Mock Exam One

AAT Level 4
Applied Management Accounting

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This practice assessment is one of a set of five AAT mock practice assessments which have been published for this subject. They are produced by our expert AAT tutors, giving real AAT exam style and standard tasks, which ensure the very best for exam success. All practice assessments are relevant for the current syllabus.

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Mock Exam One

AAT L4 Applied Management Accounting

Assessment information:

You have **3 hours** to complete this practice assessment.

This assessment contains **8 tasks** and you should attempt to complete **every** task.

The total number of marks for this assessment is **140**.

Each task is independent. You will not need to refer to your answers to previous tasks.

Tasks 2, 4 and 7 require extended writing as part of your response to the questions. You should make sure you allow adequate time to complete these tasks.

Read every task carefully to make sure you understand what is required.

Where the date is relevant, it is given in the task data.

Both minus signs and brackets can be used to indicate negative numbers **unless** task instructions state otherwise.

You must use a full stop to indicate a decimal point. For example, write 100.57 not 100,57 or 100 57.

You may use a comma to indicate a number in the thousands, but you don't have to. For example, 10000 and 10,000 are both acceptable.

Task 1 (12 marks)

You are gathering budget information for a company.

(a) Match each item for budget data given below to its most appropriate source. To show each answer, click on a box in the left hand column then click on a box in the right hand column. (3 marks)

Budget data	Appropriate source
Raw material prices	Competitor websites
Advertising costs	Company internet site
Selling prices	Marketing agencies
	Commodity price index
	Cash book

As a budget accountant you require information to complete each task given below.

(b) Match each task to the most likely contact for information required. To show each answer, click on a box in the left hand column then click on a box in the right hand column.

(4 marks)

Task	Contact
Explain a material price variance	Human resource manager
Prepare a direct labour cost budget	Sales department
Prepare a sales budget	Human resource and production manager
Prepare a production budget	Production manager
	Purchasing department

(c) Select the most appropriate budget for each of the following items

(5 marks)

Purchase of property, pant and equipment for the business	
Raw materials that must be purchased to fulfil production	
Volume and estimated earnings from selling products	
Expected cash receipts and disbursements during the period	
Functional budgets and budgeted financial statements	

Picklist: Activity-based Budget, Sales Revenue Budget, Priority-Based Budget, Material Cost Budget, Capital Expenditure Budget, Fixed Budget, Cash Budget, Master Budget, Financial Budget.

End of Task

Task 2 (24 marks)

(a) Complete the production budget shown below. Round all figures to the nearest whole number of units, if necessary. Do not use negative figures.

(12 marks)

- Closing inventory should be 10% of the following week's sales volume.
- 2% of all production will fail quality control checks and will be rejected.

Production (units)	Week 1	Week 2	Week 3	Week 4	Week 5
Opening inventory	2500				
Good production					
Sales volume	14000	12500	8900	10100	11300
Closing inventory					
Rejected production					
Total manufactured units					

(b) Identify and briefly explain TWO factors that may influence the level of rejected units for production.

(4 marks)

Burger Champion (BC) operates fast food burger restaurants nationwide. The budgeted (standard) cost of its 'Champion Burger' for the previous year is shown below:

Standard cost of One 'Champion Burger'	Units	£
Standard materials:		
Beef	0.30 Kg	0.25
Bun	0.10 Kg	0.04
Cheese	0.02 Kg	0.02
Onion and pickle	0.05 Kg	0.01
Sauces	0.05 litres	0.01
Standard labour:		
Cooking and preparation	0.06 hours	0.54
Customer service	0.03 hours	0.23
Overhead:		
Variable overhead	0.09 hours	0.32
Standard cost of One 'Champion Burger'		1.42

Food wastage has been of major concern to management throughout its chain of fast food restaurants. Management have a 'zero tolerance' policy for ingredient and cooked food wastage and this is applied in the calculation of its standard cost shown above. Despite this policy, there was 4.6% of total ingredient wastage and 8.2% of total cooked food wastage across its national chain of food restaurants.

(c)(i) Identify FOUR appropriate sources of data for Burger Champion, if constructing a new budget for its ingredients and direct labour to make the 'Champion Burger'. (4 marks)

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(c)(ii) Explain to the management of Burger Champion, ONE advantage and ONE disadvantage of allowing participation by restaurant staff if constructing a new budgeted cost for the 'Champion Burger'. (4 marks)

End of Task

Task 3 (18 marks)

ADW Limited makes prepacked sandwiches. Production information for the previous month (to make 4500 sandwiches) is shown below.

	Budget	Actual
Production - sandwiches	5000	4500
Ingredients - £	2500	2376
Ingredients - kilograms (kg)	1000	990
Direct labour - hours	500	360
Direct labour - £	4250	3060

(a)(i) Calculate each variance in the table shown below. Enter your answers to the nearest whole pound (£). Enter zero if there is no variance. Do not use minus signs or brackets. Use the drop down boxes to indicate whether each variance you have calculated is adverse, favourable or no variance.

(12 marks)

	£	Adverse/Favourable/ No variance
Ingredients price variance		
Ingredients usage variance		
Direct labour rate variance		
Direct labour efficiency variance		

Picklist: Adverse, Favourable, No variance.

(a)(ii) Identify the most likely cause of each variance calculated in part (a)(i) above.

(6 marks)

A potential reason for the ingredient price variance could be

Picklist: Seasonal changes in demand for sandwiches, Unexpected price rises for sandwich ingredients. Shortage of sandwich ingredients. Lower quality of sandwich ingredients purchased.

A potential reason for the ingredients usage variance could be

Picklist: Highly skilled production workers used to make sandwiches, Inferior quality of ingredients, Unexpected pay rise given to production workers, Shortage of sandwich ingredients.

A potential reason for the direct labour efficiency variance could be

Picklist: Unreliable machinery and equipment to make sandwiches, Unexpected pay rise given to production workers, Highly skilled production workers used to make sandwiches, Shortage of production workers in the industry.

End of Task

Task 4 (20 marks)

FC Ltd makes two products, the 'Elf' and the 'Reindeer' for the festive season market.

Budgeted production overhead costs for its two production activities is shown below:

- Material handling overheads £400,000.
- Energy overheads £300,000.

Further information about each product is shown below:

	Elf per unit	Reindeer per unit
Direct materials - £ per unit	7.50	8.00
Direct labour - £ per unit	15.00	35.00
Direct labour - hours per unit	3.00	5.00
Number of material requisitions	600	200
Energy consumed (Kw)	100,000	50,000
Budgeted production (units)	50000	30000

FC Ltd currently uses traditional absorption costing (AC) to derive production overheads for its product costs. The management are considering if activity based costing (ABC) would be more appropriate.

(a)(i) Complete the production overhead statement below, which uses an activity-based costing (ABC) approach.

(6 marks)

	£	Elf £	Reindeer £	Total overheads £
Cost driver per material requisition				
Cost driver per Kw				
Total materials handling cost £				£400,000
Total energy cost £				£300,000

(a)(ii) Using the information in part (a)(i) above, calculate the production overhead for each product (unit) made, using an absorption costing approach. Assume budgeted production overheads are absorbed on a budgeted labour hour basis. Round your answers to 2 decimal places.

(4 marks)

	Elf £	Reindeer £
Total production overhead per unit		

(a)(iii) Using the information in part (a)(i) above, calculate the production overhead for each product (unit) made, using an activity based costing (ABC) approach. Round your answers to 2 decimal places.

(4 marks)

	Elf £	Reindeer £
Total production overhead per unit		

(a)(iv) Explain the advantages and disadvantages of FC Ltd adopting an activity-based costing (ABC) system.

(6 marks)

End of Task

Task 5 (20 marks)

A manufacturer makes two products A and B. Product A earns £8 and Product B earns £14 contribution, for each unit sold.

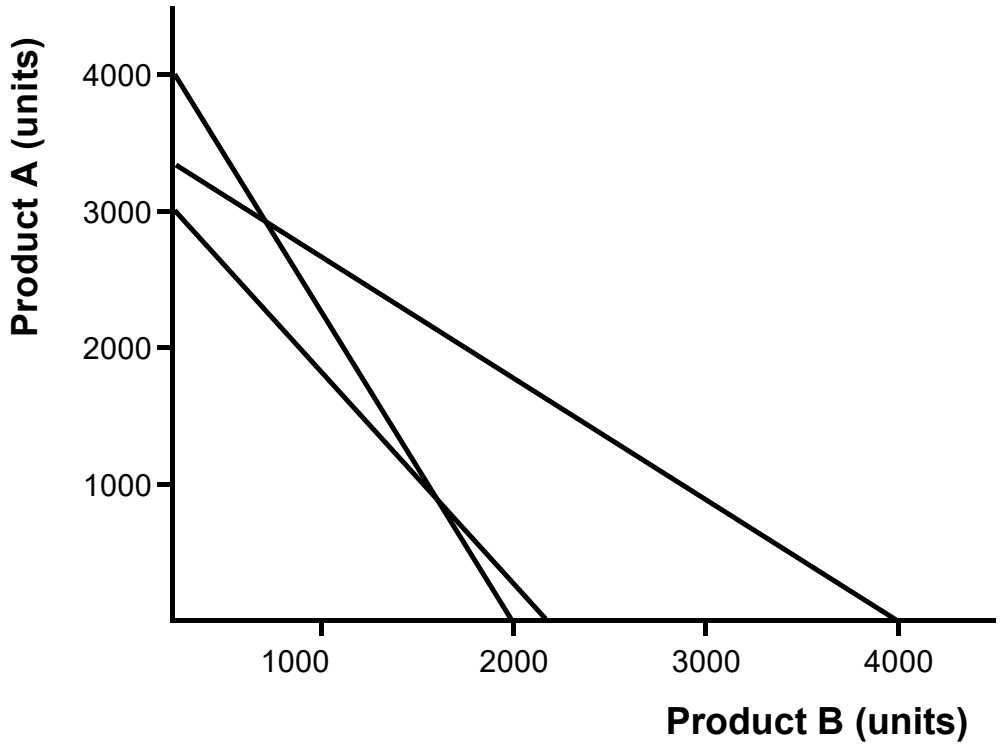
Product A and B use the same production resources, which are all in limited supply for this week:

- Skilled labour, maximum 9000 hours.
- Machine time, maximum 4000 hours.
- Raw material, maximum 1000 Kilograms.

The amount of each resource that one unit of Product A and B requires is as follows:

	A (per unit)	**B (per unit)**
Skilled labour (Hours)	3	4
Machine time (Hours)	1	2
Raw material (Kilograms)	0.3	0.25

The production manager has provided a graph, to show the maximum amounts of each product that can be manufactured this week, based on the amount of each resource available.



(a)(i) Complete the table shown below.

(4 marks)

Linear program	
Variables	A, B
Objective function	
Constraints:	
Skilled labour (Hours)	
Machine time (Hours)	
Raw material (Kilograms)	
Logic	A, B ≥ 0

Picklist: A + 2B ≤ 4000, A + 2B ≥ 4000, 8A + 14B, 0.3A + 0.25B ≤ 1000, 0.3A + 0.25B ≥ 1000, 3A + 4B ≤ 9000, 3A + 4B ≥ 9000.

(a)(ii) Calculate the optimum production plan for product A and B. Round your answers to the nearest number of whole units.

(6 marks)

Product A manufactured (units) ____

Product B manufactured (units) ____

(a)(iii) Calculate the total contribution earned from the optimum production plan. Round your answers to the nearest pound (£).

(2 marks)

Total contribution earned from the optimum production plan £ ____

(b) Identify THREE non-relevant costs.

(3 marks)

Specific fixed costs	☐
Depreciation	☐
Notional costs	☐
Future cashflows	☐
Opportunity cost	☐
Common costs	☐

X plc is a printing company and is currently pricing a job which requires 250 rolls of paper.

This type of paper is not regularly used by X plc although a limited amount is in X plc's inventory which was left over from a previous job. The cost when X plc bought this paper last year was £15 per roll and there are 100 rolls currently left in inventory. The second hand resale value of this paper is £10 per roll.

The current market price of the paper is £26 per roll.

(c) Calculate the relevant cost of 250 rolls of paper if used for the printing job.

(5 marks)

£ ☐

End of Task

Task 6 (14 marks)

BOB Builders Ltd, build houses which are sold to the general public. The management are currently considering a project to build and sell 500 houses on a plot of land, over the next 3 years. The land will be purchased by the company today, at a cost of £10 million. There is also immediate costs of £1.5 million for site preparation, to be undertaken before the construction of houses.

Further details of this project include:

Sales Volume	**Year 1**	**Year 2**	**Year 3**
Houses sold	50	250	200

- The average price of each house sold is £250,000.
- The average construction cost of each house for direct material and direct labour is £90,000.
- Specific fixed overhead for this project is £8 million every year.

Discount factors:

	10%	**12%**	**14%**
Year 0	1.000	1.000	1.000
Year 1	0.909	0.893	0.877
Year 2	0.826	0.797	0.769
Year 3	0.751	0.712	0.675
Year 4	0.683	0.636	0.592

The management of BOB use a 14% cost of capital and payback period of 2 years to evaluate new projects.

(a)(i) Calculate the net cash-flows and discounted cash-flows for the new project. Use minus signs or brackets to indicate cash outflows, negative net cash outflows and negative discounted cash outflows for each year.

(8 marks)

NPV Forecast	Year 0 £000	Year 1 £000	Year 2 £000	Year 3 £000
Purchase of land				
Site preparation				
Sale of houses				
Direct material and labour				
Specific fixed overhead				
Net cash inflows/(cash outflows)				
Discount factor 14%				
Discounted cash inflows/(cash outflows)				

(a)(ii) Calculate the net present value (NPV) for the new project (£ million). Round your answer to the nearest 2 decimal places.

(1 mark)

£ [ ] million.

(a)(iii) Calculate the undiscounted payback period for the new project. Round your answer to the nearest whole month. (3 marks)

[ ] year(s) and [ ] months.

(a)(iv) Complete the following sentence. (2 marks)

The new construction project [ ] proceed.

Picklist: should, should not.

End of Task

Task 7 (20 marks)

AAA is a large manufacturing company that makes televisions. AAA reports its actual performance each year and compares this to budget. The following is a summary of the performance of AAA for the last year:

Financial results	**Actual**	**Budget**
	£ million	**£ million**
Sales revenue	1,793	1,941
Gross profit	1,177	1,320
Operating profit	652	790
Capital employed	2,835	2,550

Performance indicators:

	Actual	**Budget**
Products returned from customers (per 1000 units sold)	28	20
Warranty claims (per 1000 units sold)	56	30
Number of finished units re-worked (units)	54000	30000
Percentage (%) of purchases from suppliers rejected	4.25%	3.00%
Average production cost per unit (£)	£262	£259
Average sales price per unit (£)	£763	£809
New product lines developed	12	10
New product lines successfully launched	1	4

(a)(i) Calculate the following performance indicators based on actual performance of AAA for the last year. Round all answers to 1 decimal place. Do not use a minus sign or brackets for negative figures. (8 marks)

Performance indicators	Actual	Budget
Gross profit margin %		68.0%
Operating profit margin %		40.7%
Return on capital employed %		31.0%
Product returns %		2.0%
Warranty claims %		3.0%
New product lines successfully launched %		40.0%
Decrease in average sales price (compared to budget) %		
Increase in average production cost (compared to budget) %		

(a)(ii) Explain the likely causes of each performance indicator being better or worse than budget.

(12 marks)

End of Task

Task 8 (12 marks)

ICE Ltd is a manufacturer of ice creams, its main ingredient required for production is milk. ICE Ltd uses time series analysis to forecast the price (per 100 litres) of milk, for each month.

(a)(i) Complete the table shown below by entering any missing figures. Use minus signs for any negative figures. Round your answers to two decimal places.

(3 marks)

20X4 Price per 100 litres	October £	November £	December £
Underlying price per 100 litres		26.00	29.00
Seasonal Variation	3.50		2.50
Seasonally adjusted price per 100 litres	26.50	20.50	

Assuming the trend and seasonal variations continue in part (a)(i) above.

(a)(ii) Compete the table shown below to forecast the price (per 100 litres) of milk for the last quarter of 20X5. Use minus signs for any negative figures. Round your answers to two decimal places.

(5 marks)

20X5 Price per 100 litres	October £	November £	December £
Underlying price per 100 litres			
Seasonal Variation			
Seasonally adjusted price per 100 litres			

ICE Ltd needs to forecast its cost for its fleet of ice cream vehicles for 20X5. If 250000 miles are driven in a year, then vehicle costs are £102,500. If 200000 miles are driven in a year, then vehicle costs will fall by £12,500.

Vehicle costs can be predicted using the linear regression equation y = a + bx.

Where:
x = number of miles driven and
y = total vehicle costs for the number of miles driven

(a)(iii) Calculate the value of a and b. Round your answers to two decimal places.

(2 marks)

Value of a: £ ☐

Value of b: £ ☐

(a)(iv) Using the information from (a)(iii) above. Calculate a forecast for vehicle costs, based on 180000 miles driven.

(2 marks)

£ ☐

End of Task

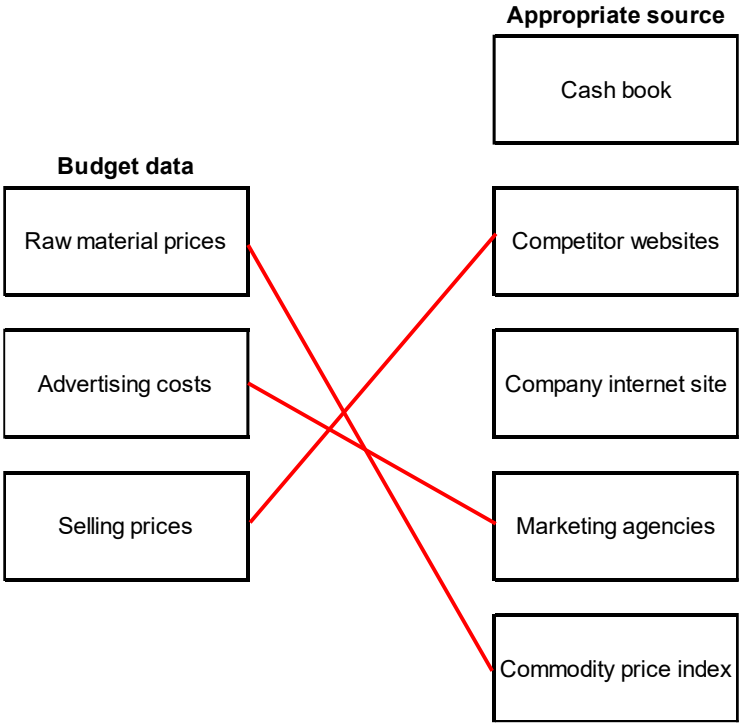
Mock Exam One - Solutions

AAT L4 Applied Management Accounting

Task 1 (12 marks)

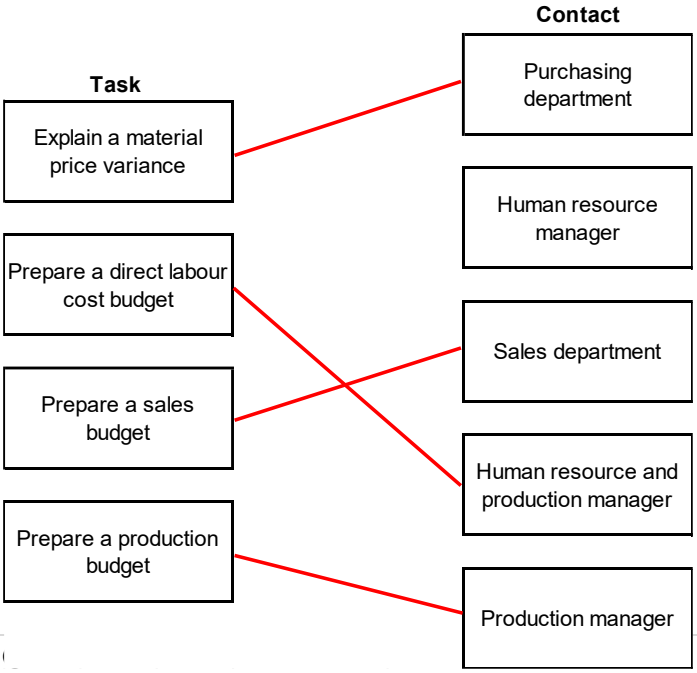
(a) Match each item for budget data given below to its most appropriate source. To show each answer, click on a box in the left hand column then click on a box in the right hand column.

(3 marks)



(b) Match each task to the most likely contact for information required. To show each answer, click on a box in the left hand column then click on a box in the right hand column.

(4 marks)



(c) Select the most appropriate budget for each of the following items

(5 marks)

Purchase of property, pant and equipment for the business	Capital Expenditure Budget
Raw materials that must be purchased to fulfil production	Material Cost Budget
Volume and estimated earnings from selling products	Sales Revenue Budget
Expected cash receipts and disbursements during the period	Cash Budget
Functional budgets and budgeted financial statements	Master Budget

Task 2 (24 marks)

(a) Complete the production budget shown below. Round all figures to the nearest whole number of units, if necessary. Do not use negative figures.

(12 marks)

- Closing inventory should be 10% of the following week's sales volume.
- 2% of all production will fail quality control checks and will be rejected.

Production (units)	Week 1	Week 2	Week 3	Week 4	Week 5
Opening inventory	2500	1250	890	1010	
Good production	12750	12140	9020	10220	
Sales volume	14000	12500	8900	10100	11300
Closing inventory	1250	890	1010	1130	
Rejected production	260	248	184	209	
Total manufactured units	13010	12388	9204	10429	

Workings:

1. First calculate closing inventories.

- Week 1 – 10% of next week's sales (week 2) sales 12500 ÷ 100% x 10% = 1250.
- Week 2 – 10% of next week's sales (week 3) sales 8900 ÷ 100% x 10% = 890.
- Week 3 – 10% of next week's sales (week 4) sales 10100 ÷ 100% x 10% = 1010.
- Week 4 – 10% of next week's sales (week 5) sales 11300 ÷ 100% x 10% = 1130.

2. Second complete the cells for opening inventories.

Closing inventories (calculated in step 2) become opening inventories in the following week.

3. Third calculate the production level (units) after rejects (good production).

The sales, opening and closing inventory figures can now be used to calculate the missing figure for 'good production'. Good production = Closing inventory + Sales - Opening inventory.

- Week 1 – Good Production 12750 = Closing inventory 1250 + Sales 14000 - Opening inventory 2500.
- Week 2 – Good Production 12140 = Closing inventory 890 + Sales 12500 - Opening inventory 1250.
- Week 3 – Good Production 9020 = Closing inventory 1010 + Sales 8900 - Opening inventory 890.
- Week 4 – Good Production 10220 = Closing inventory 1130 + Sales 10100 - Opening inventory 1010.

Good production is needed to make enough available to meet sales demand. Good production is the number of units to make 98% of total production, after 2% of total production has failed quality control checks

4. Fourth work out the number of rejected units which is 2% of total production (100%).

- Week 1 – Good Production 12750 ÷ 98% of total production x 2% rejected = 260.
- Week 2 – Good Production 12140 ÷ 98% of total production x 2% rejected = 248.
- Week 3 – Good Production 9020 ÷ 98% of total production x 2% rejected = 184.
- Week 4 – Good Production 10220 ÷ 98% of total production x 2% rejected = 209.

5. Last step, work out the 'total manufactured units', which is 100% of total production.

- Week 1 – Good Production (98%) 12750 + Rejected production (2%) 260 = 13010 total manufactured units.
- Week 2 – Good Production (98%) 12140 + Rejected production (2%) 248 = 12388 total manufactured units.
- Week 3 – Good Production (98%) 9020 + Rejected production (2%) 184 = 9204 total manufactured units.
- Week 4 – Good Production (98%) 10220 + Rejected production (2%) 209 = 10429 total manufactured units.

(b) Identify and briefly explain TWO factors that may influence the level of rejected units for production.

(4 marks)

1 mark maximum for each factor identified (2 marks maximum). 1 mark maximum for each factor briefly explained (2 marks maximum). A range of answers have been included for revision. Any other relevant issues would gain credit.

- Accuracy and reliability of any skilled labour required to make the goods e.g. trainees may not meet required standards.
- System of rewarding staff e.g. piecework rates or bonuses to incentivise greater speed, may increase reject rates.
- Quality of raw materials e.g. inferior raw materials may influence the final quality of goods made.
- Accuracy and reliability of machines or automated processes e.g. failures in machine processes may increase reject rates.
- Composite of trained and untrained production labour e.g. learning curve may affect the quality of work.

(c)(i) Identify FOUR appropriate sources of data for Burger Champion, if constructing a new standard for its ingredients and direct labour to make the 'Champion Burger'.

(4 marks)

Tips for effective writing ('DEPTH')

- **D**iversity (include a good RANGE of answer).
- **E**xamine information and requirements (APPLY (use) the scenario information in the exam task to match to the task requirements), ensure ALL of the requirements are met and the task information is extensively used in your answer.
- **P**lan before you type (in the window answer box in the task, put your headings and key words for answering the requirements) before you begin writing.
- **T**iming (don't over run).
- **H**eadings (include headings for your different answers to provide good structure).

1 mark maximum for each source of data identified (4 marks maximum). At least one source of data should be identified for ingredients and direct labour to gain full marks. A range of answers have been included for revision. Any other relevant issues would gain credit.

Ingredients

- Current levels of ingredient wastage (materials usage).
- Current levels of cooked food wastage (production).
- New product design information (if any) since it may affect the ingredient requirements, or specified weight of ingredients.
- Most recent supplier purchase invoices for beef, buns etc.
- Commodity price index for beef, onions etc.
- Supplier websites, quotes and discount policies.

Direct labour

- Payroll information or timesheets e.g. to understand the current length of time for direct labour to cook and supply one burger.
- Time and motion studies observing the workforce.
- Information about changes in automation or new working practices introduced as this could change the standard time required.
- National minimum wage levels in the Country.
- Planned pay increases for direct labour.
- Composite of trained and untrained restaurant staff e.g. learning curve may affect ingredient wastage and cooking times.

(c)(ii) Explain to the management of Burger Champion, ONE advantage and ONE disadvantage of allowing participation by restaurant staff if constructing a new budgeted cost for the 'Champion Burger'.

(4 marks)

1-2 marks maximum for each advantage or disadvantage explained (4 marks maximum). One advantage and disadvantage must be explained to gain full marks. A range of answers have been included for revision. Any other relevant issues would gain credit.

Advantages of allowing participation

It will be more interesting and more involving for staff which can increase their job satisfaction. Participation means that the new budgeted cost is more likely to be accepted by staff because they are involved in setting targets themselves. Staff maybe more up to date in terms of the current working environment and so information from them could be vital to set more realistic ingredient usage and labour efficiency levels.

Disadvantages of allowing participation

Possibility that staff may include "slack" or "padding" if setting targets themselves. Loose targets can make it less challenging for them e.g. overestimate time and ingredient wastage in the cooking process. It is an inevitable downside of human behaviour to underestimate and so avoid blame.

Participation could also create a slower process to formulate a new budgeted cost because more consultation time with staff is required. This may increase the cost and time of formulating the data and information.

Restaurant staff could be inexperienced and may not be able to contribute effectively in some cases e.g. the price of beef charged by suppliers would be less known by staff.

Task 3 (18 marks)

(a)(i) Calculate each variance in the table shown below. Enter your answers to the nearest whole pound (£). Enter zero if there is no variance. Do not use minus signs or brackets. Use the drop down boxes to indicate whether each variance you have calculated is adverse, favourable or no variance.

(12 marks)

	£	Adverse/Favourable/ No variance
Ingredients price variance	**99**	**Favourable**
Ingredients usage variance	**225**	**Adverse**
Direct labour rate variance	**0**	**No variance**
Direct labour efficiency variance	**765**	**Favourable**

Workings:

Standard costs:

Material price (£2,500 ÷ 1000 kgs)	£2.50	per kg
Material usage (1000 kgs ÷ 5000 sandwiches)	0.2	kgs per unit
0.2 kgs @ £2.50 per kg (standard cost)	£0.50	per unit
Labour rate (£4,250 ÷ 500 hours)	£8.50	per hour
Labour efficiency (500 hours ÷ 5000 sandwiches)	0.1	hours per unit
0.1 hours @ £8.50 per hour (standard cost	£0.85	per unit

Material (ingredient) price variance

990 kgs did cost	£2,376	
990 kgs should cost (x £2.50 per kg)	£2,475	
	£99	**Favourable**

Material (ingredient) usage variance

4500 sandwiches did use	990	kgs
4500 sandwiches should use (x 0.2 kgs per sandwich)	900	kgs
	90	kgs
x Standard cost per kg	£2.50	per kg
	£225	**Adverse**

Proof:

Flexed material cost (£0.50 x 4500 sandwiches)	£2,250	
Material (ingredient) price variance	£99	Favourable
Material (ingredient) usage variance	£225	Adverse
Actual material cost	£2,376	

Labour rate variance

360 hours did cost	£3,060	
360 hours should cost (x £8.50 per hour)	£3,060	
	£0	**No variance**

Labour efficiency variance

4500 sandwiches did take	360	hours
4500 sandwiches should take (x 0.1 hours per sandwich)	450	hours
	90	hours
x Standard cost per hour	£8.50	per hour
	£765	**Favourable**

Proof:

Flexed labour cost (£0.85 x 4500 sandwiches)	£3,825	
Labour rate variance	£0	No variance
Labour efficiency variance	£765	Favourable
Actual labour cost	£3,060	

(a)(ii) Identify the most likely cause of each variance calculated in part (a)(i) above.

(6 marks)

A potential reason for the ingredient price variance could be **Lower quality of sandwich ingredients purchased**.

The materials price variance is favourable which would suggest a lower quality of ingredients were purchased, more inferior raw materials are often cheaper. Seasonal changes in demand for sandwiches, is more likely to affect the sales volume variance. Unexpected price rises for sandwich ingredients, is more likely to cause the price of ingredients to rise, causing an adverse materials price variance. Shortage of sandwich ingredients, is more likely to cause the price of ingredients to rise, causing an adverse materials price variance.

A potential reason for the ingredients usage variance could be **Inferior quality of ingredients**.

The materials usage variance is adverse. A more inferior quality of ingredients purchased often creates more wastage, which may account for the adverse materials usage variance. Highly skilled production workers used to make sandwiches, is more likely to reduce wastage levels of ingredients used and cause a favourable materials usage variance. An unexpected pay rise given to production workers, is more likely to affect the direct labour rate variance. A shortage of sandwich ingredients is not likely to explain an adverse materials usage variance (the amount of ingredients used per sandwich made), but may cause the price of ingredients to rise, in which case it may affect the materials price variance.

A potential reason for the direct labour efficiency variance could be **Highly skilled production workers used to make sandwiches**.

The direct labour efficiency variance is favourable. Highly skilled production workers used to make sandwiches, is more likely to reduce the time needed to make sandwiches and cause a favourable labour efficiency variance. Unreliable machinery and equipment to make sandwiches, is more likely to cause an adverse labour efficiency variance or adverse materials usage variance. An unexpected pay rise given to production workers, is more likely to cause an adverse labour rate variance. A shortage of production workers in the industry, is likely to cause wage rates to increase and an adverse labour rate variance.

Task 4 (20 marks)

(a)(i) Complete the production overhead statement below, which uses an activity-based costing (ABC) approach.

(6 marks)

	£	Elf £	Reindeer £	Total overheads £
Cost driver per material requisition	500			
Cost driver per Kw	2			
Total materials handling cost £		300000	100000	£400,000
Total energy cost £		200000	100000	£300,000

Workings:

Cost driver per material requisition

	Elf	Reindeer	Total
Number of material requisitions	600	200	800

Materials handling overhead £400,000 ÷ 800 material requisitions = £500 per requisition

Cost driver per Kw

	Elf	Reindeer	Total
Energy consumed (Kw)	100000	50000	150000

Energy overhead £300,000 ÷ 150000 Kw = £2 per Kw

Total materials handling cost £

Elf £500 x 600 requisitions =	300000
Reindeer £500 x 200 requisitions =	100000
	400000

Total energy cost £

Elf £2 x 100000 Kw =	200000
Reindeer £2 x 50000 Kw =	100000
	300000

(a)(ii) Using the information in part (a)(i) above, calculate the production overhead for each product (unit) made, using an absorption costing approach. Assume budgeted production overheads are absorbed on a budgeted labour hour basis. Round your answers to 2 decimal places.

(4 marks)

	Elf £	Reindeer £
Total production overhead per unit	**7.00**	**11.67**

The table below calculates that budgeted labour hours would be 300000 in total for both products. Budgeted labour hours are 150000 for each product. Therefore, the two products would share production overheads of £700,000 equally.

Workings:

Materials handling overhead	£400,000
Energy overhead	£300,000
Budgeted fixed overhead	£700,000

Elf: Budget fixed overhead £700,000 x (150000 hours ÷ 300000 hours) **= £350,000**
Reindeer: Budget fixed overhead £700,000 x (150000 hours ÷ 300000 hours) **= £350,000**

Calculation of labour hours	Elf	Reindeer	Total
Direct labour - hours per unit	3.00	5.00	
Budgeted production (units)	50000	30000	
Budgeted labour hours	**150000**	**150000**	**300000**

Units costs for each product (AC):

- Elf - budgeted production overhead allocated £350,000 ÷ budgeted 50000 units = £7.00 per unit.
- Reindeer - budgeted production overhead allocated £350,000 ÷ budgeted 30000 units = £11.67 per unit (rounded to 2 decimal places).

(a)(iii) Using the information in part (a)(i) above, calculate the production overhead for each product (unit) made, using an activity based costing (ABC) approach. Round your answers to 2 decimal places.

(4 marks)

	Elf £	Reindeer £
Total production overhead per unit	**10.00**	**6.67**

Workings provided earlier in part (a)(i) of this solution, calculated that using ABC, £500,000 of production overhead would be allocated to Elf's and £200,000 of production overhead would be allocated to Reindeer's.

Units costs for each product (ABC):

- Elf - budgeted production overhead allocated £500,000 ÷ budgeted 50000 units = £10.00 per unit.
- Reindeer - budgeted production overhead allocated £200,000 ÷ budgeted 30000 units = £6.67 per unit (rounded to 2 decimal places).

(a)(iv) Explain the advantages and disadvantages of FC Ltd adopting an activity-based costing (ABC) system.

(6 marks)

Exam note: This solution covers a range of possible points that maybe included in a written response. These examples are not intended to be exhaustive and other valid comments may be relevant. 1-2 marks awarded for each advantage or disadvantage. Maximum 5 marks.

Activity based costing (ABC) is an extension of the same idea as absorption costing and is a more modern costing method for product costing. It looks in more detail about what causes each type of overhead to be incurred using 'cost drivers', activities that are more likely to cause each type of overhead to be driven.

For example, Kw of energy consumed by products is likely to drive energy overhead and the number of material requisitions (requesting the issue of materials from stores) is likely to drive material handling costs. ABC paints a more objective picture than if using just labour hours, which is unlikely to drive energy or material handling costs.

ABC helps with the efficient management of resources, for example management can understand that by reducing energy consumption (Kw) or the number of material requisitions, it is more likely to drive overhead costs down. This would be less obvious when using labour hours.

ABC typically shows better product costing information for pricing decisions and profitability analysis. ABC is generally more objective and paints a more accurate picture of a product cost per unit.

ABC can be time consuming and a more expensive costing system than absorption costing because a more detailed analysis of overhead is required.

ABC assumes that overhead is driven 'directly' by the volume of an activity (the cost driver) almost like a variable cost, however in reality overhead tends to behave like a 'stepped fixed cost'. For example, by reducing material requisitions, it does not guarantee that warehouse costs will be reduced.

Task 5 (20 marks)

(a)(i) Complete the table shown below. (4 marks)

Linear program	
Variables	A, B
Objective function	**8A + 14B**
Constraints:	
Skilled labour (Hours)	**3A + 4B ≤ 9000**
Machine time (Hours)	**A + 2B ≤ 4000**
Raw material (Kilograms)	**0.3A + 0.25B ≤ 1000**
Logic	A, B ≥ 0

(a)(ii) Calculate the optimum production plan for product A and B. Round your answers to the nearest number of whole units. (6 marks)

Product A manufactured (units) **1000**.

Product B manufactured (units) **1500**.

The optimum production plan is the number of units of product A and B that will maximise contribution.

Workings:

Scarce resources per unit

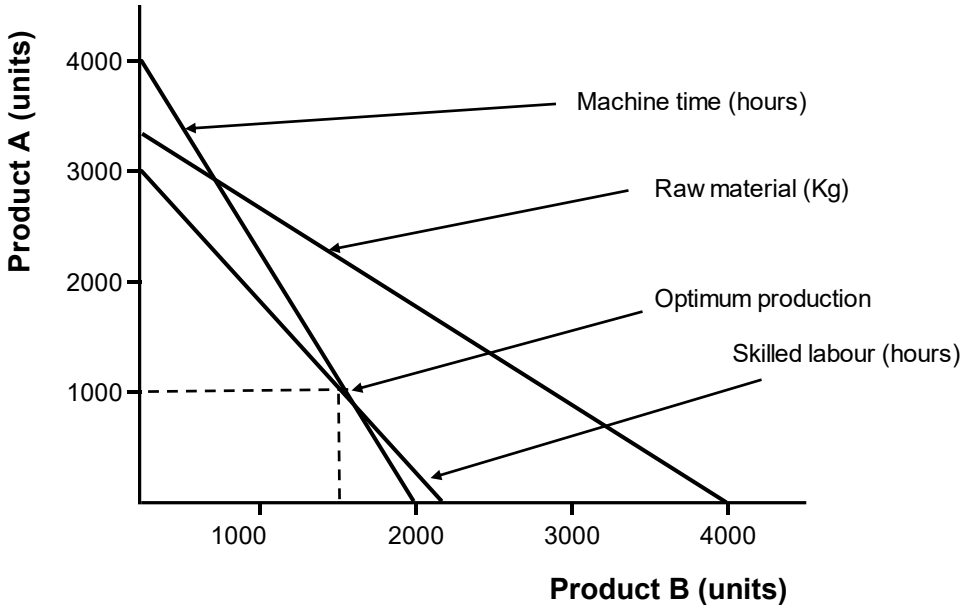
	A (per unit)	**B (per unit)**	**Maximum available**
Skilled labour (Hours)	3	4	9000
Machine time (Hours)	1	2	4000
Raw material (Kilograms)	0.3	0.25	1000

Maximum production from each resource

Maximum production for each product	**A**	**B**	**Maximum available**
Skilled labour (Hours)	3000	2250	9000 Hours
Machine time (Hours)	4000	2000	4000 Hours
Raw material (Kilograms)	3333	4000	1000 Kilograms

You can identify the two most binding constraints, by calculating the maximum value of each product that can be made with each resource available (see above table). A maximum of 3000 units of Product A can be made because of skilled labour available. A maximum of 2000 units of Product B can be made because of machine time available. These resources are the two most binding constraints and can be identified in the production managers graph.

Graph showing constraints and optimum production plan



To maximise contribution (the objective), a combination of product A and B must be manufactured, that is as far away as possible on the graph. The maximum point is where production meets the two constraint lines for machine time and labour, at the point where the two constraint lines intersect (optimum production). At this point where the two lines intersect, the amount of A and B made, is the same on both constraint lines. Skilled labour (9000 hours maximum) and machine time (4000 hours maximum) would also be fully consumed at this point on the graph. Some of the raw material (1000 Kg maximum) will be unused, since the machine time and labour constraints will reach the limit first, before raw materials are fully consumed.

To work out the optimum production you need to use simultaneous equations.

We know the optimum production plan is the point where the machine time and labour constraint intersects, and that both constraints are fully consumed (the maximum of each resource is fully used). Therefore, the following equations for skilled labour and machine time can be used to solve the optimum production plan.

- 3A+ 4B = 9000 Skilled labour (Hours).
- A + 2B = 4000 Machine time (Hours).

Workings:

1 3A + 4B = 9000
2 A + 2B = 4000

You need to decide whether it is A or B you want to eliminate first from these equations and the choice is up to you. Product A has been chosen first and all values in equation 2 above will be multiplied by 3, to ensure I have two equations that both include the same value of '3A'. This will allow me to eliminate A and then find B as a balancing figure. You can multiply or divide equations to get any values you like.

1	3A + 4B	= 9000
2	A + 2B	= 4000
3	3A + 6B	= 12000 (values in equation 2, multiplied by 3)

I now have two equations with the same value for A. Another equation can be created that eliminates any value of A. To achieve this, I will deduct the values in equation 3 from the values in equation 1.

1	3A + 4B	= 9000
2	A + 2B	= 4000
3	3A + 6B	= 12000
4	2B	= 3000 (values in equation 3 less values in equation 1)

B can now be calculated (2B = 3000), B would be 3000 ÷ 2 = 1500 units.

Now the value of B has been found, the value of A can now be found using equation 1, 2 or 3 above, it would not matter since the value of A and B in all equations above is the same. I choose A + 2B = 4000 (equation 2 above), it seems the easiest.

- A + 2B = 4000
- A + 2(1500) = 4000
- A + 3000 = 4000
- A = 4000 - 3000
- A = 1000

Alternative calculation, eliminate B first and then find A:

1	3A + 4B	= 9000 (skilled labour)
2	A + 2B	= 4000 (machine time)
3	2A + 4B	= 8000 (values in equation 2, multiplied by 2)
4	A	= 1000 (values in equation 1 less values in equation 3)

Now the value of A has been found, the value of B can now be found using equation 1, 2 or 3 above, it would not matter since the value of A and B in all equations above is the same. I choose equation 2.

Workings:

- A + 2B = 4000
- 1000 + 2B = 4000
- 2B = 4000 - 1000
- 2B = 3000
- B = 3000/2
- B = 1500

(a)(iii) Calculate the total contribution earned from the optimum production plan. Round your answers to the nearest pound (£). (2 marks)

Total contribution earned from the optimum production plan £**29000**.

A = 1000.
B = 1500.

- Contribution (objective function) = 8A + 14B.
- Contribution (objective function) = 8(1000) + 14(1500).
- Contribution (objective function) = 8000 + 21000.
- Contribution (objective function) = 29000.

(b) Identify THREE non-relevant costs. (3 marks)

Specific fixed costs	☐
Depreciation	☑
Notional costs	☑
Future cashflows	☐
Opportunity cost	☐
Common costs	☑

A relevant cost is a future cash flow arising as a direct consequence of a decision made. Examples of non-relevant costs include sunk costs, historical costs, committed costs, notional costs and common costs. Depreciation is an example of a notional cost, which means it is a conceptually based amount and not a cashflow. Common costs are general overheads, which are shared between products made from the same common production process.

(c) Calculate the relevant cost of 250 rolls of paper if used for the printing job. (5 marks)

£**4900**.

100 rolls of paper is included in inventories, this paper will not be replaced and has no further use. If the company were to use the 100 rolls of paper, they would lose out on the next best alternative, which is to sell the 100 rolls of paper for £10 each. This opportunity cost would be a relevant cash-flow e.g. the cash you would no longer earn in future, as a direct consequence of using this paper for the current printing job. The other 150 rolls required, need to be purchased by the company and would cost £26 per roll, which is the current market price.

100 rolls of paper (no further use) x £10 per roll (opportunity cost) = £1,000.
150 rolls of paper (required to be purchased) x £26 per roll (future cashflow) = £3,900.
The relevant cost of 250 rolls of paper would be £4,900 (£1,000 + £3,900).

Task 6 (14 marks)

(a)(i) Calculate the net cash-flows and discounted cash-flows for the new project. Use minus signs or brackets to indicate cash outflows, negative net cash outflows and negative discounted cash outflows for each year.

(8 marks)

NPV Forecast	Year 0 £000	Year 1 £000	Year 2 £000	Year 3 £000	Total £
Purchase of land	-10000				
Site preparation	-1500				
Sale of houses		12500	62500	50000	
Direct material and labour		-4500	-22500	-18000	
Specific fixed overhead		-8000	-8000	-8000	
Net cash inflows/(cash outflows)	-11500	0	32000	24000	44500
Discount factor 14%	1.000	0.877	0.769	0.675	
Discounted cash inflows/(cash outflows)	-11500	0	24608	16200	29308

(a)(ii) Calculate the net present value (NPV) for the new project (£ million). Round your answer to the nearest 2 decimal places. (1 mark)

£**29.31** million.

See NPV calculation is shown above which is to the nearest £000. The NPV (sum of the present value of cash-flows) is £29,308,000. If rounded to the nearest million and to 2 decimal places, this would be £29.31 million.

(a)(iii) Calculate the undiscounted payback period for the new project. Round your answer to the nearest whole month. (3 marks)

1 year and **4** months.

Workings:

	Annual cash-flows	Cumulative cash-flows
Year 0	-11500	-11500
Year 1	0	-11500
Year 2	32000	20500
Year 3	24000	44500

The payback period is 1 to 2 years, cumulative cash-flows turn from negative to positive during this time. At the end of year 1, the bank is overdrawn by - £11,500. At the end of year 2, there is a surplus of + £20,500 in the bank.

The increase in net cash-flows in year 2 was £32,000. To payback, the project needs to recoup another - £11,500 cash deficit in year 2. Therefore, 11,500 ÷ 32000 x 12 months = 4 months (to recover the shortfall of £11,500 during this 12 month period). The payback period is therefore 1 year and 4 months.

(a)(iv) Complete the following sentence.

(2 marks)

The new construction project **should** proceed.

The management of BOB use a 14% cost of capital and payback period of 2 years to evaluate new projects. Both criteria have been achieved. A positive NPV using a 14% cost of capital and a payback period of 1 year and 4 months.

Task 7 (20 marks)

(a)(i) Calculate the following performance indicators based on actual performance of AAA for the last year. Round all answers to 1 decimal place. Do not use a minus sign or brackets for negative figures. (8 marks)

Performance indicators	Actual	Budget
Gross profit margin %	65.6%	68.0%
Operating profit margin %	36.4%	40.7%
Return on capital employed %	23.0%	31.0%
Product returns %	2.8%	2.0%
Warranty claims %	5.6%	3.0%
New product lines successfully launched %	8.3%	40.0%
Decrease in average sales price (compared to budget) %	5.7%	
Increase in average production cost (compared to budget) %	1.2%	

Gross profit margin %

- Gross profit margin = gross profit/revenue x 100.
- 1,177 ÷ 1,793 x 100 = 65.6%.

Operating profit margin %

- Operating profit margin = Operating profit/revenue x 100.
- 652 ÷ 1,793 x 100 = 36.4%.

Return on capital employed %

- Return on capital employed (ROCE) = operating profit/capital employed x 100.
- 652 ÷ 2,835 x 100 = 23.0%.

Product returns %

- Products returned from customers (per 1000 units sold).
- 28 ÷ 1000 x 100 = 2.8%.

Warranty claims %

- Warranty claims (per 1000 units sold).
- 56 ÷ 1000 x 100 = 5.6%.

New product lines successfully launched %

- New product lines successfully launched ÷ New product lines developed x 100.
- 1 ÷ 12 x 100 = 8.3%.

Decrease in average sales price (compared to budget) %

- Difference between budget and actual measured as a percentage change in budget.
- (£809 - £763) ÷ £809 x 100 = 5.7%.

Increase in average production cost (compared to budget) %

- Difference between budget and actual measured as a percentage change in budget.
- (£262 - £259) ÷ £259 x 100 = 1.2%.

(a)(ii) Explain the likely causes of each performance indicator being better or worse than budget.

(12 marks)

1-2 marks per relevant point. To earn better credit don't just state better or worse, you have to give some likely reasons why this maybe the case. Maximum 12 marks awarded.

Warranty claims and product returns are both worse than budget. This would indicate higher repair costs and handling costs for AAA, due to product faults and returns. This will cause poor customer satisfaction and lost sales. Product returns 2.8% + Warranty claims 5.6% = 8.4% faulty goods sold.

The average sales price per unit was £763 compared to the budgeted price of £809 (5.7% lower than budgeted price). This could be due to such factors as the stage of the product lifecycle for televisions sold e.g. falling prices due to obsolete models at the decline stage of the PLC, or sales promotions due to more intense competition. Due to quality problems, it may also be the case that AAA has to reduce its prices to keep selling more of its televisions.

The average production cost per unit is £262, which is £3 higher than budget. This could indicate lower manufacturing efficiency or productivity e.g. lower production volume, increases the fixed cost per unit. It could also be caused by higher costs caused by warranty claims or product returns.

AAA is failing to meet its innovation target. New product lines successfully launched were 1 in 12 developed (8.3%), compared to a budget of 4 in 10 (40%). This could indicate poor research and development undertaken e.g. not designing creative products and features for televisions that customers want to buy

Gross profit margin is worse than budget. Average selling prices are down, while production costs are up. Both of these factors have led to a declining gross margin.

Operating profit margin is worse than budget. One factor driving this would be the decline in gross profit margin, also a rise in overhead costs.

ROCE is worse than budget. This indicates AAA generates lower profits from a higher amount of long-term capital (equity and debt) required to finance its business. A higher amount of capital employed may also indicate AAA is modernising its plant and

machinery, causing a higher carrying value on its financial position. This may help drive greater efficiency in future which can help lower production costs.

Non-financial factors are often the main driver of financial results. In this case AAA seems to have quality problems and is failing to innovate successfully, this in turn is driving down profitability and cashflows.

Task 8 (12 marks)

(a)(i) Complete the table shown below by entering any missing figures. Use minus signs for any negative figures. Round your answers to two decimal places.

(3 marks)

20X4 Price per 100 litres	October £	November £	December £
Underlying price per 100 litres	**23.00**	26.00	29.00
Seasonal Variation	3.50	**-5.50**	2.50
Seasonally adjusted price per 100 litres	26.50	20.50	**31.50**

Workings:

The underlying price would be the trend (T) of the price e.g. long-term movement of the price upwards or downwards. The seasonal variation (SV) adjusts the trend (T) to calculate a more accurate forecast for a time series (TS). This adjustment is normally because the trend in price is volatile, due to seasonal effects such summer and winter. The data adjusts the trend based on absolute values (£) therefore this time series uses the additive model for forecasting.

Learn these formula:

Additive model

TS = T + SV

Multiplicative model

TS = T x SV (decimal, percentage or indice)

Additive model

TS = T + SV

October

26.50 = T + 3.50

26.50 - 3.50 = **23.00**

November

20.50 = 26.00 + SV

20.50 - 26.00 = **-5.50**

December

TS = 29.00 + 2.50

TS = **31.50**

(a)(ii) Compete the table shown below to forecast the price (per 100 litres) of milk for the last quarter of 20X5. Use minus signs for any negative figures. Round your answers to two decimal places.

(5 marks)

20X5 Price per 100 litres	October £	November £	December £
Underlying price per 100 litres	**59.00**	**62.00**	**65.00**
Seasonal Variation	**3.50**	**-5.50**	**2.50**
Seasonally adjusted price per 100 litres	**62.50**	**56.50**	**67.50**

Workings

Start by identifying the trend price for October 20X5. In the 20X4 time series data, the trend price moved from £23 to £29 over two months (from October 20X4 to December 20X4). £29 - £23 = £6.00 increase in price over two monthly movements. The long-term increase (trend) of the monthly movement is £6.00 ÷ 2 movements = £3.00 each month.

In the 20X4 time series data, the last trend price calculated was in December 20X4 (£29.00). So, for October 20X5, we are predicting 10 months ahead. Last trend price £29.00 (for Dec 20X4) + (£3.00 increase each month x 10 months) (for Jan 20X5 to Oct 20X5) = £59.00 trend price for October 20X5. November 20X5 (the next month after) will be £59.00 (Oct 20X5) + £3.00 = £62.00. December 20X5 (the next month after this) will be £62.00 (Nov 20X5) + £3.00 = £65.00.

The seasonal variation adjustments were given in 20X4 for October 20X4 to December 20X4. The same adjustments would be made for October 20X5 to December 20X5, because they are the same months.

The time series (forecast) uses the additive model (TS = T + SV):

October 20X5
TS = 59.00 + 3.50.
TS = 62.50.

November 20X5
TS = 62.00 - 5.50.
TS = 56.50.

December 20X5
TS = 65.00 + 2.50.
TS = 67.50.

(a)(iii) Calculate the value of a and b. Round your answers to two decimal places.

(2 marks)

Value of a: **£40000.00**.

Value of b: **£0.25**.

The regression equation calculates a trend line (or line of best fit on a graph) using historical data. The trend forecast is expressed as Y = a + bX. The regression equation is considered more accurate than the high low method, however if only two pairs of data for cost and mileage is considered, then both techniques will give exactly the same result for a variable and fixed cost calculated.

The high low method is used to work out 'a' the fixed cost (regardless of miles driven) and 'b' the variable amount (rises or falls, as miles driven rise or fall).

TC = FC + (VC per mile x Miles), is the same as Y = a + bx.

If 250000 miles are driven in a year, then vehicle costs are £102,500. If 200000 miles are driven in a year, then vehicle costs fall by £12,500.

High low method to solve a and b:

Miles	**Total cost (£)**	
250000	102500	
200000	90000	(costs decrease by £12,500)
50000	12500	

The above working identifies that the variable cost 'b' has increased by £12,500, when miles driven increased by 50000. The variable cost per mile is £12,500 ÷ 50000 miles = £0.25 per mile.

The fixed cost 'a' (the constant), can be calculated as a balancing figure, take either of the two pairs of data used above and work it out.

250000 miles has been chosen:

£102,500 = a + (£0.25 x 250000 miles).
£102,500 = a + £62,500.
a = £102,500 - £62,500.
a = £40,000.

You now have a regression equation which can be used for forecasting cost:

y = 40000 + 0.25x

(a)(iv) Using the information from (a)(iii) above. Calculate a forecast for vehicle costs, based on 180000 miles driven.

(2 marks)

£85000

Regression equation used for forecasting cost:

y = 40000 + 0.25x

For 180000 miles, the forecast cost would be:

y = 40000 + (0.25 x 180000).
y = 40000 + 45000.
y = 85000.