

### The Measurement of Profit

1.

Total sales revenue =  $250,000 \times £2.50 = £625,000$

Profit =  $£625,000 - £125,000 = £500,000$

2.

Total sales revenue =  $2,300 \times £1.80 = £4,140$

Total costs =  $(2,300 \times £0.20) + £2,000 = £2,460$

Profit =  $£4,140 - £2,460 = £1,680$

3.

Yearly sales =  $1,400 \times 12 = 16,800$

Total sales revenue =  $16,800 \times £120 = £2,016,000$

Variable cost per unit =  $(£120 / 5) \times 2 = £48$

Total costs =  $(16,800 \times £48) + (£75,000 \times 12) = £1,706,400$

Profit =  $£2,016,000 - £1,706,400 = £309,600$

4.

Variable costs =  $£10 / 4 = £2.50$

Total variable costs =  $£2.50 \times 150,000 = £375,000$

Total revenue =  $£10 \times 150,000 = £1,500,000$

Fixed costs =  $£1,500,000 - (£375,000 + £250,000) = £875,000$

5.

Total revenue =  $910 \times £7.50 = £6,825$

Total variable costs =  $£6,825 - (£3,000 + £2,005) = £1,820$

Variable cost per bunch of flowers =  $£1,820 / 910 = £2$

6.

Total costs =  $(10,000 \times £25) + £200,000 = £450,000$

Total Revenue =  $£450,000 + £50,000 = £500,000$

Selling price per unit =  $£500,000 / 10,000 = £50$

7.

Variable costs =  $£12 / 3 = £4$

Total variable costs =  $25,000 \times £4 = £100,000$

Total revenue =  $25,000 \times £12 = £300,000$

Fixed costs =  $£300,000 - (£100,000 + £80,000) = £120,000$

8.

Profit last year:

$$\text{Selling price} = £1.50 \times 1.90 = £2.85$$

$$\text{Total revenue} = 20,000 \times £2.85 = £57,000$$

$$\text{Total costs} = (20,000 \times £1.50) + £15,000 = £45,000$$

$$\text{Profit} = £57,000 - £45,000 = £12,000$$

Profit this year:

$$\text{Total revenue} = 26,000 \times £2.85 = £74,100$$

$$\text{Fixed costs} = £15,000 \times 1.15 = £17,250$$

$$\text{Total costs} = (26,000 \times £1.50) + £17,250 = £56,250$$

$$\text{Profit} = £74,100 - £56,250 = £17,850$$

$$\text{Percentage increase in profit} = (£17,850 - £12,000) / £12,000 \times 100 = 48.75\%$$

9.

$$\text{Selling price in 2022} = £5 \times 0.95 = £4.75$$

$$\text{Number of units sold in 2022} = 50,000 \times 1.08 = 54,000 \text{ units}$$

$$\text{Total revenue in 2022} = 54,000 \times £4.75 = £256,500$$

$$\text{Total costs in 2022} = (54,000 \times £1.50) + £75,000 = £156,000$$

$$\text{Profit in 2022} = £256,500 - £156,000 = £100,500$$

10.

Profit between January and March

$$\text{Total revenue} = 8,000 \times £15 = £120,000$$

$$\text{Total costs} = (8,000 \times £5) + £15,000 = £55,000$$

$$\text{Profit} = £120,000 - £55,000 = £65,000$$

Profit between April and June

$$\text{New variable cost} = £5 \times 0.8 = £4$$

$$\text{New price} = £15 \times 0.9 = £13.50$$

$$\text{Total revenue} = 10,000 \times £13.50 = £135,000$$

$$\text{Total costs} = (10,000 \times £4) + £15,000 = £55,000$$

$$\text{Profit} = £135,000 - £55,000 = £80,000$$

$$\text{Average profit} = (£65,000 + £80,000) / 6 = £24,166.67$$

## Decision Trees

1.

$$(0.7 \times £500,000) + (0.3 \times £50,000) = £365,000 \text{ (expected value)}$$

2.

$$\text{New 'success' sales amount} = £500,000 \times 1.05 = £525,000$$

$$(0.6 \times £525,000) + (0.4 \times £50,000) = £335,000 \text{ (expected value)}$$

3.

$$(0.8 \times £220,000) + (0.2 \times £90,000) = £194,000 \text{ (expected value)}$$

$$£194,000 - £80,000 = £114,000 \text{ (net gain)}$$

4.

$$(0.6 \times £340,000) + (0.4 \times £210,000) = £288,000 \text{ (expected value)}$$

$$£288,000 - £180,000 = £108,000 \text{ (net gain)}$$

5.

### E-commerce

$$(0.7 \times £120,000) + (0.3 \times £40,000) = £96,000 \text{ (expected value)}$$

$$£96,000 - £80,000 = £16,000 \text{ (net gain)}$$

### New branch

$$(0.8 \times £90,000) + (0.2 \times £55,000) = £83,000 \text{ (expected value)}$$

$$£83,000 - £65,000 = £18,000 \text{ (net gain)}$$

The new branch should be chosen, as it has the highest net gain

6.

Option 1

Low sales =  $£50,000 - (£50,000 / 8) = £43,750$   
 $(0.6 \times £50,000) + (0.4 \times £43,750) = £47,500$  (expected value)  
 $£47,500 - £20,000 = £27,500$  (net gain)

Option 2

High sales =  $£40,000 \times 1.15 = £46,000$   
 $(0.7 \times £46,000) + (0.3 \times £40,000) = £44,200$  (expected value)  
 $£44,200 - £18,000 = £26,200$  (net gain)

Option 1 should be chosen, as it has the highest net gain

7.

Reduce Prices

$(0.7 \times £1,200,000) + (0.3 \times £700,000) = £1,050,000$  (expected value)  
 $£1,050,000 - £400,000 = £650,000$  (net gain)

Increase Promotion

$(0.8 \times £1,400,000) + (0.2 \times £500,000) = £1,220,000$  (expected value)  
 $£1,220,000 - £600,000 = £620,000$  (net gain)

Reduce prices should be chosen, as it has the highest net gain

8.

UK Park

$(0.7 \times £2,200,000) + (0.3 \times £800,000) = £1,780,000$  (expected value)  
 $£1,780,000 - £1,500,000 = £280,000$  (net gain)

South of France Park

$(0.6 \times £3,000,000) + (0.4 \times £1,800,000) = £2,520,000$  (expected value)  
 $£2,520,000 - £2,200,000 = £320,000$  (net gain)

South of France should be chosen, as it has the highest net gain

9.

Delivery service

$$(0.7 \times £120,000) + (0.2 \times £80,000) + (0.1 \times £30,000) = £103,000 \text{ (expected value)}$$

$$£103,000 - £60,000 = £43,000 \text{ (net gain)}$$

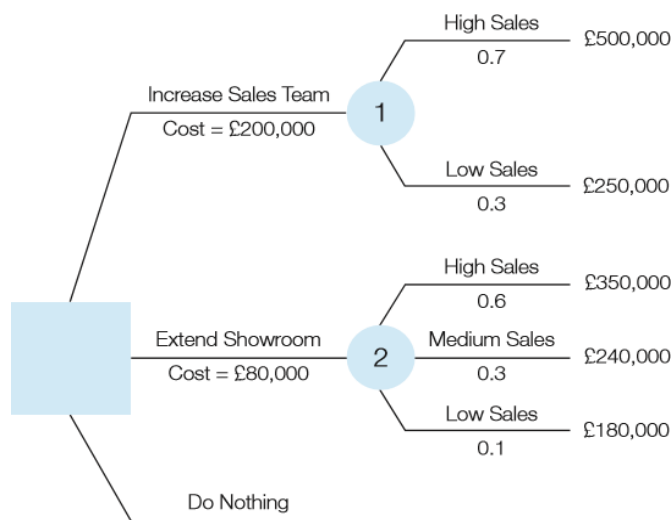
Extend premises

$$(0.6 \times £140,000) + (0.3 \times £70,000) + (0.1 \times £35,000) = £108,500 \text{ (expected value)}$$

$$£108,500 - £80,000 = £28,500 \text{ (net gain)}$$

The delivery service should be chosen, as it has the highest net gain

10.



Increasing size of sales team

$$(0.7 \times £500,000) + (0.3 \times £250,000) = £425,000 \text{ (expected value)}$$

$$£425,000 - £200,000 = £225,000 \text{ (net gain)}$$

Extend the showroom

$$(0.6 \times £350,000) + (0.3 \times £240,000) + (0.1 \times £180,000) = £300,000 \text{ (expected value)}$$

$$£300,000 - £80,000 = £220,000 \text{ (net gain)}$$

Increasing the size of the sales team should be chosen, as it has the highest net gain

### Market share, size and growth

1.

$$\text{Business A} = (£20\text{m} / £240\text{m}) \times 100 = 8.33\%$$

$$\text{Business B} = (£18\text{m} / £150\text{m}) \times 100 = 12\%$$

$$\text{Business C} = (£10\text{m} / £80\text{m}) \times 100 = 12.5\%$$

Business A has the lowest market share

2.

Market Value = £4bn

$$\text{Business A} = £4\text{bn} \times 0.30 = £1.2\text{bn}$$

$$\text{Business B} = £4\text{bn} \times 0.20 = £0.8\text{bn}$$

$$\text{Business C} = £4\text{bn} \times 0.25 = £1\text{ bn}$$

$$\text{Business D} = £4\text{bn} \times 0.10 = £0.4\text{bn}$$

$$\text{Business E} = £4\text{bn} \times 0.15 = £0.6\text{bn}$$

3.

$$\text{Sales revenue now} = 100 \times £480 = £48,000$$

$$\text{Sales revenue next year} = £48,000 \times 1.10 = £52,800$$

$$\text{Sales revenue in two years} = £52,800 \times 1.10 = £58,080$$

$$\text{Sales revenue in three years} = £58,080 \times 1.10 = £63,888$$

$$\text{Difference in sales revenue} = £63,888 - £48,000 = £15,888$$

4.

$$472,500 / 1.05 = 450,000$$

5.

$$(£575,000 / 7) \times 100 = £8,214,285.71$$

6.

$$2023 = £5\text{bn} \times 1.06 = £5.3\text{bn}$$

$$2024 = £5.3\text{bn} \times 1.06 = £5.62\text{bn}$$

7.

Sales revenue last year =  $\pounds 69,525 / 1.03 = \pounds 67,500$

Market size by value last year =  $\pounds 459,000 / 1.02 = \pounds 450,000$

Market share =  $(\pounds 67,500 / \pounds 450,000) \times 100 = 15\%$

8.

Market size by value

$2,500 \times \pounds 5 = \pounds 12,500$

$\pounds 12,500 / 10 = \pounds 1,250$

$\pounds 1,250 \times 100 = \pounds 125,000$

Market size by volume

$2,500 / 10 = 250$

$250 \times 100 = 25,000$  units

9.

$150,000 \times 1.35 = 202,500$

$(202,500 / 25) \times 100 = 810,000$  units

10.

The market has grown by 15% every year between 2020 and 2022

2023 market size by value =  $\pounds 5.29\text{m} \times 1.15 = \pounds 6.0835\text{m}$

Market share of the business in 2023 =  $(\pounds 1.51\text{m} / \pounds 6.0835\text{m}) \times 100 = 24.82\%$

## Price and Income Elasticity of Demand

### Price Elasticity of Demand

1.

Demand will change by =  $10\% \times -0.4 = -4\%$

New weekly demand =  $500 \times 0.96 = 480$  products

2.

Percentage price change =  $(£1.60 - £2) / 2 \times 100 = -20\%$

Percentage change in demand =  $-20\% \times -2 = 40\%$

New demand =  $800 \times 1.4 = 1,120$  burgers

3.

Percentage change in demand =  $(4,000 - 5,000) / 5,000 \times 100 = -20\%$

Percentage price increase =  $(£15 - £10) / £10 \times 100 = 50\%$

Price elasticity of demand =  $-20\% / 50\% = -0.4$

4.

Current weekly revenue =  $600 \times £1 = £600$

New price =  $£1 \times 0.8 = £0.80$

Percentage change in demand =  $-20\% \times -3 = 60\%$

New demand =  $600 \times 1.6 = 960$  ice creams

New revenue =  $960 \times £0.80 = £768$

Percentage change in revenue =  $(£768 - £600) / £600 \times 100 = 28\%$

5.

Current weekly profit

Total sales revenue =  $400 \times £50 = £20,000$

Total costs =  $(400 \times £10) + £10,000 = £14,000$

Profit =  $£20,000 - £14,000 = £6,000$

Price increase =  $(£60 - £50) / £50 \times 100 = 20\%$

Percentage change in demand =  $20\% \times -0.2 = -4\%$

New demand =  $400 \times 0.96 = 384$  units

New total sales revenue =  $384 \times £60 = £23,040$

New total costs =  $(384 \times £10) + £10,000 = £13,840$

New profit =  $£23,040 - £13,840 = £9,200$

Difference in weekly profit =  $£9,200 - £6,000 = £3,200$



## Income Elasticity of Demand

1.

Percentage increase in demand =  $(832 - 800) / 800 \times 100 = 4\%$   
Income increased by =  $4\% / +0.8 = 5\%$

2.

Percentage increase in sales =  $(6,400 - 5,000) / 5000 = 28\%$   
Income elasticity of demand =  $28\% / 7\% = +4$

3.

Percentage change in demand =  $-0.3 \times 2.3\% = -0.69\%$   
New revenue =  $(1 - 0.0069) \times 25,000,000 \times 0.99 = £24,579,225$

4.

Percentage change in income between 2015 and 2016 =  $(105 - 100) / 100 \times 5 = 5\%$   
Percentage change in demand between 2015 and 2016 =  $+1.3 \times 5\% = 6.5\%$   
Number of luxury handbags sold in 2016 =  $1,800 \times 1.065 = 1,917$  bags

5.

Change in demand for bread rolls =  $+0.4 \times -5\% = -2\%$   
New daily demand for bread rolls =  $400 \times 0.98 = 392$  bread rolls  
Change in demand for ciabattas =  $+2 \times -5\% = -10\%$   
New daily demand for ciabattas =  $100 \times 0.90 = 90$  ciabattas  
Currently weekly revenue =  $(£0.24 \times 400) + (£1.35 \times 100) \times 6 = £1,386$   
New weekly revenue =  $(£0.24 \times 392) + (£1.35 \times 90) \times 6 = £1,293.48$

Difference in weekly revenue =  $(£1,386 - £1,293.48) = £92.52$

## Calculation of Operations Data

### Labour Productivity

1.

Labour productivity =  $240,000 / 150 = 1,600$  units per staff member

2.

Number of employees =  $125,400 / 550 = 228$  employees

3.

Labour productivity last year =  $45,000 / 100 = 450$  units per person

Labour productivity this year =  $60,000 / (100 \times 1.20) = 500$  units per person

Percentage difference in labour productivity =  $(500 - 450) / 450 \times 100 = 11.11\%$

4.

Employees last year =  $159 / 1.06 = 150$  employees

Units produced last year =  $19,800 / 1.10 = 18,000$

Labour productivity last year =  $18,000 / 150 = 120$  units per employee

5.

Factory A employees =  $(15,000 / 100) \times 20 = 3,000$

Factory C employees =  $(15,000 / 100) \times 30 = 4,500$

Factory A labour productivity =  $450,000 / 3,000 = 150$  units per employee

Factory C labour productivity =  $562,500 / 4,500 = 125$  units per employee

### Unit Costs

1.

Total costs of producing 60,000 units =  $(60,000 \times £1.50) + £15,000 = £105,000$

Cost per unit =  $£105,000 / 60,000 = £1.75$  per unit

2.

$$\text{Business A} = (100,000 \times £0.40) + £40,000 = £80,000$$

$$\text{Cost per unit} = £80,000 / 100,000 = £0.80 \text{ per unit}$$

$$\text{Business B} = (50,000 \times £1.50) + £25,000 = £100,000$$

$$\text{Cost per unit} = £100,000 / 50,000 = £2 \text{ per unit}$$

$$\text{Business C} = (80,000 \times £0.80) + £60,000 = £124,000$$

$$\text{Cost per unit} = £124,000 / 80,000 = £1.55 \text{ per unit}$$

Business A has the lowest cost per unit

3.

$$\text{Unit costs before cost increase} = (40,000 \times £0.50) + £10,000 = £30,000$$

$$\text{Cost per unit before increase} = £30,000 / 40,000 = £0.75 \text{ per unit}$$

$$\text{Unit costs after cost increase} = (40,000 \times £0.80) + £10,000 = £42,000$$

$$\text{Cost per unit after increase} = £42,000 / 40,000 = £1.05 \text{ per unit}$$

$$\text{Percentage difference} = (£1.05 - £0.75) / £0.75 \times 100 = 40\%$$

4.

$$\text{FC} = £8,000 \text{ per month } (£96,000 / 12)$$

$$\text{Total cost in July} = (500 \times £20) + £8,000 = £18,000$$

$$\text{Unit cost in July} = £18,000 / 500 = £36 \text{ per unit}$$

$$\text{Total cost in October} = (800 \times £20) + £8,000 = £24,000$$

$$\text{Unit cost in October} = £24,000 / 800 = £30 \text{ per unit}$$

5.

$$\text{Total cost in the UK} = (400,000 \times £2) + £120,000 = £920,000$$

$$\text{Unit cost in the UK} = £920,000 / 400,000 = £2.30$$

$$\text{Total cost in Poland} = (400,000 \times £1.60) + £108,000 = £748,000$$

$$\text{Unit cost in Poland} = £748,000 / 400,000 = £1.87$$

$$\text{Difference in unit costs} = £2.30 - £1.87 = £0.43$$

(Note: Poland variable cost calculated by  $£2 \times 0.80$  and fixed cost calculated by  $£120,000 \times 0.90$ )

### Capacity and Capacity Utilisation

1.

Units per week =  $50,000 \times 1.08 = 54,000$  units per week

2.

Capacity last year =  $441,000 / 1.05 = 420,000$  units per year

3.

Capacity utilisation =  $(17,000 / 25,000) \times 100 = 68\%$

4.

Theatre capacity =  $(476 / 85) \times 100 = 560$  people

5.

Current output =  $(24,000 \times 5) \times 50 = 6,000,000$

Capacity utilisation =  $(6,000,000 / 10,000,000) \times 100 = 60\%$

6.

Total capacity between January and June = 600,000

Actual output between January and June =  $35,000 + 50,000 + 45,000 + 40,000 + 55,000 + 50,000 = 275,000$  units

Average capacity utilisation =  $(275,000 / 600,000) \times 100 = 45.83\%$

7.

Current capacity =  $(42,750 / 95) \times 100 = 45,000$

New capacity after extension =  $45,000 \times 1.20 = 54,000$

Increase in capacity =  $54,000 - 45,000 = 9,000$

8.

Current capacity =  $(450 / 60) \times 100 = 750$

Capacity per screen =  $750 / 3 = 250$

New capacity =  $750 - 250 = 500$

New capacity utilisation =  $(450 / 500) \times 100 = 90\%$

9.

Based on the scenario, if the business increased capacity by 10%, then for every 110 units that the business could produce, the business is only producing 75 units

New capacity utilisation =  $(75 / 110) \times 100 = 68.18\%$

10.

Current capacity =  $(237,500 / 95) \times 100 = 250,000$

New capacity after move =  $250,000 \times 1.875 = 468,750$

New output =  $237,500 + 100,000 = 337,500$

New capacity utilisation =  $(337,500 / 468,750) \times 100 = 72\%$

## Inventory Control

1.

Total amount of this component used by the business during months 1-5 inclusive:

Month 1: 800 units

Month 2: 800 units

Month 3: 800 units

Month 4: 800 units

Month 5: 1,000 units

Total = 4,200 units

Number of days during the 5-month period =  $30 \times 5 = 150$  days

Average daily usage across months 1-5 =  $4,200 \text{ units} / 150 \text{ days} = 28 \text{ units per day}$

2.

200 units

3.

Inventory holding in month 1 = 1,000 units

Order triggered after 40% of the inventory has been used =  $1,000 \times 0.4 = 400$  units

Re-order level =  $1,000 \text{ units} - 400 \text{ units} = 600 \text{ units}$

4.

Number of components used by the business each day in month 1 =  $800 \text{ units} / 30 \text{ days} = 26.67 \text{ units}$

Lead time =  $400 \text{ units} / 26.67 \text{ units} = 15 \text{ days}$

5.

Usual delivery =  $800 \text{ units} \times 0.75 = 600 \text{ units extra components}$

Total re-order quantity in month 6 =  $800 \text{ units} + 600 \text{ units extra} + 200 \text{ units for buffer inventory} = 1,600 \text{ units}$

### Return on Investment

1.

$$\text{Annual percentage return} = (\text{£}120,000 / \text{£}300,000) \times 100 = 40\%$$

2.

$$\text{Cost of investment} = (\text{£}60,000 / 25) \times 100 = \text{£}240,000$$

3.

Store 1

$$\text{Investment} = \text{£}205,000 \times 0.45 = \text{£}92,250$$

$$\text{Return on investment} = (\text{£}65,000 / \text{£}92,250) \times 100 = 70.46\%$$

Store 2

$$\text{Investment} = \text{£}205,000 \times 0.30 = \text{£}61,500$$

$$\text{Return on investment} = (\text{£}50,000 / \text{£}61,500) \times 100 = 81.30\%$$

Store 3

$$\text{Investment} = \text{£}205,000 \times 0.25 = \text{£}51,250$$

$$\text{Return on investment} = (\text{£}27,000 / \text{£}51,250) \times 100 = 52.68\%$$

Store 2 had the highest return on investment

4.

$$\text{Total additional revenue} = (\text{£}15,000 + \text{£}18,000 + \text{£}20,000) = \text{£}53,000$$

$$\text{Total additional costs} = (\text{£}5,000 + \text{£}7,000 + \text{£}10,000) = \text{£}22,000$$

$$\text{Total return} = \text{£}53,000 - \text{£}22,000 = \text{£}31,000$$

$$\text{Total return investment after 3 years} = (\text{£}31,000 / \text{£}140,000) \times 100 = 22.14\%$$

5.

$$\text{Additional revenue} = (\text{£}150,000 \times 1.35) - \text{£}150,000 = \text{£}52,500$$

$$\text{Additional labour costs} = (\text{£}50,000 \times 1.20) - \text{£}50,000 = \text{£}10,000$$

$$\text{Other additional costs} = \text{£}20,000$$

$$\text{Annual return} = \text{£}52,500 - (\text{£}10,000 + \text{£}20,000) = \text{£}22,500$$

$$\text{Annual percentage return on investment} = (\text{£}22,500 / \text{£}100,000) \times 100 = 22.5\%$$

### Analysing budgets

1.

$$\text{Profit Budget} = £450,000 \times 1.05 = £472,500$$

2.

$$\text{Expenditure Budget} = £250,000 \times 0.98 = £245,000$$

3.

$$1/5 \text{ of } £25,000 = £25,000 / 5 = £5,000$$

$$\text{Expenditure budget} = £25,000 - £5,000 = £20,000$$

4.

$$\text{Revenue budget} = £25,000 \times 1.15 = £28,750$$

$$2/5\text{th of } £20,000 = (£20,000 / 5) \times 2 = £8,000$$

$$\text{Expenditure budget} = £20,000 + £8,000 = £28,000$$

$$\text{Profit budget} = £28,750 - £28,000 = £750$$

5.

$$\text{Budgeted food revenue in September} = £5,800 \times 1.06 = £6,148$$

$$\text{Budgeted drink revenue in September} = £1,900 \times 1.06 = £2,014$$

$$\text{Stock expenditure} = £1,250 \times 0.98 = £1,225$$

$$\text{Profit/ Loss budget} = (£6,148 + £2,014) - (£1,225 + £1,000 + £120) = £5,817$$

6.

$$\text{Profit variance} = £730,000 - £850,000 = £120,000 \text{ adverse}$$

7.

$$\text{Profit budget} = £325,000 - £210,000 = £115,000$$

$$\text{Actual revenue} = £325,000 - £50,000 = £275,000$$

$$\text{Actual expenditure} = £210,000 \times 1.08 = £226,800$$

$$\text{Actual profit} = £275,000 - £226,800 = £48,200$$

$$\text{Profit variance} = £48,200 - £115,000 = £66,800 \text{ adverse}$$

8.

$$\text{Actual total profit} = £24,000 + £16,000 = £40,000$$

$$\text{Budgeted total profit} = £20,000 + £18,000 = £38,000$$

$$\text{Total profit variance} = £40,000 - £38,000 = £2,000 \text{ favourable}$$

9.

Actual store revenue =  $\text{£}22,000 \times 1.05 = \text{£}23,100$

Actual online revenue =  $(\text{£}6,000 / 5) \times 4 = \text{£}4,800$

Actual total revenue =  $\text{£}23,100 + \text{£}4,800 = \text{£}27,900$

Actual wages expenditure =  $\text{£}8,000 + \text{£}500 = \text{£}8,500$

Actual stock expenditure =  $\text{£}6,000 \times 0.98 = \text{£}5,880$

Actual other costs =  $\text{£}2,100$

Actual total expenditure =  $\text{£}8,500 + \text{£}5,880 + \text{£}2,100 = \text{£}16,480$

Budgeted total revenue =  $\text{£}22,000 + \text{£}6,000 = \text{£}28,000$

Budgeted total expenditure =  $\text{£}8,000 + \text{£}6,000 + \text{£}2,000 = \text{£}16,000$

Actual profit =  $\text{£}27,900 - \text{£}16,480 = \text{£}11,420$

Budgeted profit =  $\text{£}28,000 - \text{£}16,000 = \text{£}12,000$

October profit variance =  $\text{£}11,420 - \text{£}12,000 = \text{£}580$  adverse

10.

Total actual revenue =  $\text{£}184,000 + \text{£}190,000 + \text{£}208,000 = \text{£}582,000$

Total actual expenditure =  $\text{£}170,000 + \text{£}178,000 + \text{£}181,000 = \text{£}529,000$

Total actual profit =  $\text{£}582,000 - \text{£}529,000 = \text{£}53,000$

Total budgeted revenue =  $\text{£}175,000 + \text{£}182,000 + \text{£}205,000 = \text{£}562,000$

Total budgeted expenditure =  $\text{£}162,000 + \text{£}171,000 + \text{£}182,000 = \text{£}515,000$

Total budgeted profit =  $\text{£}562,000 - \text{£}515,000 = \text{£}47,000$

Total profit variance =  $\text{£}53,000 - \text{£}47,000 = \text{£}6,000$  favourable



## Cash Flow Forecasts

1.

October net cash flow = £10,000 - £4,000 = £6,000

October opening balance = £8,000

October closing balance = £8,000 + £6,000 = £14,000

2.

	January	February	March
Cash Inflows	£10,000	<b>£12,000</b>	£13,000
Cash Outflows	<b>£4,000</b>	£5,000	£5,500
Net Cash Flow	£6,000	£7,000	<b>£7,500</b>
Opening Balance	£3,000	<b>£9,000</b>	£16,000
Closing Balance	<b>£9,000</b>	£16,000	<b>£23,500</b>

3.

New net cash flow = £15,000 - £7,000 = £8,000

New closing balance = £16,000 + £8,000 = £24,000

4.

	January	February	March
Cash Inflows	£3,750	£4,500	£6,750
Cash Outflows	£1,050	£1,750	£4,200
Net Cash Flow	£2,700	£2,750	£2,550
Opening Balance	£2,500	£5,200	£7,950
Closing Balance	£5,200	£7,950	£10,500

5.

	Quarter 1	Quarter 2
Cash Inflows	£31,250	£42,900
Cash Outflows	£66,000	£24,150
Net Cash Flow	(£34,750)	£18,750
Opening Balance	£24,000	(£10,750)
Closing Balance	(£10,750)	£8,000

6.

Quarter 2

Cash Inflows = £7,000 x 1.60 = £11,200

Cash Outflows = £3,200 x 1.75 = £5,600

Net Cash Flow = £11,200 - £5,600 = £5,600

Closing balance = £5,600 + £5,800 = £11,400

7.

	January	February	March
<b>Inflows</b>			
Revenue	£20,000	£25,000	£31,250
<b>Total Inflows</b>	£20,000	£25,000	£31,250
<b>Outflows</b>			
Marketing	£4,000		
Wages	£6,250	£6,250	£6,250
Loan Repayments		£1,050	£1,050
Additional Costs	£3,000	£3,750	£4,687.50
<b>Total Outflows</b>	£13,250	£11,050	£11,987.50
<b>Net Cash Flow</b>	£6,750	£13,950	£19,262.50
<b>Opening Balance</b>	£15,000	£21,750	£35,700
<b>Closing Balance</b>	£21,750	£35,700	£54,962.50

8.

Net Cash Flow = (£250,000 / 5) x 2 = £100,000

Total Outflow = (£100,000 / 4) = £25,000

Inflows – Outflows = Net Cash Flow, so Total Cash Inflows = Net Cash Flow + Total Cash Outflows

Total Cash Inflow = £100,000 + £25,000 = £125,000

9.

	Month 1	Month 2	Month 3	Month 4
Total Cash Inflow	£10,000	£9,000	£12,000	£17,000
Total Cash Outflow	£3,000	£4,000	£7,000	£3,000
Net Cash Flow	£7,000	£5,000	£5,000	£14,000
Opening Balance	£0	£7,000	£12,000	£17,000
Closing Balance	£7,000	£12,000	£17,000	£31,000

10.

Total cash inflows = £40,000 x 0.5 = £20,000

Total cash outflows = £40,000 x 0.4 = £16,000

Outflows payable immediately = £16,000 x 0.6 = £9,600

Net cash flow = £20,000 - £9,600 = £10,400

**Break-Even Analysis (including margin of safety, contribution per unit and total contribution)**

1.

Variable cost per unit = £2.50 / 5 = £0.50

Contribution per unit = £2.50 - £0.50 = £2.00

Total contribution = £2.00 x 20,000 units = £40,000

2.

Current total monthly contribution = (£3.00 - £1.20) x 24,000 = £43,200

New total monthly contribution = (£3.20 - £1.20) x (24,000 x 0.98) = £47,040

Difference in total monthly contribution = £47,040 - £43,200 = £3,840

3.

£50 / (£2.50 - £1.25) = 40 cupcakes

4.

Yearly fixed costs = £5,000 x 52 = £260,000

Yearly break-even = £260,000 / (£150 - £20) = 2,000 units

Yearly margin of safety = 6,000 - 2,000 = 4,000 units

5.

Current break-even = £6,000 / (£4 - £0.80) = 1,875 units

Current margin of safety = 5,000 - 1,875 = 3,125 units

New fixed costs based on proposed move = £6,000 x 1.04 = £6,240

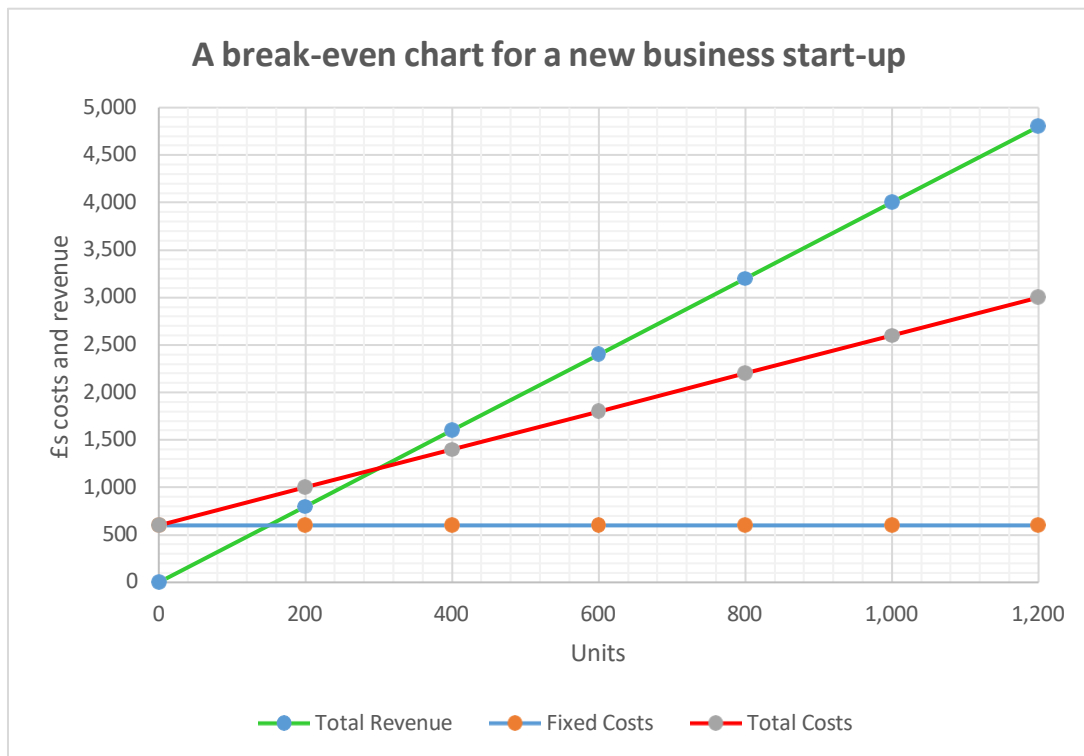
New break-even based on proposed move = £6,240 / (£4 - £0.80) = 1,950 units

New margin of safety based on proposed move = 5,000 - 1,950 = 3,050 units

Difference in margin of safety = 3,125 - 3,050 = 75 units

6.1

Output	Total Revenue	Variable Costs	Fixed Costs	Total Costs
0	£0	£0	£600	£600
200	£800	£400	£600	£1,000
400	£1,600	£800	£600	£1,400
600	£2,400	£1,200	£600	£1,800
800	£3,200	£1,600	£600	£2,200
1000	£4,000	£2,000	£600	£2,600
1200	£4,800	£2,400	£600	£3,000



6.2

Break-even point is 300 units

6.3

Weekly margin of safety = 1,200 units – 300 units = 900 units

7.1

Total variable costs at 2,500 units = £50,000 - £30,000 = £20,000

Total contribution at 2,500 units = £80,000 - £20,000 = £60,000

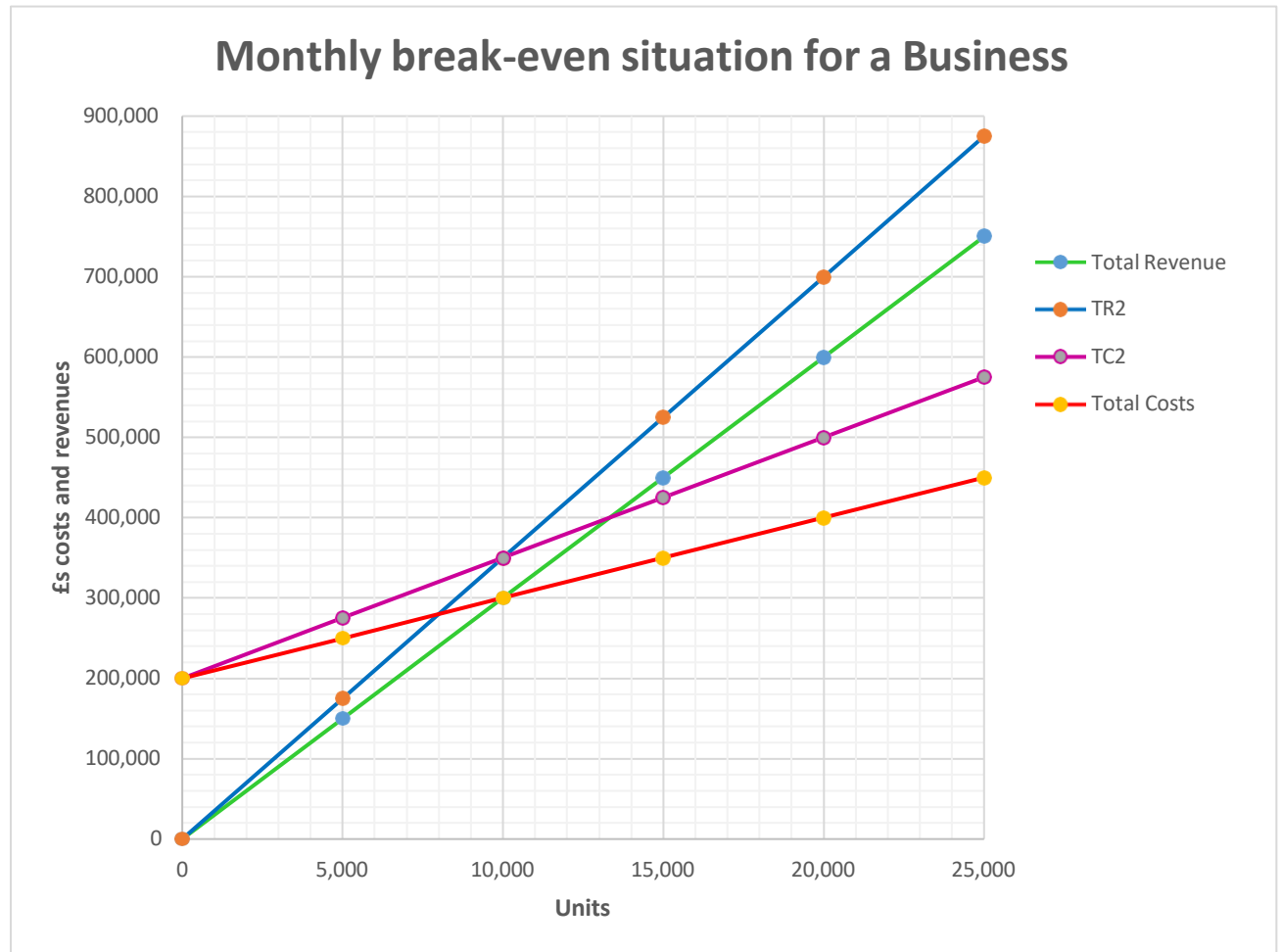
7.2

Total variable costs at 2,500 units = £20,000/2,500 = £8

7.3

Total profit at 3,000 units = £96,000 - £54,000 = £42,000

## 8.1



Total variable costs at 10,000 units (easiest point to read from the graph) = £300,000 - £200,000 = £100,000

Original variable cost per unit £100,000 / 10,000 = £10

New variable cost per unit = £10 x 1.50 = £15

Total costs at 25,000 units = (25,000 x £15) + £200,000 = £575,000

TC2 correct intersection with "Y" axis at £200,000

TC2 correct total cost value above 25,000 units = £575,000

Original selling price per unit £300,000 / 10,000 = £30 (easiest point to read from the graph)

Original contribution per unit = £30 - £10 = £20

New selling price to maintain contribution per unit = £35

Total revenue at 25,000 units at new selling price = 25,000 x £35 = £875,000

TR2 correct intersection with "Y" axis at £0

TR2 correct total revenue value above 25,000 units = £875,000

8.2

New break-even point = 10,000 units

Original break-even point = 10,000 units

Difference = 0 units

9.

Contribution per unit =  $\text{£}150,000 / 50,000 = \text{£}3$

Variable cost per unit =  $\text{£}5 - \text{£}3 = \text{£}2$

10.

Current break-even =  $\text{£}18,000 / (\text{£}1.20 - \text{£}0.80) = 45,000$  units

Variable cost after change in supplier =  $\text{£}0.80 - \text{£}0.05 = \text{£}0.75$

New break-even =  $\text{£}18,000 / (\text{£}1.20 - \text{£}0.75) = 40,000$  units

Difference in break-even =  $45,000 - 40,000 = 5,000$  unit

### **Analysing Profitability**

1.

Gross profit =  $\text{£}3.25\text{m} \times 0.54 = \text{£}1.755\text{m}$

Profit from operations =  $\text{£}3.25\text{m} \times 0.12 = \text{£}390,000$

Profit for the year =  $\text{£}3.25\text{m} \times 0.045 = \text{£}146,250$

2.

Gross profit margin =  $(\text{£}85,000 / \text{£}450,000) \times 100 = 18.89\%$

Profit from operations margin =  $(\text{£}28,000 / \text{£}450,000) \times 100 = 6.22\%$

Profit for year margin =  $(\text{£}15,400 / \text{£}450,000) \times 100 = 3.42\%$

3.

Gross profit =  $\text{£}1,255,000 - \text{£}480,000 = \text{£}775,000$

Gross profit margin =  $(\text{£}775,000 / \text{£}1,255,000) \times 100 = 61.75\%$

Profit from operations =  $\text{£}775,000 - \text{£}350,000 = \text{£}425,000$

Profit from operations margin =  $(\text{£}425,000 / \text{£}1,255,000) \times 100 = 33.86\%$

Profit for the year =  $\text{£}425,000 - \text{£}85,500 = \text{£}339,500$

Profit for the year margin =  $(\text{£}339,500 / \text{£}1,255,000) \times 100 = 27.05\%$

4.

Revenue = £1,255,000 x 1.15 = £1,443,250

Cost of sales = £480,000 x 1.22 = £585,600

Operating costs = £350,000 x 1.05 = £367,500

Net finance costs and tax = £85,500 x 1.08 = £92,340

Gross profit = £1,443,250 - £585,600 = £857,650

Gross profit margin = (£857,650 / £1,443,250) x 100 = 59.42%

Profit from operations = £857,650 - £367,500 = £490,150

Profit from operations margin = (£490,150 / £1,443,250) x 100 = 33.96%

Profit for the year = £490,150 - £92,340 = £397,810

Profit for the year margin = (£397,810 / £1,443,250) x 100 = 27.56%

5.

Product A Gross Profit = £140,000 x 0.45 = £63,000

Product B Gross Profit = £360,000 x 0.38 = £136,800

Product C Gross Profit = £780,500 x 0.52 = £405,860

Total Revenue = (£140,000 + £360,000 + £780,500) = £1,280,500

Total Gross Profit = (£63,000 + £136,800 + £405,860) = £605,660

Profit from operations = £605,660 - £500,000 = £105,660

Profit from operations margin = (£105,660 / £1,280,500) x 100 = 8.25%

Profit for the year = £105,660 - £72,000 = £33,660

Profit for the year margin = (£33,660 / £1,280,500) x 100 = 2.63%

6.

Gross profit = £10,600,000 x 0.45 = £4,770,000

Profit from operations = £10,600,000 x 0.25 = £2,650,000

Profit for the year = £10,600,000 x 0.05 = £530,000

7.

Sales revenue = £10,600,000 x 1.11 = £11,766,000

Gross profit = £4,770,000 x 1.05 = £5,008,500

Profit from operations = £2,650,000 x 1.04 = £2,756,000

Profit for the year = £530,000 x 0.98 = £519,400

Gross profit margin = (£5,008,500 / £11,766,000) x 100 = 42.57%

Profit from operations margin = (£2,756,000 / £11,766,000) x 100 = 23.42%

Profit for the year margin = (£519,400 / £11,766,000) x 100 = 4.41%



8.

Product 1 sales revenue =  $£2,800,000 \times 0.15 = £420,000$

Product 1 gross profit =  $£420,000 \times 0.45 = £189,000$

Product 2 sales revenue =  $£2,800,000 \times 0.20 = £560,000$

Product 2 gross profit =  $£560,000 \times 0.40 = £224,000$

Product 3 sales revenue =  $£2,800,000 \times 0.32 = £896,000$

Product 3 gross profit =  $£896,000 \times 0.38 = £340,480$

Product 4 sales revenue =  $£2,800,000 \times 0.33 = £924,000$

Product 4 gross profit =  $£924,000 \times 0.24 = £221,760$

Total gross profit =  $£975,240$

Gross profit margin =  $(£975,240 / £2,800,000) \times 100 = 34.83\%$

Profit from operations =  $£975,240 - £450,000 = £525,240$

Profit from operations margin =  $(£525,240 / £2,800,000) \times 100 = 18.76\%$

9.

Last Year

Revenue =  $£450,000$

Profit from operations =  $£450,000 \times 0.12 = £54,000$

Net finance costs and tax =  $£54,000 \times 0.375 = £20,250$

Profit for the year =  $(£54,000 - £20,250) / £450,000 \times 100 = 7.5\%$

Two Years Ago

Revenue =  $£600,000$

Profit from operations =  $£600,000 \times 0.08 = £48,000$

Net finance costs and tax =  $£48,000 \times 0.375 = £18,000$

Profit for the year margin =  $(£48,000 - £18,000) / £600,000 \times 100 = 5\%$

10.

Sales revenue =  $£600,000 \times 1.15 = £690,000$

Profit from operations margin =  $(£52,400 / £690,000) \times 100 = 7.59\%$

Net finance costs and tax =  $£52,400 \times 0.375 = £19,650$

Profit for the year margin =  $(£52,400 - £19,650) / £690,000 \times 100 = 4.75\%$

## Calculation of Human Resource Data

### Labour Turnover

1.

$$\text{Labour turnover} = (81/1,350) \times 100 = 6\%$$

2.

$$80 \times 0.15 = 12 \text{ employees}$$

$$(12 / 2) \times \text{£}1,250 = \text{£}7,500$$

3.

$$5,600/16 = 350 \text{ workers}$$

$$(42/350) \times 100 = 12\%$$

4.

$$\text{Store A} = 500 \times 0.12 = 60 \text{ employees. } 60 \times 0.10 = 6 \text{ employees}$$

$$\text{Store B} = 500 \times 0.16 = 80 \text{ employees. } 80 \times 0.025 = 2 \text{ employees}$$

$$\text{Store C} = 500 \times 0.18 = 90 \text{ employees. } 90 \times 0.10 = 9 \text{ employees}$$

$$\text{Store D} = 500 \times 0.12 = 60 \text{ employees. } 60 \times 0.05 = 3 \text{ employees}$$

$$\text{Store E} = 500 \times 0.24 = 120 \text{ employees. } 120 \times 0.075 = 9 \text{ employees}$$

Store F had 0% labour turnover

Total number of employees who left the business last year = 29 employees

5.

$$\text{Total number of employees last year} = 320 \times 1.15 = 368$$

$$368 \times 0.25 = 92 \text{ employees}$$

### Labour productivity

1.

$$364,000 / 52 = 7,000 \text{ units per week}$$

$$7,000 / 4,000 = 1.75$$

2.

$$\text{Total manufacturing staff} = (84/7) \times 5 = 60 \text{ staff}$$

$$60/2 = 30 \text{ staff per shift}$$

$$30 \times 15 = 450 \text{ units of output per shift}$$

3.

$$\text{Total manufacturing staff} = 60 + 6 = 66 \text{ staff}$$

$$\text{Staff per shift} = 66/2 = 33 \text{ staff}$$

$$\text{Total output} = 450 \times 1.10 = 495$$

$$495/33 = 15 \text{ units}$$

4.

Current output per worker, per week =  $32,000/40 = 800$  units

After training =  $800 \times 1.2 = 960$  units

5.

Total number of workers =  $£748,000/£22,000 = 34$  workers

Daily output =  $228,480/240 = 952$  units

Daily labour productivity =  $952/34 = 28$  units

### **Employee costs as a percentage of turnover**

1.

$(£127,500/£850,000) \times 100 = 15\%$

2.

Turnover =  $245,000 \times £2.50 = £612,500$

$£612,500 \times 0.20 = £122,500$

3.

Turnover =  $(£648,000/80) \times 100 = £810,000$

Employee costs as a percentage of turnover =  $(£202,500/£810,000) \times 100 = 25\%$

4.

Worker pay this year =  $£18,000 \times 1.04 = £18,720$

Total labour costs =  $£18,720 \times 10 = £187,200$

Turnover this year =  $£600,000 \times 1.10 = £660,000$

Employee costs as a percentage of turnover =  $(£187,200/£660,000) \times 100 = 28.36\%$

5.

Labour costs last year =  $£250,000 \times 0.20 = £50,000$

Turnover based on new capacity =  $£250,000 \times 1.15 = £287,500$

Labour costs based on new capacity =  $£50,000 \times 1.05 = £52,500$

Employee costs as a percentage of turnover =  $(£52,500/£287,500) \times 100 = 18.26\%$

### Labour costs per unit

1.

$$£34,500/6,000 = £5.75$$

2.

$$\text{Total number of tables per year} = 335 \times 25 = 8,375$$

$$£50,250/8,375 = £6$$

3.

$$8,375 \times 1.20 = 10,050$$

$$£50,250/10,050 = £5$$

4.

$$\text{Total manufacturing cost per car} = £14,000/1.40 = £10,000$$

$$\text{Labour cost per car} = £10,000 \times 0.15 = £1,500$$

5.

$$\text{Total labour costs} = £400,000 \times 0.30 = £120,000$$

$$\text{Total output} = 50 \times 1,000 = 50,000 \text{ units}$$

$$\text{Labour cost per unit} = £120,000/50,000 = £2.40$$

### Financial Ratio Analysis

#### Return on Capital Employed

1.

$$\text{ROCE} = (£4\text{m} / £20\text{m}) \times 100 = 20\%$$

2.

$$\text{Operating Profit} = £12\text{m} \times 0.15 = £1.8 \text{ million}$$

3.

$$\text{Capital employed} = £14\text{m} + £7\text{m} = £21\text{m}$$

$$\text{Return on capital employed} = (£2\text{m} / £21\text{m}) \times 100 = 9.52\%$$

4.

$$\text{Operating profit} = £2.5\text{m} \times 0.08 = £200,000$$

$$\text{Capital employed} = £1\text{m} + £250,000 = £1.25\text{m}$$

$$\text{Return on capital employed} = (£200,000 / £1.25\text{m}) \times 100 = 16\%$$

5.

Operating profit = £5m – (£2m + £1.9m) = £1.1m

Capital employed = £0.5m + £1.8m = £2.3m

Return on capital employed = (£1.1m / £2.3m) x 100 = 47.83%

### **Liquidity**

1.

Current Ratio = £200,000 / £160,000 = 1.25:1

2.

Current assets = £600,000

Current liabilities = £400,000

Current ratio = £600,000 / £400,000 = 1.5:1

3.

Current assets = £2m x 1.8 = £3.6m

4.

Current assets = £800,000

Current liabilities = £800,000 x 0.8 = £640,000

Current ratio = £800,000 / £640,000 = 1.25:1

5.

Current ratio before

Current assets = £350,000

Current liabilities = £200,000

Current ratio = £350,000 / £200,000 = 1.75:1

Current ratio after

Inventory = £220,000

Receivables = £50,000

Cash = £30,000

Current assets = £300,000

Current liabilities = £150,000

Current ratio = £300,000 / £150,000 = 2:1

## Gearing

1.

$$£300,000 / (£500,000 + £300,000) \times 100 = 37.5\%$$

2.

$$\text{Gearing} = (£9\text{m} / £15\text{m}) \times 100 = 60\%$$

3.

$$\text{Non-current liabilities} = £5\text{m} \times 0.20 = £1\text{m}$$

4.

Current gearing

$$\text{Gearing} = £6.75\text{m} / (£6.75\text{m} + £8.25\text{m}) \times 100 = 45\%$$

New gearing

$$\text{Non-current liabilities} = £6.75\text{m} + £2\text{m} = £8.75\text{m}$$

$$\text{Gearing} = £8.75\text{m} / (£8.75\text{m} + £8.25\text{m}) \times 100 = 51.47\%$$

5.

Current gearing

$$\text{Non-current liabilities} = £4\text{m} \times 1.9 = £7.6\text{m}$$

$$\text{Gearing} = (£7.6\text{m} / £19\text{m}) \times 100 = 40\%$$

New gearing

$$\text{Additional borrowing} = £8\text{m}$$

$$\text{Gearing} = (£7.6\text{m} + £8\text{m}) / (£19\text{m} + £8\text{m}) \times 100 = 57.78\%$$

## Efficiency Ratios

1.

Payables days =  $(£10,000 / £250,000) \times 365 = 14.6$  days

Receivables days =  $(£24,000 / £800,000) \times 365 = 10.95$  days

2.

Inventory turnover =  $£140m / £50m = 2.8$  times or 130.36 days  $(365 / 2.8)$

3.

Cost of sales =  $£150m - £80m = £70m$ .

Average inventory held =  $£70m / 20 = £3.5m$

4.

Payables days =  $(£4m / £22m) \times 365 = 66.36$  days

Receivables days =  $(£11m / £55m) \times 365 = 73$  days

Inventory turnover =  $£22m / £10m = 2.2$  times or 165.91 days  $(365 / 2.2)$

5.

Cost of sales =  $£900,000 - £400,000 = £500,000$

Payables =  $£50,000 \times 0.2 = £10,000$

Receivables =  $£90,000 \times 0.4 = £36,000$

Payables days =  $(£10,000 / £500,000) \times 365 = 7.3$  days

Receivables days =  $(£36,000 / £900,000) \times 365 = 14.6$  days

## Investment Appraisal

### Payback

1.

After 3 years £170,000 has been returned  $(£50,000 + £60,000 + £60,000)$  leaving £30,000 to be repaid

Year 4 net cash flow = £80,000

$(£30,000 / £80,000) \times 12 = 4.5$  months

Payback = 3 years and 4.5 months

2.

Total net cash flows after 3 years = £220,000

That leaves £80,000 to be repaid  $(£300,000 - £220,000)$

$(£80,000 / 8) \times 12 = £120,000$

Net cash flows in Year 4 = £120,000

3.

Net Cash Flows:

Year 1 = £100,000 Year 2 = £120,000 Year 3 = £120,000 Year 4 = £140,000

After 2 years £220,000 has been repaid (£100,000 + £120,000) leaving £105,000 to be repaid

Year 3 net cash flow = £120,000

$(£105,000 / £120,000) \times 12 = 10.5$  months

Payback = 2 years and 10.5 months

4.

Year 3 inflows = £200,000  $\times 1.10 = £220,000$

Year 3 outflows = £80,000  $\times 1.10 = £88,000$

Year 3 net cash flow = £220,000 - £88,000 = £132,000

$(£105,000 / £132,000) \times 12 = 9.54$

Payback = 2 years and 9.55 months

5.

Net Cash Flows:

Year 1 = £350,000 Year 2 = £350,000 Year 3 = £500,000 Year 4 = £700,000 Year 5 = £750,000

After 3 years £1,200,000 has been returned leaving £500,000 to be repaid

$(£500,000 / £700,000) \times 12 = 8.57$

Payback = 3 years and 8.57 months

### **Accounting Rate of Return (ARR)**

1.

Total Return = £37,000  $\times 4$  - £120,000 = £28,000

Average Annual Return = £28,000/4 = £7,000

ARR =  $(£7,000/£120,000) \times 100 = 5.83\%$

2.

Total return = (£600,000 - £400,000) - £140,000 = £60,000

Average Annual Return = £60,000/5 = £12,000

ARR =  $(£12,000/£140,000) \times 100 = 8.57\%$



3.

Site A

Total Cost = £1,400,000 + (£100,000 x 5) = £1,900,000

Total Return = (£425,000 x 5) - £1,900,000 = £225,000

Average Annual Return = £225,000/5 = £45,000

ARR = (£45,000/£1,400,000) x 100 = 3.21%

Site B

Total Cost = £2,000,000 + (£40,000 x 5) = £2,200,000

Total Return = (£425,000 x 1.25) x 5 - £2,200,000 = £456,250

Average Annual Return = £456,250/5 = £91,250

ARR = (£91,250/£2,000,000) x 100 = 4.56%

4.

Total Cash Inflows = £120,000+£150,000+£180,000+£240,000+£260,000 = £950,000

Total Cash Outflows = £100,000 + (£220,000+£170,000+£130,000+£130,000+£120,000) = £870,000

Total Return = £950,000 - £870,000 = £80,000

Average Annual Return = £80,000/5 = £16,000

ARR = (£16,000/£100,000) x 100 = 16%

5.

Option 1

Total Return

June = £1,500

July = (£1,500 x 1.2) = £1,800

August = (£1,800 x 1.2) = £2,160

September = (£2,160 x 1.2) = £2,592

(£1,500 + £1,800 + £2,160 + £2,592) - £4,000 = £4,052

Average Monthly Return = £4,052/4 = £1,013

ARR = (£1,013/£4,000) x 100 = 25.33%

Option 2

Total Return = £2,500 x 4 + (£2,500 x 0.8) - £6,000 = £6,000

Average Monthly Return = £6,000/5 = £1,200

ARR = (£1,200/£6,000) x 100 = 20%

## Net present value

1.

Year	Net Cash Flows	7% Discount Factor	Present Value
0	(£150,000)	1	(£150,000)
1	£175,000	0.935	£163,625
2	£220,000	0.873	£192,060
3	£280,000	0.816	£228,480
<b>NPV = £434,165</b>		<b>Total</b>	<b>£434,165</b>

2.

Year	Net Cash Flow	5 % Discount Factor	Present Value
0	(£120,000)	1	(£120,000)
1	£30,000	0.952	£28,560
2	£40,000	0.907	£36,280
3	£40,000	0.864	£34,560
4	£55,000	0.823	£45,265
5	£80,000	0.784	£62,720
<b>NPV = £87,385</b>		<b>Total</b>	<b>£87,385</b>

3.

Machine 1

Year	Net Cash Flow	5% Discount Factor	Present Value
0	(£200,000)	1	(£200,000)
1	£40,000	0.952	£38,080
2	£55,000	0.907	£49,885
3	£70,000	0.864	£60,480
4	£83,000	0.823	£68,309
5	£91,000	0.784	£71,344
<b>NPV = £88,098</b>		<b>Total</b>	<b>£88,098</b>

Machine 2

Year	Net Cash Flow	5% Discount Factor	Present Value
0	(£300,000)	1	(£300,000)
1	£90,000	0.952	£85,680
2	£94,000	0.907	£85,258
3	£106,000	0.864	£91,584
4	£120,000	0.823	£98,760
5	£125,000	0.784	£98,000
<b>NPV = £159,282</b>		<b>Total</b>	<b>£159,282</b>

Machine B should be chosen

4.

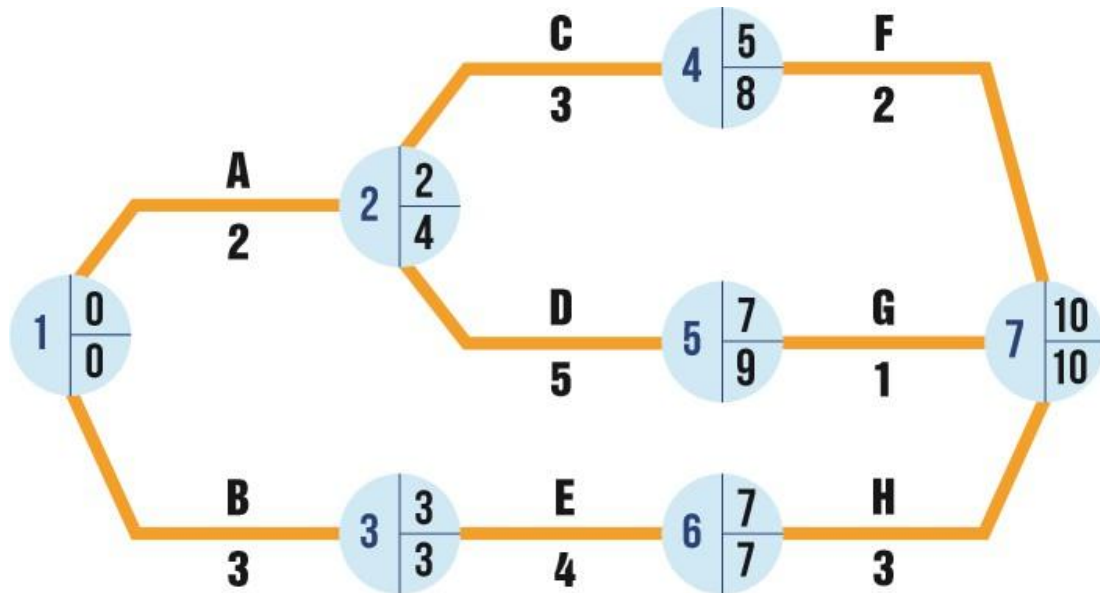
Year	Cash Inflows	Cash Outflows	Net Cash Flow	10% Discount Factor	Present Value
0		(£450,000)	(£450,000)	1	(£450,000)
1	£130,000	£6,500	£123,500	0.909	£112,261.50
2	£195,000	£9,750	£185,250	0.826	£153,016.50
3	£260,000	£13,000	£247,000	0.751	£185,497
4	£325,000	£16,250	£308,750	0.683	£210,876.25
5	£390,000	£19,500	£370,500	0.621	£230,080.50
<b>NPV = £441,731.75</b>				Total	<b>£441,731.75</b>

5.

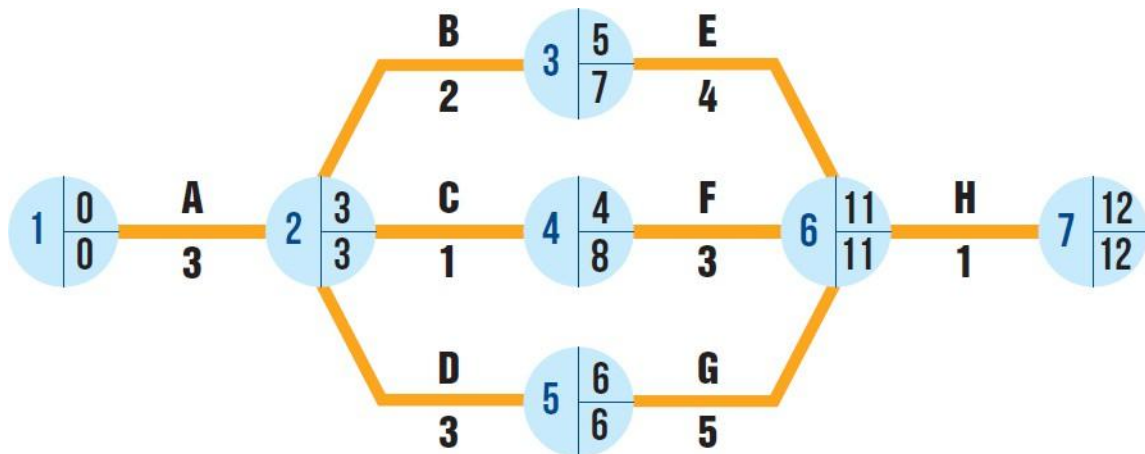
Year	Cash Inflows	Cash Outflows	Net Cash Flow	10% Discount Factor	Present Value
0		(£100,000)	(£150,000)	1	(£100,000)
1	£60,000	£12,000	£48,000	0.909	£43,632
2	£66,000	£13,200	£52,800	0.826	£43,612.80
3	£72,600	£14,520	£58,080	0.751	£43,618.08
<b>NPV = £30,862.88</b>				Total	<b>£30,862.88</b>

## Network Analysis

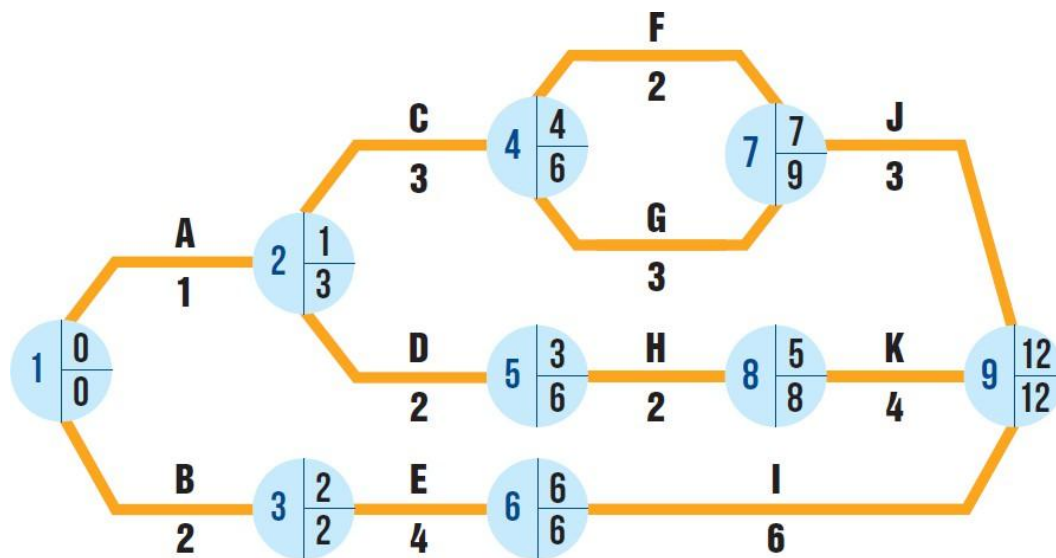
1.



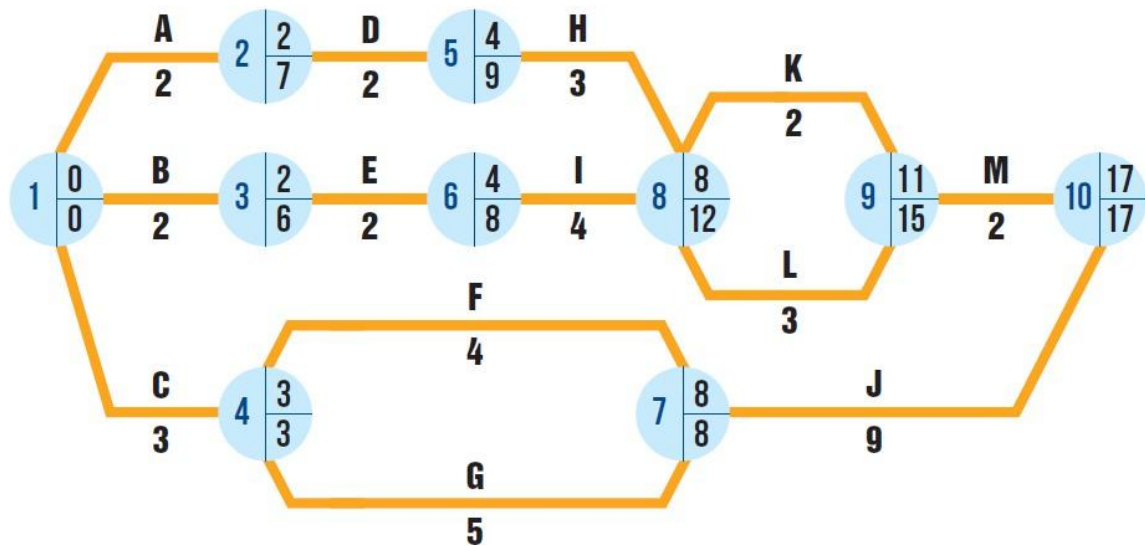
2.



3.



4.



Total float for activity D =  $9 - 2 - 2 = 5$

Total float for activity I =  $12 - 4 - 4 = 4$

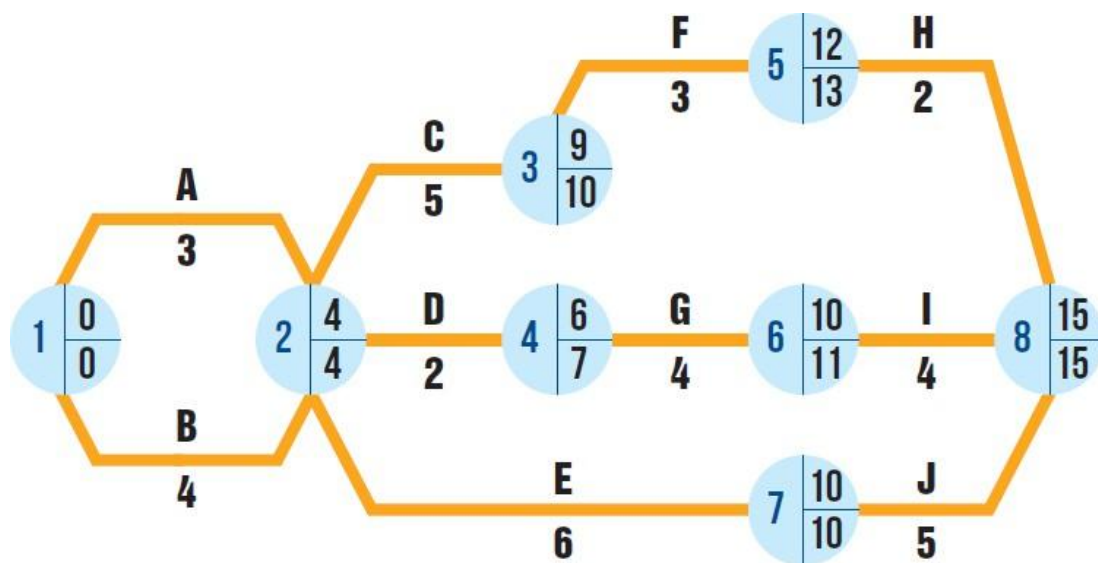
Critical path = C, G, J

5.

**Earliest start time for node 8 = 13**

**New completion time = 18**

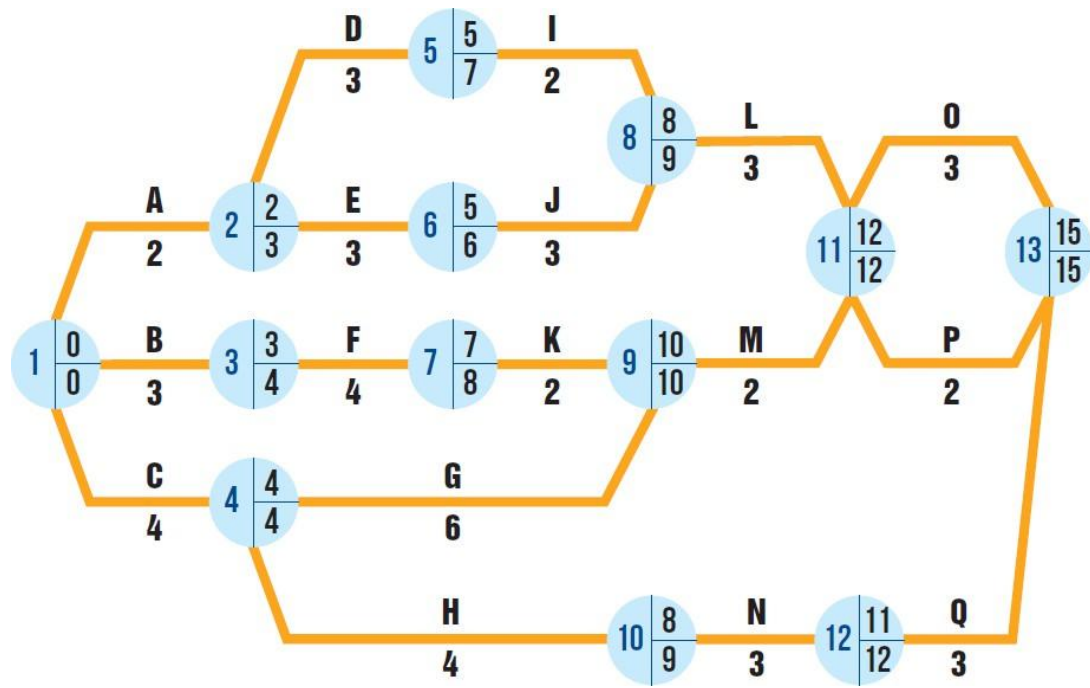
6.



**Total float for activity G =  $11 - 4 - 6 = 1$**

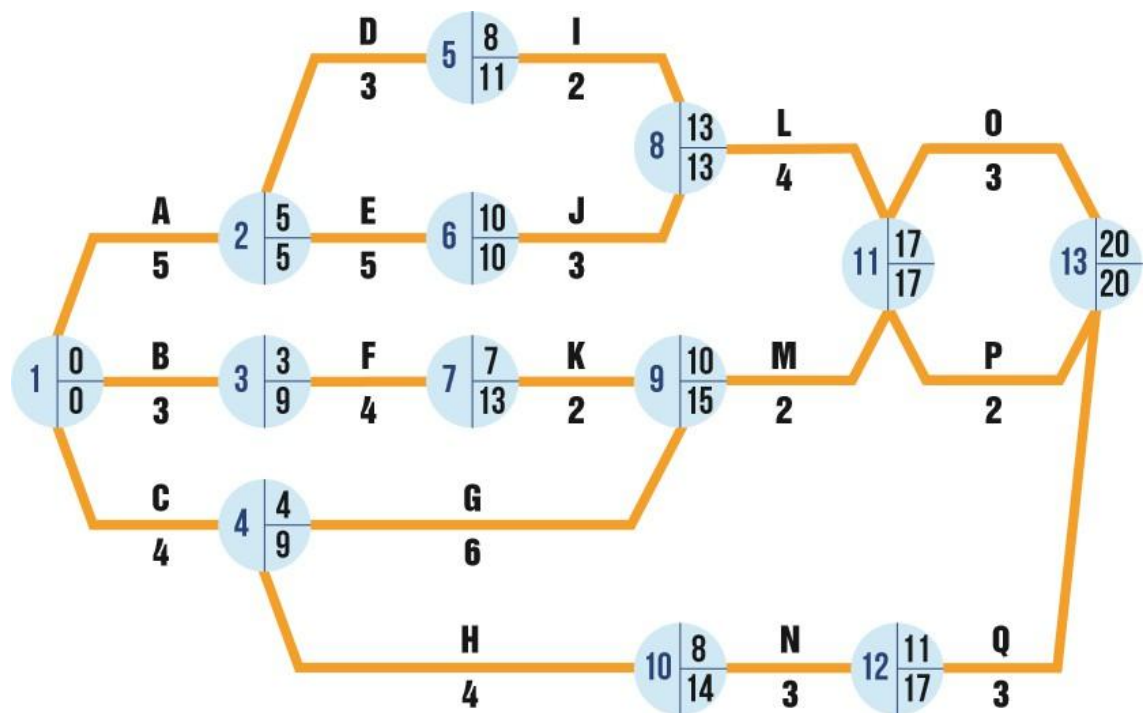
**Critical path = B, E, J**

7.



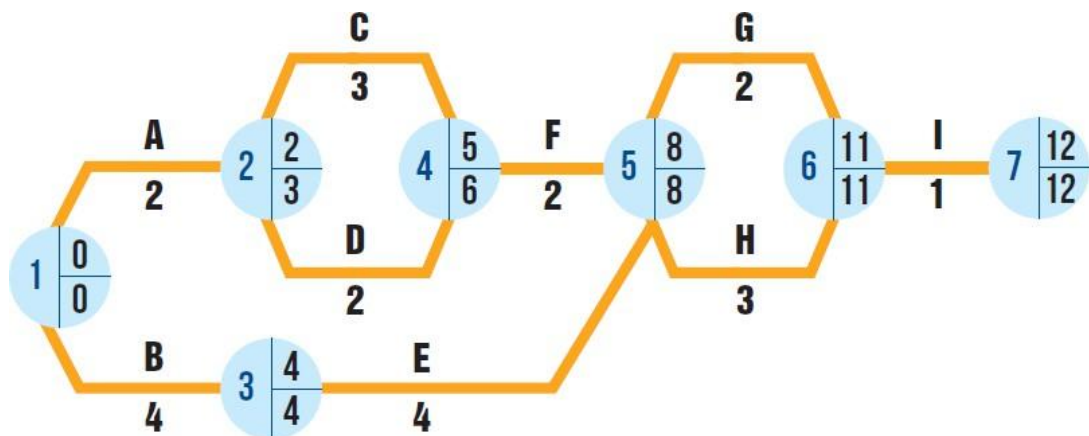
Critical path = C, G, M, O

8.



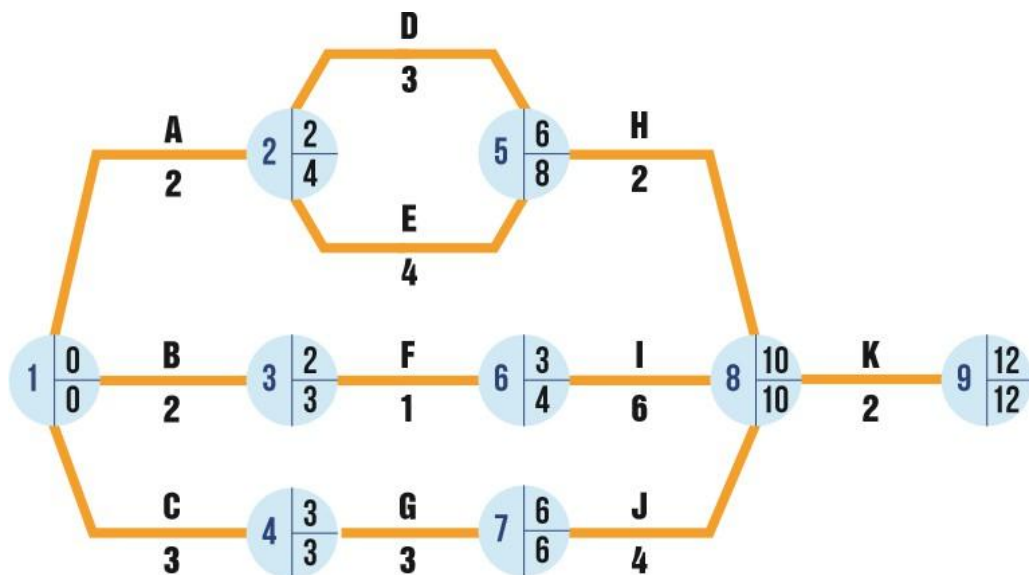
Critical path = A, E, J, L, O

9.



Critical path = B, E, H, I

10.



Critical path = C, G, J, K



### Interpreting Index Numbers

1.

Sales in April =  $3,240 \times 0.95 = 3,078$  laptops

Sales in May =  $3,240 \times 1.20 = 3,888$  laptops

2.

House prices in 2013 =  $\pounds 195,000 \times 1.10 = \pounds 214,500$

House prices in 2016 =  $\pounds 195,000 \times 1.15 = \pounds 224,250$

Difference in house prices =  $\pounds 224,250 - \pounds 214,500 = \pounds 9,750$

3.

Visitors in March =  $2,000 \times 1.05 = 2,100$

Visitors in April =  $2,000 \times 0.95 = 1,900$

Visitors in May =  $2,000 \times 1.20 = 2,400$

Visitors in June =  $2,000 \times 1.10 = 2,200$

Visitors in July =  $2,000 \times 1.25 = 2,500$

Total number of visitors over last 5 months = 11,100

Average number of visitors =  $11,100 / 5 = 2,220$

4.

Business A unit sales in 2015 =  $125,000 \times 1.20 = 150,000$

Business A units sales in 2016 =  $125,000 \times 1.24 = 155,000$

Percentage difference in unit sales =  $(155,000 - 150,000) / 150,000 \times 100 = 3.33\%$

5.

Business A appears to have the more motivated workforce as labour productivity has increased and labour turnover has fallen

### Calculation Practice Assessment

1.

Capital employed =  $\pounds 800,000 / 0.4 = \pounds 2,000,000$

Total equity =  $\pounds 2,000,000 - \pounds 800,000 = \pounds 1,200,000$

New non-current liabilities =  $\pounds 800,000 + \pounds 500,000 = \pounds 1,300,000$

New capital employed =  $\pounds 1,300,000 + \pounds 1,200,000 = \pounds 2,500,000$

New gearing ratio =  $(1,300,000 / \pounds 2,500,000) \times 100 = 52\%$

2.

Cost of sales = £2,000,000 - £1,200,000 = £800,000

Inventory turnover = £800,000 / £200,000 = 4 times

3.

3.1

Total net cash flows = £900,000

Total return = £900,000 - £400,000 = £500,000

Average return = £500,000 / 4 = £125,000

Average rate of return = (£125,000 / £400,000) x 100 = 31.25%

3.2

Year	Net Cash Flow (£000)	5 % Discount Factor	Present Value (£000)
0	(400)	1	(£400)
1	100	0.952	95.2
2	150	0.907	136.05
3	250	0.864	216
4	400	0.823	329.2
			774.45
<b>NPV = 376.45</b>		Total	<b>376.45</b>

(NPV = £376,450)

4.

Number of units produced last year = 350,000 x 0.80 = 280,000

Variable cost per unit = £1,680,000 / 280,000 = £6

Contribution per unit = £8 - £6 = £2

5.

Total variable costs last year = 400,000 x £4 = £1,600,000

Fixed costs last year = £2,000,000 - £1,600,000 = £400,000

Break-even point last year = £400,000 / (£8 - £4) = 100,000 units

Margin of safety = 400,000 - 100,000 = 300,000 units

6.

Budgeted profit last year =  $£800,000 - £300,000 = £500,000$

Actual income last year =  $£800,000 \times 1.06 = £848,000$

Actual expenditure last year =  $£300,000 \times 0.96 = £288,000$

Actual profit last year =  $£848,000 - £288,000 = £560,000$

Profit variance last year =  $£560,000 - £500,000 = £60,000$  favourable

7.

2018 output =  $500,000 \times 0.9 = 450,000$

2019 output =  $500,000 \times 0.8 = 400,000$

2020 output =  $500,000 \times 0.95 = 475,000$

2021 output =  $600,000 \times 0.80 = 480,000$

2022 output =  $600,000 \times 0.85 = 510,000$

Total output between 2018 and 2022 = 2,315,000

Average yearly output between 2018 and 2022 =  $2,315,000 / 5 = 463,000$

8.

Total current assets =  $£500,000 + £300,000 + £100,000 = £900,000$

Total current liabilities =  $£200,000 + £300,000 = £500,000$

Current ratio =  $£900,000 / £500,000 = 1.8:1$

9.

Net gain of Option A =  $(£2,000,000 \times 0.6) + (£500,000 \times 0.4) - £400,000 = £1,000,000$

Net gain of Option B =  $(£400,000 \times 0.8) + (£250,000 \times 0.2) - £100,000 = £270,000$

10.

Total sales of the top 5 retailers = £1,020m

Market share of the top 5 retailers =  $(£1,020m / £2,000m) \times 100 = 51\%$

11.

Total contribution =  $10,000 \times £0.60 = £6,000$

Additional profit =  $£6,000 - £2,000 = £4,000$