



NUMERICAL ASSESSMENT (LINEAR) VOLUME 1

➔ The maximum mark for this numerical assessment is 50

Name

Centre Name



Section A

ANSWER ALL QUESTIONS IN THIS SECTION

- 1 The data in **Table 1** refers to a business and should be used for **question 1.1**

Table 1

Data on a business

Selling price	£1.50
Total contribution	£26,250
Number of units sold	25,000

- 1.1 Based on the data in **Table 1**, calculate the business's contribution cost per unit.
Show your workings

(3 marks)

The data in **Table 2** refers to the projected revenue and costs of a firm's investment in a new retail outlet and should be used for **question 1.1**

Cost of investment £10m

Year	Inflows (£m)	Outflows (£m)
1	1	1
2	7	3
3	12	4



- 2.1** Based on the data in **Table 2**, calculate the average rate of return of the investment.
Show your workings

(4 marks)

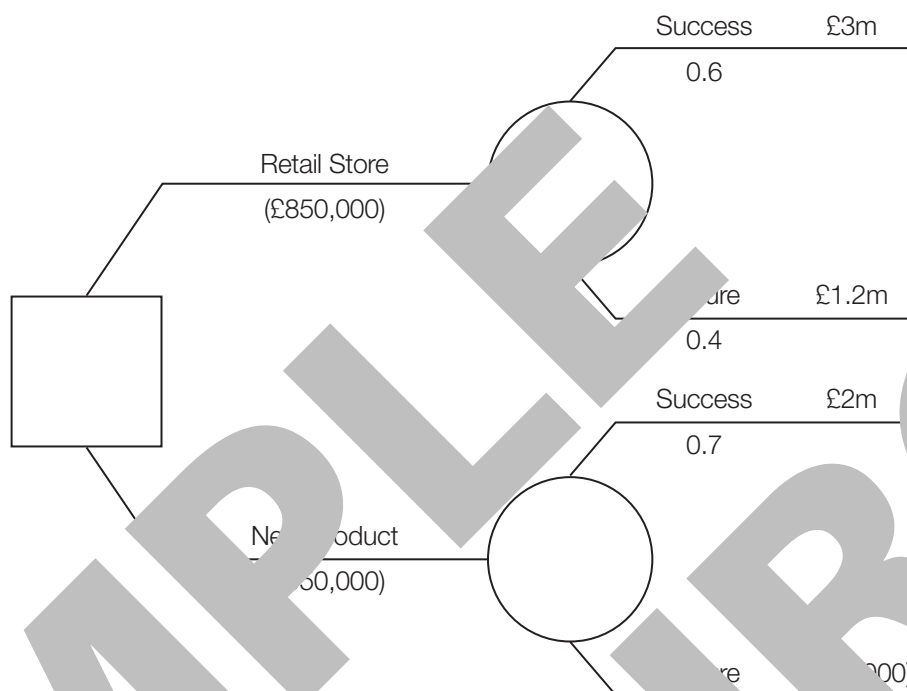
- 3** A business has an average selling price of £20. Variable costs are 1/5th of the selling price.
Last month the business sold 20,000 units. Calculate the total contribution for last month.
Show your workings

(3 marks)



- 4 A business is considering two options to increase profit. The first option, open another retail store, has a net gain of £1.43 million. Calculate the net gain of the alternative option, launch a new product. Show your workings

(5 marks)

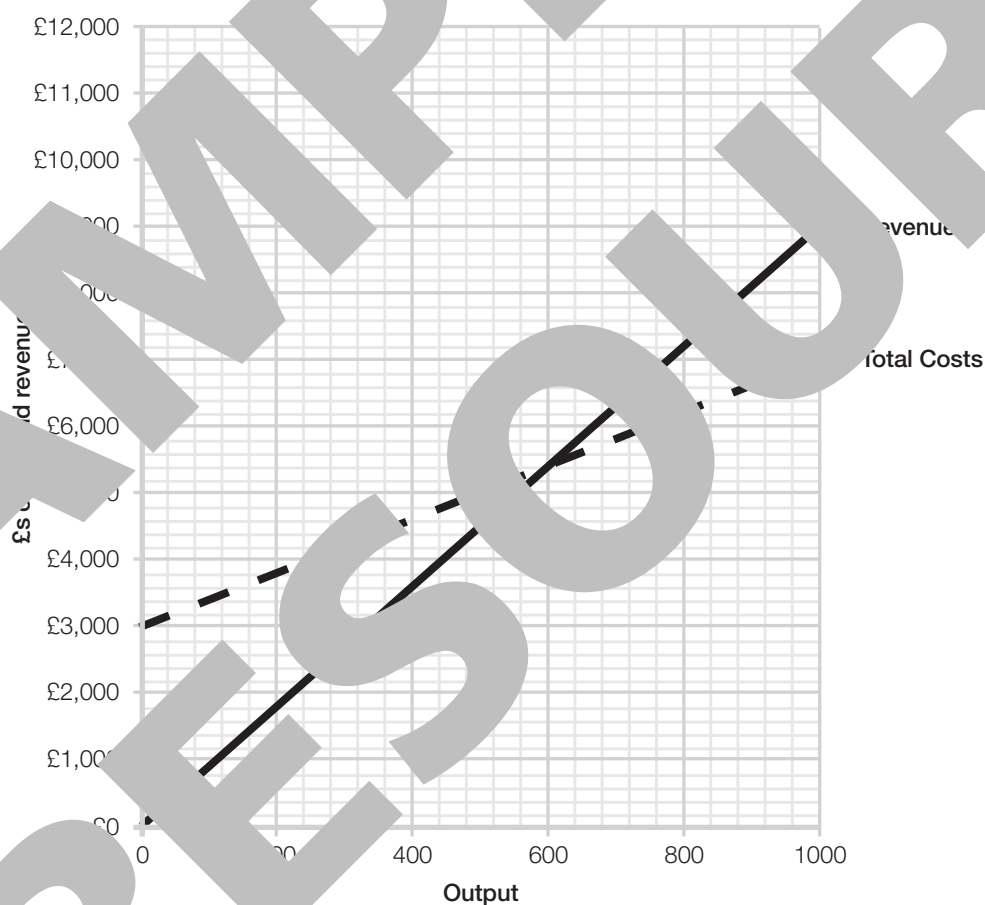




- 5 This year, a firm's sales were £489,600. This was 2% higher than its sales last year. The size of the market by value last year was £10m. Calculate the firm's market share last year.
Show your workings

(3 marks)

- 6 **Graph 1** refers to the monthly break-even situation for a new business start-up and could be used for questions 6.1, 6.2, 6.3, 6.4 and 6.5





- 6.1** At the break-even output, what percentage of total costs are fixed?
Show your workings

(3 marks)

- 6.2** Calculate the margin of the safety for the business if it expects to sell 950 units per month.
Show your workings

(2 marks)

- 6.3** Calculate the maximum profit if the business sells 1,000 units per month.
Show your workings

(3 marks)



- 6.4** After initial high sales, the owner of the business is looking to increase the selling price by $\frac{1}{3}$. Amend the break-even chart above to show the new revenue line after this change. Label this line TR2

(3 marks)

- 6.5** Calculate the new break-even point for the business after the increase in price. Show your workings



- 7 A business is considering launching two new products next month, product X and product Y. **Table 3** contains data relating to both new products.

Table 3

	Product X	Product Y
Selling price per unit	£20	£40
Variable cost per unit	£8	£10
Estimated monthly sales	500 units	750 units

The two new products will incur additional fixed costs of £12,000 per month. Calculate the expected monthly profit or loss from the launch of the two new products. Show your workings

(5 marks)



- 8 The data in **Table 4** shows extracts from a firm's company accounts and should be used for questions **8.1** and **8.2**

Table 4

Sales revenue	£850,000
Gross profit	£500,000
Operating profit	£55,000
Non-current liabilities	£275,000
Payables	£25,000
Total equity	£150,000

- 8.1** Based on the data in **Table 4**, calculate the firm's return on capital employed.
Show your workings

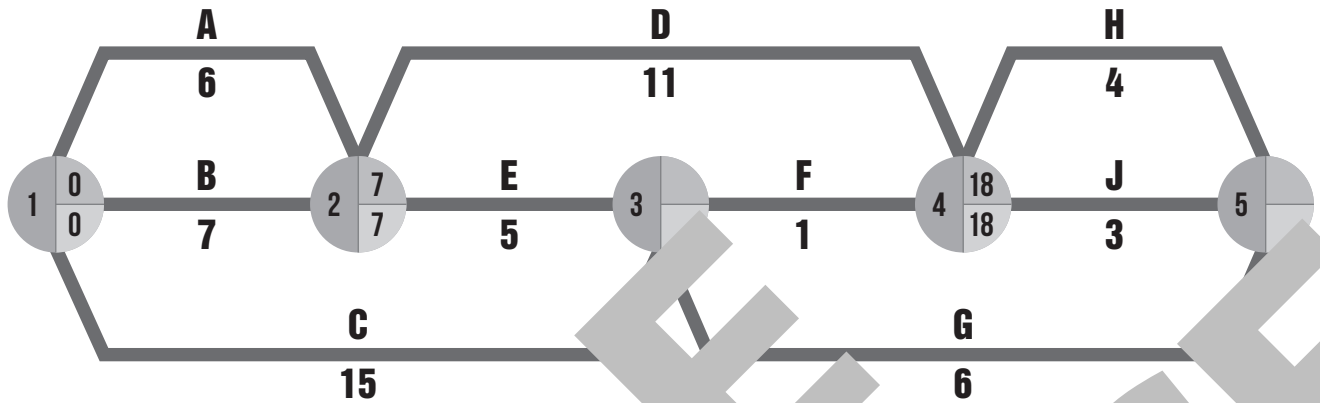
(3 marks)

- 8.2** Based on the data in **Table 4**, calculate the firm's current ratio.
Show your workings

(4 marks)



- 9 A business has produced the following network diagram. The figures relate to weeks.



Complete the EST and the LFT for nodes 3 and 5 in the network diagram

(4 marks)

Handwritten student response:

Node 3: EST = 7, LFT = 7

Node 5: EST = 18, LFT = 18



NUMERICAL ASSESSMENT (LINEAR) VOLUME 1

MARK SCHEME



Name

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Section A

- 1** The data in **Table 1** refers to a business and should be used for **question 1.1**

Table 1

Data on a business

Selling price	£1.50
Total contribution	£26,250
Number of units sold	25,000

- 1.1** Based on the data in **Table 1**, calculate the business's variable cost per unit.
Show your working. (3 marks)

Answer: 2 marks

Contribution per unit = total contribution / number of units sold

$$= £26,250 / 25,000 = £1.05 \text{ (1 mark)}$$

Variable cost per unit = selling price – contribution per unit

$$= £1.50 - £1.05 \text{ (1 mark)} = £0.45 \text{ (1 mark)}$$

If no working calculation: award 1 mark for correct formula or variable cost per unit (above)

- 2** The data in **Table 2** refers to a projected revenue and costs of a firm's investment in a new retail outlet and should be used for **question 2.1**

Table 2

Cost of investment £10m

Year	Inflows (£m)	Outflows (£m)
1	5	1
2	7	3
3	12	4



- 2.1** Based on the data in **Table 2**, calculate the average rate of return of the investment. Show your workings

(4 marks)**Answer: 20% (4 marks)**

Average rate of return % = $\frac{\text{net profit from project}}{\text{initial cost of project}} \times 100$

= net profit from project = (£24m (total inflows) - £8m (total outflows) - £10m (cost of investment) **(1 mark)** = £6m **(1 mark)**

= annual return from project = £6m/3 = £2m **(1 mark)**

= (£2m/£10m) x 100 = 20% **(1 mark)**

If no valid calculation: award 1 mark for correct formula (above or appropriate variation)

- 3** A business has an average selling price of £12. Variable costs are 1/5th of the selling price. Last month the business sold 20,000 units. Calculate the total contribution for the month. Show your workings

(3 marks)**Answer: £96,000 (3 marks)**

Total contribution = contribution per unit x number of units sold

= (£6/5) x 20,000 **(1 mark)**

= £1.20 x 20,000 = £24,000 **(1 mark)**

Total contribution = total sales revenue - total variable costs

= £6 x 20,000 = £120,000 **(1 mark)**

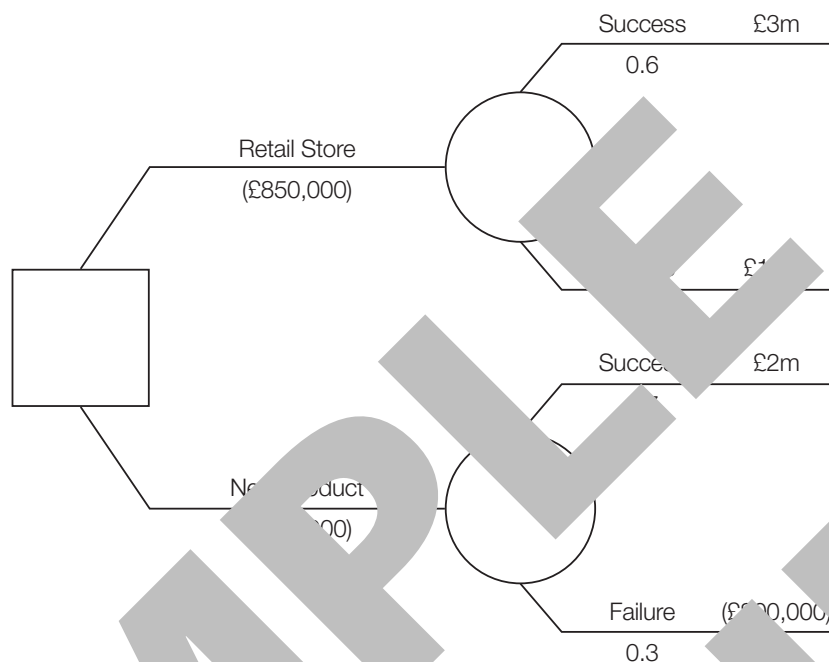
= £1.20 x 20,000 = £24,000 **(1 mark)**

= £120,000 - £24,000 = £96,000 **(1 mark)**

If no valid calculation: award 1 mark for correct formula (above)



- 4 A business is considering two options to increase profit. The first option, open another retail store, has a net gain of £1.43 million. Calculate the net gain of the alternative option, launch a new product. Show your workings

(5 marks)**Answer: £610,000 (5 marks)**

Net gain = expected value - initial cost of decision

$$= (0.6 \times £3m + 0.4 \times £1m) - £850,000 = £1.4m - £240,000 = £1,160,000$$

(1 mark) (1 mark) (1 mark)

$$= £1,160,000 - £550,000 = £610,000$$

no valid calculation: award 1 mark for correct formula (above)

This year, a firm's sales were £2489,600. This was 1.02 times higher than its sales last year. The size of the market by value last year was £10m. Calculate the firm's market share last year. Show your workings

(3 marks)**Answer: 4.8% (3 marks)**

$$\text{Market share} = \frac{\text{Sales of the business}}{\text{Total sales in the market}} \times 100$$

$$= \frac{£2489,600}{£10m} \times 100 = 24.896\%$$

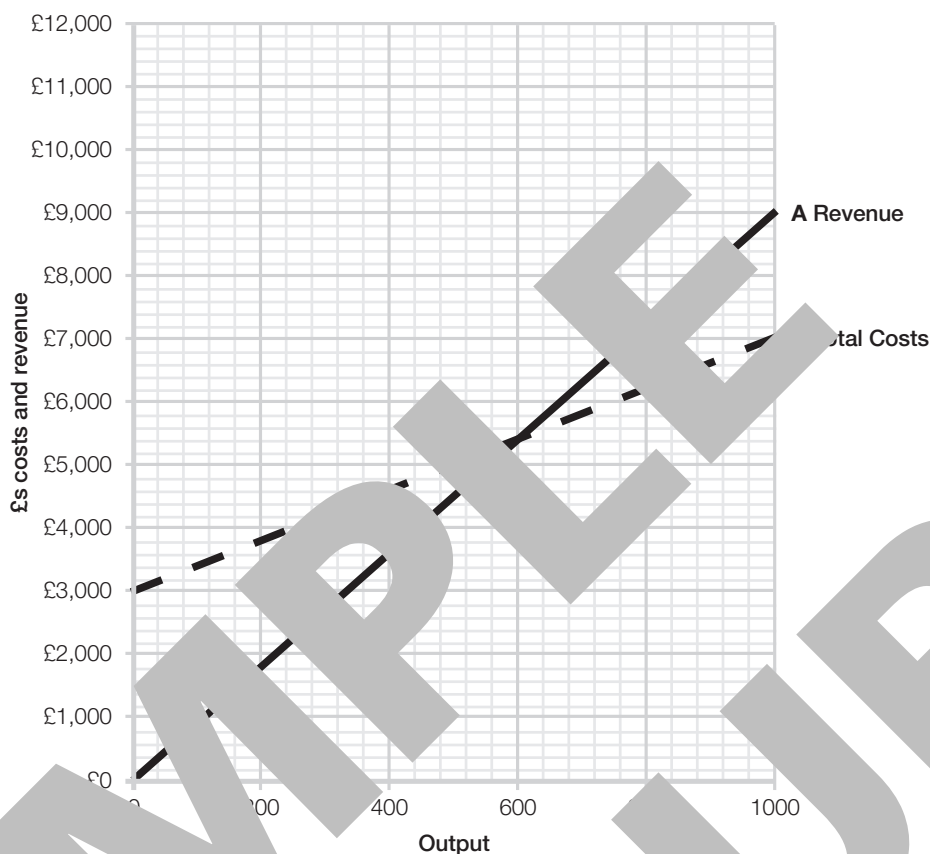
$$24.896\% \div 1.02 = 24.41\%$$

$$24.41\% \div 5 = 4.88\% \approx 4.8\%$$

valid calculation: award 1 mark for correct formula (above)



6 **Graph 1** refers to the monthly break-even situation for a new business start-up and should be used for questions **6.1, 6.2, 6.3, 6.4 and 6.5**



At the break-even output, what percentage of total costs are fixed?
Show your workings

(3 marks)

Answer: 55.56% (3 marks)

From the graph, the break-even output = 600 units

At 600 units total costs = £4,800

Fixed costs = £3,000 **(1 mark)**

$= \frac{£3,000}{£4,800} \times 100 = 55.56\%$ **(1 mark)**

(1 mark)



- 6.2** Calculate the margin of the safety for the business if it expects to sell 950 units per month. Show your workings

(2 marks)

Answer: 350 units (2 marks)

Margin of safety = actual level of output - breakeven level of output

= 950 units – 600 units **(1 mark)** = 350 units **(1 mark)**

If no valid calculation: award 1 mark for correct formula (above)

- 6.3** Calculate the level of profit if the business sells 1000 units per month. Show your workings

(3 marks)

Answer: £2,000 (3 marks)

Profit = total revenue – total costs

From the graph:

Revenue = £9,000 **(1 mark)**

Total costs = £7,000 **(1 mark)**

Profit = £9,000 – £7,000 = £2,000 **(1 mark)**

If no valid calculation: award 1 mark for correct formula (above)

- 6.4** As the selling price increases, the owner of the business is looking to increase the selling price by 1/3. Amend the break-even chart above to show the new break-even point for this change. Label the new line TR2

(3 marks)

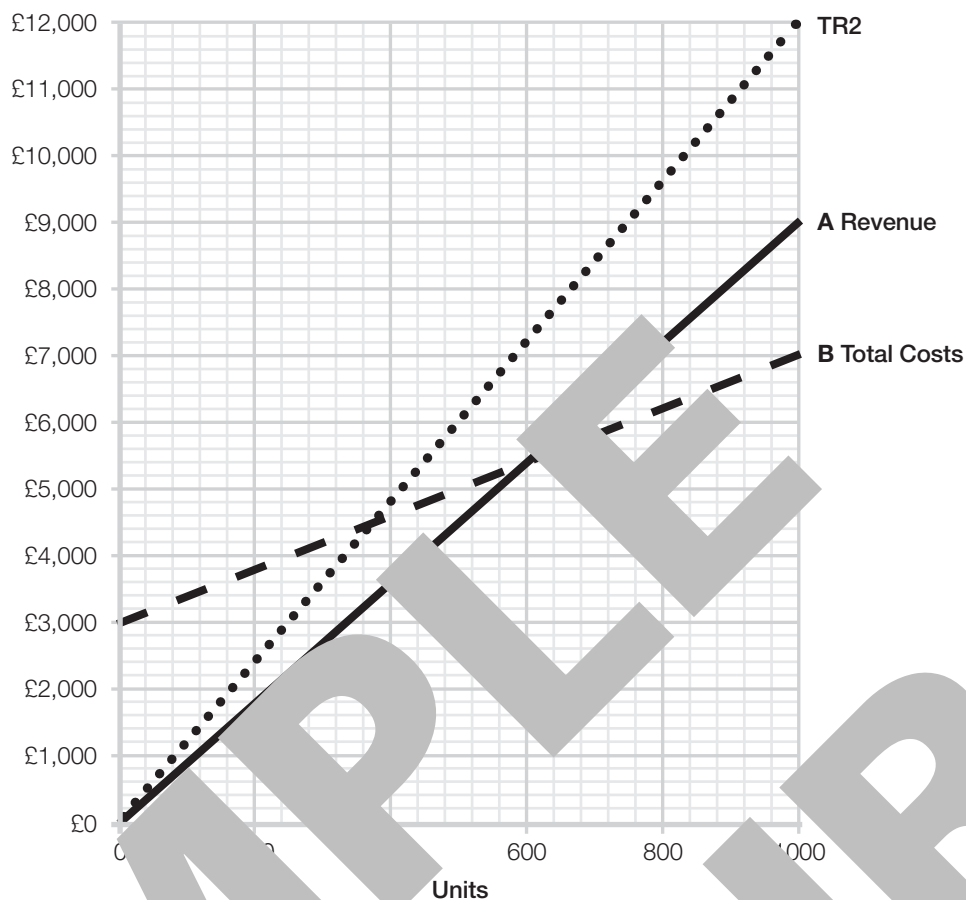
Answer = TR2 line (as below) (3 marks)

Original selling price = £9,000/1000 units = £9

New selling price = £9 × 1 1/3 = £12 **(1 mark)**

TR2 line starts at zero and finishes above the original revenue line (shows a price increase) **(1 mark)**

TR2 line at output level of 1,000 units = £12,000 **(1 mark)**



6.5 Using the graph, calculate the break-even point for the business if the selling price increases to £8.50 per unit.

(5 marks)

Answer: 375 units (5 marks)

$$\text{Break-even} = \frac{\text{fixed costs}}{\text{contribution per unit}}$$

Fixed costs = £3,000

Contribution per unit = selling price per unit – variable cost per unit

Selling price per unit = £8.50 (after price increase)

From graph, variable cost per unit = £4,000/1,000 units = £4

(at 1,000 units, variable costs = £4,000 (total costs = £7,000 – fixed costs £3,000)) **(1 mark)**

Contribution = £8.50 – £4 = £4.50

Break-even = $\frac{£3,000}{£4.50}$ **(1 mark)** = 375 units **(2 marks)**

Contribution = £4.50 **(1 mark)**

Marking: valid calculation: award up to 2 marks for correct formula (above – one mark per element)



- 7 A business is considering launching two new products next month, product X and product Y. **Table 3** contains data relating to both new products.

Table 3

	Product X	Product Y
Selling price per unit	£20	£40
Variable cost per unit	£8	£10
Estimated monthly sales	500 units	750 units

The two new products will incur additional fixed costs of £12,000 per month. Calculate the expected monthly profit or loss from the launch of the two new products. Show your workings.

(5 marks)

Answer: £16,500 (5 marks)

Profit = total revenue – total costs

Revenue

Product x = £20 x 500 = £10,000

Product y = £40 x 750 = £30,000

Total revenue = £10,000 + £30,000 = £40,000 (2 marks)

Costs

Fixed costs = £12,000

Product x variable costs = £8 x 500 = £4,000

Product y variable costs = £10 x 750 = £7,500

Total costs = £12,000 + (£4,000 + £7,500) = £23,500 (2 marks)

Profit = £40,000 - £23,500 = £16,500 (1 mark)

Contribution method:

Profit = total contribution – fixed costs

Product x = 500 x (£20 - £8) = £6,000 (2 marks)

Product y = 750 x (£40 - £10) = £22,500 (2 marks)

Profit = (£22,500 + £6,000) - £12,000 = £16,500 (1 mark)

If no valid calculation award 1 mark for either correct formula (above)



- 8** The data in **Table 4** shows extracts from a firm's company accounts and should be used for questions **8.1** and **8.2**

Table 4

Sales revenue	£850,000
Gross profit	£500,000
Operating profit	£55,000
Non-current liabilities	£275,000
Payables	£25,000
Total equity	£150,000

- 8.1** Based on the data in **Table 4**, calculate the firm's return on capital employed. Show your workings

(3 marks)

Answer: 12.94% (3 marks)

Return on capital employed (ROCE) = $\frac{\text{operating profit}}{\text{total equity} + \text{non-current liabilities}} \times 100$

$$= \frac{£55,000}{£275,000 + £150,000} \times 100 = 12.94\%$$

(1 mark) (1 mark) (1 mark)

If a valid calculation: award 1 mark for correct formula (above)

- 8.2** Based on the data in **Table 4**, calculate the firm's payables days. Show your workings

(4 marks)

Answer: 26.07 days (4 marks)

Payables days = $\frac{\text{payables} \times 365}{\text{cost of sales}}$

= $\frac{£25,000 \times 365}{£350,000}$

$$= \frac{£25,000 \times 365}{£850,000 - £500,000} = 26.07 \text{ days}$$

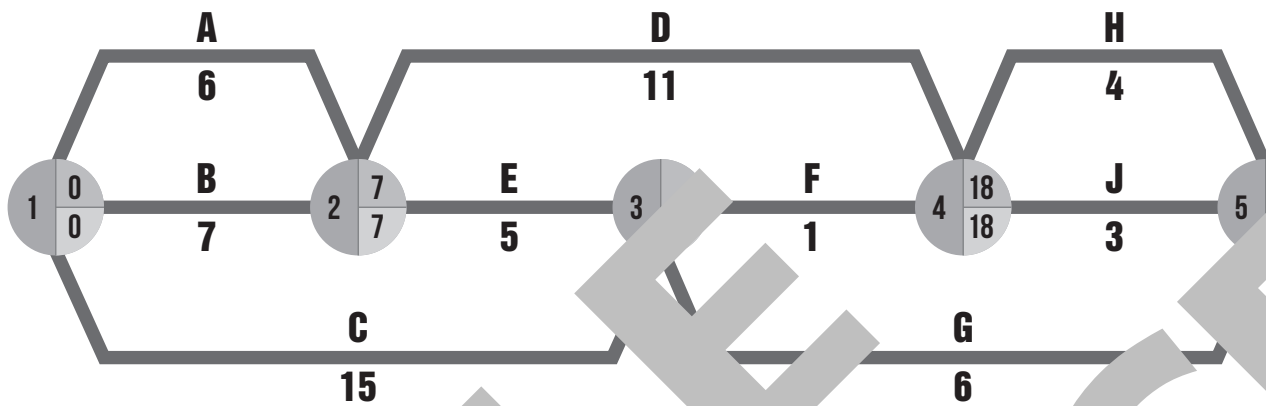
$$= \frac{£25,000 \times 365}{£350,000} = 26.07 \text{ days}$$

(1 mark) (1 mark) (1 mark)

If a valid calculation: award 1 mark for correct formula (above)



- 9 A business has produced the following network diagram. The figures relate to weeks.



Complete the EST and LFT for each node in the network diagram (2 marks)

Answer: as completed diagram below
1 mark and answer correct figure

