Answers

Market size, share and growth

Pages 6–7

1 10,000 × £2.50 = £25,000
2 £15 × 25,000 = £375,000
(£375,000 ÷ 35) × 100 = £1,071,429
3 (15,000 ÷ 25,000) × 100 = 60%
4 ((45,000 − 25,000) ÷ 25,000) × 100 = (20,000 ÷ 25,000) × 100 = 80%

Price elasticity of demand

Pages 8–9

1 % ΔQd ÷ %ΔP ((−9 ÷ 900) × 100) ÷ ((1.03 ÷ 20.60) × 100) = −1 ÷ 5 = (−)0.2
2 ? ÷ 6 = −0.5 = 6 × −0.5 = −3, i.e. quantity demanded will fall by 3%.
As the percentage change in quantity demanded is smaller than the percentage change in price, the total revenue will increase.

Stretch yourself
% ΔQd = (240 ÷ 6,000) × 100 = 4% therefore: 4 ÷ 2.5 = 1.6. Demand for hot tubs is income elastic.

Time series analysis

Pages 10–13

1

Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan
	6,660	7,020	6,840	6,480	6,737	7,083	7,460	7,483	7,503	7,667	7,093	

The figures show that there is an upward trend in sales. The figure for December is down, probably because people start diets in January and this is a seasonal variation rather than part of an underlying trend. However, Katie should continue to monitor the sales figures.

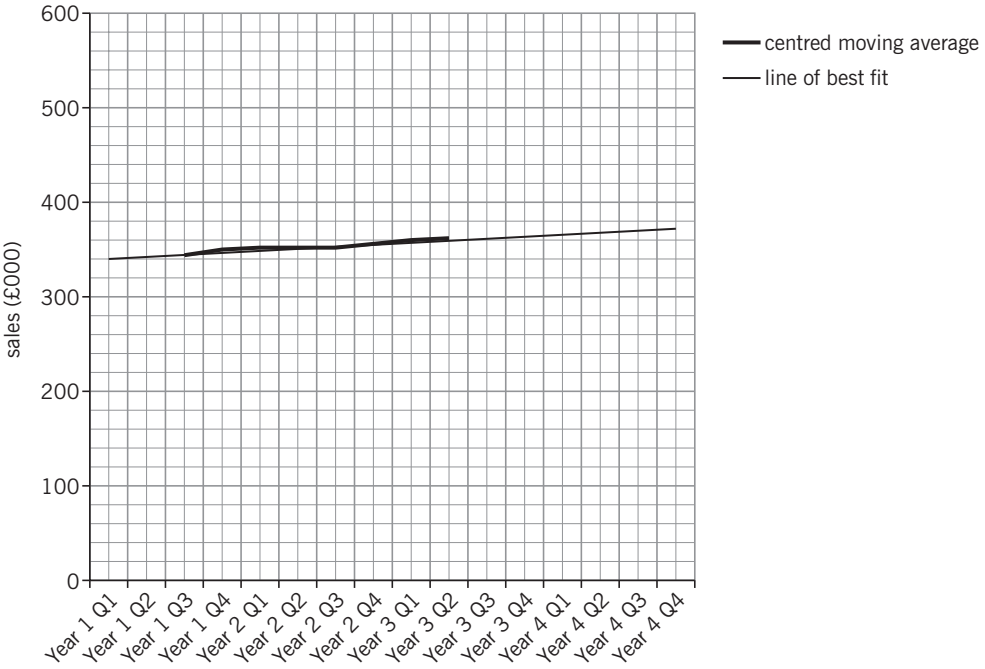
2

		Sales	5-day moving total	Moving average
Week 1	Tues	32		
	Wed	38		
	Thurs	40		43
	Fri	50		44
	Sat	55	215	**44.4**
Week 2	Tues	37	220	**44.8**
	Wed	40	222	**45.4**
	Thurs	42	224	**45.4**
	Fri	53	227	**46**
	Sat	55	**227**	**46.8**
Week 3	Tues	40	**230**	**48.4**
	Wed	44	**234**	**49.8**
	Thurs	50	**242**	**52.8**
	Fri	60	**249**	**53.6**
	Sat	70	**264**	**54.4**
Week 4	Tues	44	**268**	**54.8**
	Wed	48	**272**	**55.8**
	Thurs	52	**274**	**56.2**
	Fri	65	**279**	
	Sat	72	**281**	

The sales trend is rising

3

Year	1				2				3			
Quarter	1	2	3	4	1	2	3	4	1	2	3	4
Sales	450	260	250	400	475	280	240	410	480	295	250	425
Centred moving average trend			343.13	348.75	350	350	351.88	354.38	357.50	360.63		
Quarterly seasonal variation			−93.13	+51.25	+125	−70	−111.88	+55.62	+122.50	−65.63		
Average seasonal variation			−102.51	53.44	123.75	−67.82	−102.51	53.44	123.75	−67.82		



Using the line of best fit, the trend forecast for quarter 2 in year 4 is £364,000.
Seasonally adjust this trend forecast:
£364,000 − 67.82 = £363,932.18

Analysing data: averages

Pages 14–21

1 a (9.25 + 9.5 + 9.75 + 9.75) ÷ 4 = 38.25 ÷ 4 = 9.56, i.e. 9,560 units.
(9.75 + 9.5 + 9.5 + 9.25) ÷ 4 = 38 ÷ 4 = 9.5, i.e. 9,500 units.

b

Quantity sold (000s)	Frequency	Quantity × frequency
9.25	2	18.5
9.5	3	28.5
9.75	5	48.75
10.00	2	20
10.25	2	20.5
10.5	1	10.5
10.75	3	32.25
11.00	2	22.00
TOTALS	20	201

The mean is 201 ÷ 20 = 10.05, i.e. 10,050 sales.

2 Total frequency ÷ 2 = 20 ÷ 2 = 10. The median is 9.75 or 9,750 sales because this is where the 10th value lies when cumulative frequency is calculated.

3 The mode is 9.75 because it occurs the most times (five times).

4 Monthly output figures in ascending value order:

36	40	42	46	52	52	54	54	54	56	56	58

a Range: highest figure minus lowest figure: 58 − 36 = 22.

b Interquartile range:
Q1: (1 × 12) ÷ 4 = 3 Q3: (3 × 12) ÷ 4 = 9
3rd item = 42 and 9th item = 56 so the interquartile range = 56 – 42 = 14.

c Mean deviation:
The arithmetic mean is total production over the period = 600 ÷ 12 (number of months) = 50 units

Months	Output (000s) x	Deviation (x − 50)
Jan	40	−10
Feb	46	−4
Mar	52	2
Apr	54	4
May	54	4
Jun	52	2
Jul	58	8
Aug	56	6
Sep	54	4
Oct	56	6
Nov	42	−8
Dec	36	−14
		72

Mean deviation = 72 ÷ 12 = 6

5

Months	Output (000s) x	Deviation (x − 50)	Deviations squared
Jan	40	−10	100
Feb	46	−4	16
Mar	52	2	4
Apr	54	4	16
May	54	4	16
Jun	52	2	4
Jul	58	8	64
Aug	56	6	36
Sep	54	4	16
Oct	56	6	36
Nov	42	−8	64
Dec	36	−14	196
			Total = 568

The variance = 568 ÷ 12 = 47.33
The standard deviation = $\sqrt{47.33}$ = 6.88

6 2.5%
1 SD = 3 2 SD = 6 3 SD = 9
68% of calls answered in 15–21 seconds (18 − 3 = 15; 18 + 3 = 21)
95% of calls answered in 12–24 seconds (18 − 6 = 12; 18 + 6 = 24)
This leaves 5% to be answered between 0–11 seconds and 25+ seconds.
Thus there is a 2.5% probability of the call being answered in less than 12 seconds.

Total revenue

Pages 22–3

1 £8 × 40 = £320 £12 × 50 = £600
Total revenue = £320 + £600 = 920

2

	January	February	March	April	May	June
Sales	20	15	30	35	35	20
Price (£)	140	140	140	140	140	140
Total revenue (£)	2,800	2,100	4,200	4,900	4,900	2,800

3 Total revenue ÷ price per customer per month = number of clients
Client pays £20 × 5 per week = £100. This makes £400 per month.
£1,200 ÷ 400 = 3 clients

4 Total revenue ÷ quantity sold = average price
£3,250,000 ÷ 25,000 = £130 per seat

Total and unit costs

Pages 24–5

1 Total costs = total fixed costs + total variable costs
£50 + (£3 × 90) = £320 per month

2

	January	February	March	April	May	June
	£	£	£	£	£	£
Sales	20	15	30	35	35	20
Fixed costs	450	450	450	450	450	450
Variable costs	1,400	1,050	2,100	2,450	2,450	1,400
Total costs	1,850	1,500	2,550	2,900	2,900	1,850

3 Total costs = total fixed costs + total variable costs
Fixed costs per month: £37.50 × 4 = £150
Variable costs per month: 3 dogs × £5 = £15 per day
(£15 × 5 days) = £75 per week
£75 × 4 = £300 per month
Total costs: £150 + £300 = £450 per month
Unit costs: £450 ÷ 60 = £7.50 per dog per day (3 dogs visit 20 times per month)

4 a Total costs: £12,690 + (£375 × 60) = £12,690 + £22,500 = £35,190
Unit costs: total costs ÷ number produced = £35,190 ÷ 60 = £586.50

b If he buys from new supplier:
Variable costs fall by 20%
Either: £375 × 0.80 = £300 or: (£375 ÷ 100) × 80 = £300
Total costs: £12,690 + (£300 × 60) = £12,690 + £18,000 = £30,690
Unit costs: £30,690 ÷ 60 = £511.50
Richard's total costs would fall by £4,500 and his unit cost by £75.00 per trailer.

Profit, loss and profit margin

Pages 26–7

1 Profit = total revenue – total costs = £920 − £320 = £600 profit in July

2

	January	February	March	April	May	June
Price (£)	140	140	140	140	140	140
Sales	20	15	30	35	35	20
Total revenue (£)	2,800	2,100	4,200	4,900	4,900	2,800
Fixed costs (£)	450	450	450	450	450	450
Variable costs (£)	1,400	1,050	2,100	2,450	2,450	1,400
Total costs (£)	1,850	1,500	2,550	2,900	2,900	1,850
Profit (£)	950	600	1,650	2,000	2,000	950

3 Profit margin = £500 − £400 = £100 or (100 ÷ 500) × 100 = 20%

Stretch yourself

a Unit costs rise to £440 (400 × 1.10). £500 − £440: profit margin falls to £60 = 12%

b Average price per cake rises to £700 (500 × 1.40). £700 − £440: profit margin rises to £260 = 37%

Budgets

Pages 28–9

1 **a** £2,750 + £3,000 = £5,750
b £5,750 − £4,450 = £1,300
c £3,500 + £1,000 + £475 = £4,975
d £7,000 − £5,500 = £1,500
e £7,500 − £6,550 = £950

2 Sales revenue: £26,000 × 0.8 = £20,800
Wages: £6,000
Rent: £1,500 × 1.05 = £1,575
Materials: £5,000 × 1.30 = £6,500
Other costs: £2,500 + £375 = £2,875
Original total costs budget: £15,000
New total costs: £16,950
Original profit: £26,000 − £15,000 = £11,000
New profit: £20,800 − £16,950 = £3,850

Variances

Pages 30–1

1 Answer is **a**:
(Actual total costs) £7,250 − (budgeted total costs) £6,550 = £700 adverse (costs higher than budgeted)

2 Sales: £32,000 − £28,500 = £3,500 favourable
Wages: £16,000 − £14,000 = £2,000 adverse
Stocks: £8,000 − £7,000 = £1,000 adverse
Other costs: £5,500 − £6,000 = £500 favourable
Profit: £2,500 − £1,500 = £1,000 favourable

Cash flow

Pages 32–3

1 Net cash flow October: £2,750 − (£3,000 + £450 + £1,000) = (£1,700)
Closing balance for October: £1,000 + (£1,700) = (£700)
Opening balance for November: (£700)
Net cash flow for November: £3,000 − (£3,500 + £475 + £1,000) = (£1,975)
Closing balance for November: (£700) + (£1,975) = (£2,675)

2 Cash sales: £2,500 × 1.25 = £3,125; materials: £750 × 1.20 = £900
Total cash inflow: £3,125 + £500 = £3,625
Total cash outflows: £200 + £900 + £250 = £1,350
Net cash flow: £3,625 − £1,350 = £2,275

Stretch yourself

Item	Month 1 £m	Month 2 £m
Opening balance	0.2	0.15
Inflows		
Sales revenue	1.2	1.25
Outflows		
Wages	0.3	0.3
Materials	0.7	0.9
Overheads	0.25	0.3
Total outflows	1.25	1.5
NET CASH FLOW	(0.05)	(0.25)
Closing balance	0.15	(0.1)

Costing methods

Pages 34–41

1 Last order: price − unit VC = £500 − £325 = £175 unit contribution
Hotel order: price = total revenue ÷ sales = £2,500 ÷ 10 = £250
Unit VC = total VC ÷ sales = £1,600 ÷ 10 = £160
Unit contribution = £250 − £160 = £90
Analysis: the contribution made by the hotel order is £85 less than her previous order. This suggests that supplying the hotel might not be a good strategy unless she is struggling to find work elsewhere.

2 Total contribution = total revenue − total variable costs
Total contribution = £10.20 × 9,500 – ((£3.59 + £4.25) × 9,500)
Total contribution = £96,900 − £74,480
Total contribution = £22,420
or
Total contribution = (selling price − variable costs per unit) × sales
Total contribution = (£10.20 − (£4.25 + £3.59)) × 9,500
Total contribution = (£10.20 − £7.84) × 9,500
Total contribution = £2.36 × 9,500
Total contribution = £22,420

3 Original total contribution = £70 × 90 = £6,300
New contribution:
Change in sales = 90 × 0.8 = 72
New total contribution = £70 × 72 = £5,040

Stretch yourself

The company has the spare capacity to fulfil the order: 31,250 − 25,000 = 6,250.
The original unit contribution: £130 − 30 − 32 − 10 = £58 per unit; total contribution: £58 × 25,000 = £1,450,000
The order unit contribution: £85 − £72 = £13 per unit; total contribution: £13 × 6,000 = £78,000 minus £10,000 set-up costs = £68,000
The Breaston Garden Seat Company should accept the order.
NB This is even clearer when we see that the fixed costs of £420,000 can be met by the original level of sales, so the £68,000 is all profit.

4 a Total direct costs for the three profit centres: Accommodation = £80,000; Restaurant = £300,000; Bar = £120,000

b The total direct costs for the business are: (£80,000 + £300,000 + £120,000) = £500,000

c The % of total direct costs:
Accommodation = (£80,000 ÷ £500,000) × 100 = 16%: £600,000 × 0.16 = £96,000
Restaurant = (£300,000 ÷ £500,000) × 100 = 60%: £600,000 × 0.6 = £360,000
Bar = (£120,000 ÷ £500,000) × 100 = 24%: £600,000 × 0.24 = £144,000

d Full cost:
Accommodation: £80,000 + £96,000 = £176,000
Restaurant: £300,000 + £360,000 = £660,000
Bar: £120,000 + £144,000 = £264,000

e The problem is that the burden of indirect costs is borne by the restaurant, which would reduce its ability to make a profit. It is likely that more of the indirect costs should be allocated to accommodation. Floor space used might be a better basis for allocating indirect costs in a hotel.

Stretch yourself

P1 total direct cost = 4 + 6 + 2 = £12
Rent: 25% of total factory time ((30 ÷ 120) × 100) = 48,000 × 0.25 = £12,000 ÷ 4,000 = £3 per blade pack
Marketing (£72,000) and utilities (£96,000) are split equally.
Marketing: (£72,000 ÷ 4,000) ÷ 3 = £6 per blade pack
Utilities: (£96,000 ÷ 4,000) ÷ 3 = £8 per blade pack
Administration: 25% ((4 ÷ 16) × 100) of labour used = £16,000 × 0.25 = £4,000 ÷ 4,000 = £1 per blade pack
Total cost for profit centre P1 = 12 + 3 + 6 + 8 + 1 = £30
The full results are shown below:

Profit centre	Direct cost (£)	Rent (£)	Marketing (£)	Utilities (£)	Admin (£)	Total (£)
P1	12	3	6	8	1	30
P2	16	6	6	8	1	37
P3	16	3	6	8	2	35
Total	44	12	18	24	4	102

5 Annual contribution: selling price − unit variable costs = £4.00 – £2.80 = £1.20
Profit: total revenue − total costs = (100,000 × £4) – (£2.80 × 100,000 + £80,000) = £400,000 − £360,000
Profit = £40,000
The new order: contribution = selling price − unit variable costs = £2.50 – £2.80 = (£0.30)
Harry George should not accept the order on purely financial grounds because he would be making a loss of 30p per bag.

Break-even output and the margin of safety

Pages 42–3

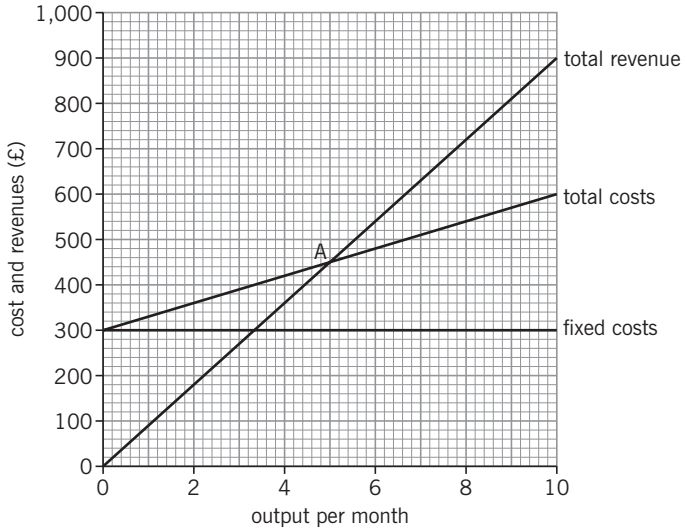
1 Break-even = FC ÷ contribution = £5,600 ÷ £70 = 80 pairs
2 Break-even = FC ÷ contribution = £6,000 ÷ £40 = 150 items of jewellery
3 Break-even before = FC ÷ contribution = £12,690 ÷ (£850 − £375) = 27 trailers
Break-even after= FC ÷ contribution = £12,690 ÷ (£748 − £325) = 30 trailers
4 Break-even = FC ÷ contribution = £280 ÷ (£10 − £2) = £280 ÷ £8 = 35 clients

Stretch yourself
Break-even = FC ÷ contribution (price – variable cost per unit)
50 = £200 ÷ (£20 − AVC)
£200 ÷ 50 = £20 − AVC
£4 = £20 − AVC
£20 − £4 = AVC
£16 = average variable costs
Check: £200 ÷ (£20 − £16) = 50
5 Break-even = FC ÷ contribution = £280 ÷ (£10 − £2) = £280 ÷ £8 = 35
Margin of safety = current output − break-even output = 40 − 35 = 5 clients
6 Break-even = FC ÷ contribution = £8,000 ÷ (£155 − £75) = £8,000 ÷ 80 = 100 pairs
Margin of safety = 112 − 100 = 12 pairs of shoes per year
7 Break-even = FC ÷ contribution = £6,000 ÷ (£60 − £30) = £6,000 ÷ £30 = 200 items
Margin of safety = 280 − 200 = 80 items
Marissa is incorrect; she will not achieve the margin of safety she expects.
8 Break-even before = FC ÷ contribution = £12,690 ÷ £475 = 27 trailers
Margin of safety: 21 trailers
Break-even after = FC ÷ contribution = £12,690 ÷ £423 = 30 trailers
Margin of safety: 30 trailers
His margin of safety has improved by 11 trailers per year.

Break-even charts

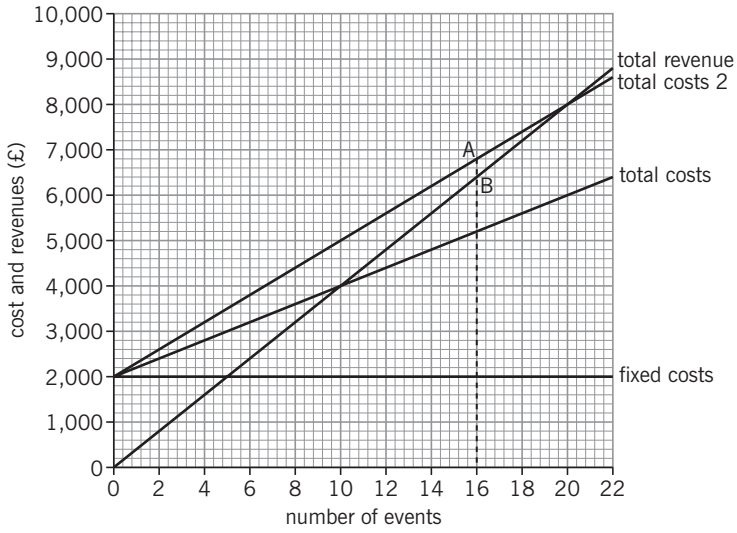
Pages 44–7

1



Total revenue for 10 properties = £600 × 0.15 × 10 = £900
Break-even is five properties.
At eight properties total revenue is £720 and total cost is £540 so profit is £180.
At seven properties the margin of safety is two properties.

2



The new break-even point is 20 events.
If Sarah runs 16 events per year, she will make a loss: total revenue = £6,400; total cost = £6,800. Total loss = £400. This is shown by the letters A and B on the diagram.

Depreciation: straight line and reducing the balance

Pages 48–51

1 (Purchase price − residual value) ÷ estimated life = (£60,000 − £8,000) ÷ 5 = £52,000 ÷ 5 = £10,400 per year

Stretch yourself
At the end of year 3, three lots of depreciation will have been deducted from this historic cost.
3 × £10,400 = £31,200; £60,000 − £31,200 = £28,800 net book value
At the end of year 5: £10,400 × 5 = £52,000; £60,000 − £52,000 = £8,000 net book value
Note that the net book value is the same as the residual value.

2 (£60,000 − £4,000) ÷ 8 = = £56,000 ÷ 8 = £7,000 per year
Year 3: £60,000 − £21,000 = £39,000; compared to £28,800 using the original figures.
Year 5: £60,000 − £35,000 = £25,000; compared to £8,000 using the original figures.
The expenses of the company will fall by the difference between the two depreciation figures, £3,400 (£10,400 − £7,000). This will increase the operating profit by the same amount.
3 Depreciation: £60,000 × 0.45 = £27,000. NBV: £60,000 − £27,000 = £33,000

Profitability ratios

Pages 52–5

1 Year 1:
Gross profit margin: (£93,897 ÷ £200,000) × 100 = 46.9%
Operating profit margin: (£40,456 ÷ £200,000) × 100 = 20.23%
ROCE: (£40,456 ÷ (£83,973 + £33,000)) × 100 = 34.59%
ROE: (£40,456 ÷ £83,973) × 100 = 48.18%
Year 2:
Gross profit margin: (£77,816 ÷ £198,000) × 100 = 39.3%
Operating profit margin: (£19,454 ÷ £198,000) × 100 = 9.83%
ROCE: (£19,454 ÷ (£69,406 + £30,000)) × 100 = 19.57%
ROE: (£19,454 ÷ £69,406) × 100 = 28.03%
All four ratios show a deterioration in the profitability of the business.
However, its performance should be assessed against trading conditions and the performance of rival companies.
2 Clothing
Operating profit: £200,000 − £128,000 = £72,000
ROCE: (£72,000 ÷ (£2,900,000 + £680,000)) × 100 = 2.01%
Equipment
Operating profit: £175,000 − £50,000 = £125,000
ROCE: (£125,000 ÷ (£2,900,000 + £340,000)) × 100 = 3.86%

Shareholder ratios

Pages 56–9

1 Year 1:
Dividend per share: total dividends ÷ number of shares issued = £1.3 ÷ 5.5 = 24p (£0.24)
Dividend yield: (dividend per share ÷ market price) × 100 = (£0.24 ÷ £1.55) × 100 = 15.48%
Year 2:
DPS: £2.2 ÷ 5.5 = 40p (£0.40)
DY: £0.40 ÷ 2.22 = 18.02%
The DPS and DY have both increased, which is good news for shareholders who buy shares in the expectation that their returns will rise over time.

2 Earnings per share: net profit after tax ÷ number of shares = £125 ÷ 260 = 48p (£0.48)
Dividend yield: (earnings per share ÷ market price) × 100 = (£0.48 ÷ £4.50) × 100 = 10.67%
Price/earnings ratio: market price ÷ earnings per share = £4.50 ÷ £0.48 = £9.38

Liquidity ratios

Pages 60–1

1 a (a) = 113.00 − (37.50 + 22.30) = 53.20
(b) = 66.60 − (14.60 + 25.90) = 26.10
(c) = 113.00 − 47.20 = 65.80
(d) = (99.50 + 36.30) − 75.0 = 60.80

b Year 1:
Current ratio: current assets ÷ current liabilities = 113.00 ÷47.20 = 2.39
Acid test ratio: (current assets − inventories) ÷ current liabilities = (113.00 − 53.20) ÷ 47.20 = 1.27
Year 2:
Current ratio: 66.60 ÷ 30.30 = 2.20
Acid test ratio: (66.60 − 26.10) ÷ 30.30 = 1.34

2 Current ratio: 12,465 ÷ 5,889 = 2.12
Acid test ratio: (12,465 − 3,744) ÷ 5,889 = 1.48

3 Global Company plc
Year 1: Current ratio: assets ÷ liabilities = 11,298,929 ÷ 10,589,293 = 1.07
Acid test: (current assets − inventories) ÷ current liabilities = (11,298,929 − 1,459,394) ÷ 10,589,293 = 0.93
Year 2: Current ratio: assets ÷ liabilities = 13,073,604 ÷ 10,686,214 = 1.22
Acid test: (13,073,604 − 1,422,373) ÷ 10,686,214 = 1.09
Stylish plc
Year 1: Current ratio: 66,862 ÷ 23,983 = 2.79
Acid test: (current assets − inventories) ÷ current liabilities = (66,862 − 40,000) ÷ 23,983 = 1.12
Year 2: Current ratio: 59,600 ÷ 30,214 = 1.97
Acid test: (current assets − inventories) ÷ current liabilities = (59,600 − 36,100) ÷ 30,214 = 0.78
Barder Computers plc
Year 1: Current ratio: 5.2 ÷ 3.3 = 1.58
Year 2: Current ratio: 6.1 ÷ 2.9 = 2.10
Walshaw plc
Year 1: Current ratio: 10,582 ÷ 7,287 = 1.45
Year 2: Current ratio: 9,231 ÷ 6,580 = 1.40
Gormally plc
Current ratio: 81 ÷ 80 = 1.01

Gearing

Pages 62–5

1 Year 1: Gearing ratio = (long-term liabilities ÷ capital employed) × 100 = (7,872,007 ÷ 18,472,744) × 100 = 42.61%
Year 2: (8,732,630 ÷ 19,663,073) × 100 = 44.41%
Global Company plc is at the upper end of the 'normal' gearing range. The long-term liabilities have increased by 10.93%, whilst the capital employed has only increased by 6.44%. This explains the slight rise in the gearing.

2 Year 1: Gearing ratio = (non-current liabilities ÷ (total equity + non-current liabilities)) × 100 = (2,381 ÷ (3,120 + 589 + 2,381)) × 100 = (2,381 ÷ 6,090) × 100 = 39.09% (39.1%)
Year 2: 5,230 ÷ (3,120 + 1,070 + 5,230) × 100 = (5,230 ÷ 9,420) × 100 = 55.52%
The gearing ratio has risen from a 'normal' 39% to a high gearing of 55.5%. This is due to an increase in non-current liabilities of 120%. The reserves did rise by 82%.

Stretch yourself

a 238 ÷ 312 = 0.76 : 1
This is a high ratio of debt to shareholder's equity and may suggest aggressive use of debt for growth.

b (5,889 + 14,483) ÷ (37,033 + 12,465) × 100 = (20,372 ÷ 49,498) × 100 = 41.16%
It depends on other firms in the industry, but in general this would not be considered a high-risk business.

c (440,000 ÷ 950,000) × 100 = 46%; (440,000 ÷ (950,000 − 150,000)) × 100 = (440,000 ÷ 800,000) × 100 = 55%
It is difficult to say, without any sort of comparisons, whether or not this firm is in a strong position, but the intangible assets do not make up a very large part of total assets (16%).

Financial efficiency ratios

Pages 66–9

1

	Year 1	Year 2
Asset turnover:	2,069 + 3,530 = 5,599	1,782 + 3,078 = 4,860
	19,428 ÷ 5,599 = 3.47	23,009 ÷ 4,860 = 4.73
Inventory turnover:	14,905 ÷ 2,069 = 7.20	18,192 ÷ 1,782 = 10.21
Receivables days:	(3,530 ÷ 19,428) × 365 = 66 days	(3,078 ÷ 23,009) × 365 = 49 days
Payables days:	(4,603 ÷ 14,905) × 365 = 113 days	(4,172 ÷ 18,192) × 365 = 84 days

These figures show that the assets were used more efficiently in year 2 than in year 1 and that stock was turned over/changed more often. These are both good signs. The receivables days has fallen, which means customers are paying more quickly and this helps with cash flow. This would not really be a problem for Company One because it takes much longer to pay its suppliers; in year 2 it was almost double the receivables days.

2

	Year 1	Year 2
Asset turnover:	11,124 ÷ 4,519 = 2.46	12,161 ÷ 6,105 = 1.99
Inventory turnover:	8,676 ÷ 2,561 = 3.39	9,416 ÷ 2,726 = 3.45
Receivables days:	(4,009 ÷ 11,124) × 365 = 132 days	(4,119 ÷12,161) × 365 = 124 days
Payables days:	(2,356 ÷ 8,676) × 365 = 99 days	(2,571 ÷ 9,416) × 365 = 100 days

As you would expect for a heavy engineering company, the figures are very different from Company One. The asset turnover has fallen, which may be a cause for concern and requires investigation. The inventory turnover is low, which is to be expected in this industry. The receivables days and payables days are very long, and should be compared to the industry average if possible. Again there are potential problems for suppliers' cash flow, but not for UK Manufacturing plc.

Stretch yourself

	Year 1	Year 2
Gross profit margin	(2,448 ÷ 11,124) × 100 = 22%	(2,745 ÷ 12,161) × 100 = 22.6%
Operating profit margin	(1,186 ÷ 11,124) × 100 = 10.7%	(1,373 ÷ 12,161) × 100 = 11.3%
ROCE	(1,186 ÷ 9,507) × 100 = 12.5%	(1,373 ÷ 10,921) × 100 = 12.6%
Current ratio	8,315 ÷ 6,916 = 1.2 : 1	9,593 ÷ 7,194 = 1.3 : 1
Acid test ratio	(8,315 − 2,561) ÷ 6,916 = 0.8:1	(9,593 − 2,726) ÷ 7,194 = 0.95:1
Gearing	(4,988 ÷ 9,507) × 100 = 52.5%	(4,816 ÷ 10,921) × 100 = 44%

In all cases the position of the business is healthier in year 2 than it was in year 1.

Simple payback and discounted payback period

Pages 70–5

1 Cumulative cash flow: year 1 (50,000); year 2 (30,000); year 3 (10,000).
(10,000 ÷ 20,000) × 12 = 6
Payback is three years six months, so the bank should agree the loan on the basis of this calculation.

2 Cumulative cash flow: year 1 (10); year 2 (7); year 3 (4); year 4 (0).
The payback period is therefore **four years exactly**.

Stretch yourself

First calculate the net cash flow and the cumulative cash flow.

Project 1 £100m					Project 2 £80m			
Year	CI (£m)	CO (£m)	NCF (£m)	CCF (£m)	CI (£m)	CO (£m)	NCF (£m)	CCF (£m)
0	0	100	(100)	(100)	0	80	(80)	(80)
1	50	30	20	(80)	30	15	15	(65)
2	70	40	30	(50)	57	20	37	(28)
3	90	50	40	(10)	65	24	41	13
4	110	40	70	60	74	26	48	61
5	90	40	50	110	74	26	48	109

Project 1 payback: (10 ÷ 70) × 12 = 1.7 = 2 months (rounded up), therefore the payback is **three years two months**.
Project 2 payback: (28 ÷ 41) × 12 = 8.20 = 9 months (rounded up), therefore the payback is **two years nine months**.
On the basis of payback the company would select project 2. However, over the whole five-year period, project 1 offers a better return as the cumulative cash flow is £110m, which is £1m more than project 2 at £109m. The company does not have liquidity problems, so might be better advised to select project 1 as the financial reward is greater.

3

Year	Net cash flow	10% discount rate	Discounted cash flows	Cumulative discounted cash flows
0	(60,000)	1	(60,000)	(60,000)
1	25,000	0.91	22,750	(37,250)
2	20,000	0.83	16,600	(20,650)
3	18,500	0.75	13,875	(6,775)
4	15,000	0.68	10,200	3,425
5	10,000	0.62	6,200	9,625

Payback: 3 years + (6,775 ÷ 10,200) × 12 = 7.97 = 8 months
Payback = 3 years 8 months

Average (or accounting) rate of return

Pages 76–9

1 In each case it is necessary to calculate the net cash flow first.

Year	Project A	Project B
	Net cash flow (£000)	Net cash flow (£000)
0	(400)	(400)
1	100	180
2	125	140
3	120	120
4	180	120
5	150	100

Project A: total net cash flow = 675; average annual profit = 675 ÷ 5 = 135
ARR = (135 ÷ 400) × 100 = 33.75%
Project B: total net cash flow = 660; average annual profit = 660 ÷ 5 = 132
ARR = (132 ÷ 400) × 100 = 33%
There is very little difference in the ARR for each project, but the company should choose investment project A because it has the higher ARR at 33.75%.

2 The first step is to calculate the cumulative cash flow:

Year	Cumulative cash flow (£m)
0	(500)
1	(800)
2	(900)
3	(880)
4	(730)
5	(430)
6	70
7	670
8	1,270
9	1,770
10	2,120

ARR: total net cash flow = 2,120; average annual profit = 2,120 ÷ 10 = 212.
ARR = (212 ÷ 500) × 100 = 42.4%
Payback: it is during year 6. (Income required ÷ net cash flow for the year) × 12 = (70 ÷ 500) × 12 = 2 months
Therefore the payback period is six years and two months.
The average rate of return on the investment appears to be very good at 42.4%. However, there is not a positive return until two months into year 6 and the business must be able to cope with five years of negative cash flow if the project is going to succeed.

Stretch yourself

ARR

Operations project: total net cash flow = 100; average annual profit = 100 ÷ 4 = 25;
ARR = (25 ÷ 50) × 100 = 50%
Marketing project: total net cash flow = 170; average annual profit = 170 ÷ 5 = 34;
ARR = (34 ÷ 40) × 100 = 85%

Year	Operations project (£m)	Marketing project (£m)
	Cumulative cash flow	Cumulative cash flow
0	(50)	(40)
1	(45)	(60)
2	(25)	(70)
3	10	(20)
4	50	40
5	–	100

Payback

Operations project: 2 years + (25 ÷ 35) × 12 = 9 months = 2 years 9 months
Marketing project: 3 years + (20 ÷ 60) × 12 = 4 months = 3 years 4 months

The operations project has a shorter payback time of two years nine months, but the marketing project has a greater return on investment at 85%. The choice may depend on:

- how quickly the firm needs to recoup the initial cost of the investment
- the reliability of the data provided about the two projects
- which of the two problems is seen as more important – quality of the product or the 'old-fashioned' image.

There are other alternatives which may be considered.

Net present value

Pages 80–3

1

Year	NCF	10% discount factors	NPV
0	(60)	1	(60)
1	10	0.91	9.1
2	20	0.83	16.6
3	20	0.75	15
4	20	0.68	13.6
5	20	0.62	12.4
		Total NPV	**6.7**

The NPV is positive, which suggests that on the basis of this calculation the project should be supported as it would be a good investment for the business.

2 a 1 year + ((income required ÷ net cash flow for the year) × 12 months)
= 1 year + ((£7,000 ÷ £10,000) × 12 months) = 1 year 8.4 months

b

Year	NCF (£)	DCF
0	(15,000)	(15,000)
1	8,000	8,000 × 0.91 = 7,280
2	10,000	10,000 × 0.83 = 8,300
3	5,000	5,000 × 0.75 = 3,750
4	5,000	5,000 × 0.68 = 3,400

c 1 year + ((income required ÷ net cash flow for the year) × 12 months)
= 1 year + ((7,720 ÷ 8,300) × 12 months) = 1 year 11.2 months

d NPV = (7,280 + 8,300 + 3,750 + 3,400) − 15,000 = £7,730

Stretch yourself

Year	NCF (£)	DCF @ 9%
0	(2,000)	(2,000)
1	100	100 × 0.92 = 92
2	100	100 × 0.84 = 84
3	100	100 × 0.77 = 77
4	2,500	2,500 × 0.71 = 1,775
		Total NPV = 28

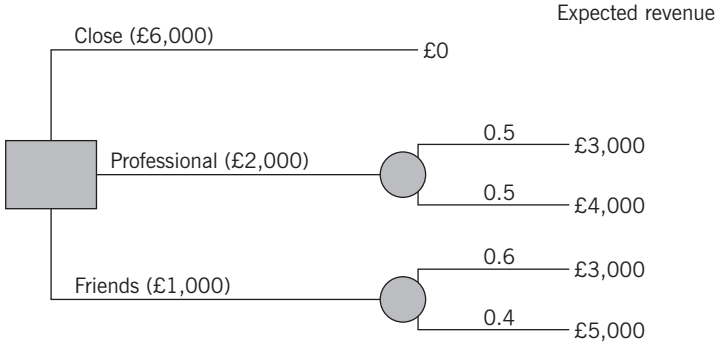
Decision making: decision trees

Pages 84–7

1 EMVs
Option A success: 0.7 × £1,000,000 = £700,000
Option A failure: 0.3 × £500,000 = £150,000
Option A total including costs: £700,000 + £150,000 − £200,000 = £650,000
Option B (do nothing): £0
Option C success: 0.8 × £400,000 = £320,000
Option C failure: 0.2 × £100,000 = £20,000
Option C total including costs: £320,000 + £20,000 − £90,000 = £250,000
Option D success: 0.5 × £100,000 = £50,000
Option D failure: 0.5 × £0 = £0
Option D total including costs: £50,000 + £0 − £20,000 = £30,000
On financial grounds alone the business should go ahead with the new model.

Stretch yourself

a



b EMVs
Close: £0 − £6,000 = −£6,000
Professional: (0.5 × £3,000) + (0.5 × £4,000) − £2,000 = £1,500 + £2,000 − £2,000 = £1,500
Friends: (0.6 × £3,000) + (0.4 × £5,000) − £1,000 = £1,800 + £2,000 − £1,000 = £2,800

c The friends option seems to be best on financial grounds. There is a lower initial cost and higher expected value.

d Gavin and Bella should also consider the following:
- The loss of loyal customers if the salon is closed.
- The reliability of estimates – are the friends really likely to gain a higher return than the professional?
- Could the professional encourage customers to leave Gavin and Bella in future?

Perhaps the most important factor to consider is not the short-term impact on profit but the longer-term impact on the reputation of the busines.

Absenteeism, labour turnover and labour productivity

Pages 88–91

1 Catalice Home Care

	2 years ago	Last year
Number of employees	580	638
Total days worked (no. of employees × 280)	162,400	178,640
Days lost to unauthorised absence	11,136	11,136
Absenteeism rate (%)	6.9%	6.2%

Number of employees: 580 × 1.1 = 638

	2 years ago	Last year
Days worked	(580 × 280) = 162,400	(638 × 280) = 178,640
Absenteeism rate	(11,136 ÷ 162,400) × 100 = 6.9%	(11,136 ÷ 178,640) × 100 = 6.2%

The absenteeism rate has fallen from 6.9% to 6.2%, which is moving back towards their target rate of below 5%. However, the rate is still higher than they would like and as a result they should be concerned to reduce it further.

2 National: (65 ÷ 650) × 100 = 10% South East: (12 ÷ 40) × 100 = 30%
There is clearly a problem in the South East as the labour turnover rate is 20% higher than for the company as a whole.

3 New workforce: 4 × 1.5 = 6 workers
New output per month: 136 × 1.75 = 238 × 12 = 2,856 pairs of shoes per year
New labour productivity: 2,856 ÷ 6 = 476 pairs of shoes per worker per year
Change in labour productivity = 476 − 408 = 68 pairs of shoes
(68 ÷ 408) × 100 = 16.7%

4 Old productivity: 1,000 ÷ 10 = 100 components per worker per month
Old unit labour cost: 10 × £1,670 = £16,700 ÷ 1,000 components = £16.70 per component
New productivity: 1,000 ÷ 8 = 125 components per worker per month
New unit labour cost: 8 × £1,670 = £13,360 ÷ 1,000 components = £13.36 per component
Change in productivity: (25 ÷ 100) × 100 = 25% increase
Change in unit labour costs: £16.70 − £13.36 = £3.34
(3.34 ÷ 16.70) × 100 = 20% reduction

Critical path analysis

Pages 92–5

1 a, b

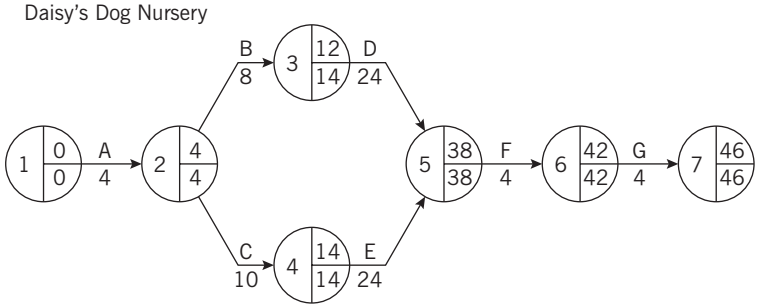
Node	EST	LFT
1	0	0
2	2	2
3	7	9
4	8	8
5	13	15
6	20	20
7	27	27
8	32	32
9	35	35

c Critical path: A; C; E; G; H; I

d Total float using task D: 15 − 6 − 7 = 2 hours

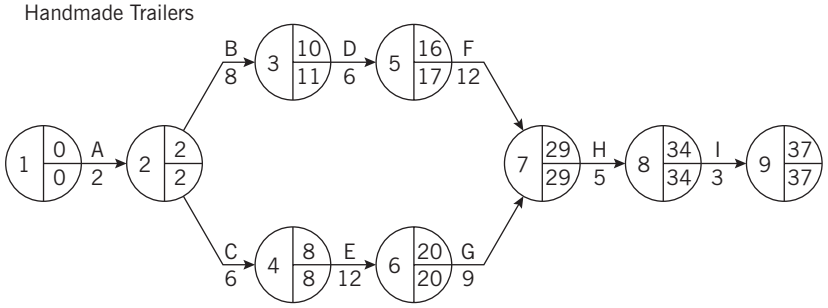
Stretch yourself

Daisy's Dog Nursery



Daisy's Dog Nursery: new time = 46 hours
Critical path: A; C; E; F; G
Total float two hours (38 − 24 − 12)

Handmade Trailers



Handmade Trailers: new time = 37 days
Critical path: A; C; E; G; H; I
Total float: (29 − 12 − 16) = 1 hour

Stock control

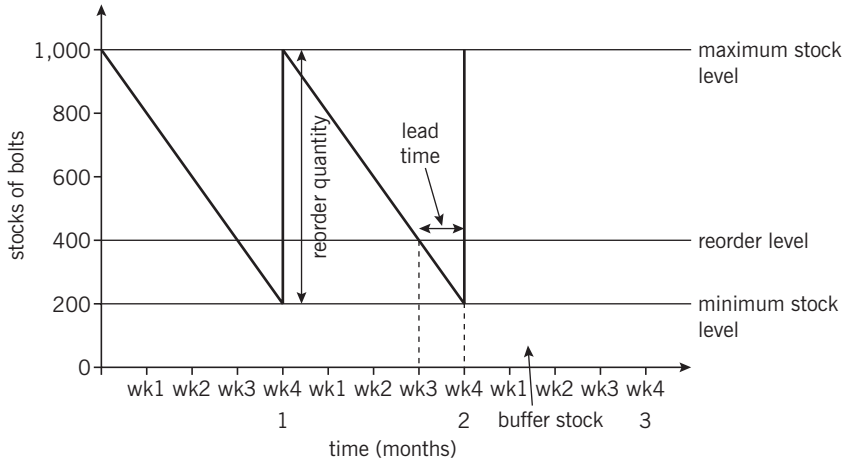
Pages 96–8

1 a Original stock control chart:

i Maximum stock level 2,000; minimum stock level 400; buffer stock 400.

ii Reorder level 1,200; reorder quantity 1,600; lead time one month.

b Suggested stock control chart should include all the information required for the original charts, i.e.: Maximum stock level 1,000; minimum stock level 200; buffer stock 200; reorder level 400; reorder quantity 800; lead time one week.



Richard should change supplier to the Birmingham producer of bolts if he can get the terms outlined in the chart and if the price is comparable. He will be holding a maximum of 1,000 bolts, which is 50% of his current level. This reduces the amount of cash tied up in stock which can be used elsewhere in the business (see acid test ratio on page 60).

Stretch yourself

$Q = \sqrt{2CA \div HP}$

$C = £2; A = 9{,}600; H = 10\%; P = £2.50$

$\sqrt{(2 \times 2 \times 9{,}600) \div (0.10 \times 2.50)} = \sqrt{38{,}400 \div 0.25} = \sqrt{153{,}600} = 392$

To minimise costs Richard should buy 392 bolts at a time.