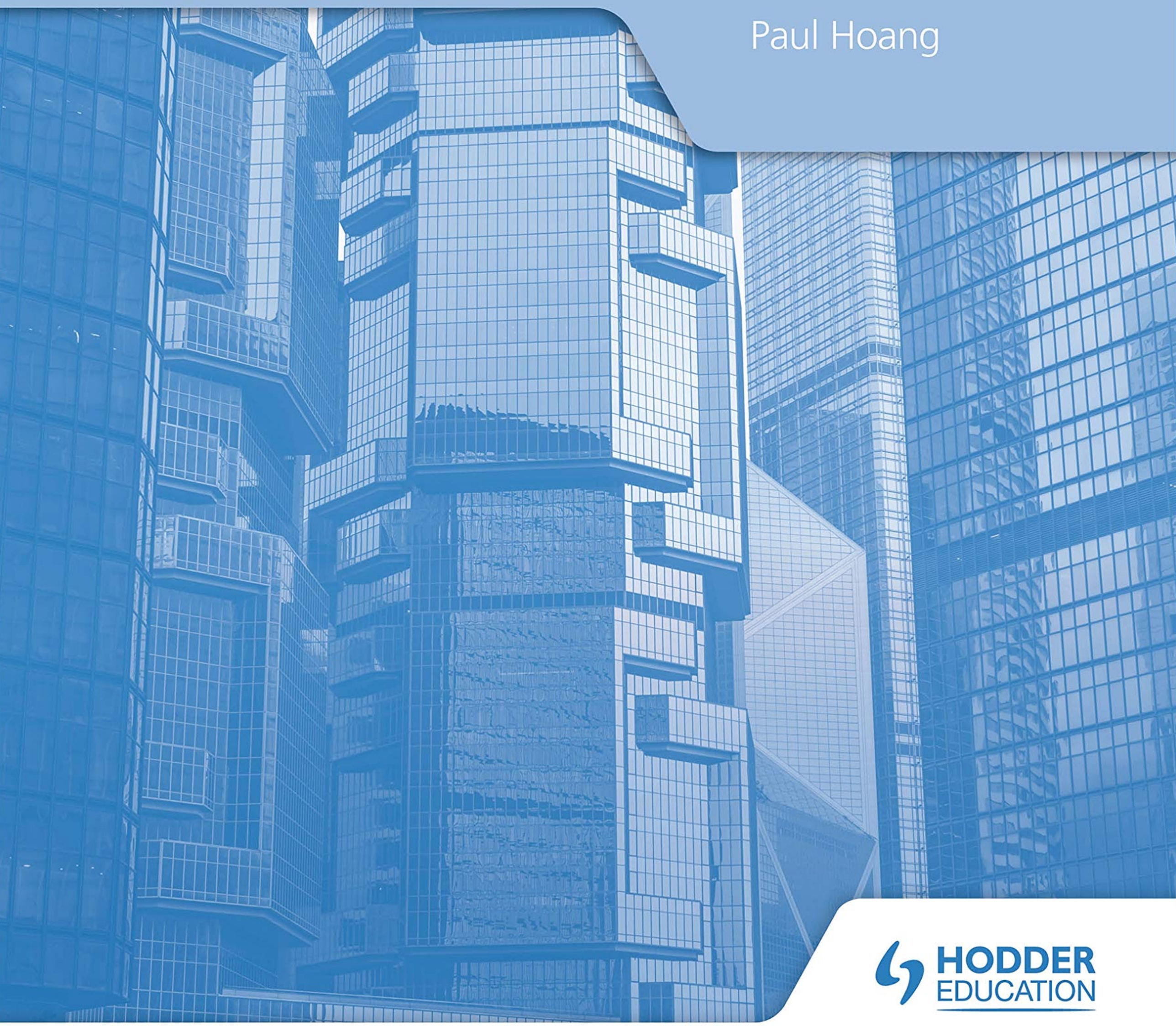
FOR THE
IB DIPLOMA

Business Management

QUANTITATIVE SKILLS WORKBOOK

Paul Hoang



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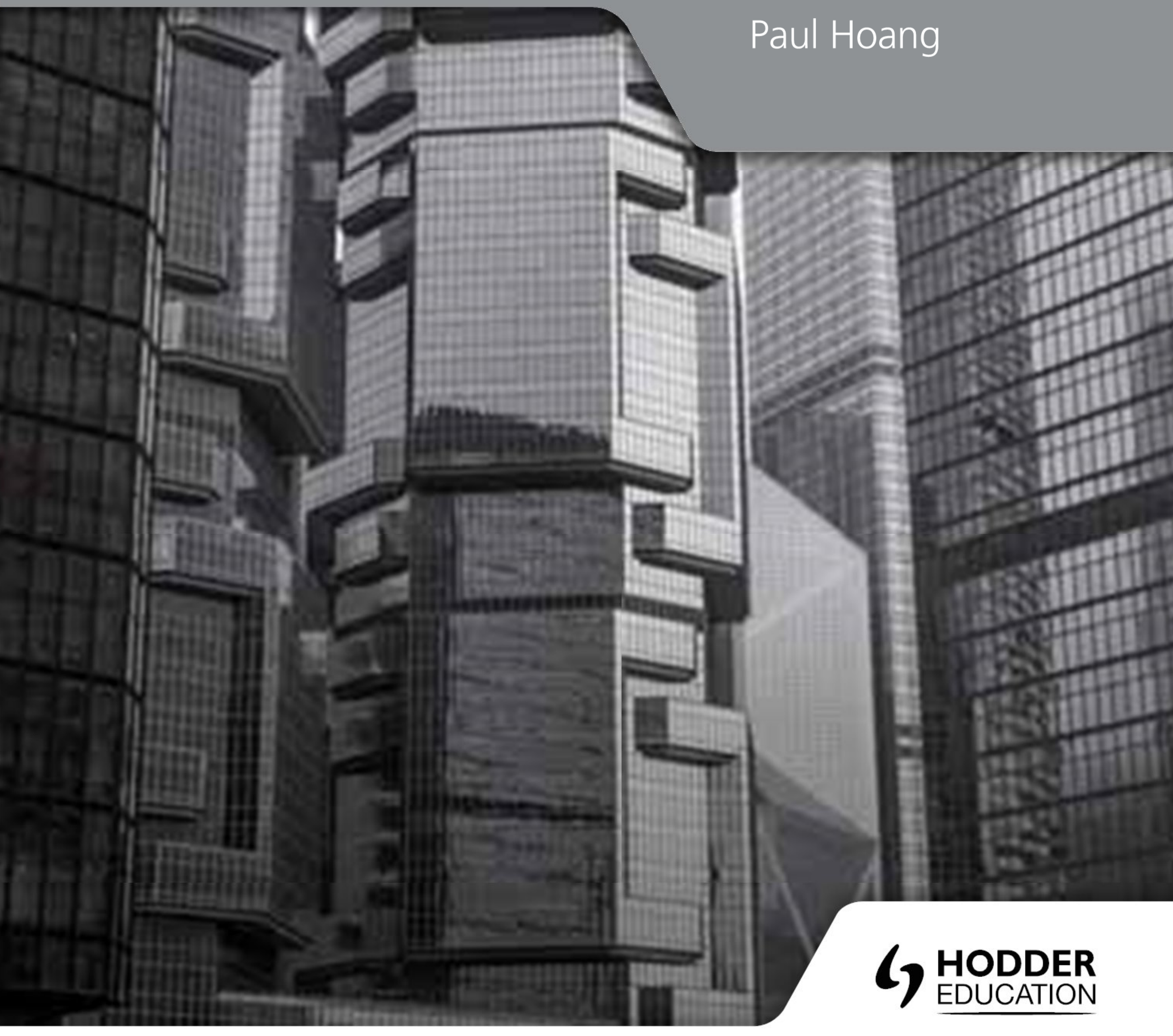

HODDER EDUCATION

CONTENTS

Unit 1 Business organization and environment

1.7 Organization and planning tools (HL only)

1 The management at *Natalia Dadidou Consultancy* is considering the introduction of a new advertising campaign (at a cost of $80 million) or spending more money on the existing campaign (which would cost $30 million), in an attempt to boost sales. The probabilities of each option are shown below.

- The new advertising campaign has a 60% chance of success, with expected sales revenues of $130 million.
- The new advertising campaign has a 40% chance of failure, with expected revenues of only $75 million.
- If the firm sticks with the current campaign, there is an 80% chance of success of earning $80 million.
- There is a 20% chance that the project will fail, in which case the likely sales revenue is $35 million.

a Use the information above to construct a decision tree diagram for *Natalia Dadidou Consultancy*. [6]

b Comment on the findings shown in the decision tree. [2]

2 *Tanusankar Chakraborty Ltd (TCL)* is considering expanding into one of three locations. The expected costs and revenues are shown in **Table 1.7.1** *TCL* only has the resources to pursue one of these options.

Location choice	Cost ($m)	Probability (%)		Revenue ($m)	
		High sales	Low sales	High sales	Low sales
Ahmedabad	95	60	40	220	85
Bengaluru	85	50	50	200	75
Chennai	100	65	35	190	90

Table 1.7.1

a Construct a decision tree diagram for *TCL*, showing which project is best on financial grounds. Show all your working and include an appropriate key in your diagram. [6]

b Comment on the findings shown in the decision tree. [2]

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3 *Cathal O'Mahony Bikes* manufactures bicycles in a large factory. Government data suggest that there is a 45% chance of the economy improving during the next three years, with a 35% chance of it remaining unchanged and only a 20% chance of the economy worsening. Hence, *Cathal O'Mahony Bikes* is considering three growth options:

- Option 1: Launch a new line of foldable bikes, costing an estimated $2.5m.
- Option 2: Build a new factory to increase the productive capacity of its existing bikes, costing an estimated $4.5m.
- Option 3: Diversify by building skateboards to add to its current product portfolio, costing an estimated $1.5m.

The estimated costs and profit or loss of these options is shown in **Table 1.7.2**.

State of economy	Option 1 ($m)	Option 2 ($m)	Option 3 ($m)
Improves	5	8	3
Unchanged	3	5	2
Worsens	2	3	–1

Table 1.7.2

a Construct a decision tree diagram for *Cathal O'Mahony Bikes* and calculate the predicted outcome for each option. [6]

b Based on the decision tree, comment on which option *Cathal O'Mahony Bikes* should pursue. [2]

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4 *Elvy Verton Construction Co.* has been appointed to renovate the house of a client. Draw a Gantt chart for the project from the data in **Table 1.7.3**. [4]

Activity	Order	Duration (weeks)
A	–	2
B	A	4
C	A	3
D	B	2
E	C	1
F	D and E	2

Table 1.7.3

5 *Greberman Education* publishes educational textbooks for university students. The typical publication goes through the process below. Draw a Gantt chart for the typical publication project from the data shown in **Table 1.7.4**. [4]

Activity	Order	Duration (months)
A	–	1
B	–	2
C	A	3
D	B	4
E	C and D	1
F	E	2
G	E	2
H	G	1
I	F and H	2

Table 1.7.4

Unit 3 Finance and accounts

3.2 Costs and revenues

1 The following financial information is for *CXO School*, a private fee-paying school with 500 students and 80 members of staff. *CXO School* charges parents annual fees of $20 050 per child for 10 months of the year. The staff earn an average annual salary of $35 000, paid across 12 months. The school also charges $500 as an annual registration fee for all students. The school incurs other costs of $600 000 per month.

a Calculate the following values for *CXO School*

i Total tuition fees for the year. [2]

ii Total costs for the year. [2]

iii Profit for the year. [2]

2 *CMR Ltd* sells its products for $10 each and has average variable costs of $4 per unit. *CMR Ltd's* fixed costs are $5 000 per month and the monthly sales volume is 1 500 units.

a Calculate the total contribution per month for *CMR Ltd* [2]

b Calculate the profit per month for *CMR Ltd* [2]

c Calculate *CMR Ltd's* average cost of production. [2]

3 During the summer season, *Nic's Ice Cream* has fixed costs of $2 200 and sales of 8 000 units. Each ice cream sells for $2.50 and has direct costs of $0.65.

a Calculate *Nic's Ice Cream*'s total costs during the summer season. [2]

b Calculate the percentage markup for the firm's ice creams. Express your answer to 1 decimal place. [2]

c Calculate *Nic's Ice Cream*'s profit or loss for the summer season. [2]

4 *GXT Co.* has fixed costs of $45 000 per month and variable costs of $10 per unit. This month, the firm's level of demand was 1 500 units. Total revenue was $97 500 for the month.

a Calculate *GXT Co.*'s average costs (per unit costs). [2]

b Calculate *GXT Co.*'s unit contribution. [2]

c Calculate *GXT Co.*'s profit or loss for this month. [2]

d Calculate *GXT Co.*'s average costs if demand for its products increases to 2 000 units next month. [2]

e Calculate *GXT Co.*'s profit or loss if demand for its products increases to 2 000 units next month. [2]

5 *Drones-R-Us* has fixed costs of $2 000 and sells 200 units per month. Each item sells for $40 and has direct costs of $15.

a Calculate the total costs per month for *Drones-R-Us* [2]

b Calculate the monthly profit or loss for *Drones-R-Us* [2]

c Calculate the change in the average cost of production for *Drones-R-Us* at 100 units and 200 units of output. [2]

d With reference to part above, explain why operating at a larger level of output can benefit *Drones-R-Us* [4]

3.3 Break-even analysis

1 *Jake's Skates* has an average selling price of $40, fixed costs of $1 000 per month and variable costs of $15.

a Calculate the break-even quantity for *Jake's Skates*. [2]

b Calculate the value of profit or loss for *Jake's Skates* if it sells 65 units per month. [2]

c Calculate the target profit output if *Jake's Skates* wants to earn a profit of $800 per month. [2]

2 *Mo's Hotdogs* has unit costs of $1.50 and sells each hotdog for $4. Its fixed costs are $1 000 per time period.

a Calculate the break-even quantity for *Mo's Hotdogs* [2]

b Calculate the margin of safety if *Mo's Hotdogs* sells 650 hotdogs per time period. [2]

c Calculate the profit for *Mo's Hotdogs* if it sells 650 hotdogs per time period. [2]

3 *STC Co.* has sales revenue of $60 000 and makes a profit of $10 000. Fixed costs are $5 000 and sales volume is 10 000 units.

a Calculate *STC Co.*'s selling price. [2]

b Calculate *STC Co.*'s variable cost per unit. [3]

c Calculate the value of *STC Co.*'s total costs and total revenue at the break-even level of output. [4]

d Calculate the change in *STC Co.*'s profits if a 10% price rise reduces sales volume by 5%. [4]

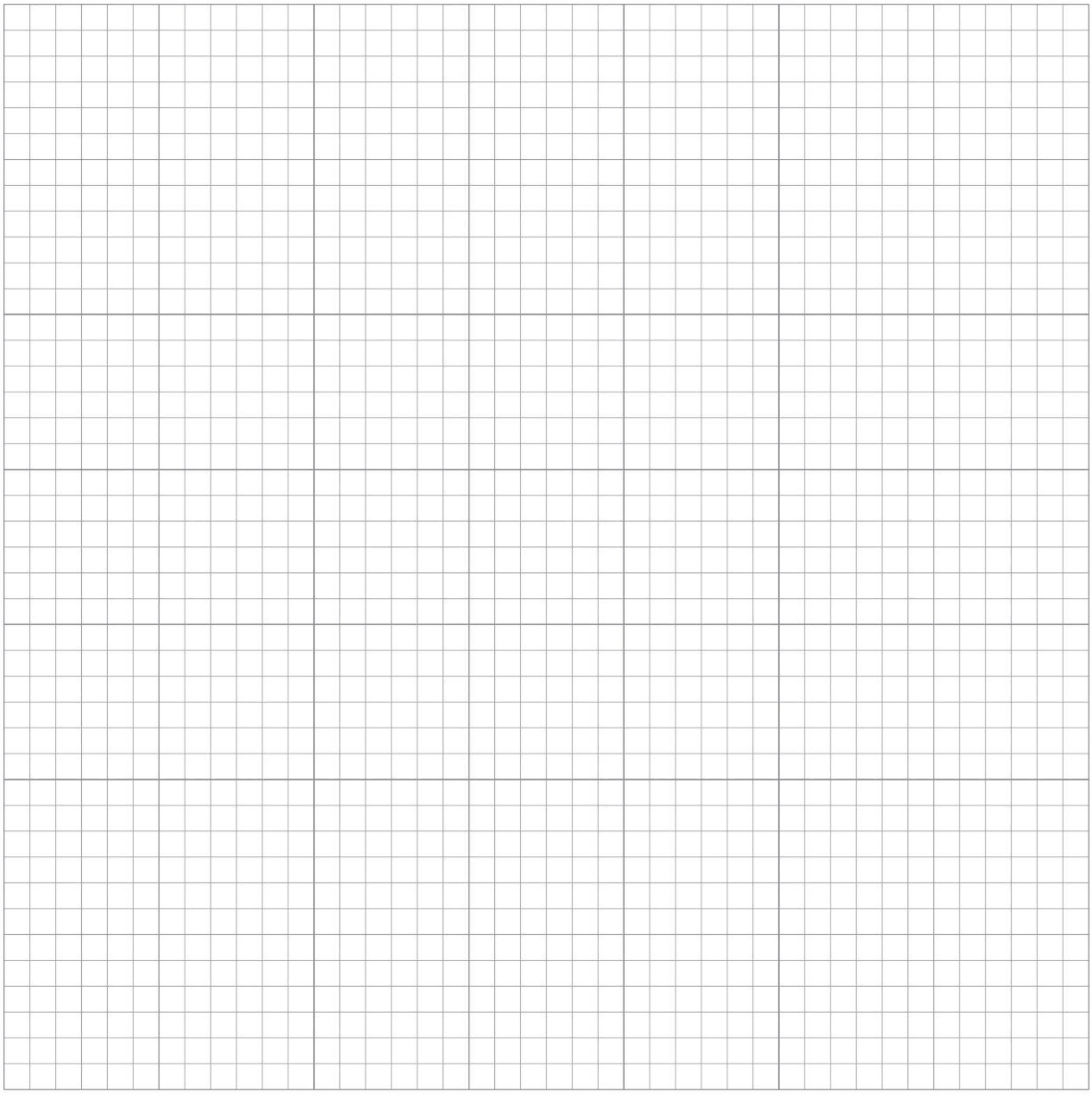
4 The *Oolab Wand Co.* sells its products for $50 each. During the year, the firm forecasts sales of 40 000 units. Its fixed costs are $600 000 per year. Variable costs are $20 per unit.

a Calculate the contribution per unit for *Oolab Wand Co* [1]

b Calculate the break-even quantity for *Oolab Wand Co.* [2]

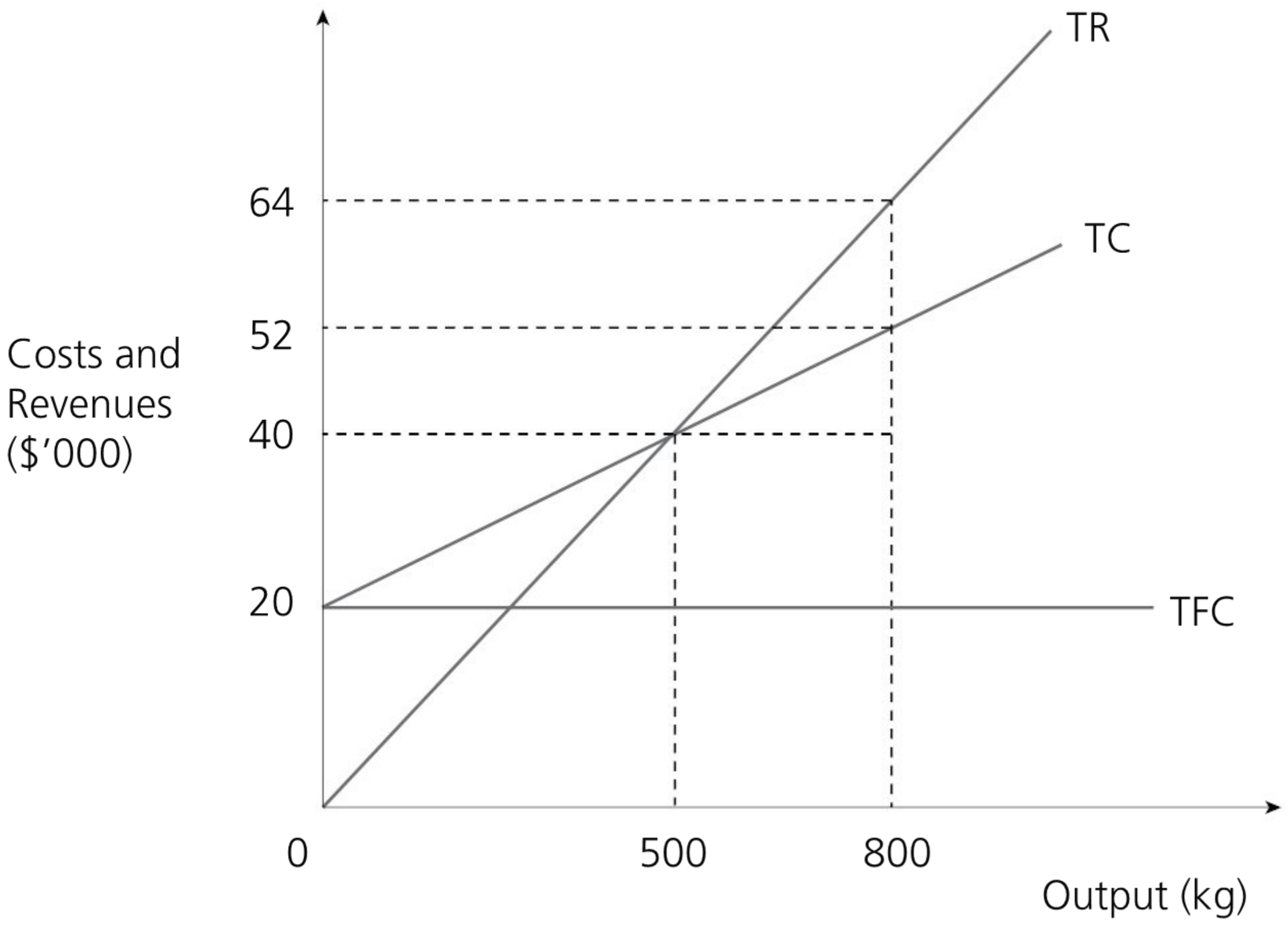
c Calculate the expected margin of safety for *Oolab Wand Co* [2]

d Plot and label a break-even chart for *Oolab Wand Co.*, clearly showing the break-even quantity and the margin of safety. [6]



5 Refer to the break-even chart below, which is for *Satcolbe Ltd*.

Break-even chart for *Satcolbe Ltd*



a State the margin of safety. [1]

b Calculate the price charged per kilo (kg). [2]

c Calculate the variable cost per kilo (kg). [2]

d Calculate *Satcolbe Ltd*'s total contribution at 800 units. [2]

3.4 Final accounts (some HL only*)

1 **Table 3.4.1** contains excerpts from the final accounts of *Patisserie de Nimes* for year ending 31st March 2019. All figures are in US dollars ($).

	$
Cost of goods sold	150 000
Dividends	10 000
Expenses	60 000
Gross profit	**A**
Interest	8 000
Net profit after interest and tax	25 600
Net profit before interest and tax	**B**
Net profit before tax	32 000
Retained profit	**C**
Sales revenue	250 000
Tax	6 400

Table 3.4.1

a Define the term *cost of goods sold* [2]

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.....

b Calculate the missing figures for **A** **B** and **C** in the table above. [3]

.....

.....

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c Construct the profit and loss account for *Patisserie de Nimes* for the year ending 31st March 2019. [5]

2 **Table 3.4.2** contains excerpts from the financial data of *Lancaster Holidays Ltd* as at 1st April 2019. All figures are in thousands of US dollars ($'000).

	$
Accumulated depreciation	80
Accumulated retained profit	62
Buildings	380
Cash	23
Creditors	28
Debtors	18
Long-term liabilities	290
Machinery and equipment	150
Overdraft	8
Share capital	130
Short-term loans	5
Stock	32

Table 3.4.2

a Define the term *balance sheet* [2]

b Calculate the value of *Lancaster Holidays Ltd*'s working capital on 1st April 2019. [2]

c Construct the balance sheet for *Lancaster Holidays Ltd*. [5]

3 The balance sheet for *Nix Nightclubs Ltd*, as at 31st March 2019, is shown in **Table 3.4.3** below.

Balance sheet for *Nix Nightclubs Ltd* as at 31st March 2019		
	$'000	$'000
Fixed assets		
Premises	1000	
Equipment	500	
Net fixed assets		1500
Current assets		
Stock	280	
Cash	150	
Debtors	80	
	510	
Current liabilities		
Creditors	350	
Overdraft	120	
	470	
Net current assets		40
Total assets less current liabilities		1540
Long-term liabilities (debt)		
Mortgage	380	
Debentures	185	
	565	
Net assets		**A**
Financed by:		
Share capital	650	
Accumulated retained profit	**B**	
Equity		975

Table 3.4.3

a Define the term *current liabilities* [2]

b Explain why *debtors* are recorded as a current asset for *Nix Nightclubs Ltd* [2]

c State the value of the following for *Nix Nightclubs Ltd*

i Net fixed assets (**A** [1]

ii Working capital. [1]

iii Net assets. [1]

iv Accumulated retained profit (**B**). [1]

d Calculate the value of the current ratio (to 2 decimal places) for *Nix Nightclubs Ltd*. [2]

4 *Babbacombe Ltd* is a small family business that sells organic produce. Excerpts from its final accounts are shown in **Table 3.4.4**. The company wants to buy new vehicles to replace its old delivery vans.

	$
Sales revenue	**A**
Cost of sales	130 000
Gross profit	150 000
Expenses	1 000
Interest	12 000
Taxation	13 500
Profit after interest and tax	123 500
Dividends	49 400
Retained profit	**B**

Table 3.4.4

a Define the term *dividends* [2]

b State the value of the following for *Babbacombe Ltd*

i Sales revenue (**A**). [1]

ii Retained profit (**B**). [1]

c Calculate the value of *Babbacombe Ltd*'s net profit before interest and tax. [2]

d Suggest **two** expenses that *Babbacombe Ltd* is likely to incur. [2]

e Explain why *Babbacombe Ltd* might choose to use retained profits to finance the purchase of the delivery vans, rather than a loan from the bank. [2]

5* *BM Leasing Ltd* specializes in leasing BMW cars to private and commercial clients. The company bought five new 5-series BMW vehicles at $50 000 each. The cars are anticipated to have a useful life of 4 years, by which time *BM Leasing Ltd* expects to be able to sell them for around $9 000 each. The firm uses an annual depreciation rate of 35%.

a Define the term *depreciation*. [2]

b Describe **one** disadvantage to customers of leasing *BM Leasing Ltd* s cars. [2]

c Calculate the total value of depreciation per year if *BM Leasing Ltd* uses the straight line method of depreciation. (Show all working out.) [2]

d Calculate the net book value of each BMW car at the end of the 4th year, using the reducing balance method of depreciation. (Show all working out for both the depreciation allowance and net book value.) [4]

3.5 Profitability and liquidity ratio analysis

1 The profit and loss account and the balance sheet for *Scott Thompson International* are shown in **Tables 3.5.1 and 3.5.2**. All figures are in US dollars ($).

Profit and loss account for *Scott Thompson International*, year ending (date) ($)	
Sales revenue	2 500 000
Cost of goods sold	1 375 000
Gross profit	1 125 000
Expenses	555 000
Net profit before interest and tax	570 000
Interest	36 000
Net profit before tax	534 000
Tax	106 800
Net profit after interest and tax	427 200
Dividends	170 880
Retained profit	256 320

Table 3.5.1

Balance sheet for *Scott Thompson International* as at (date)		
	$	$
Fixed assets		
Premises	1 000 000	
Machinery	220 000	
Accumulated depreciation	45 000	
Net fixed assets		1 175 000
Current assets		
Stock	30 000	
Cash	15 000	
Debtors	15 000	
	60 000	
Current liabilities		
Overdraft	15 000	
Creditors	20 000	
Short-term loans	10 000	
	45 000	
Net current assets		15 000
Total assets less current liabilities		1 190 000
Long-term liabilities (debt)	350 000	
Net assets		840 000
Financed by:		
Share capital	500 000	
Accumulated retained profit	340 000	
Equity		840 000

Table 3.5.2

a Calculate the gross profit margin (GPM) for *Scott Thompson International*. [2]

b Calculate the net profit margin (NPM) for *Scott Thompson International*. [2]

c Calculate the return on capital employed (ROCE) for *Scott Thompson International* [2]

d Calculate the current ratio for *Scott Thompson International* [2]

e Calculate the acid test ratio for *Scott Thompson International*. [2]

2 Extracts from this year's financial accounts for *Lopa Sharma Clockworks Ltd* are shown in **Table 3.5.3**. All figures are in US dollars ($). Corporate tax on company profits is charged at 15%. The value of the firm's capital employed is $382 500.

	$
Sales revenue	200 000
Cost of goods sold	80 000
Expenses	50 000
Interest	10 000

Table 3.5.3

a Prepare a profit and loss account for *Lopa Sharma Clockworks Ltd*. [4]

b Calculate the following financial ratios for *Lopa Sharma Clockworks Ltd*

i Gross profit margin (GPM). [2]

ii Net profit margin (NPM). [2]

iii Return on capital employed (ROCE). [2]

3 Extracts from this year's final accounts of *Rebeca Llavata Navarro Architects (RLNA)* are shown in **Table 3.5.4** below. All figures are in US dollars ($).

	$
Sales revenue	25 500 000
Cost of goods sold	16 575 000
Expenses	5 360 000
Long-term liabilities	1 200 000
Share capital	5 000 000
Accumulated retained profit	800 000

Table 3.5.4

a Calculate the value of *RLNA*'s gross profit margin (GPM). [2]

b Calculate the value of *RLNA*'s net profit margin (NPM) [2]

c Calculate the value of *RLNA*'s capital employed. [2]

d Calculate the value of *RLNA*'s return on capital employed (ROCE). [2]

4 Excerpts from the latest profit and loss account of *Wenxuan Wang Restaurant* are shown in **Table 3.5.5** below. All figures are in US dollars ($).

Profit and loss account for *Wenxuan Wang Restaurant*, year ending (date) ($)	
Sales revenue	1 500 000
Cost of goods sold	900 000
Gross profit	**A**
Expenses	**B**
Net profit before interest and tax	245 000
Interest	12 000
Net profit before tax	**C**
Tax	34 950
Net profit after interest and tax	198 050
Dividends	79 220
Retained profit	**D**

Table 3.5.5

a With reference to the profit and loss account, state the missing values of the following for *Wenxuan Wang Restaurant*

i Gross profit (**A**). [1]

ii Expenses (**B**). [1]

iii Net profit before tax (**C**). [1]

iv Retained profit (**D**). [1]

b Calculate the value of *Wenxuan Wang Restaurant*'s gross profit margin (GPM) [2]

c Calculate the value of *Wenxuan Wang Restaurant*'s net profit margin (NPM) [2]

d Explain why the owners of *Wenxuan Wang Restaurant* might be concerned with the restaurant's net profit margin (NPM). [4]

5 Excerpts from the latest balance sheet of *SalikaAziz Skateboards* are shown in **Table 3.5.6**

	$
Cash	10 500
Creditors	8 500
Debtors	8 500
Overdraft	10 000
Short-term loans	5 000
Stock	35 000

Table 3.5.6

a Calculate the value of working capital for *SalikaAziz Skateboards*. [3]

b Calculate the value of the firm's current ratio [2]

c Calculate the value of the firm's quick ratio [2]

d Comment on your findings of the firm's current and quick ratios. [4]

3.6 Efficiency ratio analysis (HL only)

1 The balance sheet and profit and loss account for *Shiba Misra Technologies (SMT)* are shown in **Tables 3.6.1 and 3.6.2**. All figures are in US dollars ($).

Balance sheet for *Shiba Misra Technologies (SMT)* as at (date)		
	$	**$**
Fixed assets		
Premises	2 500 000	
Machinery	1 250 000	
Accumulated depreciation	60 000	
Net fixed assets		3 690 000
Current assets		
Stock	450 000	
Cash	48 000	
Debtors	220 000	
	718 000	
Current liabilities		
Overdraft	150 000	
Creditors	280 000	
Short-term loans	80 000	
	510 000	
Net current assets		208 000
Total assets less current liabilities		3 898 000
Long-term liabilities (debt)	500 000	
Net assets		3 398 000
Financed by:		
Share capital	2 500 000	
Accumulated retained profit	898 000	
Equity		3 398 000

Table 3.6.1

Profit and loss account for *Shiba Misra Technologies (SMT)*, year ending (date) ($)	
Sales revenue	3 500 000
Cost of goods sold	1 400 000
Gross profit	2 100 000
Expenses	1 225 000
Net profit before interest and tax	875 000
Interest	50 000
Net profit before tax	825 000
Tax	165 000
Net profit after interest and tax	660 000
Dividends	363 000
Retained profit	297 000

Table 3.6.2

a Calculate the gross profit margin (GPM) for *SMT* [2]

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.....

b Calculate the net profit margin (NPM) for *SMT* [2]

c Calculate the return on capital employed (ROCE) for *SMT*. [2]

d Calculate the current ratio for *SMT* [2]

e Calculate the acid test ratio for *SMT* [2]

f Calculate the debtor days ratio for *SMT*. [2]

g Calculate the creditor days ratio for *SMT* [2]

h Calculate the stock turnover for *SMT*. [2]

2 Extracts from this year's final accounts of *Andy Hay Engineering Co. (AHEC)* are shown in **Table 3.6.3**. All figures are in US dollars ($).

	$
Sales revenue	8 840 000
Cost of goods sold	5 746 000
Expenses	1 325 000
Long-term liabilities	1 200 000
Share capital	5 000 000
Accumulated retained profit	875 000

Table 3.6.3

a Calculate the value of *AHEC*'s gross profit margin (GPM) [2]

b Calculate the value of *AHEC*'s net profit margin (NPM). [2]

c Calculate the value of *AHEC*'s return on capital employed (ROCE) [2]

3 Yung Webster owns *Gold Coast Educational Toys (GCET)* in Brisbane, Australia. Extracts from the annual financial accounts for 2019 and 2020 are shown in **Table 3.6.4**

	2019	2020
Creditors	$20 000	$24 000
Debtors	$30 000	$40 000
Stock	$22 000	$18 000
Sales revenue	$190 000	$210 000
Cost of goods sold	$57 000	$63 000

Table 3.6.4

a Calculate the debtor days ratio for *GCET* in both years [3]

b Calculate the creditor days ratio for *GCET* in both years [3]

c Calculate the stock turnover for *GCET* in both years [3]

4 Carlos Jr. Enriquez runs *Best Furniture* in Vienna, Austria. Financial information for the previous tax year is shown in **Table 3.6.5**.

Acid test ratio	**B**
Cash	€120 000
Cost of goods sold (COGS)	€250 000
Creditors	€100 000
Current ratio	**A**
Debtor days	**F**
Debtors	€75 000
Expenses	€300 000
Gearing ratio	**E**

Gross profit margin (GPM)	**C**
Long-term liabilities	€250 000
Net profit margin (NPM)	**D**
Overdraft	€80 000
Sales revenue	€750 000
Share capital	€250 000
Stock	€300 000
Retained profit	€125 000
Return on capital employed	**G**

Table 3.6.5

a Calculate the current ratio for *Best Furniture*. [2]

b Calculate the acid test ratio for *Best Furniture*. [2]

c Calculate the gross profit margin (GPM) for *Best Furniture*. [2]

d Calculate the net profit margin (NPM) for *Best Furniture*. [2]

e Calculate the gearing ratio for *Best Furniture* [2]

f Calculate the debtor days ratio for *Best Furniture*. [2]

g Calculate the return on capital employed (ROCE) for *Best Furniture* [2]

5 Marcin Sztomberski runs *MS Bakery* a successful family business in Paris, France. Excerpts from the latest financial accounts are shown in **Table 3.6.6**. All figures are in euros (€).

	€
Accumulated depreciation	25 000
Accumulated retained profit	121 000
Cash	10 200
Creditors	18 000
Debtors	12 000
Long-term liabilities (debt)	350 000

	€
Machinery	85 000
Overdraft	12 000
Premises	800 000
Share capital	400 000
Short-term loans	6 200
Stock	25 000

Table 3.6.6

a Prepare a balance sheet for *MS Bakery* [5]

b Use the balance sheet for *MS Bakery* to calculate the following ratios:

i Current ratio. [2]

ii Quick ratio. [2]

iii Gearing ratio. [2]

c Comment on the short-term liquidity position of *MS Bakery*. [4]

3.7 Cash flow

1 The financial information shown in **Table 3.7.1** is for the previous month at *AEE Accountants*

Cash inflow	$320 500
Cash outflow	$295 750
Opening balance	$15 500

Table 3.7.1

a Define the term *cash outflow* [2]

b Calculate the net cash flow for *AEE Accountants*. [2]

c Calculate the closing balance for *AEE Accountants* [2]

2 The 4-month cash flow forecast for *Odeta Greeting Cards* is shown in **Table 3.7.2** in US dollars ($). The business has planned an overdraft of $3 100 in September.

	Sep ($)	Oct ($)	Nov ($)	Dec ($)
Opening balance	2 000	3 900	**C**	1 780
Sales revenue	4 000	4 800	4 600	5 300
Bank overdraft	3 100			
Cash inflows	**A**	4 800	4 600	5 300
Direct costs	3 200	3 840	3 680	4 240
Overheads	2 000	2 000	2 000	2 000
Cash outflows	5 200	5 840	5 680	6 240
Net cash flow	1 900	**B**	–1 080	–940
Closing balance	3 900	2 860	1 780	**D**

Table 3.7.2

a Complete the missing figures (**A–D**) in the cash flow forecast. [4]

b Ignoring the overdraft, calculate the profit or loss for *Odeta Greeting Cards* for the period September to December. [2]

c Use the cash flow forecast shown in **Table 3.7.2** to explain the liquidity position of *Odeta Greeting Cards* [4]

3 **Table 3.7.3** shows an excerpt from a cash flow forecast produced by the owner of *Amigos Gift Store*. All figures are in US dollars ($).

	April ($)	May ($)	June ($)	July ($)
Cash sales	2 000	2 500	3 000	4 500
Credit sales	2 400	2 400	3 000	3 600
Total inflows	4 400	4 900	6 000	8 100
Wages and salaries	4 000	4 000	4 000	4 000
Expenses	1 000	1 000	1 000	1 000
Total outflows	5 000	5 000	5 000	5 000
Net cash flow				
Opening balance	500			
Closing balance				

Table 3.7.3

a State the value of the following figures for *Amigos Gift Store*:

i The net cash flow in April. [1]

ii The opening balance in May. [1]

iii The net cash flow in June. [1]

iv The closing balance in July. [1]

b Comment on the cash flow position of *Amigos Gift Store*. [4]

4 Helen Law will open a kiosk selling healthy lunch snacks and drinks located near a busy train station. She has produced the following financial forecasts for her business over the first 6 months of trading. She has secured a bank loan of $8 000 to help start her business in March, although the bank manager had some reservations about the firm's liquidity position. Helen intends to only accept cash payments from customers.

- Helen has $5 000 of her own funds.
- Sales revenues for March and April are predicted to be $10 000 and are expected to rise by 10% for May and June and a by further 10% for July and August.
- Costs of goods sold for the snacks and drinks are 60% of the sales revenue.
- Rent for the kiosk is $2 000 per month.
- Helen has hired two employees, who will be paid a salary of $800 each per month.
- Other costs are expected to total $700 per month.

a Define the term *cost of goods sold (COGS)*. [2]

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.....

b Construct a cash flow forecast for Helen Law for the first 6 months of trading. [6]

c Use the cash flow forecast to outline why the bank manager had some reservations about the liquidity position of Helen Law's business. [2]

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5 The following financial information is for *STC College*, a private fee-paying school with 500 students and 80 members of staff. *STC College* charges parents monthly fees of $2 050 per child for 10 months of the year. The school closes in December and January for the winter holidays. The staff earn a monthly salary of $3 050 which is paid throughout the year. The school also charges $500 as an annual registration fee for all students, which is collected in September. It incurs other costs of $600 000 per month. The closing balance in August was $290 000.

a Using the above information, construct a 4-month cash flow forecast for *STC College* (September to December). [4]

b Comment on the cash flow position of *STC College* [4]

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3.8 Investment appraisal (some HL only*)

1 *Cam & Nga Taxi Co.* is thinking about spending $38 000 on a new vehicle. The firm expects the net cash flow from this investment will average out at $12 000 per year over 4 years.

a Calculate the payback period (PBP) for *Cam & Nga Taxi Co* [2]

b Calculate the average rate of return (ARR) for *Cam & Nga Taxi Co*. [2]

c Referring to the ratios calculated in Questions **1a** and **b**, suggest why the firm might be undecided about whether to proceed with the purchase of the new vehicle. [4]

2 *Fotan Stationers* is considering the purchase of a new multifunctional photocopier at a cost of $18 000. The machine is expected to generate the following net cash flows (shown in **Table 3.8.1**) over the next 5 years, at which point the machine is expected to be replaced.

	Year 1	Year 2	Year 3	Year 4	Year 5
Net cash flow ($)	4 500	5 500	5 000	4 200	3 000

Table 3.8.1

a Define the term *net cash flow*. [2]

b Calculate the payback period for *Fotan Stationers*. [2]

c Calculate the average rate of return for *Fotan Stationers* [2]

d Using your answers from Questions **2b** and **c**, explain whether *Fotan Stationers* should purchase the new multifunctional photocopier. [4]

3 *Rhys Thomas Holidays* offers clients bespoke holiday packages in Da Nang, Vietnam. The company is considering purchasing a new fleet of vehicles for airport pick-up and drop-offs, as well as to take tourists to popular destinations in the surrounding area. The cost of purchasing these vehicles is $200 000, with the intention to replace the vehicles after 7 years. The expected net cash flows from this investment project are shown in **Table 3.8.2**

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Projected net cash flow ($)	25 000	35 000	50 000	60 000	60 000	40 000	30 000

Table 3.8.2

a Calculate the payback period for the proposed investment. [2]

b* Calculate the total profit of the investment if discounted net cash flows are not considered. [2]

c* Calculate the net present value (NPV) for the proposed investment, using a discount factor of 6%. [3]

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Discount factor	0.9434	0.8900	0.8396	0.7921	0.7473	0.7050	0.6651

Table 3.8.3

d* Comment on whether you think *Rhys Thomas Holidays* should purchase the new fleet of vehicles. [4]

4 *Kucharek Parlour* is considering the purchase of five industrial massage chairs for a total purchase price of $65 000. The estimated net cash flows from the investment during the useful life cycle of 5 years are shown in **Table 3.8.4**, along with the discount rates of 5% for the duration of the investment.

Year	Net cash flow ($)	Discount rate
1	15 000	0.9524
2	20 000	0.9070
3	30 000	0.8638
4	20 000	0.8227
5	20 000	0.7835

Table 3.8.4

a Calculate the payback period of the investment project. [2]

b Calculate the average rate of return from the investment project. [2]

c* Calculate the net present value (NPV) of the investment project. [3]

d Explain whether *Kucharek Parlour* should purchase the industrial massage chairs. [4]

5 *Brownsword Books* is considering an investment of $220 000 in new printing equipment that is expected to generate the net cash flows shown in **Table 3.8.5** over the next five years:

	Year 1	Year 2	Year 3	Year 4	Year 5
Projected net cash flow ($)	30 000	40 000	60 000	70 000	60 000

Table 3.8.5

The management at *Brownsword Books* wants a quick recovery of the investment due to the competitive nature of the industry.

a Calculate the payback period for *Brownsword Books* [2]

b Comment on your findings from Question **5a** above. [2]

c Calculate the average rate of return (ARR) on the proposed investment. [2]

d* Calculate the net present value (NPV) of the investment project using a 4% discount factor. The discount factors for each successive year are: 0.9615, 0.9246, 0.8890, 0.8548, 0.8219. [3]

3.9 Budgets (HL only)

1 The data shown in **Table 3.9.1** are for *Nina Konrad Hair Salon Co*. All figures are in US dollars ($) for the year.

Variable	Budgeted ($)	Actual ($)	Variance ($)
Cost of sales		296 000	14 000 favorable
Expenses	180 000	183 600	
Sales revenue	1 500 000		104 000 favorable
Wages	400 000	420 000	

Table 3.9.1

a Define the term *cost of sales* [2]

b Complete the missing figures in **Table 3.9.1** for *Nina Konrad Hair Salon Co* [4]

2 *Buggy Tours* has produced a budget statement for the first 4 months of the year.

a Define the term *budget* [2]

b Complete the missing figures in the budget statement (**Table 3.9.2**) for *Buggy Tours* [4]

	January ($)	February ($)	March ($)	April ($)
Income	5 000	4 500	6 000	
Variable costs	3 250			4 225
Fixed costs	1 500		1 500	
Total costs		4 425	5 400	
Profit		75		775

Table 3.9.2

3 The data shown in **Table 3.9.3** are the budgeted figures ($) for *Salcolbe Consultancy Co*

	June		July	
	Budgeted ($)	Actual ($)	Budgeted ($)	Actual ($)
Revenue	4 500	4 400	5 000	5 200
Variable costs	2 700	2 640	3 000	3 120
Fixed costs	1 400	1 400	1 400	1 400

Table 3.9.3

a Calculate the budgeted and actual profit figures for June and July. [4]

b Using the budget figures in **Table 3.9.3**, identify the following:

i The month with a favorable revenue variance. [1]

ii The month with an adverse variable costs variance. [1]

iii The month with a favorable total costs variance. [1]

iv The month with an adverse profit variance. [1]

4 *Jak & Luk's Ice Creams* has produced the following budget statement (**Table 3.9.4**). The firm employs three managers and twelve workers.

	July			August		
	Budgeted ($)	Actual ($)	Variance ($)	Budgeted ($)	Actual ($)	Variance ($)
Sales revenue	14 000	15 000	1 000	16 000	18 000	
Cost of sales	7 000	7 500	–500	8 000	9 000	
Overheads	3 000	3 200	–200	3 200	3 200	
Profit	4 000	4 300	300	4 800	5 800	

Table 3.9.4

a Calculate the values of the four variances in August. [4]

b Explain why the profit variance in July is favorable, despite two adverse variances for the month. [2]

c Suggest why it might not be a good idea to reward the three managers at *Jak & Luk's Ice Creams* for exceeding the sales target for August. [2]

5 *NAIS Academy*'s business manager has produced the following excerpts from the fee-paying school's budget statement (**Table 3.9.5**).

Item	Budgeted ($)	Actual ($)
Staffing costs	15 200 000	15 325 000
Equipment	2 300 000	2 200 000
Photocopying	1 345 000	1 450 000
Textbook purchases	800 000	830 000

Table 3.9.5

a Define the term *variance* [2]

b Calculate the **four** variances from the data above. [4]

c Suggest why there might be a large variance in the school's photocopying budget. [2]

d Explain **two** reasons why budgets are important for organizations such as *NAIS Academy*. [4]

Unit 4 Marketing

4.3 Sales forecasting (HL only)

1 The data in **Table 4.3.1** show monthly sales revenue ($'000) for *Aofei Clothing Co*.

Month	1	2	3	4	5	6	7
Sales ($'000)	225	300	450	600	795	900	1 200

Table 4.3.1

a Define the term *sales forecasting* [2]

b Calculate the 3-month moving average for *Aofei Clothing Co*. [4]

2 The data in **Table 4.3.2** show quarterly sales revenue ($'000) for *Yaffa Wines Co*

Quarter	1	2	3	4	5	6	7	8
Sales ($'000)	200	300	250	450	220	350	250	500

Table 4.3.2

a Explain **one** benefit of sales forecasting to *Yaffa Wines Co* [2]

b Calculate the 4-point moving average for *Yaffa Wines Co* [4]

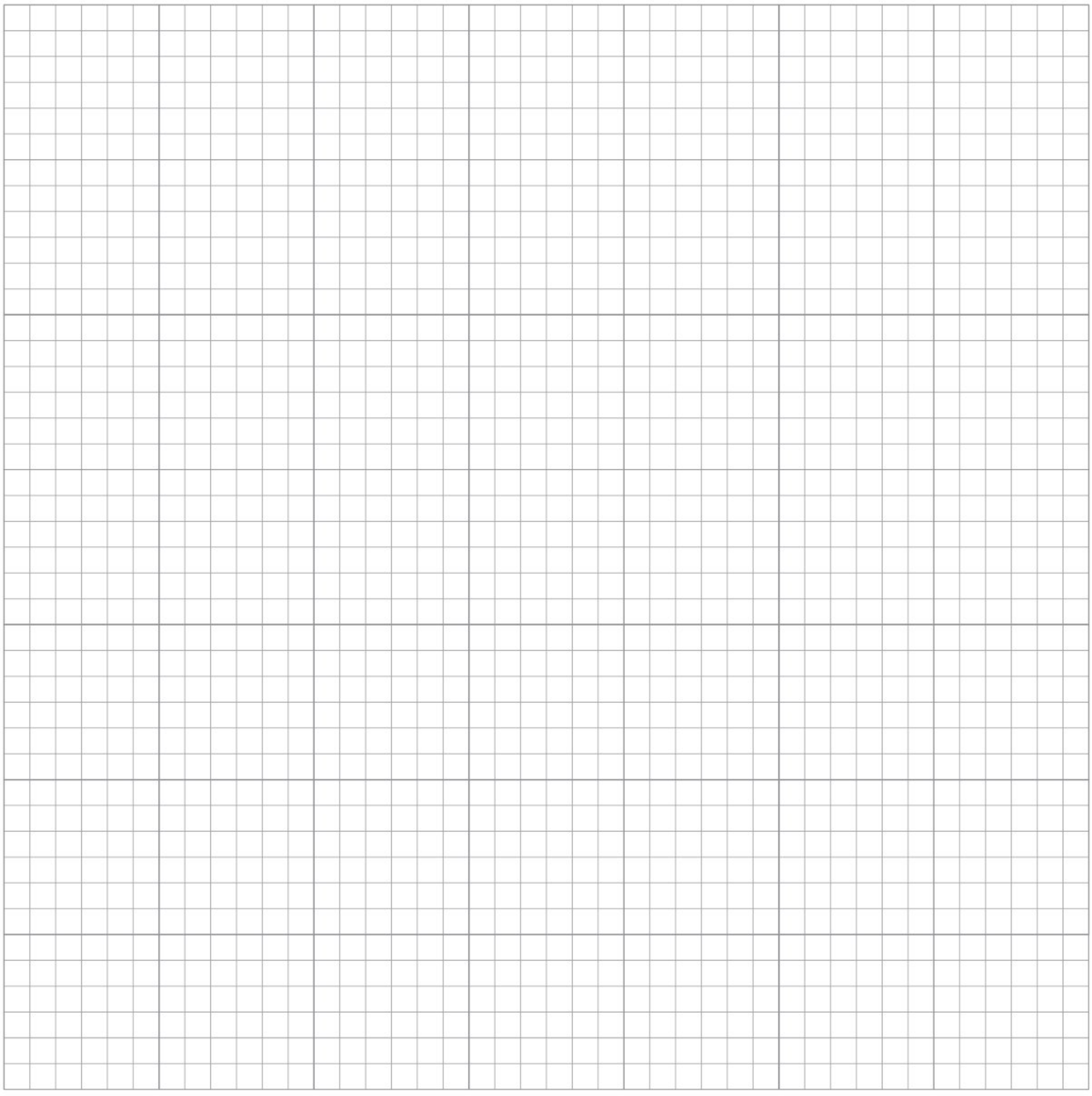
3 The data in **Table 4.3.3** show the quarterly sales revenue for *Aman Consultancy Ltd*

Year	Quarter	Sales revenue ($)
1	1	5 000
	2	3 500
	3	2 500
	4	3 000
2	1	5 500
	2	3 300
	4	3 000

Table 4.3.3

a Calculate the 4-point moving average for *Aman Consultancy Ltd* [4]

b Plot the actual sales revenue and 4-point moving average for *Aman Consultancy Ltd.* [4]



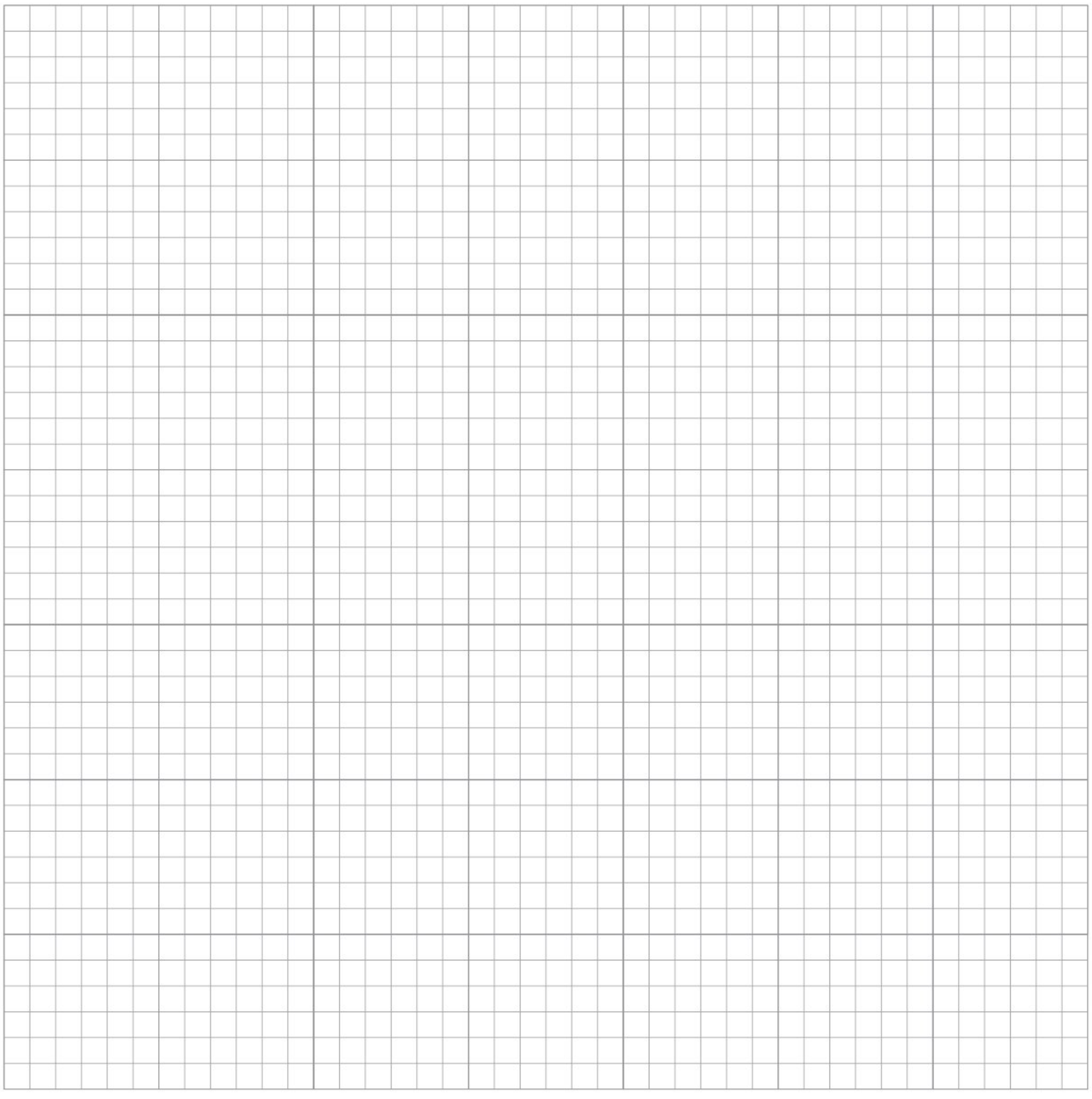
4 The data in **Table 4.3.4** show the monthly sales revenue ($) for *Rupert Greeting Cards*.

Month	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Sales ($)	2 500	3 000	2 500	1 500	1 400	1 600	2 000	3 000	3 300

Table 4.3.4

a Calculate the quarterly moving average for *Rupert Greeting Cards*. Round the figures to the nearest dollar. [2]

b Plot the actual sales revenue and 3-point moving average for *Rupert Greeting Cards*. [4]



c Calculate the seasonal variation for the period shown. [2]

5 The data in **Table 4.3.5** show the monthly sales ($'000) for *Oshin Sun Lotion*

Month	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct
Sales ($'000)	10	12	16	20	24	26	20	14

Table 4.3.5

a Use a 3-month moving average to calculate the sales trend for *Oshin Sun Lotion*. [4]

b Using your answers from part **a**, calculate the monthly sales variation for *Oshin Sun Lotion*. [2]

c Distinguish between seasonal and cyclical variations. [4]

d Calculate the cyclical variation for *Oshin Sun Lotion* [2]

Unit 5 Operations management

5.5 Production planning (HL only)

1 John Sprague runs a nightclub in Singapore. The firm's total costs amount to $98 000 per month, with labour costs totalling $52 000 per month. Rent and overheads are $11 500 per month and the remaining costs are for hiring state-of-the-art sound systems. On an average night, the club has 261 guests but has a maximum capacity of 300.

a Calculate the firm's capacity utilization rate. [2]

b Calculate the labour intensity rate for John Sprague's business. [2]

c Calculate the capital intensity rate for John Sprague's business. [2]

2 *Lucy Clark's Shoes Co.* has fixed costs of $6 000 a month. The firm can produce a maximum of 2 000 pairs of shoes per month. The variable costs are $20 per unit and its shoes are sold for an average price of $80. The current level of demand for the firm's shoes is 1 600 units per month.

a Calculate the capacity utilization rate for *Lucy Clark's Shoes Co* [2]

b Calculate *Lucy Clark's Shoes Co.*'s fixed costs per unit at 1 600 units of output and at its maximum capacity. [3]

c Calculate *Lucy Clark's Shoes Co.*'s profit margin at 1 600 units of output and at its maximum capacity. [3]

d Calculate the difference in profit if *Lucy Clark's Shoes Co.* could operate and sell all of its products at its productive capacity. [3]

3 Study **Table 5.5.1** for two real estate firms selling residential property during a typical weekend. The number of properties sold and the number of real estate agents (sales staff) involved are also shown.

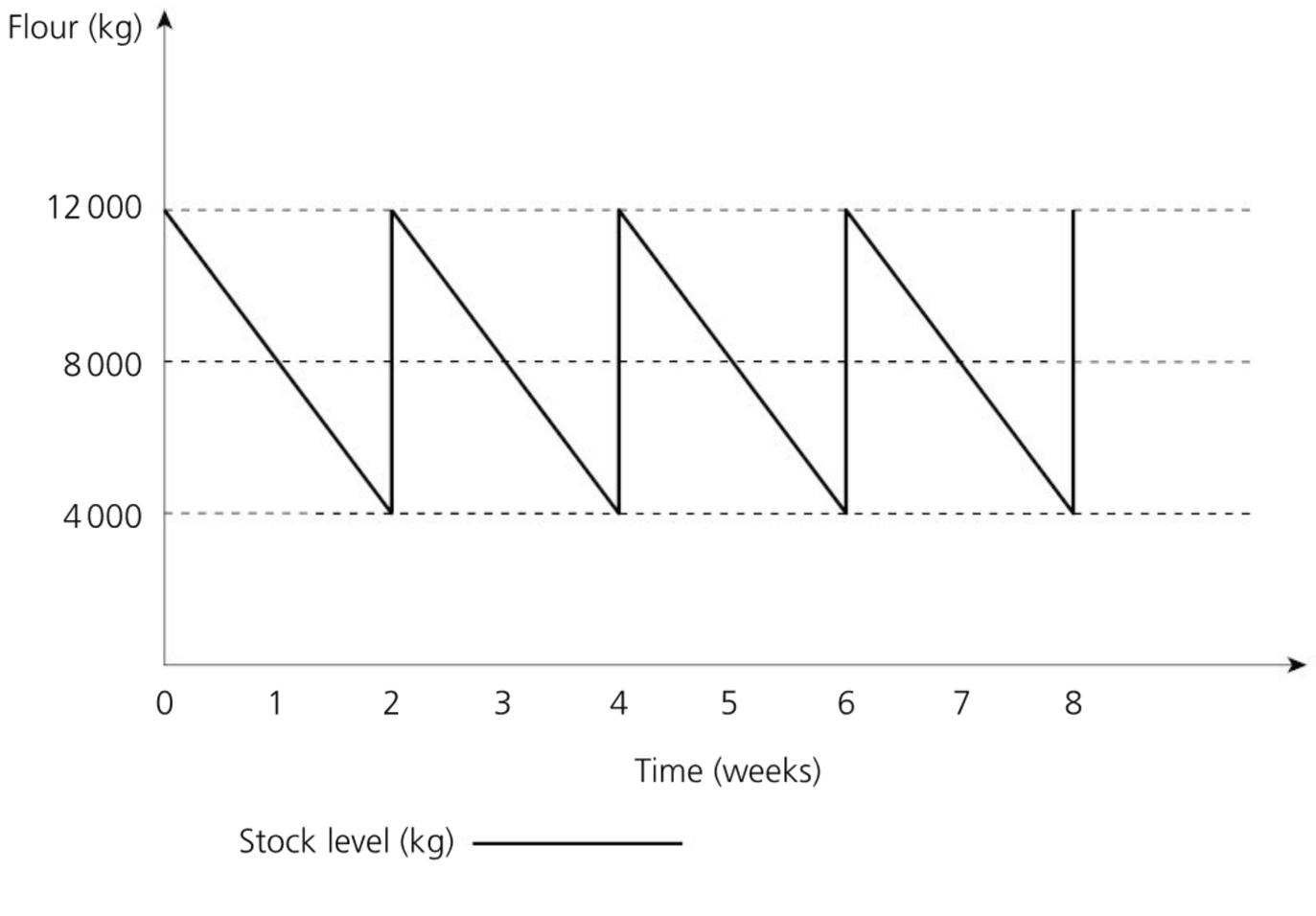
Firm	Total sales ($)	Properties sold	Sales staff
Au Property Co.	5 000 000	10	12
Konrad Real Estate	4 200 000	12	10

Table 5.5.1

a Calculate the labour productivity rate as measured by sales per worker for both firms. [3]

b Use the information above to explain why it might be difficult to determine whether *Au Property Co.* *Konrad Real Estate* is the more productive firm. [4]

4 *Ben Boyd Bakery* sells its products to well-known supermarkets in Sydney, Australia. The firm uses a just-in-case (JIC) stock control system, as shown in the diagram below.



a Define the term *just-in-case (JIC)* stock control system. [2]

b With reference to the stock control diagram on the previous page, state the value of the following for *Ben Boyd Bakery*

i The lead time. [1]

ii The buffer stock. [1]

iii The reorder quantity. [1]

iv The reorder level. [1]

5 *Ollie Judkins Tiles* can purchase the necessary capital equipment for in-house production for $15 000 and manufacture the tiles for $1 each. Alternatively, a local supplier can produce the tiles for $1.50 each. Demand for the tiles is forecast to be 25 000 units.

a Define the term *make-or-buy decision*. [2]

b Calculate the cost to make and the cost to buy, and comment on your findings. [4]

Mock exam practice paper

Each question is worth [10 marks]. Write your answers in the boxes provided.

1. *Supreme Skateboards* is a small business that specializes in producing bespoke skateboards. Data from the latest financial information for the business are listed below:

- Annual sales revenue = $56 250
- Net profit after interest and tax = $20 000
- Annual expenses = $10 000
- Sales volume = 750 skateboards per year

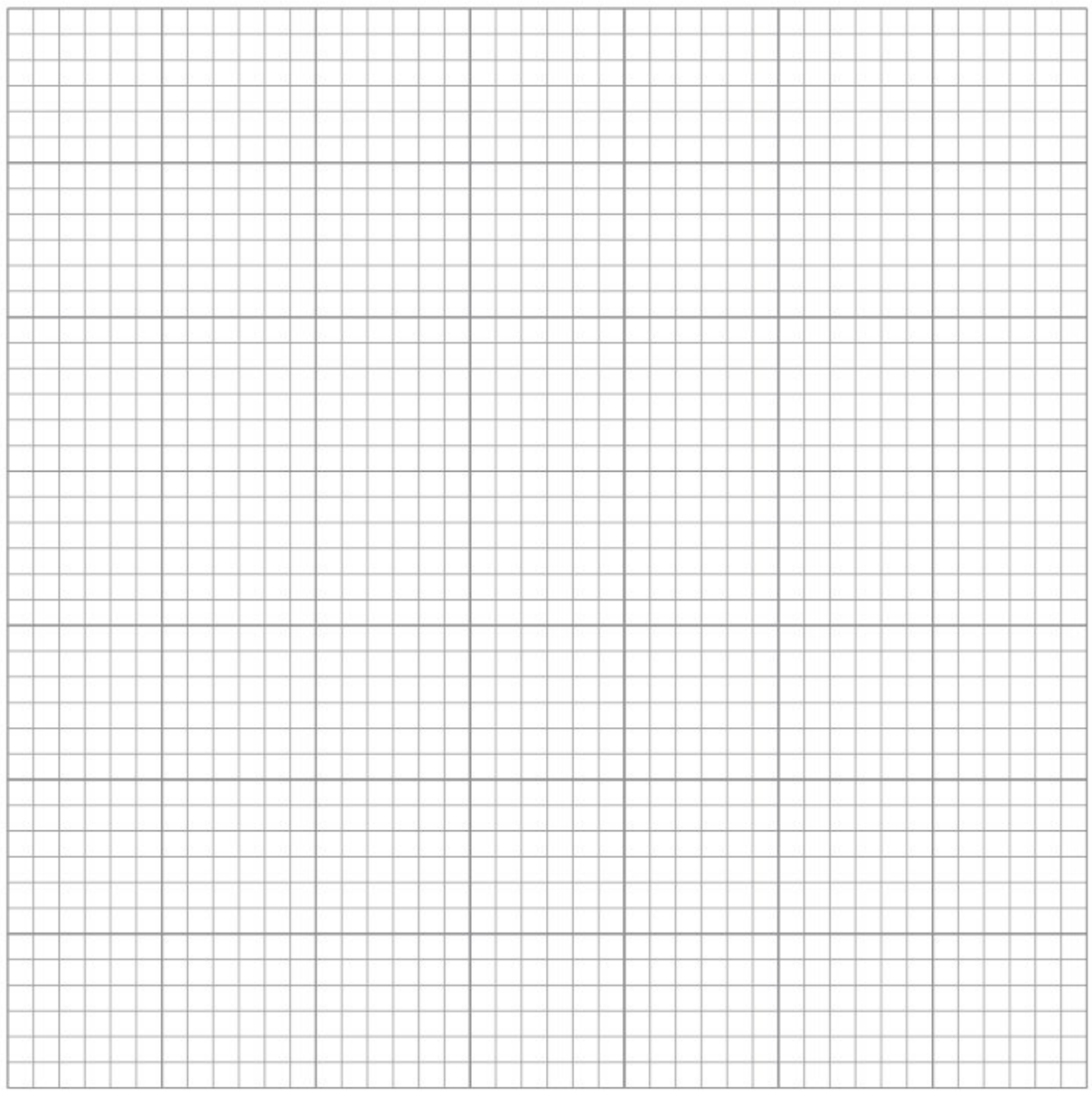
Market research suggests that a 10% increase in the average price of its bespoke skateboards will reduce demand by just 5%. Hence, the business is considering whether to raise its prices.

(a) Calculate the following for *Supreme Skateboards*

(i) average price of each skateboard [2]

(ii) variable cost per skateboard [2]

(b) Construct a fully labelled break-even chart for *Supreme Skateboards*. [4]



(c) Calculate the change in expected profits if *Supreme Skateboards* increases its average price by 10% and demand falls by 10%. [2]

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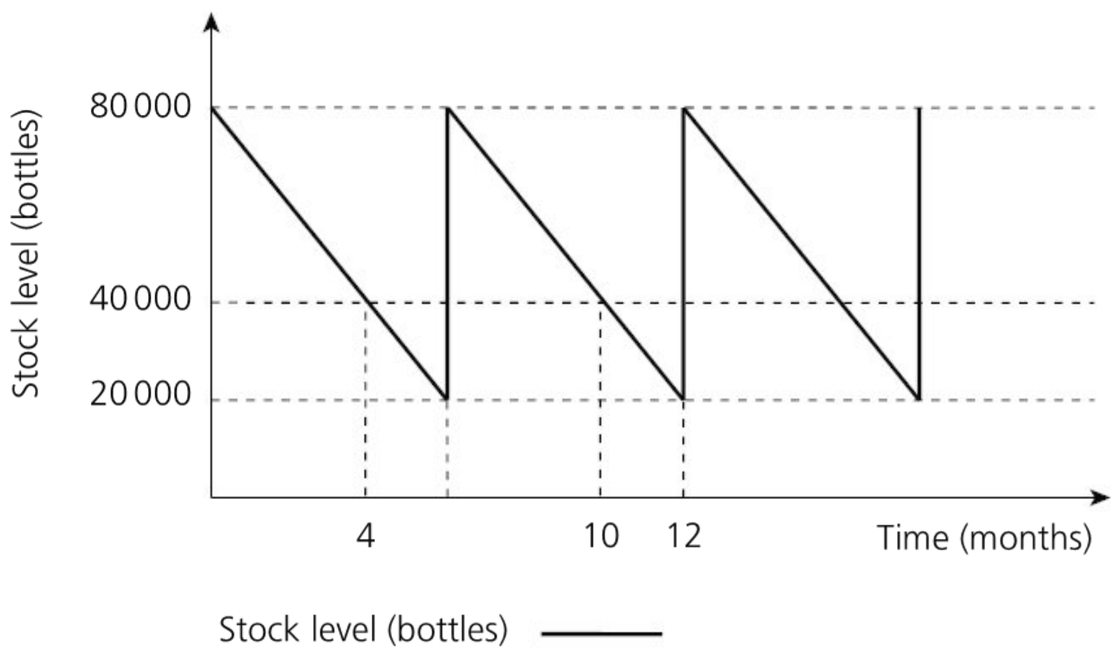
2. *Victoria L. Wines* (*VLW*) is a large importer of fine wines in southern France. With large-scale operations, *VLW* benefits from **economies of scale** *VLW* uses a traditional just-in-case stock control system, relying on large stockpiles of its wines. Its stock control chart is shown below.



(a) Define the term **economies of scale**. [2]

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(b) Using the stock control chart for *VLW*, state the following:

(i) reorder quantity [1]

.....

(ii) reorder level [1]

.....

(iii) lead time

(iv) buffer stock level

(c) Explain **two** costs of stockpiling to businesses such as *VLW* [4]

3. *Gel Nails* produces a range of nail beauty products for multinational retailers. With operations currently only in China, *Gel Nails* is considering expanding its production in one of three locations: Vietnam, Indonesia or Thailand. The estimated costs and benefits of these three options are shown in **Table 1**, with the probabilities of success, no change and failure also shown.

Option	Outcome	Chance (%)	Potential return ($ million)	Cost of project ($ million)
Vietnam	Success	45	25.0	12.5
	No change	30	20.0	
	Failure	25	12.0	
Indonesia	Success	55	22.0	10.5
	No change	20	12.5	
	Failure	25	8.5	
Thailand	Success	50	20.0	14.5
	No change	25	10.0	
	Failure	25	–2.0	

Table 1

(a) State **two** features of multinational companies. [2]

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(b) Construct a fully labelled decision tree and calculate the predicted outcome for each option presented to *Gel Nails* [6]

(c) Explain **one** other financial or non-financial factor that *Gel Nails* needs to consider before choosing any of these locations to expand into. [2]

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4. Dany Huang is a franchisee of *Big Bao*. The business specialises in the sale of Vietnamese fresh food and snacks. *Big Bao* only accepts cash payments. Dany Huang has produced a cash flow forecast for his business, shown in **Table 2**. In December, he pays workers 50% extra as an end-of-year bonus.

	Sept ($)	Oct ($)	Nov ($)	Dec ($)
Cash sales	20 000	18 500	19 500	22 500
Cash inflow	20 000	18 500	19 500	22 500
Direct costs	8 000	7 400	7 800	9 000
Expenses	3 000	3 000	3 000	3 000
Salaries	8 000	8 000	8 000	12 000
Cash outflow	19 000		18 800	24 000
Net cash flow		100	700	–1 500
Opening balance	200	1 200		2 000
Closing balance	1 200	1 300	2 000	

Table 2

(a) Define the term **franchise** [2]

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(b) State the value of the following:

(i) net cash flow in September [1]

.....

(ii) cash outflow in October

.....

(iii) opening balance in November

.....

(iv) closing balance in December [1]

.....

(c) Using the figures in the cash flow forecast, comment on the liquidity position of *Big Bao* [2]

(d) Calculate the profit earned by Dany Huang for the period September to December. [2]

5. *Mustang Motors Inc.* (*MMI*) is a business specializing in servicing, repairing and restoring Ford Mustang cars and other similar sports cars. Excerpts from the firm's financial information, as at 31st December 2019, are shown in **Table 3**

Accumulated depreciation	$25 000
Accumulated retained profit	$14 000
Cost of sales	$60 000
Current assets	$33 000
Current liabilities	$22 000

Expenses	$35 000
Fixed assets	$250 000
Long-term liabilities	$120 000
Sales revenue	$125 000
Share capital	$80 000

Table 3

(a) Construct a profit and loss account for *MMI* from the financial information given above. [4]

(b) Calculate the following for *MMI*

(i) working capital [2]

(ii) net profit margin (NPM) [2]

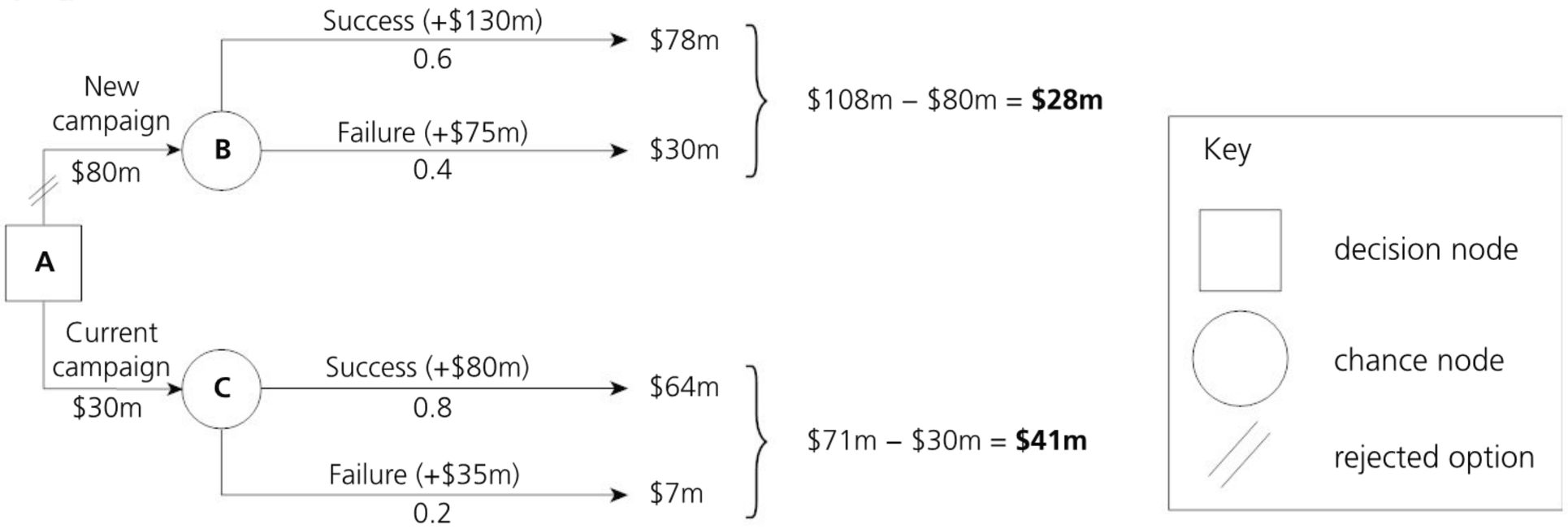
(iii) return on capital employed (ROCE) [2]

Answers Unit 1

Business organization and environment

1.7 Organization and planning tools (HL only)

1 a



Working out of the expected values:

- The new advertising campaign has a 60% chance of success, with expected sales revenues of $130 million. Hence, the likely outcome is $130m × 0.6 = $78 million.
- The new advertising campaign has a 40% chance of failure, with expected revenues of only $75 million. Hence, the probable outcome is $75m × 0.4 = $30 million.
- Therefore, the combined outcome for the new advertising campaign is $78m + $30m = $108 million. After the costs of the project are accounted for, the likely yield (return) of this is $108m − $80m = **$28 million**
- If the firm sticks with the current campaign, there is an 80% chance of success of earning $80 million. Hence, the likely outcome is $80m × 0.8 = $64 million.
- There is a 20% chance that the current campaign will fail, earning just $35 million for the firm. The probable outcome is therefore $35m × 0.2 = $7 million.
- Hence, the combined likely outcome of the current campaign is $64m + $7m − $30m = **$41 million**.

Award 1 to 2 marks if there is some evidence of a general knowledge of decision trees but it is not accurately constructed. The calculations of each option are not all presented or are inaccurate.

Award 3 to 4 marks if the main elements of the decision tree are constructed but it is not entirely accurate or the working is not shown. Award 4 marks if the calculations for each option are largely correct and presented clearly.

Award 5 to 6 marks if the decision tree is accurately constructed. The calculations of each option are correct and well presented, with appropriate working out shown. Award 6 marks if an appropriate key is provided.

b The outcomes of the decision tree suggest that *Natalia Dadidou Consultancy* should continue to use the current advertising campaign. The absolute financial returns of doing so are lower, but there is a larger risk of failure should the company choose to use a new advertising campaign. Essentially, the lower cost investment ($30m versus $80m) yields a higher probable return ($41m versus $28m).

Award 1 mark for an answer that shows some understanding of the demands of the question, but without clear application of the data in the decision tree.

Award 2 marks for an answer that shows clear understanding of the demands of the question, with relevant use of the data in the decision tree.

2 a

Award 1 to 2 marks if there is some evidence of a general knowledge of decision trees but it is not accurately constructed. The calculations of each option are not all presented or are inaccurate.

Award 3 to 4 marks if the main elements of the decision tree are constructed, but it is not entirely accurate or the working is not shown. Award 4 marks if the calculations for each option are largely correct and presented clearly.

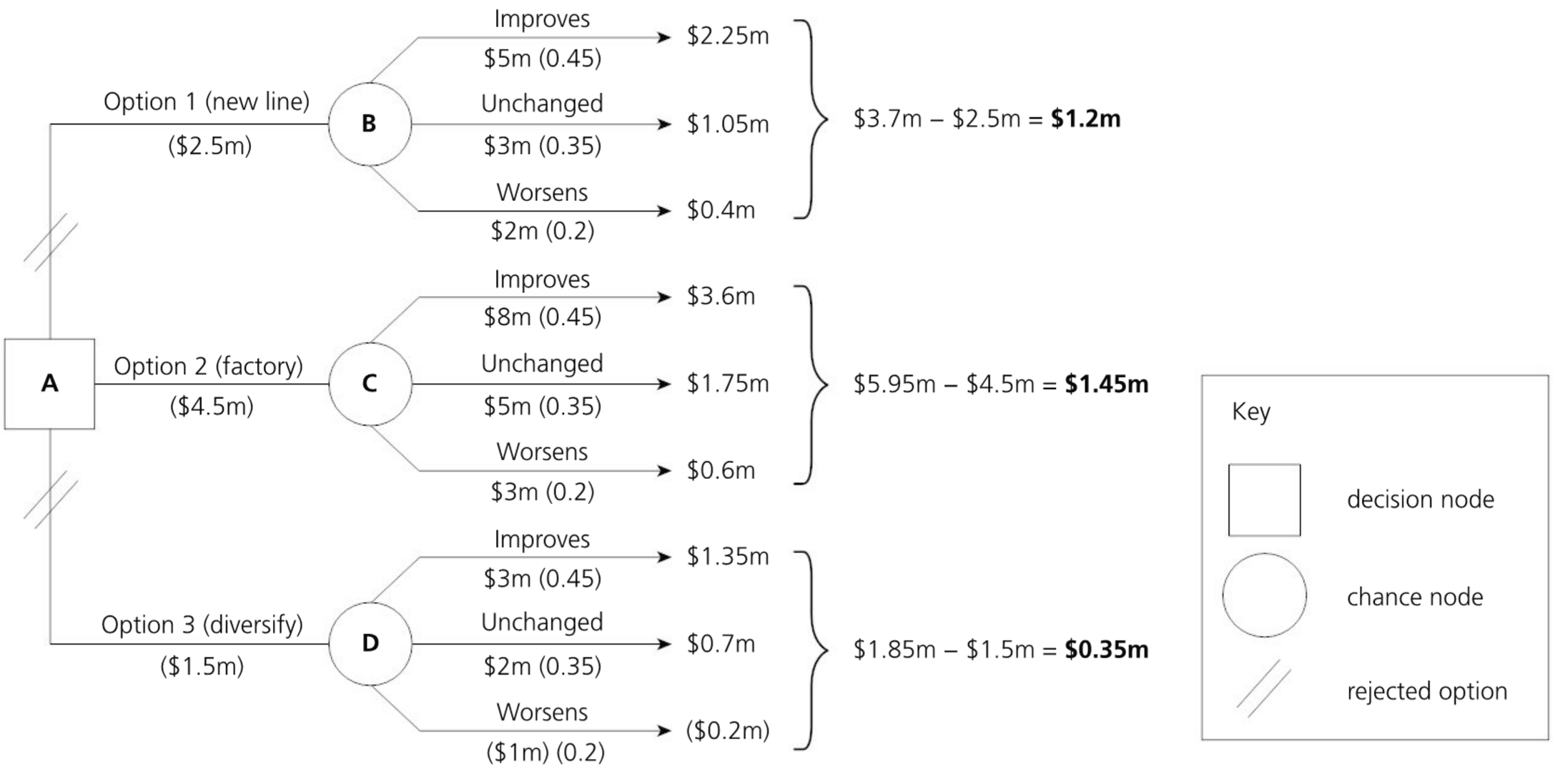
Award 5 to 6 marks if the decision tree is accurately constructed. The calculations of each option are correct and well presented, with appropriate working out shown. Award 6 marks if an appropriate key is provided.

b The outcomes of the decision tree show that Ahmedabad is the best location for expansion, based on financial measures. The cost of expansion to Ahmedabad is relatively high compared to Bengaluru but there is a smaller chance of success in Bengaluru. While Chennai has the highest chance of success (65%), the higher investment cost ($100m) and lower absolute return ($190m) mean that Ahmedabad is the best option financially. Essentially, the lower cost investment ($95m versus $100m) yields a higher probable return ($71m versus $55m).

Award 1 mark for an answer that shows some understanding of the demands of the question, but without clear application of the data in the decision tree.

Award 2 marks for an answer that shows clear understanding of the demands of the question, with relevant use of the data in the decision tree.

3 a



Award 1 to 2 marks if there is some evidence of a general knowledge of decision trees, but it is not accurately constructed. The calculations of each option are not all presented or are inaccurate.

Award 3 to 4 marks if the main elements of the decision tree are constructed, but it is not entirely accurate or the working is not shown. Award 4 marks if the calculations for each option are largely correct and presented clearly.

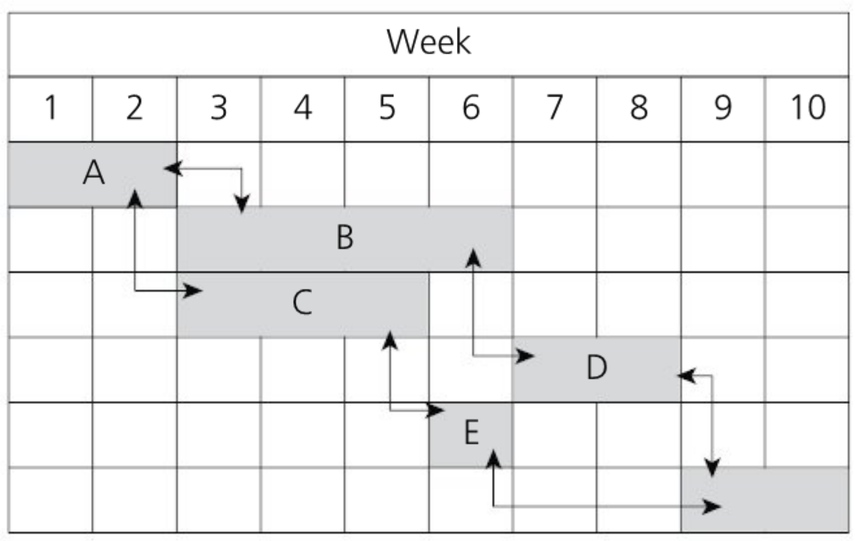
Award 5 to 6 marks if the decision tree is accurately constructed. The calculations of each option are correct and well presented, with appropriate working out shown. Award 6 marks if an appropriate key is provided.

b The findings shown in the decision tree suggest that *Cathal O'Mahony Bikes* ought to pursue Option 2, i.e. build a new factory to improve its productive capacity. Despite being the most expensive option, the potential return ($8m) is the highest of the three options should the economy improve. Similarly, even if the economy sees no change or improvement, the expected return from Option 2 is still the highest ($5m) of the three options.

Award 1 mark for an answer that shows some understanding of the demands of the question, but without clear application of the data in the decision tree.

Award 2 marks for an answer that shows clear understanding of the demands of the question, with relevant use of the data in the decision tree.

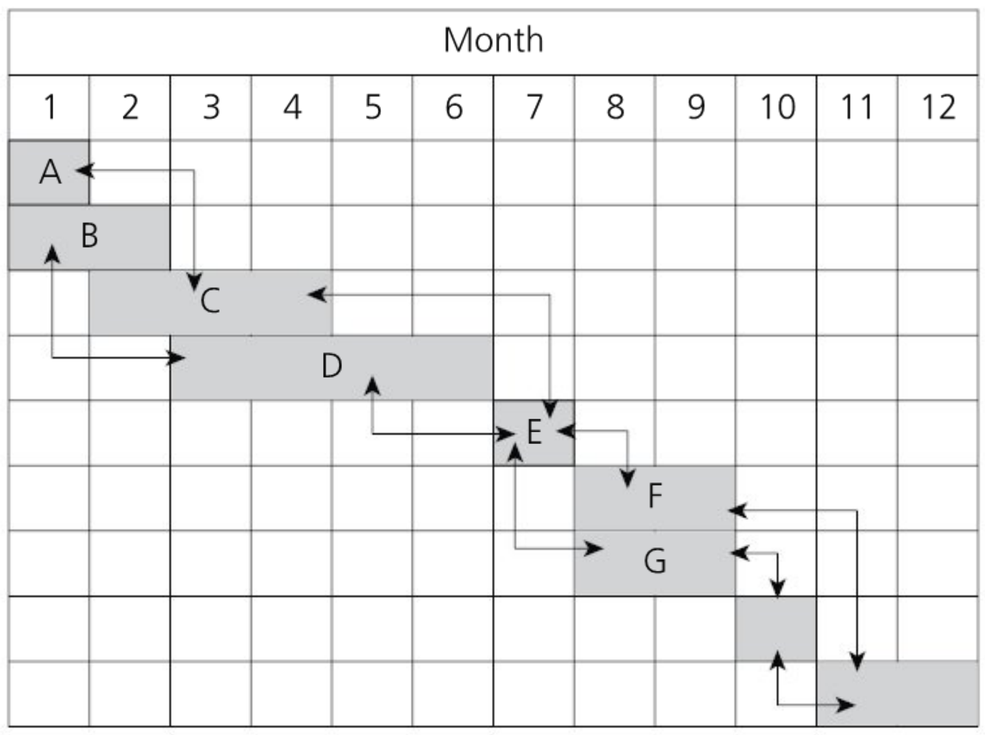
4



Award 1 to 2 marks for a Gantt chart that shows some understanding in scheduling, although there are two or more errors in the chart.

Award 3 to 4 marks for a Gantt chart that shows a good understanding of scheduling, including the correct unit of measurement (number of weeks to complete the project). Award 3 marks if there is one error in the chart.

5



Award 1 to 2 marks for a Gantt chart that shows some understanding in scheduling, although there are two or more errors in the chart.

Award 3 to 4 marks for a Gantt chart that shows a good understanding of scheduling, including the correct unit of measurement (number of months to complete the project). Award 3 marks if there is one error in the chart.

Answers Unit 3

Finance and accounts

3.2 Costs and revenues

1 a i Total tuition fees = $20 050 × 500 = **$10 025 000**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

ii TC = ($35 000 × 80) + ($600 000 × 12) = **$10 000 000**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

iii
- Profit = TR − TC
- Revenues include the registration fees, i.e. $500 × 500 = $250 000
- Hence, TR = $10 025 000 + $250 000 = $10 275 000
- Annual profit is therefore $10 275 000 − $10 000 000 = **$275 000**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

2 a
- Total contribution = (Price − AVC) × Quantity
- Total contribution = ($10 − $4) × 1 500 = **$9 000**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

b
- Profit = Total contribution – TFC
- Profit = $9 000 − $5 000 = **$4 000**

Alternatively:
- Profit = TR − TC
- Profit = ($10 × 1 500) − (($4 × 1 500) + $5 000))
- Profit = $15 000 − ($6 000 + $5 000) = **$4 000**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

c
- AC = TC ÷ Output
- AC = (($4 × 1 500) + $5 000)) ÷ 1 500 units
- AC = $11 000 ÷ 1 500 = **$7.33**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

3 a
- TC = TFC + TVC
- TC = $2 200 + ($0.65 × 8 000) = **$7 400**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

b Markup or profit margin = ($2.50 − $0.65) ÷ $0.65 = **284.6%**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

c
- Profit (or loss) = Total contribution − TFC
- Profit (or loss) = (($2.50 − $0.65) × 8 000) − $2 200 = **$12 600**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

4 a
- AC = TC ÷ Output
- AC = (AFC + AVC)
- AC = ($45 000 ÷ 1 500) + $10 = **$40**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

b
- Unit contribution = Price − AVC
- Price = Total revenue ÷ Output = $97 500 ÷ 1 500 = $65
- Hence, unit contribution = $65 − $40 = **$25**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

c
- Profit = Total contribution − TFC
- Profit = (($65 − $40) × 1 500) − $45 000 = −$7 500
- *GXT Co.* made a **loss of $7 500** for the month.

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

d
- AC = TC ÷ Output
- AC = (AFC + AVC)
- AC = ($45 000 ÷ 2 000) + $10 = **$32.50**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

e
- Profit = Total contribution − TFC
- Profit = (($65 − $40) × 2 000) − $45 000 = $5 000)
- *GXT Co.* would make a **profit of $5 000** for the next month.

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

5 a
- TC = TFC + TVC
- TC = ($15 × 200) + $2 000 = **$5 000**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

b
- Profit = Total contribution − TFC
- Profit = (($40 − $15) × 200) − $2 000 = $3 000

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

c
- AC = TC ÷ Output
- AC at 100 units = (100 × $15) + $2 000 = $3 500 ÷ 100 = $35
- AC at 200 units = (200 × $15) + $2 000 = $5 000 ÷ 200 = $25
- Hence, the change in average cost is **$10 lower** at the higher level of output.

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

d Sales are higher at 200 units so the fixed costs (of $2 000) are spread over more units of output. This results in the average cost falling by $10 (from $35 to $25), enabling *Drones-R-Us* to have a higher profit margin and/or the ability to reduce its price. In fact, profit would increase significantly:

- Profit = Total contribution − TFC
- Profit at 100 units = (($40 − $15) × 100) $2 000 = $500
- Profit at 200 units = (($40 − $15) × 200) − $2 000 = $3 000
- Hence, operating at 200 units benefits the firm due to the higher profit and/or the ability to attract more customers by offering a lower price.

Award 1 to 2 marks for an answer that shows some understanding of how the firm benefits from operating at a higher level of output. There are likely to be errors or omissions from the calculations.

Award 3 to 4 marks for an answer that shows a good level of understanding of how the firm benefits from operating at a higher level of output. Calculations are accurate and are used effectively to answer the question.

3.3 Break-even analysis

1 a
- Break-even quantity = TFC ÷ (Price − AVC)
- Break-even quantity = $1 000 ÷ ($40 − $15) = **40 units**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

b
- Profit = ((Price − AVC) × Q) − TFC
- Profit = ((40 − 15) × 65) − $1 000 = **$625**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

c
- Target profit output = (TFC + Target profit) ÷ Contribution per unit
- Target profit output = (1 000 + 800) ÷ (40 − 15) = $1 800 ÷ $25 = **72 units**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

2 a
- Break-even quantity = TFC ÷ (Price − AVC)
- Break-even quantity = $1 000 ÷ ($4 − $1.5) = **400 hotdogs**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

b
- Margin of safety = Sales volume − Break-even quantity
- Margin of safety = 650 − 400 = **250 hotdogs**

Accept answers that express the margin of safety as a percentage above the break-even quantity, i.e. 250 ÷ 400 = 62.5%

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

c
- Profit = ((Price − AVC) × Q) − TFC
- Profit = (($4 − $1.5) × 650) − $1 000 = **$625**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

3 a
- Price = TR ÷ Sales volume
- Price = 60 000 ÷ 10 000 = **$6**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

b
- Profit = TR − (TFC + TVC)
- $10 000 = $60 000 − ($5 000 + TVC)
- Therefore, TVC = $45 000
- Therefore, AVC = $45 000 ÷ 10 000 = **$4.50**

Award 1 mark for the correct answer and up to 2 marks for showing the full working out.

c
- Break-even quantity = TFC ÷ Contribution per unit
- Break-even quantity = $5 000 ÷ ($6 − $4.5) = 3 333.33 units (accept answers that state 3 334 units)
- TC = TFC + TVC
- TC at 3 333.33 units = $5 000 + ($4.5 × 3 333.33) = **$20 000**
- TR = Price × Quantity sold
- TR at 3 333.33 units = $6 × 3 333.33 = **$20 000**

Award 1 mark for the correct calculation of total costs and 1 mark for showing appropriate working out.

Award 1 mark for the correct calculation of total revenue and 1 mark for showing appropriate working out.

d
- Profit = Total contribution − TFC
- New price = $6 + 10% = $6.60
- New sales volume = 10 000 − 5% = 9 500 units
- Unit contribution increases to $6.6 − $4.5 = $2.1
- New profit = (9 500 × $2.1) − $5 000 = $14 950 units
- Therefore, change in profit = +$4 950
- This means the price change has caused profit to **increase by $4 950**.

Award 1 mark for the correct calculation of the change in price and 1 mark for the correct calculation of the change in sales volume.

Award 1 mark for the correct calculation of change in profits and 1 mark for showing appropriate working out.

Apply the own figure rule (error carried forward) where appropriate.

4 a
- Contribution per unit = Price − Unit variable cost
- Contribution per unit = $50 − $20 = **$30**

Award 1 mark for the correct calculation. There is no need to show the working out.

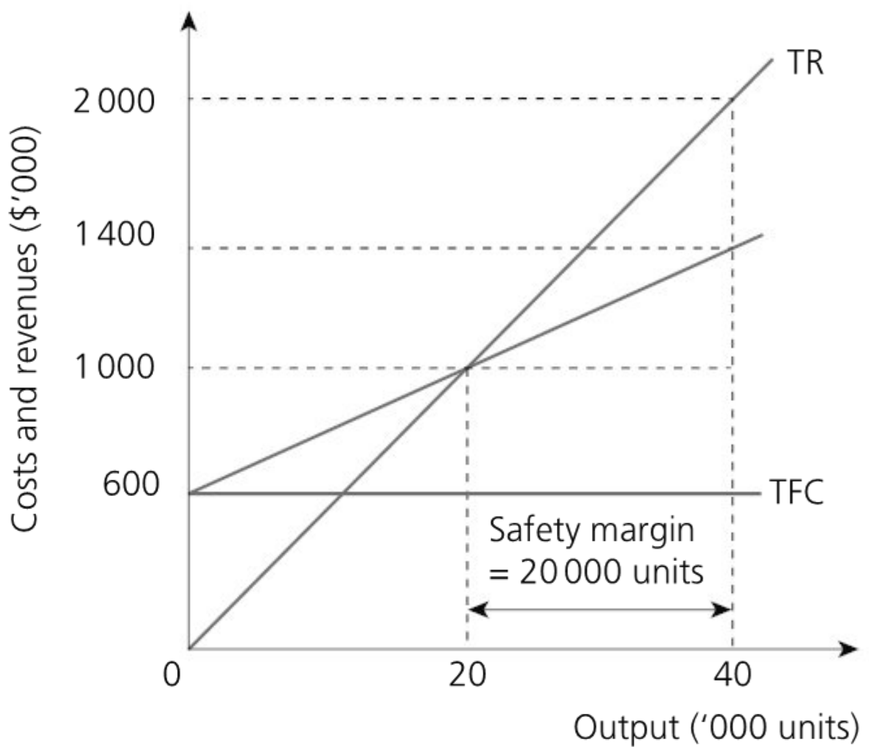
b
- Break-even quantity = TFC ÷ Contribution per unit
- Break-even quantity = $600 000 ÷ ($50 − $20) = **20 000 units**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

c
- Margin of safety = Expected sales volume – Break-even quantity
- Margin of safety = 40 000 − 20 000 = **20 000 units**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

d



Award 1 mark for correctly and fully labelled axes.

Award 1 mark for correctly drawn and labelled total revenue line.

Award 1 mark for correctly drawn and labelled total cost line.

Award 1 mark for accurately identifying the break-even quantity (20 000 units).

Award 1 mark for accurately identifying the margin of safety (also 20 000 units).

Award 1 mark for an appropriate title.

Note: **there is no need to plot the total fixed costs line for the purpose of showing break-even.**

5 a **300 kg** (i.e. 800 kg – 500 kg)

Award 1 mark for the correct answer. There is no need to show the working out as the calculation is simplistic.

b
- Price = Total revenue ÷ Quantity
- At the Break-even point, Price = $40 000 ÷ 500 = **$80**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

c
- AVC = TVC ÷ Quantity
- At the Break-even quantity, TC = $40 000, of which $20 000 is fixed costs, so $20 000 is attributed to total variable costs.
- Hence, AVC = $20 000 ÷ 500 = **$40**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

d
- Total contribution = (Price − AVC) × Quantity
- Total contribution = ($80 − $40) × 800
  $32 000

Note: once the fixed costs ($20 000) have been paid, the remaining amount ($12 000) is profit.

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

3.4 Final accounts (some HL only)

1 a Cost of goods sold (COGS) refers to the costs incurred by a business when purchasing the stock (inventories) that it then sells to its own customers. The formula for calculating COGS is: Opening stock + Purchases − Closing stock.

Award 1 mark for an answer that shows some understanding of the term cost of goods sold.

Award 2 marks for an answer that shows a clear understanding of the term cost of goods sold, similar to the one given above.

b
- A (Gross profit) = Sales revenue − COGS = **$100 000**
- B (NP before interest and tax) = Gross profit − Expenses = **$40 000**
- C (Retained profit) = NP after interest and tax − Dividends = **$15 600**

Award 1 mark for each correct answer. There is no need to show the working out to gain full marks.

c
- Award marks as follows:

Award 1 mark for an answer that shows some idea of what a P&L is.

Award 2 marks for a P&L account that is largely recognizable but the figures do not balance (such as dividends plus retained profit = net profit after interest and tax).

Award 3 marks for a P&L account that is largely accurate, albeit with a few miscalculations.

Award 4 marks for an accurate P&L account according to the IB prescribed format.

Award 5 marks for an accurate P&L account according to the IB prescribed format which is dated.

Apply the own figure rule (error carried forward) where appropriate.

2 a The balance sheet is a financial statement that is part of a firm's final accounts, recording the assets and liabilities of the business at a particular point in time. It is called a balance sheet as the firm's sources of finance need to match its uses of those funds.

Award 1 mark for an answer that shows some understanding of the term balance sheet.

Award 2 marks for an answer that shows a clear understanding of the term balance sheet, similar to the one given above.

b
- Working capital (or net current assets) = Current assets − Current liabilities
- Working capital = (23 000 + 18 000 + 32 000) − (8 000 + 28 000 + 5 000) = **$32 000**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

c

Balance sheet for *Lancaster Holidays Ltd* as at 1st April 2019		
	$'000	$'000
Fixed assets		
Buildings	380	
Machinery and equipment	150	
Accumulated depreciation	80	
Net fixed assets		450
Current assets		
Cash	23	
Debtors	18	
Stock	32	
Total current assets	73	
Current liabilities		
Overdraft	8	
Creditors	28	
Short-term loans	5	
Total current liabilities	41	
Net current assets (working capital)		32
Total assets less current liabilities		482
Long-term liabilities (debt)	290	
Net assets		192
Financed by:		
Share capital	130	
Accumulated retained profit	62	
Equity		192

Table A3.4.1

Award 1 to 2 marks for a balance sheet that is not accurately constructed but where there is evidence of limited understanding of the format.

Award 3 to 4 marks if the main elements of the balance sheet are constructed but are not entirely accurate. The calculations under each heading/component of the balance sheet are mainly correct. Allow up to two errors/omissions for 3 marks. Award 4 marks if there is one error or omission.

Award 5 marks for a balance sheet that is accurately constructed according to the IB prescribed format. All the relevant headings/components are presented correctly. An appropriate title is included.

Apply the own figure rule where appropriate.

3 a Current liabilities are the short-term debts of an organization, i.e. they are due to be repaid within 12 months to the creditors of *Nix Nightclubs Ltd*. Current liabilities could include money owed to suppliers of drinks or food for the nightclubs, or to the bank for the overdraft.

Award 1 mark for an answer that shows some understanding of the term current liabilities.

Award 2 marks for an answer that shows a clear understanding of the term current liabilities, similar to the one given above.

b Debtors refer to customers who owe *Nix Nightclubs Ltd* money for items bought on credit. For example, customers may have booked a private function (party) at the venue using credit, with the agreement to pay *Nix Nightclubs Ltd* at a later date. Hence, the value of debtors is counted as a current asset.

Award 1 mark for an answer that shows some understanding of why debtors are recorded as a current asset.

Award 2 marks for an answer that shows a clear understanding of why debtors are recorded as a current asset, similar to the one given above.

c i **$1 500 000** (i.e. $1 000 000 + $500 000)

Award 1 mark for the correct answer. There is no need to show the working out as the calculation is simplistic.

ii **$40 000** (i.e. $510 000 − $470 000)

Award 1 mark for the correct answer. There is no need to show the working out as the calculation is simplistic.

iii **$975 000** (i.e. $1 500 000 + $510 000 − $470 000 − $565 000)

Award 1 mark for the correct answer. There is no need to show the working out as the calculation is simplistic.

iv **$325 000** (i.e. Equity = Share capital + Accumulated retained profit)

Award 1 mark for the correct answer. There is no need to show the working out as the calculation is simplistic.

d ■ Current ratio = Current assets ÷ Current liabilities
■ $510 000 ÷ $470 000 = **1.09:1 (accept 1.08:1)**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

4 a Dividends are a financial payment made to shareholders from a company's profits after all costs (direct and indirect) have been paid. What remains can then be kept in the business (retained profit) as an internal source of finance.

Award 1 mark for an answer that shows some understanding of the term dividends.

Award 2 marks for an answer that shows a clear understanding of the term dividends, similar to the one given above.

b i **$280 000** (i.e. 280 000 $130 000 = $150 000)

Award 1 mark for the correct answer. There is no need to show the working out as the calculation is simplistic.

ii ■ Retained profit = Profit after interest and tax − Dividends
■ Hence, retained profit = $123 500 − $49 400 = **$74 100**

Award 1 mark for the correct answer. There is no need to show the working out as the calculation is simplistic.

c
- NP before interest and tax = Gross profit – Administrative expenses
- NP before interest and tax = $150 000 – $1 000 = **$149 000**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

d Possible answers could include:
- Rent or mortgage payments on commercial premises.
- Insurance costs, such as employee and third-party insurance, or insurance for its motor vehicles.
- Interest payments (of $12 000) due to existing bank loans.
- Salaries for management at *Babbacombe Ltd*.
- Allowances for depreciation of its current delivery vans.
- Utility bills (such as water, gas, telecommunications and electricity) paid by *Babbacombe Ltd*

Accept any other reasonable example of a business expense for *Babbacombe Ltd*.

Award 1 mark for each plausible example of a business expense for *Babbacombe Ltd*, up to the maximum of 2 marks.

e Possible reasons could include:
- Using retained profits would avoid bank charges and interest imposed on a bank loan.
- Internal finance is often more affordable than external finance; *Babbacombe Ltd* has $74 100 worth of accumulated retained profit.
- External finance (bank loans) can be more difficult to access, especially if banks are reluctant to lend to small businesses such as *Babbacombe Ltd*.

Accept any other reasonable explanation of why *Babbacombe Ltd* might choose to use retained profits.

Award 1 mark for an answer that outlines why the firm may choose to use its retained profits. The answer may be generic and/or lack application.

Award 2 marks for an answer that shows a clear understanding of why the firm may choose to use its retained profits to purchase the delivery vans.

5 a Depreciation is the fall in the value of fixed assets over time, due to wear and tear (usage) and obsolescence (going out of fashion or newer models becoming available).

Award 1 mark for an answer that shows some understanding of the term depreciation.

Award up to 2 marks for an answer that shows a clear understanding of the term depreciation, similar to the one given above.

b Possible disadvantages include:
- In the long run, it can be more expensive for customers to lease the BMW cars than if they purchase the assets outright or use hire purchase instead.
- Interest is usually charged on leasing contracts, thereby raising the costs to the customer.
- Customers need to pay an initial deposit towards the cost of the asset (with the balance being paid in instalments over an agreed period of time), yet the customers never own the vehicles.
- Customers may not qualify for leasing if they are not financially stable and do not have a good credit record.
- Customers may be locked in to medium-term leasing contracts (4 years in this case) so it can be rather inflexible, or difficult for them to terminate the leasing agreement.

Award 1 mark for describing a disadvantage of leasing.

Award 1 mark for applying the answer to the customers who lease BMW cars from *BM Leasing Ltd*

c
- Annual depreciation = ($50 000 – $9 000) ÷ 4 years
- Annual depreciation = $41 000 ÷ 4 = **$10 250 per year**
- Total annual depreciation = $10 250 × 5 cars = **$51 250**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

d

Year end	Depreciation allowance	Net book value
Year 1	($50 000 × 35%) = $17 500	$50 000 – $17 500 = $32 500
Year 2	($32 500 × 35%) = $11 375	$32 500 – $11 375 = $21 125
Year 3	($21 125 × 35%) = $7 394	$21 125 – $7 394 = $13 731
Year 4	($13 731 × 35%) = $4 806	$13 731 – $4 806 = $8 925

Table A3.4.2

Candidates are expected to show the full working, i.e. yearly figures for depreciation allowance and the calculation of the net book value.

For each year, award 1 mark for the correct working out and the allowance for the depreciation, up to the maximum of 4 marks. Apply the own figure rule where appropriate.

Award 1 mark if only the correct net book value is given without any working out shown.

3.5 Profitability and liquidity ratio analysis

1 a
- Gross profit margin = (Gross profit ÷ Sales revenue) × 100
- Gross profit margin = ($1 125 000 ÷ $2 500 000) × 100 = **45%**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

Apply the own figure rule (error carried forward) where appropriate.

***Note:* astute students might notice that as the costs of goods sold (COGS) accounts for 55% of the sales revenue, the gross profit margin must be 45%.**

b
- Net profit margin = (NP before interest and tax ÷ Sales revenue) × 100
- Net profit margin = ($570 000 ÷ $2 500 000) × 100 = **22.8%**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

Apply the own figure rule where appropriate.

c
- ROCE = (NP before interest and tax ÷ Capital employed) × 100
- Capital employed = Long-term liabilities + Equity
- ROCE = (570 000 ÷ (350 000 + 500 000 + 340 000)) × 100 = **47.9%**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

Apply the own figure rule where appropriate.

d
- Current ratio = Current assets ÷ Current liabilities
- Current ratio = $60 000 ÷ $45 000 = **1.33**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

e
- Acid test ratio = (Current assets – Stock) ÷ Current liabilities
- Acid test ratio = ($60 000 – $30 000) ÷ $45 000 = **0.67**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

2 a

Profit and loss account for *Lopa Sharma Clockworks Ltd*, year ending (date) ($)	
Sales revenue	200 000
Cost of goods sold	80 000
Gross profit	120 000
Expenses	50 000
Net profit before interest and tax	70 000
Interest	10 000
Net profit before tax	60 000
Tax (15%)	9 000
Net profit after interest and tax	51 000

Table A3.5.1

Award 1 to 2 marks for an answer that shows some understanding of the demands of the question. The format of the profit and loss account is not presented according to the IB prescribed format.

Award 3 to 4 marks for an answer that shows good understanding of the demands of the question. The format of the profit and loss account is clear and presented according to the IB prescribed format. Award up to 3 marks if there is one error.

b i
- Gross profit margin = (Gross profit ÷ Sales revenue) × 100
- Gross profit margin = (($200 000 − $80 000) ÷ $200 000) × 100 = **60%**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

Apply the own figure rule where appropriate.

ii
- Net profit margin = ((Gross profit − Expenses) ÷ Sales revenue) × 100
- Net profit margin = (($120 000 − $50 000) ÷ $200 000) × 100 = **35%**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

Apply the own figure rule where appropriate.

iii
- ROCE = (NP before interest and tax ÷ Capital employed) × 100
- ROCE = ($70 000 ÷ $382 500) × 100 = **18.3%**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

Apply the own figure rule where appropriate.

3 a
- Gross profit margin = (Gross profit ÷ Sales revenue) × 100
- Gross profit margin = (($25 500 000 − $16 575 000) ÷ $25 500 000)) × 100 = **35%**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

b
- Net profit = Gross profit − Expenses = $8 925 000 − $5 360 000 = $3 565 000
- Net profit margin = (NP ÷ Sales revenue) × 100
- Net profit margin = ($3 565 000 ÷ $25 500 000) × 100 = **13.98%**

Accept answers that give the net profit margin as 14%.

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

c
- Capital employed = Long-term liabilities + Share capital + Accumulated retained profit
- Capital employed = $1 200 000 + $5 000 000 + $800 000 = **$7 000 000**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

d
- ROCE = (NP before interest and tax ÷ Capital employed) × 100
- ROCE = ($3 565 000 ÷ ($1 200 000 + $5 000 000 + $800 000)) × 100 = **50.93%**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

Apply the own figure rule where appropriate.

4 a

	$
Sales revenue	1 500 000
Cost of goods sold	900 000
Gross profit	**600 000**
Expenses	**355 000**
Net profit before interest and tax	245 000
Interest	12 000
Net profit before tax	**233 000**
Tax	34 950
Net profit after interest and tax	198 050
Dividends	79 220
Retained profit	**118 830**

Table A3.5.2

The table on the previous page is provided for illustrative purposes only.

i Gross profit = $1 500 000 − $900 000 = **$600 000**

Award 1 mark for the correct answer. There is no need to show the working out as the calculation is simplistic.

ii
- NP before interest and tax = Gross profit − Expenses
- $245 000 = $600 000 − Expenses
- Hence, Expenses = **$355 000**

Award 1 mark for the correct answer. There is no need to show the working out as the calculation is simplistic.

iii
- NP before tax = NP before interest and tax − Interest
- NP before tax = $245 000 − $12 000 = **$233 000**

Award 1 mark for the correct answer. There is no need to show the working out as the calculation is simplistic.

iv
- Retained profit = NP after interest and tax − Dividends
- Retained profit = $198 050 − $79 220 = **$118 830**

Award 1 mark for the correct answer. There is no need to show the working out as the calculation is simplistic.

b
- Gross profit margin = (Gross profit ÷ Sales revenue) × 100
- Gross profit margin = ($600 000 ÷ $1 500 000) × 100 = **40%**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

c
- Net profit margin = (NP before interest and tax ÷ Sales revenue) × 100
- Net profit margin = ($245 000 ÷ $1 500 000) × 100 = **16.33%**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

d Despite *Wenxuan Wang Restaurant* having sales revenues of $1 500 000 during the year, the costs of goods sold accounted for 60% of this, i.e. GPM is 40%. However, by the time expenses are deducted, the restaurant only earns $16.33 (before interest and tax) for each $100 of sales revenue. Hence, the owners are unlikely to be happy that total costs account for 83.67% of sales revenue.

Award 1 to 2 marks for an answer that shows some understanding of the demands of the question. Application of the numerical data and calculations is likely to be missing or lacking in depth.

Award 3 to 4 marks for an answer that shows good understanding of the demands of the question. Explanation of the calculations is clear and the numerical data are used effectively to answer the question.

5 a
- Working capital (net current assets) = Current assets − Current liabilities
- Current assets = $10 500 + $8 500 + $35 000 = $54 000
- Current liabilities = $8 500 + $10 000 + $5 000 = $23 500
- Working capital = $54 000 − $23 500 = **$30 500**

Award 1 mark for the correct answer and up to 2 marks for appropriate working out for the values of current assets and current liabilities.

b
- Current ratio = Current assets ÷ Current liabilities
- Current ratio = $54 000 ÷ $23 500 = **2.3**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

c
- Quick ratio = (Current assets − Stock) ÷ Current liabilities
- Quick ratio = ($54 000 − $35 000) ÷ $23 500 = **0.81**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

d The current ratio is healthy at a rate of 2.3, i.e. $2.30 worth of current assets for each $1 of current liabilities. This means the firm is highly liquid and can afford its short-term debts. However, the quick ratio (or acid test ratio) is only 0.81, i.e. for each $1 it owes within the next 12 months of the balance sheet date, it only has $0.81 of liquid assets. This is because the firm's stock ($35 000) may not be highly liquid, yet it accounts for almost 65% of the firm's current assets.

Award 1 to 2 marks for an answer that shows some understanding of the demands of the question. Application of the numerical data and calculations is likely to be missing or lacking in depth.

Award 3 to 4 marks for an answer that shows good understanding of the demands of the question. Explanation of the calculations is clear and the numerical data are used effectively to answer the question.

3.6 Efficiency ratio analysis (HL only)

1 a
- Gross profit margin = (Gross profit ÷ Sales revenue) × 100
- Gross profit margin = ($2 100 000 ÷ $3 500 000) × 100 = **60%**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

Apply the own figure rule (error carried forward) where appropriate.

***Note:* astute students might notice that as the costs of goods sold (COGS) accounts for 40% of the sales revenue, the gross profit margin must be 60%.**

b
- Net profit margin = (NP before interest and tax ÷ Sales revenue) × 100
- Net profit margin = ($875 000 ÷ $3 500 000) × 100 = **25%**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

Apply the own figure rule where appropriate.

c
- ROCE = (NP before interest and tax ÷ Capital employed) × 100
- ROCE = ($875 000 ÷ ($500 000 + $2 500 000 + $898 000)) × 100 = **22.45%**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

Apply the own figure rule where appropriate.

d
- Current ratio = Current assets ÷ Current liabilities
- Current ratio = $718 000 ÷ $510 000 = **1.41**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

Apply the own figure rule where appropriate.

e
- Acid test ratio = (Current assets − Stock) ÷ Current liabilities
- Current ratio = ($718 000 − $450 000) ÷ $510 000 = **0.53**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

Apply the own figure rule where appropriate.

f
- Debtor days ratio (number of days) = (Debtors ÷ Sales revenue) × 365
- Debtor days ratio = ($220 000 ÷ $3 500 000) × 365 = **22.94 days**

Accept answers that give the debtor days ratio as 23 days.

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

g
- Creditor days ratio (number of days) = (Creditors ÷ COGS) × 365
- Creditor days ratio = ($280 000 ÷ $1 400 000) × 365 = **73 days**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

h
- Stock turnover ratio (number of days) = (Stock ÷ COGS) × 365
- Stock turnover ratio = ($450 000 ÷ $1 400 000) × 365 = **117.32 days**

Alternatively:

- Stock turnover ratio (number of times per year) = (COGS ÷ Stock)
- Stock turnover ratio = ($1 400 000 ÷ $450 000) = **3.11 times**

Accept answers that give the stock turnover ratio as 118 days.

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

2 a
- Gross profit margin = (Gross profit ÷ Sales revenue) × 100
- Gross profit margin = (($8 840 000 − $5 746 000) ÷ $8 840 000) × 100 = **35%**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

b
- Net profit = Gross profit − Expenses = $3 094 000 − $1 325 000 = $1 769 000
- Net profit margin = (NP ÷ Sales revenue) × 100
- Net profit margin = ($1 769 000 ÷ $8 840 000m) × 100 = **20.01%**

Accept answers that give the net profit margin as 20%.

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

c
- ROCE = (NP before interest and tax ÷ Capital employed) × 100
- ROCE = ($1 769 000 ÷ ($1 200 000 + $5 000 000 + $875 000)) × 100 = **25%**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

3 a
- Debtor days ratio (number of days) = (Debtors ÷ Sales revenue) × 365
- Debtor days ratio 2019 = ($30 000 ÷ $190 000) × 365 = **57.63 days**
- Debtor days ratio 2020 = ($40 000 ÷ $210 000) × 365 = **69.52 days**

Accept answers that give the debtor days ratio as 58 days and 70 days, respectively.

Award 1 mark for each correct answer and 1 mark for showing appropriate working out, up to the maximum of 3 marks.

b
- Creditor days ratio (number of days) = (Creditors ÷ COGS) × 365
- Creditor days ratio 2019 = ($20 000 ÷ $57 000) × 365 = **128.07 days**
- Creditor days ratio 2020 = ($24 000 ÷ $63 000) × 365 = **139.05 days**

Accept answers that give the creditor days ratio as 128 or 129 days and 139 or 140 days, respectively.

Award 1 mark for each correct answer and 1 mark for showing appropriate working out, up to the maximum of 3 marks.

c
- Stock turnover ratio (number of days) = (Stock ÷ COGS) × 365
- Stock turnover ratio 2019 = ($22 000 ÷ $57 000) × 365 = **140.88 days**
- Stock turnover ratio 2020 = ($18 000 ÷ $63 000) × 365 = **104.29 days**

Alternatively:

- Stock turnover ratio (number of times per year) = (COGS ÷ Stock)
- Stock turnover ratio 2019 = ($57 000 ÷ $22 000) = **2.59 times**
- Stock turnover ratio 2020 = ($63 000 ÷ $18 000) = **3.5 times**

Accept answers that give the stock turnover ratio as 141 days and 104 or 105 days, respectively.

Award 1 mark for each correct answer and 1 mark for showing appropriate working out, up to the maximum of 3 marks.

4 a
- Current ratio = Current assets ÷ Current liabilities
- Current ratio = (Cash + Stock + Debtors) ÷ (Creditors + Overdraft) = $495 000 ÷ $180 000 = **2.75**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

b
- Acid test ratio = (Current assets − Stock) ÷ Current liabilities
- Current ratio = ($495 000 − $300 000) ÷ $180 000 = **1.08**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

c
- Gross profit margin = (Gross profit ÷ Sales revenue) × 100
- Gross profit = $750 000 − $250 000 = $500 000
- Gross profit margin = ($500 000 ÷ $750 000) × 100 = **66.67%**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

d
- Net profit margin = (NP ÷ Sales revenue) × 100
- NP = Gross profit − Expenses = $500 000 − $300 000 = $200 000
- Net profit margin = ($200 000 ÷ $750 000) × 100 = **26.67%**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

Apply the own figure rule where appropriate.

e
- Gearing ratio = (Long-term liabilities ÷ Capital employed) × 100
- Gearing ratio = ($250 000 ÷ ($250 000 + $250 000 + $125 000)) × 100 = **40%**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

Apply the own figure rule where appropriate.

f
- Debtor days ratio (number of days) = (Debtors ÷ Sales revenue) × 365
- Debtor days ratio = ($75 000 ÷ $750 000) × 365 = **36.5 days**

Accept answers that give the debtor days ratio as 37 days.

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

g
- ROCE = (NP before interest and tax ÷ Capital employed) × 100
- ROCE = (($500 000 − $300 000) ÷ ($250 000 + $250 000 + $125 000)) × 100 = **32%**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

Apply the own figure rule where appropriate.

5 a

Balance sheet for *MS Bakery* as at (date)		
	€	€
Fixed assets		
Premises	800 000	
Machinery	85 000	
Accumulated depreciation	25 000	
Net fixed assets		860 000
Current assets		
Stock	25 000	
Cash	10 200	
Debtors	12 000	
	47 200	
Current liabilities		
Overdraft	12 000	
Creditors	18 000	
Short-term loans	6 200	
	36 200	
Net current assets		11 000
Total assets less current liabilities		871 000
Long-term liabilities (debt)	350 000	
Net assets		521 000
Financed by:		
Share capital	400 000	
Accumulated retained profit	121 000	
Equity		521 000

Table A3.6.1

Award 1 to 2 marks for a balance sheet that is not accurately constructed but where there is evidence of limited understanding of the format.

Award 3 to 4 marks if the main elements of the balance sheet are constructed but are not entirely accurate. The calculations under each heading/component of the balance sheet are mainly correct. Allow up to two errors/omissions for 3 marks. Award 4 marks if there is one error or omission.

Award 5 marks for a balance sheet that is accurately constructed according to the IB prescribed format. An appropriate title is included.

Apply the own figure rule where appropriate.

b i ■ Current ratio = Current assets ÷ Current liabilities ■ Current ratio = €47 200 ÷ €36 200 = **1.3**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

Apply the own figure rule where appropriate.

ii ■ Quick ratio = (Current assets − Stock) ÷ Current liabilities
■ Quick ratio = (€47 200 − €25 000) ÷ €36 200 = **0.61**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

Apply the own figure rule where appropriate.

iii ■ Gearing ratio = (Long-term liabilities ÷ Capital employed) × 100
■ Gearing ratio = (€350 000 ÷ (€350 000 + €400 000 + €121 000)) × 100 = **40.18%**

Accept answers that give the gearing ratio as 40.2%.

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

Apply the own figure rule where appropriate.

c ■ Current ratio = 1.3 ■ Quick ratio = 0.61

Using the current ratio shows that the firm has €1.3 of liquid assets for each €1 of current liabilities. This is a good position to be in as the bakery can afford its short-term debts. The acid test (quick) ratio is less impressive at just 0.61, which suggests that MS *Bakery* must sell its stock in order to repay its immediate and short-term debts. However, the nature of the business suggests that selling the stock is not a major issue for the 'successful family business'.

Award 1 to 2 marks for an answer that shows some understanding of the demands of the question. There is limited application of the short-term liquidity ratios.

Award 3 to 4 marks for an answer that shows good understanding of the demands of the question. There is effective application of both short-term liquidity ratios.

Apply the own figure rule where appropriate.

3.7 Cash flow

1 a Cash outflow refers to the money an organization pays for its business activities, i.e. money that leaves the business. Examples include the payment of wages, rent, bank loans and bank interest, utility bills and insurance.

Award 1 mark for an answer that shows some understanding of the term cash outflow.

Award 2 marks for an answer that shows a clear understanding of the term cash outflow, similar to the one given above.

b ■ Net cash flow = Cash inflow Cash outflow ■ Net cash flow = $320 500 − $295 750 = **$24 750**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

c ■ Closing balance = Opening balance + Net cash flow
■ Closing balance = $15 500 + $24 750 = **$40 250**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

Apply the own figure rule (error carried forward) where appropriate.

2 a

A	$7 100	sum of cash inflows: $4 000 + $3 100
B	–$1 040	cash inflow – cash outflow: $4 800 – $5 840
C	$2 860	same as closing balance in previous month (October)
D	$840	opening balance + net cash flow: $1 780 + (–)$940

Table A3.7.1

Award 1 mark for each correct answer, up to the maximum of 4 marks. There is no need to show the working out to gain full marks.

Apply the own figure rule where appropriate.

b
- TR = $4 000 + $4 800 + $4 600 + $5 300 = $18 700
- TC = $5 200 + $5 840 + $5 680 + $6 240 = $22 960
- Hence, profit/loss = **$4 260** (a loss)

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

c The firm is not doing well in terms of its cash flow. While sales revenue is on an upward trend, the higher direct costs suggest the firm is unable to benefit from economies of scale. Moreover, the relatively high expenses ($2 000 per month) literally wipe out any profit margin for the firm.

While the cash flow forecast shows a positive closing balance for all four months, it is in continual decline. In fact, without the $3 100 overdraft as a source of finance in September, the closing balance would be negative in the following three months (−$240, −$1 320 and −$2 260 respectively). Unless sales improve and/or costs fall, the firm is likely to face a liquidity crisis.

Award 1 to 2 marks for an answer that shows some understanding of the demands of the question, although the answer lacks detail or use of the cash flow forecast.

Award 3 to 4 marks for an answer that shows a good understanding of the demands of the question. The cash flow forecast is used accurately to answer the question.

3 a
i Net cash flow in April: −$600
ii Opening balance in May: −$100
iii Net cash flow in June: $1 000
iv Closing balance in July: $3 900

Award 1 mark for each correct answer, up to the maximum of 4 marks.

b Essentially, the cash flow situation for *Amigos Gift Store* is positive, ending the period with $3 900. However, there is a negative closing balance in both April and May, as the net cash flows (−$600 and −$100 respectively) are not sufficiently covered by the firm's opening balances in those months ($500 and −$100 respectively). Hence, the firm will need additional cash, perhaps through an overdraft, to continue operating for this period. Thereafter, as sales continually increase (especially credit sales), the firm's cash flow position improves.

Award 1 to 2 marks for an answer that shows some understanding of the demands of the question, although the answer lacks detail or use of the cash flow forecast.

Award 3 to 4 marks for an answer that shows a good understanding of the demands of the question. The cash flow forecast is used accurately to answer the question.

4 a Cost of goods sold (COGS) refers to the costs incurred by a business when purchasing the stocks (inventories) that it then sells to its own customers. The formula for calculating COGS is: Opening stock + Purchases − Closing stock.

Award 1 mark for an answer that shows some understanding of the term cost of goods sold.

Award 2 marks for an answer that shows a clear understanding of the term cost of goods sold, similar to the one given above.

b

	March	April	May	June	July	August
Sales revenue	10 000	10 000	11 000	11 000	12 100	12 100
Bank loan	8 000					
Owner's capital	5 000					
Total cash inflows	23 000	10 000	11 000	11 000	12 100	12 100
Cost of goods sold	6 000	6 000	6 600	6 600	7 260	7 260
Rent	2 000	2 000	2 000	2 000	2 000	2 000
Salaries	1 600	1 600	1 600	1 600	1 600	1 600
Other costs	700	700	700	700	700	700
Total cash outflows	10 300	10 300	10 900	10 900	11 560	11 560
Net cash flow	12 700	**−300**	100	100	540	540
Opening balance	0	12 700	12 400	12 500	12 600	13 140
Closing balance	12 700	12 400	12 500	12 600	13 140	13 680

Table A3.7.2

Award 1 mark for an answer that shows limited understanding of a cash flow forecast. It is largely inaccurate, incomplete, or illegible.

Award 2 to 3 marks for an answer that shows some understanding of a cash flow forecast, with the forecast containing two or more errors. The presentation is not in a generally accepted format or it is untidy.

Award 4 to 5 marks for an answer that shows good understanding of a cash flow forecast. The cash flow forecast is largely correct and is neatly presented in a generally accepted format. Award 4 marks if there are two errors and 5 marks if there is one error.

Award 6 marks for an answer that shows excellent understanding of a cash flow forecast. The cash flow forecast is drawn accurately and is neatly presented in a generally accepted format and is error free.

In all cases, apply the own figure rule where appropriate.

c There are several potential issues arising from this cash flow forecast, including:

- A negative net cash flow balance in April, when cash outflows ($10 300) exceed inflows ($10 000).
- The net cash flow balances from May ($100) to August ($540) is hardly impressive, especially in relation to the cash sales figures ($11 000 in May and $12 100 in August).
- While the closing balance in December is $13 680, this is largely due to the bank loan of $8 000 in March; without the bank loan, the closing balance at the end of the first 6 months of trading would be only $5 680 (barely more than the $5 000 that Helen Law invested in the business). In fact, without the bank loan, the closing balance only exceeds $5 000 from July onwards.

Award any other relevant concern that is applied in the context of the case study, using the cash flow forecast.

Award 1 mark for an answer that shows some understanding of the demands of the question, but lacks clear explanation or limited use of the cash flow forecast.

Award 2 marks for an answer that shows good understanding of the demands of the question, with effective use of the cash flow forecast.

5 a

	September	October	November	December
Tuition fees	1 025 000	1 025 000	1 025 000	0
Registration fees	250 000	0	0	0
Total cash inflow	1 275 000	1 025 000	1 025 000	0
Salaries	244 000	244 000	244 000	244 000
Other costs	600 000	600 000	600 000	600 000
Total outflows	844 000	844 000	844 000	844 000
Net cash flow	431 000	181 000	181 000	844 000
Opening balance	290 000	721 000	902 000	1 083 000
Closing balance	721 000	902 000	1 083 000	239 000

Table A3.7.3

- Monthly tuition fees = $2 050 × 500 = $1 025 000
- Registration fees = $500 × 500 = $250 000
- Salaries = $3 050 × 80 = $244 000

Award 1 mark for an answer that shows limited understanding of a cash flow forecast. It is largely inaccurate, incomplete, or illegible.

Award 2 marks for an answer that shows some understanding of a cash flow forecast, with the forecast containing two or more errors. The presentation is not in a generally accepted format or it is untidy.

Award 3 marks for an answer that shows good understanding of a cash flow forecast. The cash flow forecast is largely correct and is neatly presented in a generally accepted format. There is one error.

Award 4 marks for an answer that shows excellent understanding of a cash flow forecast. The cash flow forecast is drawn accurately and is neatly presented in a generally accepted format and is error free.

In all cases, apply the own figure rule where appropriate.

b Possible comments could include consideration of the following:

- The closing balance in December, while positive, is only covered because of the larger amount received as registration fees in September, i.e. $250 000 > $239 000. In fact, the closing balance in December would be −$11 000 without all the registration fees collected in September.
- As the school is closed in December, there is no cash inflow, resulting in a net cash flow of −$844 000.
- It can be questioned why other costs in December are still so high (at $600 000) despite the school being closed; this should be investigated by the management.
- Perhaps the biggest concern is in January when the school remains closed for the winter holidays, as the closing balance in December ($239 000) is insufficient to pay salaries ($244 000) plus other expenses ($600 000). This would result in an alarming closing balance of −$605 000.

Award 1 to 2 marks for an answer that shows some understanding of the demands of the question, although the answer lacks detail or use of the cash flow forecast.

Award 3 to 4 marks for an answer that shows a good understanding of the demands of the question. The cash flow forecast is used accurately to answer the question.

3.8 Investment appraisal (some HL only)

1 a

- Payback period (PBP) = Cost of project ÷ Annual anticipated profits
- PBP = $38 000 ÷ $12 000 = **3 years and 2 months**

Award 1 mark if the calculation is incorrect but the working out is accurate, or if the calculation is correct but the working is not shown.

Award 2 marks if the calculation is correct and appropriate working out is shown.

b
- Average rate of return (ARR) = (Average yearly profit ÷ Capital employed) × 100
- Total profit = ($12 000 × 4) − $38 000) = $10 000
- Annual profit = $10 000 ÷ 4 = $2 500
- ARR = ($2 500 ÷ $38 000) × 100 = **6.58%**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

c The PBP is relatively long (3 years and 2 months) for a project anticipated to last 4 years, by which time the vehicle will need to be replaced. Hence, the firm is only able to earn profit for the remaining 10 months.

The ARR is 6.58%, meaning that the yearly net cash flow of $12 000 on an investment project that costs $38 000 yields $6.58 for every $100 invested. If *Cam & Nga Taxi Co.* cannot earn a greater return on the investment cost of $38 000, this yield may not be attractive to the firm.

Award 1 to 2 marks for an answer that shows some understanding of the two investment appraisal methods but there are some noticeable mistakes, misunderstandings or omissions.

Award 3 to 4 marks for an answer that shows a good understanding of the two investment appraisal methods. Award 3 marks for an unbalanced response.

2 a Net cash flow is the difference between a firm's total cash inflows and its total cash outflows, per time period.

Award 1 mark for an answer that shows some understanding of the term net cash flow.

Award 2 marks for an answer that shows a clear understanding of the term net cash flow, similar to the one given above.

b

	Year 1	Year 2	Year 3	Year 4	Year 5
Net cash flow ($)	4 500	5 500	5 000	4 200	3 000
Cumulative net cash flow ($)		10 000	15 000	19 200	22 200

Table A3.8.1

Fotan Stationers reaches its payback period (PBP) within year 4, when the net cash flow ($19 200) exceeds the cost of the investment ($18 000).
- Shortfall in Year 3 = $18 000 − $15 000 = $3 000 to reach payback
- Monthly average Net cash flow in Year 4 = $4 200 ÷ 12 = $350
- $3 000 ÷ $350 = 8.57 months (or 9 months)
- Hence, PBP = **3 years and 9 months**

Award 1 mark if the calculation is incorrect but the working out is accurate, or if the calculation is correct but the working is not shown.

Award 2 marks if the calculation is correct and appropriate working out is shown.

c

	Year 1	Year 2	Year 3	Year 4	Year 5
Net cash flow ($)	4 500	5 500	5 000	4 200	3 000
Cumulative net cash flow ($)		10 000	15 000	19 200	22 200

Table A3.8.2

- Total profit = $22 200 − $18 000 = $4 200
- Average profit = $4 200 ÷ 5 = $840
- Hence, Average rate of return = $840 ÷ $18 000 = **4.67%**

Award 1 mark if the calculation is incorrect but the working out is accurate, or if the calculation is correct but the working is not shown.

Award 2 marks if the calculation is correct and appropriate working out is shown.

d The PBP is relatively long (3 years and 9 months) for a project anticipated to last 5 years, by which time the photocopier is likely to be replaced. Hence, the firm is only able to earn profit on the investment for a little more than a year – and possibly less if the forecasts are adversely incorrect.

The ARR is 4.67%, i.e. the yield is only $4.67 for every $100 invested in the project. However, if *Fotan Stationers* need to have this new machine to operate efficiently, then it may still be worth the expense.

Award 1 to 2 marks for an answer that shows some understanding of the two investment appraisal methods but there are some noticeable mistakes, misunderstandings or omissions.

Award 3 to 4 marks for an answer that shows a good understanding of the two investment appraisal methods. Award 3 marks for an unbalanced response.

3 a

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Projected net cash flow ($)	25 000	35 000	50 000	60 000	60 000	40 000	30 000
Cumulative net cash flow ($)		60 000	110 000	170 000	230 000	270 000	300 000

Table A3.8.3

Rhys Thomas Holidays reaches its payback period (PBP) after the 4th year, i.e. within the 5th year, when the net cash flow ($230 000) exceeds the cost of the investment ($200 000).

- Shortfall in Year 4 = $200 000 − $170 000 = $30 000
- Monthly average Net cash flow in Year 5 = $60 000 ÷ 12 = $5 000
- $30 000 ÷ $5 000 = 6 months
- Hence, PBP = **4 years and 6 months**

Award 1 mark if the calculation is incorrect but the working out is accurate, or if the calculation is correct but the working is not shown.

Award 2 marks if the calculation is correct and appropriate working out is shown.

b

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Projected net cash flow ($)	25 000	35 000	50 000	60 000	60 000	40 000	30 000

Table A3.8.4

- Total projected net cash flow = $25 000 + $35 000 + $50 000 + $60 000 + $60 000 + $40 000 + $30 000 $300 000
- Investment cost = $200 000
- Profit = $300 000 − $200 000 = **$100 000**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

c

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Projected net cash flow ($)	25 000	35 000	50 000	60 000	60 000	40 000	30 000
Discount factor	0.9434	0.8900	0.8396	0.7921	0.7473	0.7050	0.6651
Present value ($)	23 585	31 150	41 980	47 526	44 838	28 200	19 953

Table A3.8.5

- The total present value = $23 585 + $31 150 + $41 980 + $47 526 + $44 838 + $28 200 + $19 953 = $237 232
- Hence, the Net present value = $237 232 − $200 000 = **$37 232**

Award 1 to 2 marks if the correct procedure has been followed but there is an error(s) in the calculation(s) of the net present value. Deduct 1 mark per error, but do not penalize for errors that have been carried forward.

Award 3 marks for the correct final value for net present value ($37 232) with no errors. There is a clear indication of the workings shown.

Apply the own figure rule (error carried forward) where appropriate.

d The PBP is relatively short (4 years and 6 months) for a project expected to last 7 years, by which time the firm is anticipated to earn profit on the investment for another 2 years and 6 months.

The net present value is positive at $37 232 so the firm is expected to earn a positive return on its investment in real terms, after discounting future cash flows at 6% (presumably, the minimum rate expected from the company's owners, or the average interest rate from placing the initial $200 000 in a bank account).

Note: the profit without consideration of the future value of net cash flows is $100 000, as shown in Question **3b** – rather than the much lower figure of $37 232 once the (more realistic) net present value figure is used.

Award 1 to 2 marks for an answer that shows some understanding of the two investment appraisal methods but there are some noticeable mistakes, misunderstandings or omissions.

Award 3 to 4 marks for an answer that shows a good understanding of the two investment appraisal methods.

Award 3 marks for an unbalanced response.

4 a The payback period = **3 years**

Year	Net cash flow	Cumulative cash flow
1	$15 000	$15 000
2	$20 000	$35 000
3	$30 000	**$65 000**
4	$20 000	$85 000
5	$20 000	$105 000

Table A3.8.6

Note: **the table above is provided for illustrative purposes only.**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

b
- Total projected net cash flow = $15 000 + $20 000 + $30 000 + $20 000 + $20 000 = $105 000
- Profit from the investment project = $105 000 − $65 000 = $40 000
- Average annual profit = $40 000 ÷ 5 years = $8 000
- Average rate of return = $8 000 ÷ $65 000 = **12.31%**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

c Net present value = $90 464 − $65 000 = **$25 464**

Year	Net cash flow ($)	Discount rate	Discounted cash flow (DCF) ($)
1	15 000	0.9524	14 286
2	20 000	0.9070	18 140
3	30 000	0.8638	25 914
4	20 000	0.8227	16 454
5	20 000	0.7835	15 670
Total	105 000		90 464

Table A3.8.7

Award 1 to 2 marks if the correct procedure has been followed but there is an error(s) in the calculation(s) of the net present value. Deduct 1 mark per error, but do not penalize for errors that have been carried forward.

Award 3 marks for the correct final value for net present value ($25 464) with no errors. There is a clear indication of the workings shown.

Apply the own figure rule (error carried forward) where appropriate.

d Arguments in favor of purchasing the industrial massage chairs include the following:
- There is a relatively short payback period of 3 years, so the investment is expected to earn *Kucharek Parlour* profit for the remaining 2 years of the project.

- The business earns profit averaging $8000 per year over 5 years, or an ARR of 12.31% (more than double the discount rate of 5%).
- The project yields a positive net present value of $25464 so the project is viable on financial grounds.

Arguments against the purchase of the industrial massage chairs might include the following:

- It is difficult to project accurate or realistic figures for 5 years.
- There is potential bias in the use of a low discount factor (5%) to make the net present value figure look artificially or unrealistically higher.
- There is no qualitative information on the investment project, i.e. how reputable is the supplier of the massage chairs?

Award 1 to 2 marks for an answer that shows some understanding of the demands of the question, although the answer lacks detail or is unbalanced.

Award 3 to 4 marks for a detailed explanation that considers whether the purchase is a feasible/sensible investment. There is appropriate use of the data provided, including the calculations from the previous answers.

5 a

	Year 1	Year 2	Year 3	Year 4	Year 5
Projected net cash flow ($)	30000	40000	60000	70000	60000
Cumulative cash flow ($)		70000	130000	200000	260000

Table A3.8.8

Brownsword Books reaches its payback period (PBP) between years 4 and 5 (when the cumulative net cash flow exceeds $220000 for the first time).

- Shortfall in Year 4 = $220000 − $200000 = $20000 to reach payback
- Monthly average Net cash flow in Year 5 = $60000 ÷ 12 = $5000
- $20000 ÷ $5000 = 4 months
- Hence, PBP = **4 years and 4 months**

Award 1 mark if the calculation is incorrect but the working out is accurate, or if the calculation is correct but the working is not shown.

Award 2 marks if the calculation is correct and appropriate working out is shown.

b As the payback period is longer than desired by the management at *Brownsword Books*, the investment should not be made. If it takes 4 years and 4 months to reach payback, the firm will only earn profits for 8 months during the 5 year project, so this is a highly risky investment.

Award 1 mark for an answer that shows show understanding of the demands of the question, although the answer lacks detail or the use of the data/calculations.

Award 2 marks for an answer that comments on the decision not to invest, given the high risks of a long payback period. There is use of the data/calculations to substantiate the comment.

c

- Total net cash flow = $260000
- Investment cost = $220000
- Total profit = $40000
- Annual profit = $40000 ÷ 5 years = $8000
- ARR = ($8000 ÷ $220000) × 100 = **3.64%**

Award 1 mark if the calculation is incorrect but the working out is accurate, or if the calculation is correct but the working is not shown.

Award 2 marks if the calculation is correct and appropriate working out is shown.

d

	Year 1	Year 2	Year 3	Year 4	Year 5	Total
Projected net cash flow ($)	30000	40000	60000	70000	60000	260000
Discount factor	0.9615	0.9246	0.8890	0.8548	0.8219	
Discounted cash flow (DCF) ($)	28845	36984	53340	59836	49314	228319

Table A3.8.9

- Sum of DCF = $228 319
- Net present value = $228 319 − $220 000 = **$8 319**

Award 1 to 2 marks if the correct procedure has been followed but there is an error(s) in the calculation(s) of the net present value. Deduct 1 mark per error, but do not penalize for errors that have been carried forward.

Award 3 marks for the correct final value for net present value ($8 319) with no errors. There is a clear indication of the workings shown.

Apply the own figure rule (error carried forward) where appropriate.

3.9 Budgets (HL only)

1 a Cost of sales (COS) is the direct costs attributable to the production of a good or service sold by a business. COS includes the cost of direct labour and the materials used in manufacturing the product.

Award 1 mark for an answer that shows some understanding of the term cost of sales.

Award 2 marks for an answer that shows a clear understanding of the term cost of sales, similar to the one given above.

b

Variable	Budgeted ($)	Actual ($)	Variance ($)
Cost of sales	**310 000**	296 000	14 000 favorable
Expenses	180 000	183 600	**3 600 adverse**
Sales revenue	1 500 000	**1 604 000**	104 000 favorable
Wages	400 000	420 000	**20 000 adverse**

Table A3.9.1

Award 1 mark for each correct answer, up to the maximum of 4 marks.

2 a A budget is a target or plan for a firm's costs and revenues over a given period of time. For example, an income (or revenue) budget sets a minimum but realistic sales target, while an expenditure budget sets a realistic maximum target or plan for costs.

Award 1 mark for an answer that shows some understanding of the term budget.

Award 2 marks for an answer that shows a clear understanding of the term budget, similar to the one given above.

b

	January ($)	February ($)	March ($)	April ($)
Income	5 000	4 500	6 000	**6 500**
Variable costs	3 250	**2 925**	**3 900**	4 225
Fixed costs	1 500	**1 500**	1 500	**1 500**
Total costs	**4 750**	4 425	5 400	**5 725**
Profit	**250**	75	**600**	775

Table A3.9.2

Award 1 to 2 marks for a budget statement that is not accurately calculated and demonstrates limited understanding. There are two or more errors.

Award 3 to 4 marks for a budget statement that is accurately calculated and demonstrates good understanding. Allow one error for 3 marks.

Apply the own figure rule (error carried forward) where appropriate.

3 a

	June		July	
	Budgeted ($)	**Actual ($)**	**Budgeted ($)**	**Actual ($)**
Revenue	4 500	4 400	5 000	5 200
Variable costs	2 700	2 640	3 000	3 120
Fixed costs	1 400	1 400	1 400	1 400
Total costs	**4 100**	**4 040**	**4 400**	**4 520**
Profit	**400**	**360**	**600**	**680**

Table A3.9.3

Award 1 mark for each correctly calculated profit figure (budgeted and actual) for each month, up to the maximum of 4 marks.

Apply the own figure rule where appropriate.

b i **July** (the actual revenue exceeds the budgeted revenue by $200)

Award 1 mark for the correct answer.

ii **July** (the actual variable costs exceed the budgeted amount by $120)

Award 1 mark for the correct answer.

iii **June** (the actual total costs are lower than the budgeted amount by $60)

Award 1 mark for the correct answer.

iv **June** (the actual profit of $360 is lower than the budgeted amount of $400, i.e. an adverse variance of $40)

Award 1 mark for the correct answer.

4 a

	July			August		
	Budgeted ($)	**Actual ($)**	**Variance ($)**	**Budgeted ($)**	**Actual ($)**	**Variance ($)**
Sales revenue	14 000	15 000	1 000	16 000	18 000	**2 000**
Cost of sales	7 000	7 500	−500	8 000	9 000	**–1 000**
Overheads	3 000	3 200	−200	3 200	3 200	**0**
Profit	4 000	4 300	300	4 800	5 800	**1 000**

Table A3.9.4

Award 1 mark for each correctly calculated variance, up to the maximum of 4 marks.

Apply the own figure rule where appropriate.

b *Jak & Luk's Ice Creams* had a large favorable variance of $1 000 for sales revenue (perhaps due to hotter than expected weather), which more than compensated for the adverse variances for cost of sales ($500) and overheads ($200). Hence, overall, there was a $300 favorable variance to the firm's profit for July.

Award 1 mark for an answer that shows some understanding of the demands of the question, although there is limited use of the data in the budget statement.

Award 2 marks for an answer that shows clear understanding of the demands of the question, with relevant use of the data in the budget statement.

c Although there is a favorable variance of $2 000 for sales revenue in August, there are possible reasons beyond the performance of the managers which account for this. For example:

- Hotter than expected weather could mean more sales, without the managers actually having performed any better than usual.

- The sales target for August may be have been deliberately underestimated, especially if financial rewards are tied to the budgets.
- The sales team (of twelve workers) are not rewarded, although they contribute to the sales revenue being exceeded.

Award any other relevant reason that is applied in the context of the case study.

Award 1 mark for an answer that shows some understanding of the demands of the question, although there is limited application to the context of the case study.

Award 2 marks for an answer that shows good understanding of the demands of the question, explained in the context of the case study.

5 a A variance occurs in a budget when an actual figure in a financial plan differs from the forecasted (more likely) budgeted figure.

Award 1 mark for an answer that shows some understanding of the term variance.

Award 2 marks for an answer that shows a clear understanding of the term variance, similar to the one given above.

b

Item	Budgeted ($)	Actual ($)	Variance ($)
Staffing costs	15 200 000	15 325 000	**125 000 A**
Equipment	2 300 000	2 200 000	**100 000 F**
Photocopying	1 345 000	1 450 000	**105 000 A**
Textbook purchases	800 000	830 000	**30 000 A**

Table A3.9.5

Award 1 mark for each correctly calculated variance, up to the maximum of 4 marks.

c Possible answers could include:

- A larger number of students attended the school than planned, which resulted in more photocopying costs.
- The introduction of new courses or curriculums, or changes to certain syllabi (updates), created a need for more photocopying than usual.
- There was an unrealistic budget allocation for photocopying. Students have access to many resources on laptops/tablets and so the need for photocopying was expected to be lower.
- Suppliers (of ink cartridges and photocopying paper) increased their prices during the academic year.

Award any other relevant reason that is outlined in the context of the case study.

Award 1 mark for a feasible reason and 1 mark for the outline (brief explanation).

d Possible reasons could include:

- Budgets can help the school to set financial goals so that it operates within its means; the business manager will be particularly interested in this function of budgets.
- Budgets can act as an important motivating mechanism for budget holders, such as heads of subject/department or heads of year.
- Similarly, budgets hold people accountable for their expenditure, ensuring as much as possible that budget holders do not spend beyond their planned targets (as shown in a variance analysis).
- Budgets act as a control mechanism, which is vital for the sustainability of an organization, including any fee-paying school, as adverse variances can jeopardize the survival of the business.
- Fee-paying parents would be concerned if budgets were allocated or spent inappropriately.

Award any other appropriate reason, outlined in the context of schools.

Award 1 mark for each relevant reason, plus 1 mark for explaining the importance for organizations such as *NAIS Academy*, up to the maximum of 4 marks.

Answers Unit 4

Marketing

4.3 Sales forecasting (HL only)

1 a Sales forecasting is the quantitative process of predicting a firm's future sales, based on past sales data and trends over a specific period of time.

Award 1 mark for an answer that shows some understanding of the term sales forecasting.

Award 2 marks for an answer that shows a clear understanding of the term sales forecasting, similar to the one given above.

b

Month	1	2	3	4	5	6	7
Sales ($'000)	225	300	450	600	795	900	1 200
Moving average ($'000)		325	450	615	765	965	

Table A4.3.1

- (225 + 300 + 450) ÷ 3 = 325
- (300 + 450 + 600) ÷ 3 = 450
- (450 + 600 + 795) ÷ 3 = 615
- (600 + 795 + 900) ÷ 3 = 765
- (795 + 900 + 1 200) ÷ 3 = 965

Award 1 to 2 marks if the moving averages are calculated but there are some noticeable mistakes, misunderstandings or omissions.

Award 3 to 4 marks if the moving averages are correctly calculated and the working is shown. Allow one minor inaccuracy for 3 marks.

Apply the own figure rule (error carried forward) where appropriate and do not double penalize the candidates whose calculations are inaccurate.

2 a Answers may include an explanation of any of the following points:

- Being able to identify sales trends can help planning by accurately forecasting sales figures in the future.
- Sales forecasting uses past and current sales data to help reduce future uncertainties.
- Sales forecasting enables various budgets to be prepared for different functions of the business.
- Sales forecasting facilitates the setting of organizational objectives and the implementation of appropriate strategies to achieve those goals.

Accept any other relevant explanation.

Award 1 mark for a relevant benefit identified and 1 mark for an appropriate explanation of the benefit.

b

Quarter	1	2	3	4	5	6	7	8
Sales ($'000)	200	300	250	450	220	350	250	500
4-quarter total ($'000)				1 200	1 220	1 280	1 280	1 320
8-quarter total ($'000)				1 220	1 280	1 280	1 320	
4-point moving average ($'000)				302.5	312.5	320	325	

Table A4.3.2

The 4-point moving average is found by centering the 4-quarter and 8-quarter totals.

- (200 000 + 300 000 + 250 000 + 450 000) = 1 200 000
- (300 000 + 250 000 + 450 000 + 220 000) = 1 220 000
- 8-quarter total = 1 200 000 + 1 220 000 = 2 420 000
- 4-point moving average = 2 420 000 ÷ 8 = **$302 500**

Award 1 to 2 marks if the 4-point moving averages are calculated but there are some noticeable mistakes, misunderstandings or omissions.

Award 3 to 4 marks if the 4-point moving averages are correctly calculated and appropriate working is shown. Allow one minor inaccuracy for 3 marks.

Apply the own figure rule where appropriate and do not double penalize the candidates whose calculations are inaccurate.

3 a The 4-point moving average is found by centering the 4-quarter and 8-quarter totals, so for the first time period:

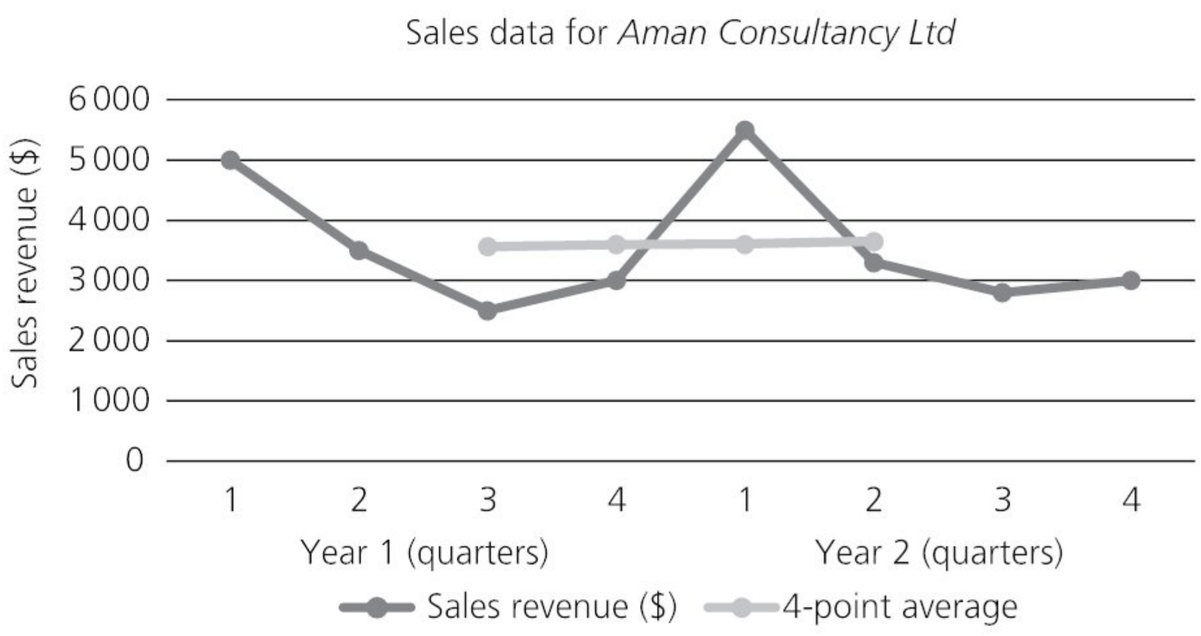
- (5 000 + 3 500 + 2 500 + 3 000) = $14 000
- (3 500 + 2 500 + 3 000 + 5 500) = $14 500
- 8-quarter total = $28 500
- 4-point moving average = $28 500 ÷ 8 = **$3 563**

Award 1 to 2 marks if the 4-point moving averages are calculated but there are some noticeable mistakes, misunderstandings or omissions.

Award 3 to 4 marks if the 4-point moving averages are correctly calculated and appropriate working is shown. Allow one minor inaccuracy for 3 marks.

Apply the own figure rule where appropriate and do not double penalize the candidates whose calculations are inaccurate.

b



Award 1 mark for correctly and fully labelled axes.

Award 1 mark for accurately plotted sales revenue line.

Award 1 mark for accurately plotted trend line (4-point moving average).

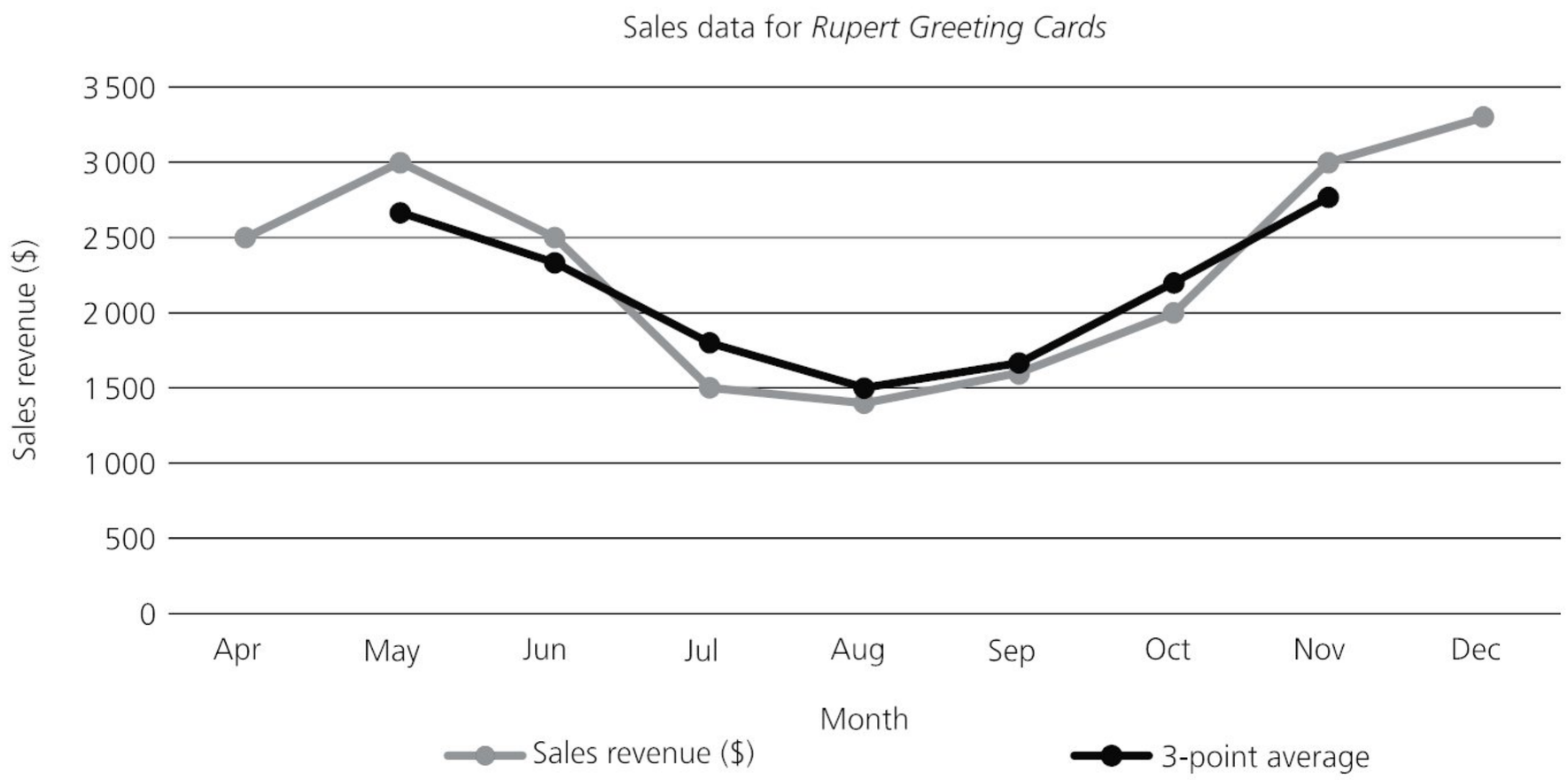
Award 1 mark for an appropriate title.

4 a

- (2 500 + 3 000 + 2 500) ÷ 3 = 2 667
- (3 000 + 2 500 + 1 500) ÷ 3 = 2 333
- (2 500 + 1 500 + 1 400) ÷ 3 = 1 800
- (1 500 + 1 400 + 1 600) ÷ 3 = 1 500
- (1 400 + 1 600 + 2 000) ÷ 3 = 1 667
- (1 600 + 2 000 + 3 000) ÷ 3 = 2 200
- (2 000 + 3 000 + 3 300) ÷ 3 = 2 767

Award 1 mark for the correct answers and 1 mark for showing appropriate working out, up to the maximum of 2 marks.

b



Award 1 mark for correctly and fully labelled axes.

Award 1 mark for accurately plotted sales revenue line.

Award 1 mark for accurately plotted trend line (4-point moving average).

Award 1 mark for an appropriate title.

c

Month	Sales revenue ($)	3-point average ($)	Seasonal variation ($)
4	2 500		
5	3 000	2 667	333
6	2 500	2 333	167
7	1 500	1 800	−300
8	1 400	1 500	−100
9	1 600	1 667	−67
10	2 000	2 200	−200
11	3 000	2 767	233
12	3 300		

Table A4.3.3

- $3\,000 - 2\,667 = 333$
- $2\,500 - 2\,333 = 167$
- $1\,500 - 1\,800 = -300$
- $1\,400 - 1\,500 = -100$
- $1\,600 - 1\,667 = -67$
- $2\,000 - 2\,200 = -200$
- $3\,000 - 2\,767 = 233$

Award 1 mark for the correct answers and 1 mark for showing appropriate working out, up to the maximum of 2 marks.

5 a

- $(10 + 12 + 16) \div 3 = 12.67$
- $(12 + 16 + 20) \div 3 = 16.00$
- $(16 + 20 + 24) \div 3 = 20.00$
- $(20 + 24 + 26) \div 3 = 23.33$
- $(24 + 26 + 20) \div 3 = 23.33$
- $(26 + 20 + 14) \div 3 = 20.00$

Award 1 to 2 marks if the 3-point moving averages are calculated but there are some noticeable mistakes, misunderstandings or omissions.

Award 3 to 4 marks if the 3-point moving averages are correctly calculated and appropriate working is shown. Allow one minor inaccuracy for 3 marks.

Apply the own figure rule where appropriate and do not double penalize the candidates whose calculations are inaccurate.

b

Month	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct
Sales ($'000)	10	12	16	20	24	26	20	14
3-point average ($'000)		12.67	16.00	20.00	23.33	23.33	20.00	
Sales variation ($'000)		–0.67	0.00	0.00	0.67	2.67	0.00	

Table A4.3.4

Award 1 mark if the monthly sales variation is calculated but there are some noticeable mistakes, misunderstandings or omissions.

Award 2 marks if the monthly sales variation is correctly calculated.

Apply the own figure rule where appropriate.

c Although seasonal and cyclical variations are used to predict sales trends, there is a subtle difference, or purpose.

Seasonal variations are used to adjust the sales forecast from the trend within a year, usually using quarterly or monthly sales data. They are used to make a more accurate forecast for a specific quarter (or season).

Cyclical variations occur in the sales figures due to fluctuations in the business (or trade) cycle, i.e. economic recessions and booms. To make the forecasted figures from the trend more accurate, the fluctuations are adjusted by the average of the cyclical variations.

Seasonal variations are usually reoccurring due to the time of year (i.e. the seasons), whereas cyclical variations occur due to less regular fluctuations in the level of economic activity.

Award 1 to 2 marks for an answer that shows some knowledge of seasonal and cyclical variations to sales trends. The definitions are brief but show a basic level of understanding.

Award 3 to 4 marks for an answer that distinguishes between seasonal and cyclical variations to sales trends. For 4 marks there is clear distinction between seasonal and cyclical variations and how they are used to adjust sales forecasts.

d Using the monthly sales variation calculated in Question **5b** above, the cyclical variation is (−0.67 + 0.00 + 0.00 + 0.67 + 2.67 + 0.00) ÷ 6 = **0.44** (or **$440**)

Accept answers that give the cyclical variation as 0.445 or $445.

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

Answers Unit 5

Operations management

5.5 Production planning (HL only)

1 a
- Capacity utilization rate = Actual output ÷ Productive capacity × 100
- Capacity utilization rate = (261 ÷ 300) × 100 = **87%**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

b
- Labour intensity rate = (Labour costs ÷ TC) × 100
- ($52 000 ÷ $98 000) × 100 = **53.06%**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

c
- Capital intensity rate = (Capital expenditure ÷ TC) × 100
- Capital expenditure = $98 000 $52 000 $11 500 = $34 500
- Capital intensity rate = ($34 500 ÷ $98 000) × 100 = **35.2%**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

2 a
- Capacity utilization rate = Actual output ÷ Productive capacity × 100
- Capacity utilization rate = (1600 ÷ 2000) × 100 = **80%**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

b
- AFC = TFC ÷ Output
- At 1600 units, AFC = $6000 ÷ 1600 = **$3.75**
- At 2000 units, AFC = $6000 ÷ 2000 = **$3.00**

Award 1 mark for each correct answer and 1 mark for showing appropriate working out, up to the maximum of 3 marks.

c
- Profit margin = Price AC
- At 1600 units, AC = $3.75 + $20 = $23.75
- At 1600 units, profit margin = $80 − $23.75 = **$56.25**
- At 2000 units, AC = $3.00 + $20 = $23
- At 2000 units, profit margin = $80 − $23 = **$57.00**

Award 1 mark for each correct answer and 1 mark for showing appropriate working out, up to the maximum of 3 marks.

d
- Profit = Total contribution − TFC
- At the current 1600 units, profit = ((80 20) × 1600) − $6000 = $90000
- At the maximum 2000 units, profit = ((80 20) × 2000) − $6000 = $114000
- Hence, the difference in profit = $114000 − $90000 = **$24000**

Award 1 mark for the correct answer and 2 marks for showing appropriate working out, up to the maximum of 3 marks.

3 a
- Sales per worker at *Au Property Co.* = $5000000 ÷ 12 = **$416667 per sales person**
- Sales per worker at *Konrad Real Estate* = $4200000 ÷ 10 = **$420000 per sales person**

Award 1 mark for each correct answer and 1 mark for showing appropriate working out, up to the maximum of 3 marks.

b

Firm	Total sales ($)	Properties sold	Sales staff	Average price ($)	Sales ($)/ worker	Units/ worker
Au Property Co.	5000000	10	12	500000	416667	0.83
Konrad Real Estate	4200000	12	10	350000	420000	1.20

Table A5.5.1

- Based on the calculation in Question **4a**, the sales team at *Konrad Real Estate* is slightly more productive, even though they have fewer staff and sold a lower value of real estate.
- However, *Au Property Co.* might be considered to be more productive as the average price sold for each property was much higher ($500000 versus $350000).
- If the productivity rate is based on the number of units (properties) that each real estate agent sold, then *Konrad Real Estate* is more productive. The staff at *Au Property Co.* sold an average of less than 1 property (0.83) between the 12 workers, whereas the average was 1.2 units in the same time period with 10 workers at *Konrad Real Estate*
- Thus, the choice of measurement of productivity can determine how productive the two firms are interpreted to be.

Award 1 to 2 marks for an answer that shows some understanding of how the firms vary in their productivity rates. There are likely to be errors or omissions in the calculations of labour productivity.

Award 3 to 4 marks for an answer that shows a good understanding of how the firms vary in their productivity rates. The calculations are accurate and are used effectively to address the question.

4 a Just-in-case (JIC) is an inventory-management scheme whereby stocks of materials and goods (such as flour) are stored within the business for use when needed in the production process. JIC helps to ensure the business does not run out of stock.

Award 1 mark for an answer that shows some understanding of the term just-in-case.

Award 2 marks for an answer that shows a clear understanding of the term just-in-case, similar to the one given above.

b i 1 week

Award 1 mark for the correct answer. There is no need to show any working out, but the correct unit of measurement should be included.

ii 4000 kg of flour

Award 1 mark for the correct answer. There is no need to show any working out, but the correct unit of measurement should be included.

iii 12000 − 4000 = 8000 kg of flour

Award 1 mark for the correct answer. There is no need to show any working out, but the correct unit of measurement should be included.

iv 8000 kg of flour

Award 1 mark for the correct answer. There is no need to show any working out, but the correct unit of measurement should be included.

5 a A make-or-buy decision (also called an outsourcing decision) is a quantitative management tool used to judge whether a firm should make a particular product (such as tiles) internally or buy it from a supplier in the market.

Award 1 mark for an answer that shows some understanding of the term make-or-buy decision.

Award 2 marks for an answer that shows a clear understanding of the term make-or-buy decision, similar to the one given above.

b
- For break-even, Cost to buy (CTB) = Cost to make (CTM)
- $1.5Q = $15000 + $1Q
- $0.5Q = $15000
- Q = 30000 units

Therefore, the firm needs to sell 30000 tiles in order to break-even, but sales forecasts suggest only 25000 units will be sold. Since the CTM > CTB, it is more desirable financially to buy the tiles from the supplier. It would only be cost-effective to make the tiles if the firm's demand exceeds 25000 units.

Alternatively, students might work out the CTB and CTM differently:

- CTB 25000 units = $1.5 × 25000 = $37500
- CTM 25000 units = ($1 × 25000) + $15000 = $40000

Hence, as CTB < CTM, it is more financially sound to opt to buy from the supplier.

Award 1 to 2 marks for an answer that shows some understanding of the demands of the question. There may be errors in the calculation or the working out is not shown.

Award 3 to 4 marks for an answer that shows good understanding of the demands of the question. The calculations are correct, with appropriate working out shown to demonstrate that as there is insufficient demand, the firm cannot afford to make the product itself so is better off buying it from the local supplier.

Mock exam practice paper answers

1 a i $56 250 ÷ 750 = **$75 per skateboard**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

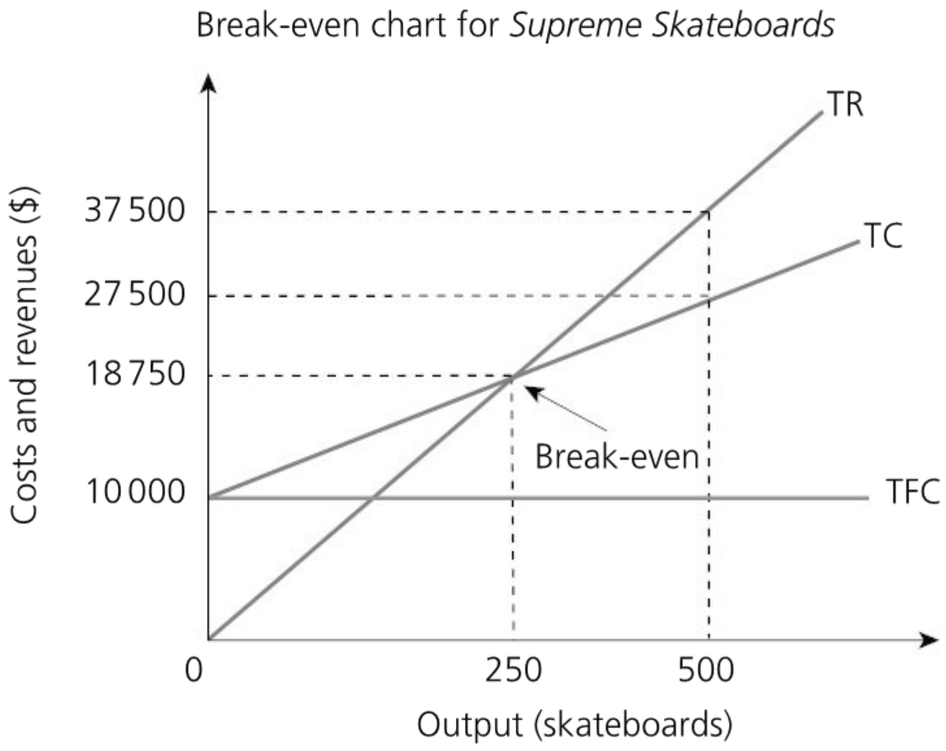
ii
- TVC = $56 250 − $20 000 − $10 000 = $26 250
- AVC = $26 250 ÷ 750 = **$35**

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

b

Quantity	Total variable costs (35Q)	Total cost (35Q + Total fixed costs)	Total revenue (75Q)	Profit ($)
0	0	10 000	0	(10 000)
250	8 750	18 750	18 750	0
500	17 500	27 500	37 500	10 000
750	26 250	36 250	56 250	20 000

Answer table 1



Award 1 mark for correct labels for the y-axis: Costs and revenues ($) and for the x-axis: Output (skateboards).

Award 1 mark for correctly drawn and labelled total revenue or sales revenue line*.

Award 1 mark for correctly drawn and labelled total costs line*.

Award 1 mark for an appropriate title, e.g. 'Break-even chart for *Supreme Skateboards*'.

***These curves clearly identify the correct break-even point (250 skateboards on the x-axis and $18 750 on the y-axis).**

***Note:* it is not essential to plot the total fixed costs line for the purpose of showing break-even but it has been included here for illustrative purposes.**

c
- Price increases 10% from $75 to $82.50
- Demand drops 10% from 750 to 675 skateboards
- Contribution per unit = $82.5 − $35 = $47.50
- Hence, profit = ($47.50 × 675) − $10 000 = $22 062.50
- Therefore, profits increase by **$2 062.50** ($22 062.50 − $20 000) or by **10.3%**

Award 1 mark if the answer is correct but the working out is missing or incomplete.

Award 2 marks for the correct answer, with accurate working out of the expected change in profits.

2 a Economies of scale are the cost-saving benefits of large-scale production, which help to reduce unit production costs. For example, *VLW* is able to bulk purchase its fine wines, thereby saving on its average costs of production.

Award 1 mark for an answer that shows some understanding of the term economies of scale, although the answer may be too simplistic.

Award 2 marks for an answer that shows a clear understanding of the term economies of scale, similar to the one given above.

b i 80 000 − 20 000 = **60 000 bottles**

Award 1 mark for the correct answer. There is no need to show any working out, but the correct unit of measurement should be included.

ii 40 000 bottles

Award 1 mark for the correct answer. There is no need to show any working out, but the correct unit of measurement should be included.

iii 2 months

Award 1 mark for the correct answer. There is no need to show any working out, but the correct unit of measurement should be included.

iv 20 000 bottles

Award 1 mark for the correct answer. There is no need to show any working out, but the correct unit of measurement should be included.

c Possible costs of stockpiling to *VLW* include:

- There would be costs of maintaining stocks of wine, e.g. air conditioning, insurance premiums and security costs.
- Inventory may be prone to breakages, theft or even fire damage.
- There may be added pressure on *VLW*'s liquidity position (paying for the large stocks of wine, but without sufficient cash from customers buying all of the wine).

Accept any other valid cost of stockpiling that is explained in the context of the case study.

Award 1 to 2 marks for showing some understanding of the demands of the question, although the answer might lack substance or the clear application to *VLW*.

Award 3 to 4 marks for a thorough explanation of two costs of stockpiling to businesses such as *VLW*. There is appropriate use of business management terminology, written in the context of the case study.

***Note:* stockpiling is not necessarily an issue for *VLW* as the firm may be over-ordering deliberately in anticipation of a sharp rise in sales (perhaps due to seasonal peaks such as during festive holidays).**

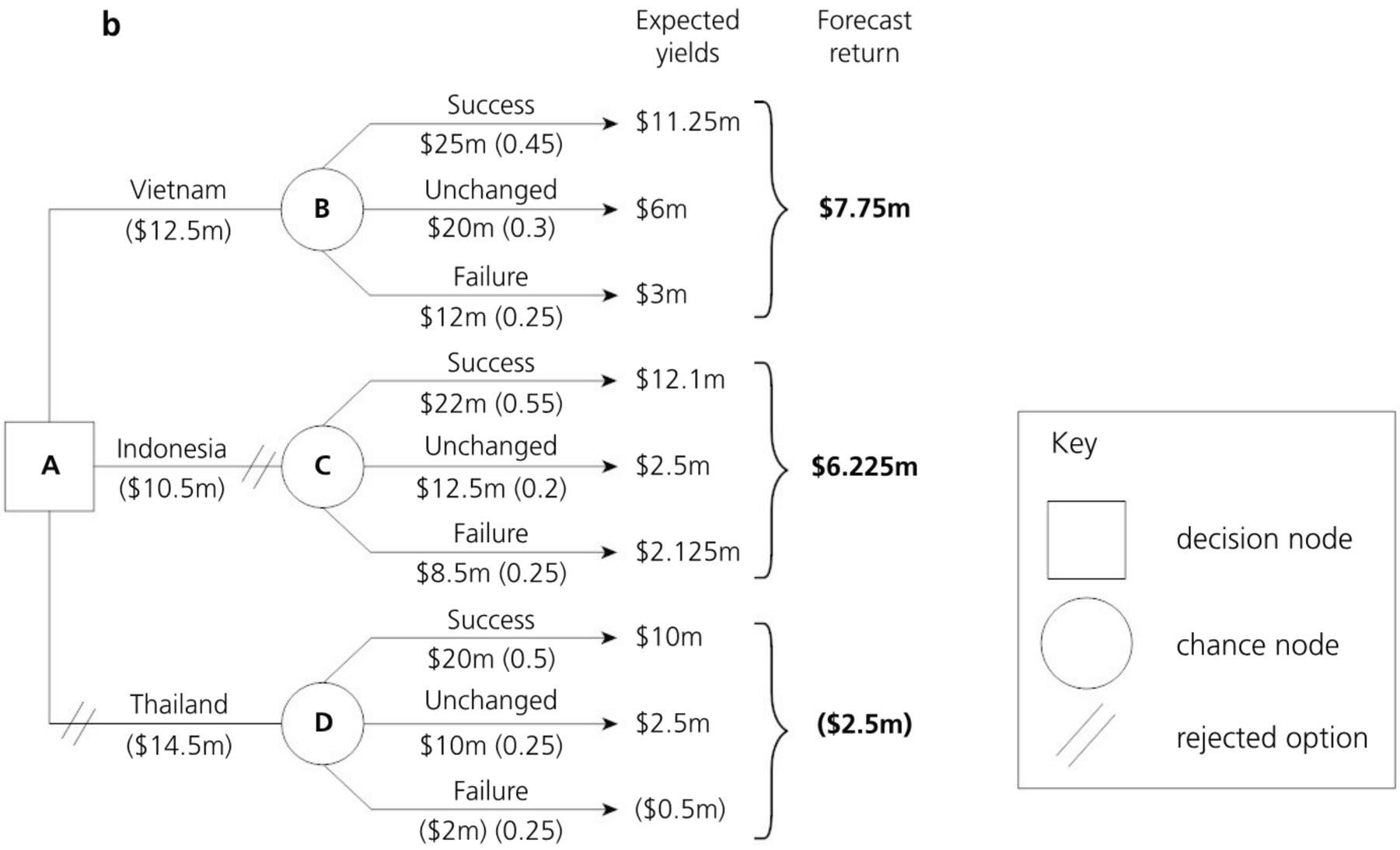
3 a Features of multinational companies include:

- They operate in two or more host countries.
- They have headquarters in the home country (country of origin).
- They are typically large in size, as they usually have operations in many locations.
- They have centralized ownership and control in the home country (headquarters), although very large multinational companies may have regional offices/headquarters.

Accept any other feature of multinational companies.

Award 1 mark for each appropriate feature, up to the maximum 2 marks.

b



Award 1 mark if the answer shows some understanding of a decision tree, but otherwise the response is largely inaccurate, incomplete or illegible.

Award 2 to 3 marks if a decision tree is constructed, but is either untidy (so illegible in places) and/or the forecast contains three or more errors or omissions.

Award 4 to 5 marks if the decision tree is largely correct and constructed neatly in a generally accepted format (including the use of a key), but there is one error for 5 marks or two errors for 4 marks.

Award 6 marks if the decision tree is constructed accurately and neatly in a generally accepted format (including an appropriate key), and is error free (including striking out Indonesia and Thailand – the two options that should not be pursued on financial grounds).

Apply the own figure rule (error carried forward) where appropriate.

c Valid non-financial factors could include:

- Management preferences, e.g. familiarity with the different locations and potential language barriers (as Chinese is not widely spoken in Vietnam, Indonesia or Thailand).
- Possible impacts on staffing, e.g. staff may be resistant to change (such as having to relocate from China).
- Existing competition in overseas markets, such as manufacturers of beauty products in Vietnam, Indonesia and Thailand.
- Stability (or volatility) of the various currencies (i.e. Vietnamese Dong, Indonesian Rupiah and Thai Baht) because fluctuations in the exchange rate will affect the profits of *Gel Nails*.

Accept any other valid financial or non-financial factor that is explained in the context of the case study.

Award 1 mark for an answer that briefly outlines one financial or non-financial factor. There is some use of appropriate business management terminology.

Award 2 marks for an answer that clearly explains one financial or non-financial factor that *Gel Nails* needs to consider before choosing any of the three options for overseas expansion. Appropriate business management terminology is used.

4 a A franchise is a form of legal ownership and method of growth whereby a person or organization buys the lawful right to trade using the name, logo, brand and trademark of another business. In return, the purchaser (known as the franchisee) pays a license fee to the parent company (known as the franchisor) plus a royalty payment based on the franchisee's sales revenue.

Award 1 mark for an answer that shows some understanding of the term franchise, although the answer may lack clarity.

Award 2 marks for an answer that shows a clear understanding of the term franchise, similar to the one given above.

b i **$1 000** (i.e. $20 000 − $19 000)

Award 1 mark for the correct answer. There is no need to show any working out.

ii **$18 400** (i.e. $7 400 + $3 000 + $8 000)

Award 1 mark for the correct answer. There is no need to show any working out.

iii **$1 300** (i.e. equal to the closing balance in September).

Award 1 mark for the correct answer. There is no need to show any working out.

iv **$500** (i.e. −$1 500 + $2 000)

Award 1 mark for the correct answer. There is no need to show any working out.

c Possible comments may include:

- The net cash flow is negative in December ($1 500). This is largely due to the 50% extra pay that staff receive as an end of year bonus. This is only affordable due to the positive $2 000 closing balance in November.
- The closing balance in December is only positive because of the positive closing balance in November. This may suggest liquidity problems in January onwards, especially if sales revenue has a seasonable dip after December.
- Although profitable, the liquidity position is somewhat of a concern as net cash flow is only $100 in October (and negative in December).

Accept any other relevant comment with reference to the data in *Big Bao*'s cash flow forecast.

Award 1 mark for an answer that shows some understanding of the liquidity position of *Big Bao*.

Award 2 marks for an answer that shows a clear understanding of the liquidity position of *Big Bao*, with good application of the data in the cash flow forecast.

d
- Profit = Sales revenue − TC
- Profit = ($20 000 + $18 500 + $19 500 + $22 500) ($19 000 + $18 400 + $18 800 + $24 000)
- Profit = $80 500 $80 200 = **$300**

Note: without paying staff an extra 50% in December, profit for the period would be $4 300.

Award 1 mark for the correct answer and 1 mark for showing appropriate working out.

5 a

Profit and loss account for *Mustang Motors Inc. (MMI)*, year ending 31st December 2019 ($)	
Sales revenue	125 000
Cost of goods sold	60 000
Gross profit	65 000
Expenses	35 000
Net profit before interest and tax	30 000

Answer table 2

Award 1 mark if limited understanding of the profit and loss account is shown. The profit and loss account may be presented in an incoherent or illegible format.

Award 2 to 3 marks if the profit and loss account is coherent. An appropriate title may be missing. Award 2 marks if there are two errors and award 3 marks if there is one error.

Award 4 marks for an answer that shows good understanding of the demands of the question. The format of the profit and loss account is clear and presented according to the IB prescribed format, including an appropriate title. There are no errors or omissions.

Apply the own figure rule where appropriate.

b i
- Working capital = Current assets − Current liabilities
- $33 000 − $22 000 = **$11 000**

Award 1 mark if the answer is correct but the working out is missing or incomplete.

Award 2 marks for the correct answer (expressed in dollars), with accurate working out shown.

ii
- Net profit margin (NPM) = (NP before interest and tax ÷ Sales revenue) × 100
- NPM = ($30 000 ÷ $125 000) × 100 = **24.0%**

Award 1 mark if the answer is correct but the working out is missing or incomplete.

Award 2 marks for the correct answer (expressed as a percentage), with accurate working out shown.

iii
- ROCE = (NP before interest and tax ÷ Capital employed) × 100
- ROCE = ($30 000 ÷ ($120 000 + $80 000 + $14 000)) × 100
- ROCE = ($30 000 ÷ $214 000) × 100 = **14.02%**

Award 1 mark if the answer is correct but the working out is missing or incomplete.

Award 2 marks for the correct answer (expressed as a percentage), with accurate working out shown.

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