Rather than carrying out some more original research in a half-hearted and ill-informed manner (and it is impossible to get any findings of real value for £400), it might be a useful starting point to look at the secondary literature and see whether there are any MINTEL or Key Note reports on this market.

Also Delaney's need to give some thought to who their customers really are, and bearing this in mind, decide what their long-term objectives for this product range should be (or alternatively whether the product range should be replaced).

### Calculations for Exercise 26.1

- (a) Time period for compounding is 1 year  
 $i = \text{interest rate per year} = 5\% = 0.05$   
 $n = \text{number of years} = 2$   
 $\text{Future Value} = £5000 * (1 + 0.05)^2 = £5000 * (1.05)^2$   
 $= £5000 * 1.1025 = £5512.50$
- (b) Time period for compounding is 6 months  
 $i = \text{interest rate per 6 months} = 5\%/2 = 2.5\% = 0.025$   
 $n = \text{number of 6 months} = 4$   
 $\text{Future Value} = £5000 * (1 + 0.025)^4 = £5000 * (1.025)^4$   
 $= £5000 * 1.10381289 = £5519.06 \text{ to the nearest penny}$
- (c) Time period for compounding is 1 quarter  
 $i = \text{interest rate per quarter} = 5\%/4 = 1.25\% = 0.0125$   
 $n = \text{number of quarters} = 8$   
 $\text{Future Value} = £5000 * (1 + 0.0125)^8 = £5000 * (1.0125)^8$   
 $= £5000 * 1.104486 = £5522.43 \text{ to the nearest penny}$

### Exercise 26.2

- (a) Option 1  
 $\text{Present value} = £200\,000$
- (b) Option 2  
See Table A26.1

TABLE A26.1

BRIGHT OFFICE COMPANY: SCHEDULE OF PAYMENTS		
Time	Payment	Present Value
	£	£
Now	50 000	50 000
End Year 1	60 000	56 075
End Year 2	70 000	61 141
End Year 3	80 000	65 304
		Total 232 520

$$\text{Present value} = £232\,520$$

The present values are worked out using the formula, as follows:

- Present value of £60 000 after 1 year  
 $= £60\,000 / (1 + 0.07)$
- Present value of £70 000 after 2 years  
 $= £70\,000 / (1 + 0.07)^2$

## Chapter 26

### Exercise 26.1

The calculations are:

- Present value of £80 000 after 3 years  
 $= \text{£80 000} / (1 + 0.07)^3$

**(c) Option 3**

$$\text{Present value} = \text{£290 000} / (1 + 0.07)^3 = \text{£236 726}$$

The cheapest option is Option 1, which is to pay £200 000 now, but Bright Office would have to be convinced that the property company would still be around in three years' time to do the job.

### Exercise 26.3

**(a) Option 1**

$$\text{Present value} = \text{£200 000}$$

**(b) Option 2**

See Table A26.2

$$\text{Present value} = \text{£232 500 (to 4 significant figures)}$$

### TABLE A26.2

BRIGHT OFFICE COMPANY:  
SCHEDULE OF PAYMENTS USING  
PRESENT VALUE TABLES

Time	Payment	Discount Factor (from Table 26.2)	Present Value
	£		£
Now	50 000	1	50 000
End Year 1	60 000	0.9346	56 076
End Year 2	70 000	0.8734	61 138
End Year 3	80 000	0.8163	65 304
	Total		232 518

**(c) Option 3**

$$\text{Present value} = \text{£290 000} * 0.8163 = \text{£236 727} = \text{£236 700}$$

(to 4 significant figures)

Note that the answers have been rounded to 4 significant figures because the discount factors in the present value table are given to only 4 decimal places, so these answers are not as precise as using the formula. We still conclude that the cheapest option is Option 1.

TABLE A26.3

DANNY: DCF CALCULATION

Time	Cash Flow	Discount Factor	Present Value
	£		£
Now	-100 000	1	-100 000
End Year 1	15 000	0.9346	14 019
End Year 2	15 000	0.8734	13 101
End Year 3	30 000	0.8163	24 489
End Year 4	30 000	0.7629	22 887
End Year 5	30 000	0.7130	21 390
			Net Present Value (NPV)
			-4 114

The NPV is negative. The investment is not profitable at a discount rate of 7 per cent.

### Exercise 26.5

Work out the net cash flows each year and then perform a discounted cash flow calculation using a rate of 12 per cent per annum as shown in Table A26.4.

TABLE A26.4

AHMAD: DCF CALCULATION

Time	Net Cash Flow £	Discount Factor	Present Value £
	£		£
Now	-70 000	1	-70 000
End Year 1	15 000	0.8929	13 394
End Year 2	35 000	0.7972	27 902
End Year 3	45 000	0.7118	32 031
			Net Present Value (NPV)
			3 327

The NPV is positive so Ahmad is getting more than 12 per cent per annum. He should buy the shop.

### Exercise 26.6

The NPV calculation is shown in Table A26.5.

### Exercise 26.4

See Table A26.3

TABLE A26.5

EXERCISE 26.6: NPV CALCULATIONS (RATE = 10%)			
Time	Net Cash Flow £	Discount Factor	Present Value £
Now	-450 000	1	-450 000
End Year 1	115 000	0.9091	104 547
End Year 2	135 000	0.8264	111 564
End Year 3	145 000	0.7513	108 939
End Year 4	160 000	0.6830	109 280
Net Present Value (NPV)			-15 670

The NPV is negative so the IRR must be between 8 per cent and 10 per cent.

We can perform the calculation using a rate of 9 per cent as shown in Table A26.6.

TABLE A26.6

EXERCISE 26.6: NPV CALCULATIONS (RATE = 9%)			
Time	Net Cash Flow £	Discount Factor	Present Value £
Now	-450 000	1	-450 000
End Year 1	115 000	0.9174	105 501
End Year 2	135 000	0.8417	113 630
End Year 3	145 000	0.7722	111 969
End Year 4	160 000	0.7084	113 344
Net Present Value (NPV)			-5 556

The NPV is negative so the IRR must be between 8 per cent and 9 per cent, but from the size of the NPV we conclude that the internal rate of return is approximately 8.5 per cent.

## Chapter 27

### Exercise 27.1

Expected receipts per throw are

$$40 * 1/6 + 10 * 1/3 + 0 * 1/2 = 10\text{p}$$

This is exactly the same amount as he has to pay to join the game so now the game is fair. In other words Jim's expected winnings are zero and the banker's expected winnings are zero. Jim can now join the game in the knowledge that he is not getting ripped off by the banker.

### Exercise 27.2

$$\text{Weather fine} \quad \text{Income} = 750 * £5 = £3750$$

$$\text{Weather wet} \quad \text{Income} = 50 * £5 = £250$$

Expected income per concert

$$= (£3750 * 70\%) + (£250 * 30\%) = £2700$$

Average cost for performers per concert = £500

Expected net income per concert = 2200

This is well in excess of the £200 per concert proposed by the council. The society can afford to continue with the concerts. Although it will lose money on wet nights, this is more than offset by the gain on fine evenings.

### Exercise 27.3

*First location:*

Expected net profit

$$= £80 000 * 0.7 + (-£5000) * 0.3$$

$$= £56 000 - £1500 = £54 500$$

*Second location:*

Expected net profit

$$= £120 000 * 0.6 + (-£10 000) * 0.4$$

$$= £72 000 - £4000 = £68 000$$

The second location gives the higher expected net profit and would be selected on those grounds. Note that there is a 40 per cent chance of a loss of £10 000 using this strategy. Other strategies are possible. An optimist would always select the option that will bring in the most money if all goes well so this would be the second location with its chance of £120 000 in profits. A pessimist would always choose the option that minimises losses if everything turned out badly. Here, he would select the first location as the most to be lost is £5000.

### Exercise 27.4

(a) Stock 200 dozen biscuits:

If demand is 160, gross profit =

$$160 * £0.70 - 160 * £0.40 - 40 * £0.40 = £32$$

If demand is 180, gross profit =

$$180 * £0.70 - 180 * £0.40 - 20 * £0.40 = £46$$

If demand is 200 or 220, gross profit =

$$200 * £0.70 - 200 * £0.40 = £60$$

## (b) Stock 220 dozen biscuits

If demand is 160, gross profit =

$$160 * £0.70 - 160 * £0.40 - 60 * £0.40 = £24$$

If demand is 180, gross profit =

$$180 * £0.70 - 180 * £0.40 - 40 * £0.40 = £38$$

If demand is 200, gross profit =

$$200 * £0.70 - 200 * £0.40 - 20 * £0.40 = £52$$

If demand is 220, gross profit =

$$220 * £0.70 - 220 * £0.40 = £66$$

**Exercise 27.5**

Build small factory:

$$\begin{aligned} EMV &= 200 * 0.5 + 200 * 0.3 + 150 * 0.2 \\ &= 190 \text{ thousand pounds} \end{aligned}$$

Build large factory:

$$\begin{aligned} EMV &= 350 * 0.5 + 175 * 0.3 + 100 * 0.2 \\ &= 247.5 \text{ thousand pounds} \end{aligned}$$

Based on expected monetary values, the company should choose to build the large factory.

**Exercise 27.6**

The payoff matrix is shown in Table A27.1.

TABLE A27.1

'BROWN BEAR' PUB: PAYOFF MATRIX  
(PAYOFFS IN £)

State of Nature	Decision Options		
	Stock 30	Stock 40	Stock 50
Level of Demand	21	16	11
30	21	16	11
40	23	28	23
50	25	30	35

Stock 30

$$EMV = £21 * 0.25 + 23 * 0.5 + 25 * 0.25 = £23$$

Stock 40

$$EMV = £16 * 0.25 + 28 * 0.5 + 30 * 0.25 = £25.50$$

Stock 50

$$EMV = £11 * 0.25 + 23 * 0.5 + 35 * 0.25 = £23$$

The best option based on expected monetary value is to stock 40 and buy in extra supplies on days when demand is above this level.

**Exercise 27.7**

Referring to Table A27.1, we calculate:

$$\begin{aligned} \text{Expected profit with perfect information} &= \\ £21 * 0.25 + £28 * 0.5 + £35 * 0.25 &= £28 \end{aligned}$$

$$EVPI = £28 - £25.50 = £2.50 \text{ per day}$$

The landlord could ask customers to phone in with orders or to let him know the previous day if they are not going to be having a sandwich the following lunchtime.

**Chapter 28****Exercise 28.1**

See answers to Exercises 26.4, 26.5 and 26.6.

**Exercise 28.2**

See Table A28.1.

TABLE A28.1

PREMIER PUB COMPANY: EXPECTED CASH FLOWS				
Scenario	Buying	Renting		
	NPV	IRR	NPV	IRR
Original	-£166 197	0%	£117 248	23%
Sales +£60 000	£42 104	7%	£325 548	48%
Sales -£40 000	-£305 064	-7%	-£21 620	2%
Slower Growth	-£225 877	-3%	£57 568	15%
Cost of Goods				
Sold 45%	-£274 205	-5%	£9 240	7%
Cost of Goods				
Sold 35%	-£58 189	4%	£225 255	36%

Studying the results in Table A28.1, it appears that the renting option is superior to the buying option in every scenario. The renting option is vulnerable if sales are only £240 000. Before it goes ahead with the project, the Premier Pub Company must be confident that it can achieve the projected sales level of £280 000. If the cost of goods sold rises to 45 per cent of sales revenue, the company will achieve only a 7 per cent rate of return, so it is vital for them to keep costs under control.

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# Glossary of Terms

## **ABSOLUTE CELL REFERENCE**

In a *SPREADSHEET*, a cell reference which does not change when copied. This is achieved by typing a \$ symbol before the column label and the row number of the cell (*see RELATIVE CELL REFERENCE*).

## **ABSOLUTE DEVIATION**

The positive difference between the forecasted and actual values disregarding any negative signs.

## **ABSORPTION COSTING**

A system which attempts to track and record the full *COST* of producing, distributing and selling each product and which relates this cost to the product via a series of *COST CENTRES*. The full cost is used as the basis for *PRICING* and decision-making (*see COST-PLUS PRICING, FULL COST PRICING*).

## **ACID TEST**

A *RATIO* measuring the immediate *LIQUIDITY* of an organisation if it does not rely on selling its stock in order to pay creditors.

$$\text{Acid Test} = \frac{\text{Current assets} - \text{Stock}}{\text{Current liabilities}}$$

For example, an acid test ratio of 0.4 means that for every £1 owed to creditors in the short term the business can raise £0.40 without having to sell off any stock. This ratio is particularly relevant when analysing the

accounts of manufacturing organisations, as they may find it difficult to sell their stock quickly.

## **ACTUAL COST**

The exact historical costs actually incurred during the *BUDGET* period. These are compared to *STANDARD COSTS* to determine the *VARIANCE*.

## **ADVERSE**

A variance arising from *ACTUAL COSTS* which are higher than the *STANDARD COSTS* budgeted for. The principles of *RESPONSIBILITY ACCOUNTING* and *MANAGEMENT BY EXCEPTION* dictate that this should be investigated and if the cost is a *CONTROLLABLE COST*, remedial action should be taken (*see VARIANCE, VARIANCE ANALYSIS*).

## **ALLOCATION**

The process of directly identifying *COSTS* with the *COST CENTRES* where they are incurred.

## **APPORTIONMENT**

The division of unallocated *COST* (*OVERHEAD*) among a number of *COST CENTRES* in proportion to the benefits received, using an appropriate base, such as turnover, number of employees.

## **ASSET**

A right (for example, a patent) or property (for example, shop premises, stock) acquired for use in the business; depending on its nature it can be a *FIXED ASSET* or a *CURRENT ASSET*.

**ASSET TURNOVER**

A *RATIO* showing the relationship between the capital invested in the business and the sales revenue generated on that basis.

$$\text{Asset turnover} = \frac{\text{Sales}}{\text{Net total assets}}$$

For example, an asset turnover figure of 3.7 means that in the accounting period under scrutiny the value of sales was 3.7 times that of the value of the net total assets of the business.

**ATTAINABLE STANDARD**

A *STANDARD COST* based on historical average *COST* data and on realistic assumptions about what is achievable in future periods.

**AVERAGE COST**

The share of the total cost attributed to each unit sold.

$$\text{Average cost} = \frac{\text{Total cost}}{\text{Number of units sold}}$$

**BALANCE SHEET**

An accounting statement showing the financial position of a business at a particular point in time. It draws on the records kept by the business and communicates information concerning those aspects of the business which can be given an objective monetary value. The balance sheet is based on the *BALANCE SHEET EQUATION*.

**BALANCE SHEET EQUATION**

The *BALANCE SHEET* is based on the equation:

$$\text{Assets} = \text{Capital} + \text{Liabilities}$$

This means that management is accountable for every penny that has been invested in the business and must disclose what the business has got to show for the investment in terms of *ASSETS*.

**BAR CHART**

A chart that consists of a series of horizontal or vertical bars representing the frequency in different categories.

**BOTTOM UP**

An approach to drawing up a *BUDGET* which starts from the grass roots, involving line management in compiling budgets for their own areas of responsibility. This approach is often used in combination with the *TOP DOWN* approach. The budgets for the individual *COST*

*CENTRES* and *PROFIT CENTRES* are brought together in the *MASTER BUDGETS* (*see ZERO-BASE BUDGETING*).

**BREAK-EVEN ANALYSIS**

A technique for analysing the relationship between *COST*, sales volume and *PROFIT* which is used to assess the potential viability of projects and to find the most profitable combination of resources and prices (*see BREAK-EVEN CHART, BREAK-EVEN POINT*).

**BREAK-EVEN CHART**

A diagram showing the relationship between *COST*, sales volume and *PROFIT* and the *BREAK-EVEN POINT*.

**BREAK-EVEN POINT**

The point at which neither profit nor loss is made for a given combination of costs and selling price

$$\text{Break-even point in units} = \frac{\text{Total fixed costs}}{\text{Unit contribution}}$$

$$\text{Break-even point in £} =$$

$$\text{Break-even point in units} * \text{Selling price/Unit}$$

(*see BREAK-EVEN ANALYSIS, BREAK-EVEN CHART, CONTRIBUTION, UNIT CONTRIBUTION, MARGINAL COSTING*).

**BUDGET**

A detailed plan of the activities of a business for a specific future time period, concerning the allocation of physical resources, expressed in money terms. This plan is based on *STANDARDS* and serves as a yardstick against which actual performance can be compared. It can act as a motivating tool for line management by devolving responsibility, improving communication and control (*see BOTTOM UP, BUDGET, FIXED BUDGET, FLEXIBLE BUDGET, MANAGEMENT BY EXCEPTION, MANAGEMENT BY OBJECTIVES, MASTER BUDGET, TOP DOWN, VARIANCE ANALYSIS, ZERO-BASE BUDGETING*).

**BUDGETED BALANCE SHEET**

A forecast of the balance sheet as it would look at the end of the budgetary period if everything went according to plan. This is part of the *MASTER BUDGET*.

**BUDGETED INCOME STATEMENT** (*see BUDGETED PROFIT AND LOSS ACCOUNT*).**BUDGETED PROFIT AND LOSS ACCOUNT**

A detailed plan of the expected revenues and expenditure of the business for the budgetary period. This is part of the *MASTER BUDGET*.

**BUDGETED PROFIT AND LOSS STATEMENT** (*see BUDGETED PROFIT AND LOSS ACCOUNT*).

**BUSINESS CYCLE** (*see ECONOMIC CYCLE*).

#### **BUSINESS ENTITY**

For accounting purposes the business's affairs are treated as separate from the private affairs of the owner, even in the case of unincorporated businesses, where legally there is no such distinction.

#### **CAPITAL**

The value of the original investment made by the owner of the business, plus any long-term loans taken out, plus any *RETAINED PROFITS* reinvested in the organisation over time. The capital of most large incorporated businesses consists of a mixture of *SHARE FINANCE* and *LOAN FINANCE*. Because of the *DUALITY* rule, the *BALANCE SHEET* total for the capital section must equal the balance sheet figure for net total assets.

#### **CAPITAL GAIN**

The gain in the market price of shares due to the success of the business, changes in market confidence or general stock market fluctuations.

#### **CAPITAL STRUCTURE**

The combination of long-term sources of finance used to resource the business (*see GEARING*).

#### **CASH BUDGET**

A detailed forecast of the cash flows for the budgetary period, showing cash payments and receipts and their timing. This is part of the *MASTER BUDGET*.

#### **CASH FLOW**

The physical movement of cash over time.

#### **CASH FLOW STATEMENT**

An accounting statement based on the organisation's records of the physical cash *RECEIPTS* and *PAYMENTS* which take place in the course of business activities.

#### **CATASTROPHIC VARIATION**

An abnormal large movement of a *TIME SERIES* affecting the value of the variable in a single time period (*see RESIDUAL VARIATION*).

#### **CELL**

The element of a *SPREADSHEET* where entry of *TEXT*, *NUMBER* or a *FORMULA* can be made.

#### **CENTRED AVERAGE**

A procedure used in the method of *MOVING AVERAGES* to ensure that the *TREND* values are calculated for exactly

the same points in time as the data values. This procedure needs to be used only when the moving average is calculated over an even number of time periods such as the four quarters of a year. Each consecutive pair of moving averages is added and divided by two.

#### **CLOSING BALANCE**

The value of a resource (such as cash or stock) held by the business at the end of the accounting period.

#### **COEFFICIENT OF DETERMINATION**

This is also called **R square**. In both *LINEAR REGRESSION* and *MULTIPLE REGRESSION*, it is the proportion or percentage of the variation in the *DEPENDENT VARIABLE*, **Y**, that is explained by changes in the *EXPLANATORY VARIABLE(S)* through the regression equation. The closer the coefficient is to one or 100 per cent, the better the fit of the equation to the data.

#### **COMMON COST**

A *COST* which does not differ between alternatives. In the context of short-term decision-making this type of cost can be disregarded, as it is not affected by the decision.

#### **COMPOUND INTEREST**

A charge resulting from the application of a predetermined percentage rate to cumulative funds consisting of the *PRINCIPAL* plus the interest of previous periods added to it.

#### **CONTRIBUTION**

That part of the selling price which is left after all variable *COSTS* have been paid for. This initially is used to pay for fixed costs; once all fixed costs have been paid for, this is *PROFIT*.

#### **CONTROLLABLE COST**

A *COST* which can be influenced by the manager in charge of the relevant *COST CENTRE*. The manager can therefore be made accountable for this cost and charged with the responsibility of controlling it (*see RESPONSIBILITY ACCOUNTING, VARIANCE ANALYSIS*).

#### **CORRELATION**

The degree of linear relationship between two variables, as established through *CORRELATION ANALYSIS* and expressed by the *CORRELATION COEFFICIENT*.

#### **CORRELATION ANALYSIS**

A technique for calculating and examining the degree of *CORRELATION* between two variables.

**CORRELATION COEFFICIENT**

A measure of the strength and direction of the **CORRELATION** between two variables. It is denoted by the symbol **r**. Its value is +1 in the case of *perfect positive correlation*. In the case of *perfect negative correlation* its value is -1.

**COST**

The amount of financial resource used up in relation to a specified thing, product or activity (see **CONTROLLABLE COSTS**, **UNCONTROLLABLE COSTS**, **COSTING SYSTEM**, **COST CENTRE**).

**COST CENTRE**

A location, function, item of equipment or product line to which direct **COSTS** can be allocated and **OVERHEAD** apportioned for planning and control purposes.

**COST OF GOODS SOLD**

The **MATCHING CONCEPT** implies that in order to calculate **GROSS PROFIT** in the **TRADING ACCOUNT**, the selling and purchase prices must be matched for the same goods, which are the goods actually sold during the accounting period. The sales figure can be obtained from till records. The cost of goods sold figure must be calculated to eliminate the distorting influence of differences in stock holding at the beginning and the end of the accounting period. The calculation is carried out using the formula:

$$\text{Opening stock} + \text{Purchases} - \text{Closing stock}$$

$$= \text{Cost of goods sold}$$

**COSTING SYSTEM**

A methodical approach towards determining **COSTS** and relating them to business activities (see **ABSORPTION COSTING**, **DIRECT PRODUCT PROFITABILITY**)

**COST-PLUS PRICING**

A technique which uses the total **COST** of producing, distributing and merchandising a product as the basis for **PRICING**. Total cost is established through a system of **ABSORPTION COSTING** or **DIRECT PRODUCT COSTING** and the price is calculated by adding a predetermined **MARK-UP** to the cost.

**CREDITOR**

A person or organisation to which the business owes money (see **CURRENT LIABILITY**, **LONG-TERM LIABILITY**).

**CREDITORS: DUE AFTER ONE YEAR** (see **LONG-TERM LIABILITY**).**CREDITORS: DUE WITHIN ONE YEAR** (see **CURRENT LIABILITY**).**CREDITORS' PAYMENT PERIOD**

A **RATIO** which shows how many days it takes the business (on average) to pay its suppliers.

Creditors' payment period (in days)

$$= \frac{\text{Creditors}}{\text{Credit purchases}} * 365$$

This ratio gives an indication as to the credit terms the business is obtaining. A figure of 47 would mean that on average it takes 47 days after delivery before suppliers are paid.

**CURRENT ASSET**

An **ASSET** which is in the form of cash or will be turned into cash within the next accounting period (usually one year). This includes the cash in the tills, money outstanding from **DEBTORS** and stock to be sold to customers.

**CURRENT LIABILITY**

Those amounts which the business owes to outsiders at the **BALANCE SHEET** date and which it reasonably expects to have to pay out within the next accounting period (usually one year). These include, for example, **TRADE CREDITORS** and bank overdrafts.

**CURRENT RATIO**

A **RATIO** measuring the **Liquidity** of a business.

$$\text{Current ratio} = \frac{\text{Current assets}}{\text{Current liabilities}}$$

A current ratio of, for instance, 0.3 means that for every £1 owed to creditors in the short run £0.3 can be raised by turning current assets into cash.

**CYCCLICAL VARIATIONS**

The fluctuations in economic variables reflecting the movement of the economy through boom and recession. The impact of the business cycle on the individual organisation is of a long-term and gradual nature and can therefore not be taken into account when making short-term forecasts (see **TIME SERIES ANALYSIS**)

**DEBTOR**

A person or organisation owing money to the business (see **CURRENT ASSET**).

**DEBTORS' COLLECTION PERIOD**

A *RATIO* measuring the time it takes for *DEBTORS* to settle their accounts.

Debtors' collection period (days)

$$= \frac{\text{Debtors}}{\text{Credit sales}} * 365.$$

**DEPENDENT VARIABLE**

The variable the values of which are to be predicted in the context of forecasting using *LINEAR REGRESSION* and *MULTIPLE REGRESSION*.

**DEPRECIATION**

The matching of the *COST minus* the salvage value of a *FIXED ASSET* to the accounting periods during which the business has the use of that *ASSET*, in a systematic and rational manner. Two main depreciation methods have been examined, the *STRAIGHT LINE* method and the *REDUCING BALANCE* method. The method should be chosen which most closely reflects the pattern of the asset's usefulness to the business.

**DIFFERENTIAL COST**

The *COST* of selling a number of additional units as a direct result of a short-term decision (see *INCREMENTAL, RELEVANT COST*).

**DIRECT PRODUCT COST (DPC)**

A *COST* which can be allocated to an individual product and which is affected by variations in the storing and handling of the product. Direct product costing is a system of cost accounting which is based on the detailed *ALLOCATION* of all those costs which can be directly identified with the handling, distribution and selling of a product to the product.

**DIRECT PRODUCT PROFIT (DPP)**

The *CONTRIBUTION* to *PROFIT* and unallocated *COSTS* made by an individual product after all the *DIRECT PRODUCT COSTS* have been accounted for.

**DIRECT PRODUCT PROFITABILITY**

A system which uses *DIRECT PRODUCT COSTING* as the basis for making decisions concerning the choice of distribution channels, pricing and space management.

**DISCOUNT FACTOR**

The factor  $1/(1+i)^n$  used in *PRESENT VALUE* calculations, where  $i$  is the *DISCOUNT RATE*. The present value of a future sum is calculated by multiplying the *FUTURE VALUE* by the discount factor.

**DISCOUNT RATE**

The interest rate used when computing the *DISCOUNT FACTOR* in *PRESENT VALUE* calculations.

**DISCOUNTED CASH FLOW (DCF) TECHNIQUE**

A forecast of the capital expenditure and annual revenues associated with a capital investment project, expressed in terms of *PRESENT VALUES*. This can be used to compare and decide between mutually exclusive projects (see *DISCOUNTING, INTERNAL RATE OF RETURN, NET PRESENT VALUE, PRESENT VALUE, PRESENT VALUE TABLE*).

**DISCOUNTING**

Calculating the *PRESENT VALUE* of a sum of money expected to be received at a future point in time through the application of a pre-determined percentage rate, which usually reflects the *OPPORTUNITY COST*.

**DIVIDEND**

A slice of the *PROFIT* of an accounting period which is distributed to the shareholders. The amount of dividend to be paid on each share depends on the profits made by the business.

**DIVIDEND COVER**

A *RATIO* measuring the extent to which the business can afford to pay out current levels of *DIVIDEND*

$$\text{Dividend cover} = \frac{\text{Earnings per share}}{\text{Dividend per share}}$$

To give an example, a dividend cover of 3 implies that net profit after tax is three times the amount of the total dividends paid out.

**DIVIDEND PER SHARE (DPS)**

A *RATIO* measuring the relationship of the total *DIVIDEND* paid out and the number of shares over which this is distributed.

$$\text{Dividend per share} = \frac{\text{Total dividend}}{\text{Number of ordinary shares}}$$

**DIVIDEND YIELD**

A *RATIO* measuring the relationship of the *DIVIDEND* received and the current market price of a share. This ratio fluctuates with the market price of the share. It can be used to compare the returns the shareholder receives in form of dividends to those which

could be obtained by investing the money tied up in shares in some other manner

$$\text{Dividend yield} = \frac{\text{Dividend per share}}{\text{Share price}} * 100.$$

#### DUALITY

The principle that every business transaction has at least two effects on the *BALANCE SHEET*. Any form of business activity entails turning the resources of the business from one form into another, for example cash into stock and stock back into more cash via sales to customers. To give an example, imagine a business acquires stock from a supplier for £1000 cash. As a result of this transaction the balance sheet entry *CURRENT ASSETS*: 'cash' would decrease by that amount, whereas the entry under Current assets: 'stock' would increase by the same amount: the resource 'cash' has been turned into the resource 'stock'.

#### EARNINGS PER SHARE (EPS)

A *RATIO* measuring the relationship of the profits generated over an accounting period to the number of ordinary shares issued

$$\text{Earnings per share} = \frac{\text{Net profit after tax}}{\text{Number of ordinary shares}}.$$

#### ECONOMIC CYCLE

The long-term fluctuations in the economy as it passes through boom, recession, depression, expansion and returns to boom.

#### ECONOMIES OF SCALE

Cost savings arising with increases in sales volume as *OVERHEAD* can be *APPORTIONED* to a larger number of units sold and therefore spread more thinly. For example, a large multiple retailer with a high annual turnover is more likely to enjoy savings from bulk buying and will find it easier to afford the cost of investing in equipment than an independent competitor who has only a small sales volume.

#### EQUATION OF A STRAIGHT LINE

This is of the form  $y = a + b * x$ , where  $x$  represents values of the *EXPLANATORY VARIABLE* and  $y$  represents values of the *DEPENDENT VARIABLE* in a *LINEAR RELATIONSHIP*. The *INTERCEPT* is represented by the symbol  $a$ . The *SLOPE* is represented by the symbol  $b$ .

#### EXPECTED MONETARY VALUE (EMV)

In conditions of risk when different possible outcomes may occur with known probabilities, the expected monetary value is the sum of the *PAYOUT* associated with each outcome multiplied by its probability of occurrence.

#### EXPECTED VALUE OF PERFECT INFORMATION (EVPI)

The difference between the *EXPECTED MONETARY VALUES* under conditions of risk and conditions of certainty. It is the maximum amount we would be prepared to pay to obtain perfect knowledge of the market.

#### EXPENSE

The *COST* of generating the *SALES REVENUE* of an accounting period.

#### EXPLANATORY VARIABLE

A variable which is used as the basis for predicting future values of the *DEPENDENT VARIABLE*.

#### EXPONENTIAL SMOOTHING

A *SHORT-TERM FORECASTING* technique which attaches differing weight to more recent data than to older data through the application of a *SMOOTHING CONSTANT*  $\alpha$  (alpha). The procedure is monitored through the calculation of the *SMOOTHED MEAN ABSOLUTE DEVIATION*.

#### EXTRAPOLATION

Estimating the *DEPENDENT VARIABLE* in *LINEAR REGRESSION* and *MULTIPLE REGRESSION*, for *X*-values outside the range of the given data (see *INTERPOLATION*).

#### FACTOR

An element of resource which is needed to make up a business. Such elements can be divided into *FIXED FACTORS* and *VARIABLE FACTORS*.

#### FAVOURABLE

A *VARIANCE* arising from *ACTUAL COSTS* which are lower than the *STANDARD COSTS* budgeted for.

#### FIRST IN FIRST OUT (FIFO)

A method of stock valuation. For accounting purposes the assumption is made that the goods first purchased are the first to be sold. In this sense the method matches the physical flow of goods. In times of inflation FIFO assigns a realistic value to stock in the *BALANCE SHEET*. However, this implies lower accuracy in matching current *SALES REVENUE* with current purchase costs in the *PROFIT AND LOSS ACCOUNT*, which on paper results in higher *GROSS PROFIT* figures than would be obtained using the *LAST IN FIRST OUT (LIFO)* or the

**WEIGHTED AVERAGE COST (WAC)** method of stock valuation. The FIFO method is legally acceptable in the UK. It is most appropriate for businesses selling goods of considerable value per item.

#### FIXED ASSET

An **ASSET** which has been acquired of relatively permanent use in the business, at some considerable cost. As the asset will be useful for a number of accounting periods, the **MATCHING CONCEPT** implies that **DEPRECIATION** must be charged.

#### FIXED ASSET RATIO

A **RATIO** measuring the relationship of **SALES REVENUE** generated and the monetary value of a business's investment in **FIXED ASSETS**.

#### FIXED BUDGET

A **BUDGET** which is based on only one sales level.

#### FIXED COST

A **COST** which does not vary with the level of output or sales.

#### FIXED FACTOR

A resource element of a relatively inflexible and permanent nature. The amount of this kind of resource used in the business can only be changed in the long run. Examples are land and capital. (For contrast, see **VARIABLE FACTOR**.)

#### FLEXIBLE BUDGET

A **BUDGET** which is adjustable according to sales volume.

#### FORECASTING

Estimating the value of future variables such as revenue, stock or number of employees. Techniques for making such forecasts include **LINEAR REGRESSION**, **EXPONENTIAL SMOOTHING** and **TIME SERIES ANALYSIS** (see **SHORT-TERM** and **LONG-TERM FORECASTING**).

#### FORECAST ERROR

The difference between the value of a variable predicted for a time period and the actual value of that variable. In the context of **EXPONENTIAL SMOOTHING**, this is monitored by calculating the **SMOOTHED MEAN ABSOLUTE DEVIATION**.

#### FORMULA

An algebraic expression for working out the value of a calculation. In a **SPREADSHEET** it consists of a sequence of numbers, cell addresses and **OPERATORS**, prefixed by an = sign.

#### FULL COST PRICING (see COST-PLUS PRICING).

#### FUNCTION

In a **SPREADSHEET**, a built-in **FORMULA** for commonly used procedures such as summation.

#### FUTURE VALUE

The future equivalent of an amount of money currently held. This is calculated by applying a pre-determined interest rate which reflects the **OPPORTUNITY COST** of the money.

#### GEARING

A **RATIO** showing the long-term **CAPITAL STRUCTURE** of the business expressed as the relation of **SHARE FINANCE** to the total capital of the business. It is calculated using the formula:

#### Gearing

$$= \frac{\text{Share capital} + \text{Long-term loan capital}}{\text{Share capital}}$$

For example, if a business has £100 000 worth of share finance and £50 000 loan finance, then the gearing is 1.5.

#### GROSS MARGIN

A **RATIO** providing a measure of **PROFITABILITY** which relates the level of profit before expenses to the sales level achieved by the business

$$\text{Gross margin} = \frac{\text{Gross profit}}{\text{Sales}} * 100$$

A gross margin of, for instance, 18 per cent means that for every £1 of sales achieved by the business, £0.18 is gross profit.

#### GROSS PROFIT

The difference between selling prices and purchase prices, applied to the same goods, which have been sold to customers during an accounting period. Gross profit is calculated in the **TRADING ACCOUNT** using the formula

$$\text{Sales} - \text{Cost of goods sold} = \text{Gross profit.}$$

#### HISTORIGRAM

A **LINE CHART** depicting a **TIME SERIES**.

#### IDEAL STANDARDS

Those **STANDARD COST** levels which might be achieved if all aspects of the business could be guaranteed to operate to perfection and under conditions of

certainty. Whilst it is useful to have ideals and to aim for them, staff can be de-motivated if standards are always set too high.

**INCREMENTAL**

Additional, in a step-wise fashion. Management accounting makes use of this concept in a number of ways:

- (a) An incremental approach to budgeting bases the *BUDGET* on historical *COST* and sales data, plus a certain percentage increase which reflects inflation
- (b) An incremental volume consists of a number of additional units, rather than just one; in the context of short-term decision-making this concept is used to establish the *DIFFERENTIAL COST* of undertaking a project.

**INTERCEPT**

The point where a straight line cuts through the vertical (or *Y*) axis. In the *EQUATION* of a *Straight Line*, it is the value of *Y* when *X* equals zero.

**INTERNAL RATE OF RETURN (IRR)**

A *DISCOUNTED CASH FLOW* technique which determines that percentage rate which results in the *NET PRESENT VALUE* of zero when applied to discount the cash flows of a given capital investment project. This is the rate for which the project breaks even.

**INTERPOLATION**

Estimating the *DEPENDENT VARIABLE* in *LINEAR REGRESSION* and *MULTIPLE REGRESSION*, for *X* values within the range of the given data (*see EXTRAPOLATION*).

**LAST IN FIRST OUT (LIFO)**

A method of stock valuation. For accounting purposes, the assumption is made that the goods last purchased are the first ones to be sold. (**Note:** Accounting methods of stock valuation do not have to reflect the physical flow of goods.) In times of inflation the LIFO method is accurate in matching current *COSTS* and *SALES REVENUES*, thereby resulting in a lower *GROSS PROFIT* figure than FIFO or WAC. However, in the *BALANCE SHEET* an unrealistically low figure is assigned to stock as a result. This method is legally acceptable in the USA.

**LEARNING CURVE**

A graphic representation of the fact that efficiency improves and cost savings are achieved as an initially new task becomes familiar.

**LEAST SQUARES REGRESSION LINE**

In a *SCATTER DIAGRAM*, the line that minimises the sum of the squares of the vertical deviations of the points from the line (*see LINEAR REGRESSION*).

**LIABILITY**

An amount owed by the business to an outsider at the *BALANCE SHEET* date. Depending on how soon it will become due, this can be classed as a *CURRENT LIABILITY* or as a *LONG-TERM LIABILITY*.

**LINE CHART**

A chart consisting of one or more series of points joined with straight lines. It is often used to show changes over time (*see HISTORIGRAM*).

**LINEAR REGRESSION**

A technique which is used to calculate the *EQUATION* of the *Straight Line* which provides the 'best fit' for a given set of data for two variables. This can be used to make a forecast by extending the line to cover other values of the variables (*see LEAST SQUARES REGRESSION LINE*).

**LINEAR RELATIONSHIP**

An association between two variables which can be diagrammatically represented in the form of a straight line.

**LIQUIDITY**

The short-term ability to repay creditors falling due within the next 12 months by turning *CURRENT ASSETS* into cash, as measured by the *CURRENT RATIO* and the *ACID TEST*.

**LOAN FINANCE**

Finance borrowed from the financial institutions on a long-term basis, at an agreed interest rate and with a fixed repayment date (*see CAPITAL STRUCTURE*).

**LONG-TERM FORECASTING**

A technique for estimating the value of a variable several periods of time ahead (*see TIME SERIES ANALYSIS*).

**LONG-TERM LIABILITY (*see LOAN FINANCE*)****MANAGEMENT BY EXCEPTION (MBE)**

A management style which concentrates on identifying those areas of the business where things are going wrong and intervention is needed, leaving well enough alone in other areas. *VARIANCE ANALYSIS* and *RESPONSIBILITY ACCOUNTING* are used as management tools in this context.

**MANAGEMENT BY OBJECTIVES (MBO)**

The translation of organisational objectives into individualised objectives and targets for line management. This is an aspect of *RESPONSIBILITY ACCOUNTING*. Individual objectives, expressed in money terms, are set as part of the *BUDGETING* process; these serve as a yardstick against which actual results can be evaluated (see **BOTTOM UP, MANAGEMENT BY EXCEPTION, TOP DOWN, VARIANCE ANALYSIS**).

**MARGINAL COST**

The additional *COST* incurred as a result of selling one extra unit.

**MARGINAL COST PRICING**

A technique which uses the *MARGINAL COST* as the basis for pricing goods which are sold in the course of borderline activities. (For comparison, see **FULL COST PRICING**.)

**MARKET PENETRATION**

A *PRICING* strategy which aims for rapid gains of market share through low prices.

**MARK-UP**

A *RATIO* used in the context of *PRICING*. Here the cost price of goods is used as the basis, to which a pre-determined percentage is added to calculate the selling price to be charged for the goods. This percentage is the target gross profit

$$\text{Mark-up} = \frac{\text{Gross profit}}{\text{Cost of goods sold}}$$

For example, a mark-up of 0.35 means that the selling price of goods is worked out by adding 35 per cent of the cost price to it.

**MASTER BUDGET**

An integrated *BUDGET* bringing together all aspects of the business in a master plan, consisting of

- a *CASH BUDGET*
- a *BUDGETED PROFIT AND LOSS ACCOUNT*
- a *BUDGETED BALANCE SHEET*.

**MATCHING CONCEPT (see MATCHING PRINCIPLE).****MATCHING PRINCIPLE**

In the calculation of *PROFIT* the *SALES REVENUE* for an accounting period must be set off against the *EXPENSES* incurred in bringing about these sales. This principle is reflected in the application of *DEPRECIATION* and stock valuation methods.

**MEAN**

The average of a set of values calculated by summing them and dividing by the number of values.

**MOVING AVERAGES**

A technique for calculating the *TREND*, in the context of *TIME SERIES ANALYSIS*, which bases forecasts on the average figures of a number of previous periods. This smooths out the peaks and troughs caused by *SEASONAL VARIATIONS*.

**MULTIPLE REGRESSION**

A statistical technique for constructing a forecasting equation which is used to forecast the values of a *DEPENDENT VARIABLE* based on the values of a number of *EXPLANATORY VARIABLES*. For each additional explanatory variable the *COEFFICIENT OF DETERMINATION* is calculated to indicate the degree of additional explanation provided by introducing this variable. The multiple regression model is

$$y = a + b_1x_1 + b_2x_2 + b_3x_3 + \dots$$

where *y* represents values of the dependent variable and *x<sub>1</sub>, x<sub>2</sub>, x<sub>3</sub>, ...* represent values of the explanatory variables (see **LINEAR REGRESSION**).

**MULTIPLICATIVE MODEL**

A model used to combine the different components of a *TIME SERIES ANALYSIS*.

Value of variable =

Trend \* Seasonal variation \* Residual variation

**NEGATIVE CORRELATION**

Linear association between two variables, for which an increase in the values of the *EXPLANATORY VARIABLE* goes with a decrease in the values of the *DEPENDENT VARIABLE*.

**NET MARGIN**

A *RATIO* providing a measure of *PROFITABILITY* which relates the level of *PROFIT* after *EXPENSES* to the sales level achieved by the business

$$\text{Net margin} = \frac{\text{Net profit}}{\text{Sales}} * 100$$

A net margin of, for example, 7 per cent means that after all expenses have been paid for every £1 worth of sales achieved by the business, £0.07 are left in the business.

**NET PRESENT VALUE (NPV)**

A *DISCOUNTED CASH FLOW* technique, used to determine the *PRESENT VALUE* of the cash flows associated with a capital investment project, expressed in current prices, by *DISCOUNTING* them, making use of an appropriate percentage rate.

**NUMBER**

In a *SPREADSHEET*, any entry that is not *TEXT* or a *FORMULA*.

**OPENING BALANCE**

The value of a resource, such as stock or cash, held by the business at the beginning of the accounting period.

**OPERATOR**

A mathematical symbol to denote a procedure such as addition (+) (see **SPREADSHEET**).

**OPPORTUNITY COST**

The benefits forgone as a result of undertaking one course of action as opposed to another. This is measured in terms of the likely *PROFITS* from the most promising alternative course of action.

**ORDINARY SHARE**

Dominant type of share (see **SHARE FINANCE**).

**OVERHEAD**

A *COST* which cannot be directly allocated to a *COST CENTRE*, but must be apportioned.

**P-VALUE**

A value that is calculated as part of the regression output from a *SPREADSHEET*, reflecting the degree to which a particular *EXPLANATORY VARIABLE* contributes to a regression equation. If the P-value for a variable is less than 0.05, that variable makes a significant contribution to the regression equation and we can have confidence in using it for forecasting purposes (see **LINEAR REGRESSION**, **MULTIPLE REGRESSION**).

**PAYMENT**

A physical transfer of an amount of cash from the business to an outside party, for example a supplier.

**PAYOUT**

The monetary value associated with the occurrence of a *STATE OF NATURE*.

**PAYOUT MATRIX**

A table showing the different possible *PAYOUTS* dependent on which option is chosen and on the *STATE OF NATURE* that occurs.

**PERFORMANCE**

The ability of the business to generate *PROFITS* in relation to the value of the resources invested in it. This is measured through the *RETURN ON CAPITAL EMPLOYED (ROCE)* ratio (see **RATIO ANALYSIS**).

**PIE CHART**

A circular chart divided into sectors showing the proportion or percentage of items in different categories.

**POSITIVE CORRELATION**

Linear association between two variables, for which an increase in the values of the *EXPLANATORY VARIABLE* goes with a increase in the values of the *DEPENDENT VARIABLE*.

**PRESENT VALUE**

The current equivalent of an amount of money expected to be held at a future point in time. This is calculated by *DISCOUNTING* the future amount through the application of a pre-determined *DISCOUNT RATE*, chosen to reflect the *OPPORTUNITY COST* of money.

**PRESENT VALUE TABLES**

Tables listing the *DISCOUNT FACTORS* used in calculating the *NET PRESENT VALUE* of a capital investment project for a number of combinations of years and *DISCOUNT RATES*.

**PRICE EARNINGS RATIO (P/E)**

A *RATIO* which measures the relationship of the current market price of a share and the business's earnings attributable to it. This ratio fluctuates with the market price of the share

$$\text{Price earnings ratio} = \frac{\text{Share price}}{\text{Earnings per share}}$$

**PRICING**

The process of establishing selling prices (see **COST-PLUS PRICING**, **MARGINAL COST PRICING**, **MARKET PENETRATION**, **SKIMMING**).

**PRINCIPAL**

Initial amount invested (in the context of the calculation of *COMPOUND INTEREST*).

**PROFIT**

The amount of financial surplus generated by the business activities of an accounting period. Profit is calculated in the *PROFIT AND LOSS ACCOUNT* by matching the *COSTS* and *SALES REVENUE* of the accounting period. This is done in stages, from *GROSS PROFIT*, through *TRADING PROFIT* to *RETAINED PROFIT*.

**PROFIT AND LOSS ACCOUNT**

An accounting statement which shows the *SALES REVENUE* and *EXPENSE* transactions which have taken place between two *BALANCE SHEET* dates. It reports the *PROFIT* or loss made by the business in the course of the accounting period.

**PROFIT CENTRE**

A *COST CENTRE* which directly generates *SALES REVENUE* for the business.

**PROFIT TREE**

A model of structured *RATIO ANALYSIS*, taking the *RETURN ON SHAREHOLDERS' FUNDS* as the starting point and showing the relationship between key ratios, thus facilitating interpretation.

**PROFITABILITY**

The relationship between the volume of business activity and the *PROFITS* generated, as measured by the *RATIOS*: *GROSS MARGIN* and *NET MARGIN*.

**PUBLIC LIMITED COMPANY (PLC)**

The legal format of a large incorporated business, whose shares are publicly sold and quoted on the Stock Exchange.

**RANDOM VARIATION**

In *TIME SERIES ANALYSIS*, small variations that cannot be predicted and which are equally likely in the long run to push up the value of the time series as to lower it (see **RESIDUAL VARIATION**).

**RATIO**

A quantitative relation between two figures, determined by the number of times one contains the other (see **RATIO ANALYSIS**).

**RATIO ANALYSIS**

A tool of financial control which uses *RATIOS* to plan and monitor changes in company performance over time, as well as in comparison to industry average performance.

**RECEIPT**

The physical transfer of an amount of cash from an outside party, for example a customer, to the business.

**REDUCING BALANCE**

A method of calculating the annual amount of *DEPRECIATION* to be charged to the *PROFIT AND LOSS ACCOUNT* through the repeated application of a certain percentage rate. In the first year this rate is applied to the

historic *COST* of the *FIXED ASSET* to calculate the charge. This charge is treated as an *EXPENSE* in the profit and loss account. To find the depreciation charge for year 2, first the depreciation charge applied in year 1 is deducted from the historic cost. This gives the book value at the end of year 1. This book value is the figure which goes into the *BALANCE SHEET* at the end of year 1.

To find the depreciation charge of year 2, the same percentage rate is applied to this book value at the end of year 1. The same procedure as for year 1 is carried out again. This is repeated for as many years as the asset is to be depreciated over.

The percentage rate to use can be found through the formula:

$$\text{Percentage depreciation rate}$$

$$= (1 - \sqrt[n]{\text{Scrap value/Cost}}) * 100$$

with **n** = number of years expected life of asset.

This method allocates a higher depreciation charge to the earlier accounting periods. It is therefore the appropriate method to use where the asset is most useful to the organisation in the earlier years of its life, for instance, assets using the latest technology and becoming obsolete quickly, such as computer equipment (see **DEPRECIATION**).

**RELATIVE CELL REFERENCE**

The default procedure used in a spreadsheet package to label a *CELL* so that, when copying takes place, the cell address in a formula is modified automatically to take account of the number of rows and columns between the source and the destination cells (see **ABSOLUTE CELL REFERENCE**).

**RELEVANT COST**

In the context of short-term decision-making, a *COST* is relevant if it is affected by the decision. Relevant costs include *DIFFERENTIAL COSTS* and *OPPORTUNITY COSTS*. These types of costs must be taken into consideration when making the decision.

**RELEVANT RANGE**

The range of sales volumes for which the level of *FIXED COSTS* remains unaltered.

**RESIDUAL VARIATION**

In *TIME SERIES ANALYSIS*, any variation that cannot be attributed to *TREND*, *CYCCLICAL VARIATION* or *SEASONAL VARIATION*. It may be *CATASTROPHIC VARIATION* or *RANDOM VARIATION*.

**RESOURCE UTILISATION**

The value of **SALES REVENUE** generated on the basis of a capital investment made in a business. This is measured by the **ASSET TURNOVER** ratio.

**RESPONSIBILITY ACCOUNTING**

A managerial control system based on the principles of **MANAGEMENT BY OBJECTIVES**, by which corporate objectives are translated into individual objectives for line management. In parallel, responsibility for controlling **COST** items is identified with line managers who are held responsible for the monitoring and control of these items.

**RETAINED PROFIT**

The amount of **PROFIT** reinvested in the business.

**RETURN ON CAPITAL EMPLOYED (ROCE)**

A **RATIO** measuring business **PERFORMANCE** by relating the profits generated by the business to the value of the resources invested in it

$$\text{ROCE} = \frac{\text{Net profit}}{\text{Net total assets}}$$

For example, a ROCE figure of 0.14 means that for every £1 invested in the business, a net profit of £0.14 has been generated during the accounting period in question. The **PROFIT TREE** model relates the ROCE to the **ASSET TURNOVER** and **NET MARGIN**, facilitating interpretation.

**RETURN ON SHAREHOLDERS' FUNDS (ROSF)**

A **RATIO** relating the **PROFIT** generated to the money invested in the **SHARE FINANCE** of the business

Return on Shareholders' Funds

$$= \frac{\text{Net profit (minus loan interest)}}{\text{Share finance}}$$

The **PROFIT TREE** model links this ratio to **RETURN ON CAPITAL EMPLOYED** on one hand and **GEARING** on the other.

**SALES PER EMPLOYEE**

A **RATIO** measuring the relationship of the **SALES REVENUE** generated to the number of staff members employed by a business.

**SALES PER SQUARE FOOT**

A **RATIO** measuring the relationship of the **SALES REVENUE** generated to the space occupied by a branch of a business.

**SALES REVENUE**

The monetary value of the business an organisation has generated from its customers over an accounting period. This includes cash and credit sales.

**SCATTER DIAGRAM**

A graphical presentation of the relationship between two variables. The convention is to plot the **DEPENDENT VARIABLE** on the vertical (or Y) axis and the **EXPLANATORY VARIABLE** along the horizontal (or X) axis so that each pair of values (X, Y) corresponds to one point on the diagram. This is used to gain a visual impression of the nature of the relationship between the two variables, in the context of **CORRELATION** and **LINEAR REGRESSION ANALYSIS**.

**SEASONAL ADJUSTMENT FACTOR**

A percentage to indicate how much the value of a **TIME SERIES** is typically above or below the **TREND** figure for a particular season. In the context of **TIME SERIES ANALYSIS**, this is used to adjust the trend for seasonal effects in order to assist accurate **FORECASTING**.

**SEASONAL VARIATIONS**

Short-term regular fluctuations in variables due to predictably recurring events such as pay days, festivities, holidays and types of weather. When making sales forecasts, the seasonality must be taken into account. In the context of **TIME SERIES ANALYSIS** this is done by applying a **SEASONAL ADJUSTMENT FACTOR** to the **TREND**.

**SEMI-VARIABLE COST**

A cost which has a **FIXED COST** element as well as a **VARIABLE COST** aspect. For example, a telephone bill consists of a basic charge (the fixed cost part) and an itemised unit cost which varies directly with the number of telephone calls (the variable part). For cost accounting purposes this type of cost is split into its fixed and variable elements.

**SENSITIVITY ANALYSIS**

A thorough examination of the degree of potential vulnerability of an organisation to changes in a number of internal and external factors. The focus is on the question 'What if...?' with the objective of identifying and minimising risk exposure. On the basis of the outcomes of such an analysis, a number of contingency plans can be made for alternative sets of circumstances, taking into account uncertainty. This allows the planner to switch to that plan which

most closely matches reality. A much quicker response to changing circumstances is possible than there would have been if only one plan had been made.

#### **SHARE FINANCE**

The risk **CAPITAL** investment in a company. Shareholders are the owners of the business. They gain from the investment in shares in two forms: through the receipt of **DIVIDENDS** and **CAPITAL GAIN**. For **ORDINARY SHARES**, shareholders are not legally entitled to dividends, and the amount of dividends, will vary depending on the **PROFITABILITY** of the business. Capital gains arise as the business prospers and the market value of the shares increases. Unlike **LOAN FINANCE**, shares are irredeemable. However, they are transferable and a large and active market exists in the form of the Stock Exchange.

#### **SHORT-TERM FORECASTING**

A technique for making accurate predictions of the value of a variable just one period of time ahead. An example of such a technique is **EXPONENTIAL SMOOTHING**.

#### **SKIMMING**

A **PRICING** strategy which aims to exploit early opportunities in a new product market by charging high prices.

#### **SLOPE**

In the **EQUATION OF A STRAIGHT LINE**, the amount by which the **DEPENDENT VARIABLE**, **Y**, changes when the **EXPLANATORY VARIABLE**, **X**, increases in value by one unit.

#### **SMOOTHING CONSTANT, $\alpha$**

The Greek letter  $\alpha$  is used in the context of **EXPONENTIAL SMOOTHING**, to represent the smoothing constant. This constant assumes a value between 0 and 1, chosen by the forecaster, depending on the relative weighting he/she wishes to give to the most recent data. A high value of  $\alpha$  gives a lot of weight to the most recent data; a low value of  $\alpha$  gives a smoother series. A high value is normally chosen where recent changes and events are likely to have a very strong impact on future data.

#### **SMOOTHED MEAN ABSOLUTE DEVIATION**

A system for monitoring the general trend in forecasting errors for an **EXPONENTIAL SMOOTHING** system of **SHORT-TERM FORECASTING**. This system gives greater weight to more recent **FORECAST ERRORS** through the application of a **SMOOTHING CONSTANT**.

#### **SPREADSHEET**

A computer package that displays words and numbers in rows and columns and enables calculations to be performed.

#### **STANDARD**

An average based on historical data from a number of accounting periods, used to draw up a **BUDGET** for a future period (*see ATTAINABLE STANDARD, IDEAL STANDARD*).

#### **STANDARD COST**

An average **COST** based on historical data, used to draw up a **BUDGET** for a future period. **VARIANCE ANALYSIS** compares standard costs and **ACTUAL COSTS**.

#### **STATE OF NATURE**

A happening over which we have no control.

#### **STOCK**

Goods held for sale to customers (*see CURRENT ASSET*).

#### **STOCK TURNOVER**

A **RATIO** showing the number of times the average stock of a business is sold in one accounting period

$$\text{Stock turnover} = \frac{\text{Cost of goods sold}}{\text{Average stock}}$$

A stock turnover of 18 means that in one accounting period the business would sell stock to the value of 18 times that normally held in the business at any one point in time. Stock turnover can vary greatly between industries.

#### **STRAIGHT LINE**

A method of calculating the annual amount of **DEPRECIATION** to be charged to the **PROFIT AND LOSS ACCOUNT** by using the formula

Annual depreciation charge

$$= \frac{\text{Historic cost} - \text{Scrap value}}{\text{Number of years of expected life of asset}}$$

The cost of the **ASSET** is spread over its useful life in equal parts. This method is therefore appropriate where the business is getting the same amount of use of the asset in each accounting period, as in the case of office furniture (*see DEPRECIATION*).

#### **SUNK COST**

A **COST** which cannot be recovered. In the context of short-term decision-making this type of cost is ignored as it is not affected by the decision.

**TEMPLATE**

A standard, generalised spreadsheet layout, which can be re-used an unlimited number of times for different problems requiring the application of the same technique.

**TEXT**

In a *SPREADSHEET*, any entry of words or a string of keyboard characters that is not a *NUMBER* or a *FORMULA*.

**TIME SERIES**

A table of figures showing the values of a variable at regular intervals in time. This can be used to make forecasts through *TIME SERIES ANALYSIS*.

**TIME SERIES ANALYSIS**

A technique for making forecasts based on the analysis of historical figures in the form of a *TIME SERIES*. This technique separates out the *SEASONAL VARIATIONS* and the overall *TREND*, facilitating predictions for the future movement of the series, provided the underlying assumptions remain unchanged.

**TIME VALUE**

In the context of *COMPOUND INTEREST* calculations, the fact that the earlier we receive a sum of money, the greater its value to us as it can be invested at the current discount rate and earn interest.

**TOP DOWN**

An approach to budgeting which takes the views of top management as the starting point for drawing up a *BUDGET*. This is based on the idea that there are considerable *ECONOMIES OF SCALE* to be derived from centralised information gathering and evaluation. A head office view of the economy, the industry and the company is therefore necessarily more accurate than a branch view. However, since branch managers are more aware of local preferences and peculiarities, this is often combined with a *BOTTOM UP* approach.

**TOTAL COST**

The sum of all *FIXED COSTS*, *SEMI-VARIABLE COSTS* and *VARIABLE COSTS*.

**TRADE CREDITOR** (*see CURRENT LIABILITY*).**TRADING ACCOUNT**

The part of the *PROFIT AND LOSS ACCOUNT* which sets the *COST OF GOODS SOLD* against the *SALES REVENUE* of the accounting period to calculate *GROSS PROFIT*.

**TRADING PROFIT**

The financial surplus calculated by deducting the business *EXPENSES* of an accounting period from the *GROSS PROFIT* for that period.

**TREND**

The long-run component of a *TIME SERIES*. In the context of *TIME SERIES ANALYSIS* this can be estimated by filtering out the impact of *SEASONAL VARIATIONS*.

**UNCONTROLLABLE COST**

A *COST* which cannot be influenced by the manager in charge of the relevant cost centre. The manager can therefore not be held responsible for any *ADVERSE VARIANCES* in this type of cost (*see RESPONSIBILITY ACCOUNTING*).

**UNIT CONTRIBUTION**

That part of the selling price charged for each unit which is left after all unit *VARIABLE COSTS* have been paid for. This initially is used to pay for *FIXED COSTS*; once all fixed costs have been paid for, this is the profit made on the sale of each additional unit.

Unit contribution

= Selling price/Unit – Variable cost/Unit

(*see CONTRIBUTION*).

**VARIABLE COST**

A *COST* which varies in proportion to the level of sales or output of the business.

**VARIABLE FACTOR**

A resource element of a flexible and easily adjustable nature. The amount of this kind of resource used in the business can be changed in the short run. An example is labour. (For contrast, *see FIXED FACTOR*).

**VARIANCE**

The difference between *ACTUAL COST* and *STANDARD COST* for a budgetary period. This can be *ADVERSE* or *FAVOURABLE* and is investigated in the process of *VARIANCE ANALYSIS* (*see VARIANCE ANALYSIS*).

**VARIANCE ANALYSIS**

The process of calculating *VARIANCES*, identifying responsibility for *COST* control, investigating reasons behind *ADVERSE* variances, and taking remedial action.

**WEIGHTED AVERAGE COST (WAC)**

A method of stock valuation. Under this method the average cost of all goods in stock is calculated every time a purchase of stock is made. In this calculation a

weighting is given to the quantities purchased at the different cost prices, using the formula

#### WAC

$$= \frac{\text{Quantity A} * \text{Price A} + \dots + \text{Quantity N} * \text{Price N}}{\text{Quantity A} + \dots + \text{Quantity N}}$$

In times of inflation or deflation, the use of WAC will result in a *GROSS PROFIT* figure in between those resulting from the use of LIFO or FIFO. The use of this method is legal in the UK. WAC is mostly used by businesses selling large quantities of small and indistinguishable items.

#### XY CHART

A chart showing the relationship between two variables (See **SCATTER DIAGRAM**).

#### ZERO-BASE BUDGETING

A form of *BOTTOM UP* budgeting by which line managers are required to compete with each other for resources as part of the budgeting process. To claim resources they have to submit detailed requests, justifying future expenditure plans. These are evaluated (and approved or rejected) in the light of the comparative benefits to the organisation.

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