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INSIGHT
YEAR 12 Trial Exam Paper

2011
FURTHER MATHEMATICS
UNIT 4

Written examination 2
QUESTION AND ANSWER BOOK

Reading time: 15 minutes
Writing time: 1 hour 30 minutes
Structure of book

Core		
<i>Number of questions</i>	<i>Number of questions to be answered</i>	<i>Number of marks</i>
5	5	15
Module		
<i>Number of modules</i>	<i>Number of modules to be answered</i>	<i>Number of marks</i>
6	3	45
		Total 60

- Students are permitted to bring the following items into the examination: pens, pencils, highlighters, erasers, sharpeners, rulers, one bound reference that may be annotated (can be typed, handwritten or a textbook), one approved graphics calculator (memory DOES NOT have to be cleared) and, if desired, one scientific calculator.
- Students are NOT permitted to bring blank sheets of paper or white out liquid/tape into the examination.

Materials provided

- The question and answer book of 33 pages.
- A separate sheet with miscellaneous formulas.
- Working space is provided throughout the question book.

Instructions

- Write your **name** in the box provided on the multiple-choice answer sheet.
- Remove the formula sheet during reading time.
- Unless otherwise indicated, diagrams in this book are **not** drawn to scale.

At the end of the examination

- You may keep this question book.

Students are NOT permitted to bring mobile phones or any other electronic devices into the examination.

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Instructions

This examination consists of a core and six modules. Students should answer **all** questions in the core and then select **three** modules and answer **all** question within the modules selected. You do not need to give numerical answers as decimals unless instructed to do so. Alternative forms may involve, for example, π , surds or fractions.

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Module	
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SECTION A**Core: Data analysis****Question 1**

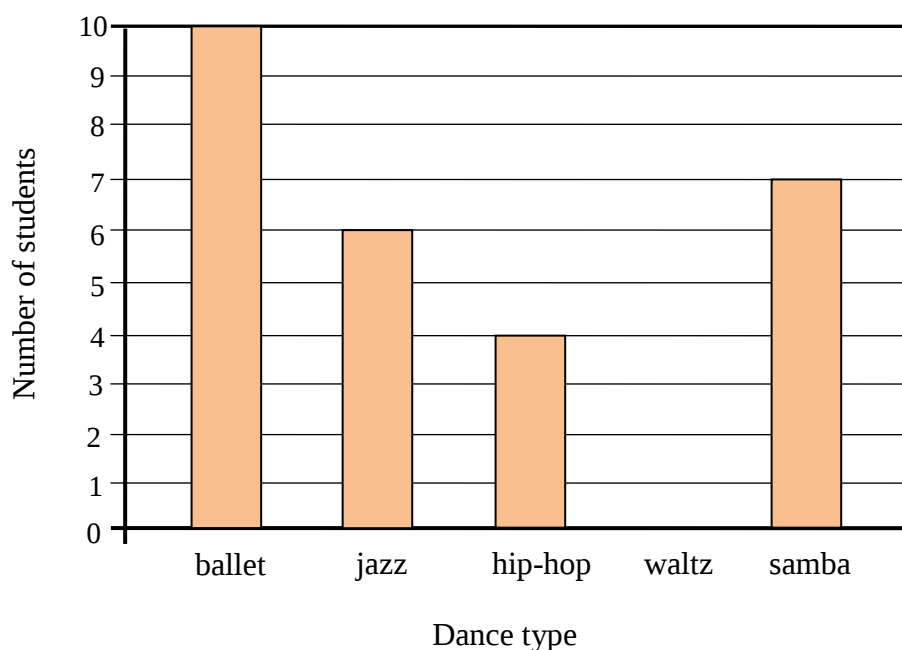
Shining Star Dance School teaches five different types of dance (ballet, jazz, hip-hop, waltz and samba) to four age groups (3–6 years, 7–10 years, 11–14 years, and 15 years and above). A survey of thirty-two Shining Star Dance School students who are in the 7–10 age group is conducted to find out what type of dance they enjoyed most.

Their responses are recorded below.

ballet	ballet	jazz	samba	jazz	hip-hop	ballet	samba
jazz	samba	waltz	waltz	hip-hop	samba	hip-hop	ballet
ballet	samba	jazz	waltz	ballet	jazz	ballet	samba
waltz	samba	ballet	jazz	hip-hop	waltz	ballet	ballet

Use the data to:

- a. complete the following bar chart by adding the missing column for waltz.



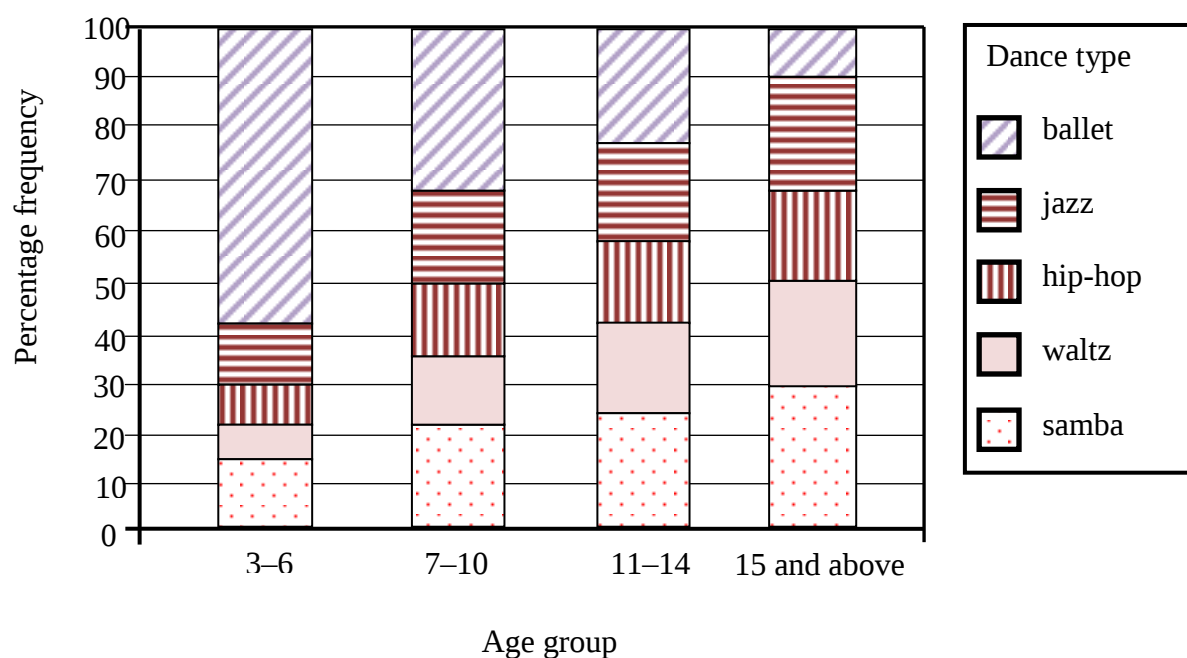
1 mark

- b. Determine the percentage of 7–10 year old Shining Star Dance School students who enjoyed jazz dancing most.

1 mark

Question 2

The survey from Question 1 is conducted again, only this time all age groups of the dance school are surveyed. The results are displayed in the percentage segmented bar chart below.



Does the percentage segmented bar chart support the opinion that, for these students, the dance type that they enjoy most is associated with their age group? Justify your answer by quoting appropriate percentages.

2 marks

Question 3

The birth years of 25 randomly chosen students of the Shining Star Dance School are given in the table below.

Name	Birth year
Abigail	2007
Timothy	1991
Bella	1994
Lara	1994
Mia	1996
Josh	1993
Jaden	1993
Sera	1993
Emma	1994
Craig	1998
Keith	1993
Ashley	1997
Stephanie	1993

Name	Birth year
Tyler	1992
Hattie	2001
Rebecca	1996
Jordan	1998
Courtney	1994
Matthew	1992
Joanne	1997
Vanessa	1992
Miguel	1991
Tiffany	1995
John	1993
Brennan	1999

- a. What proportion of these 25 students are older than Tiffany?

1 mark

- b. Complete the following sentence about the 25 Shining Star Dance School students:

The middle 50% of these students have birth years between and

1 mark

- c. For this distribution, the median is a more appropriate measure of centre than the mean. Explain why.

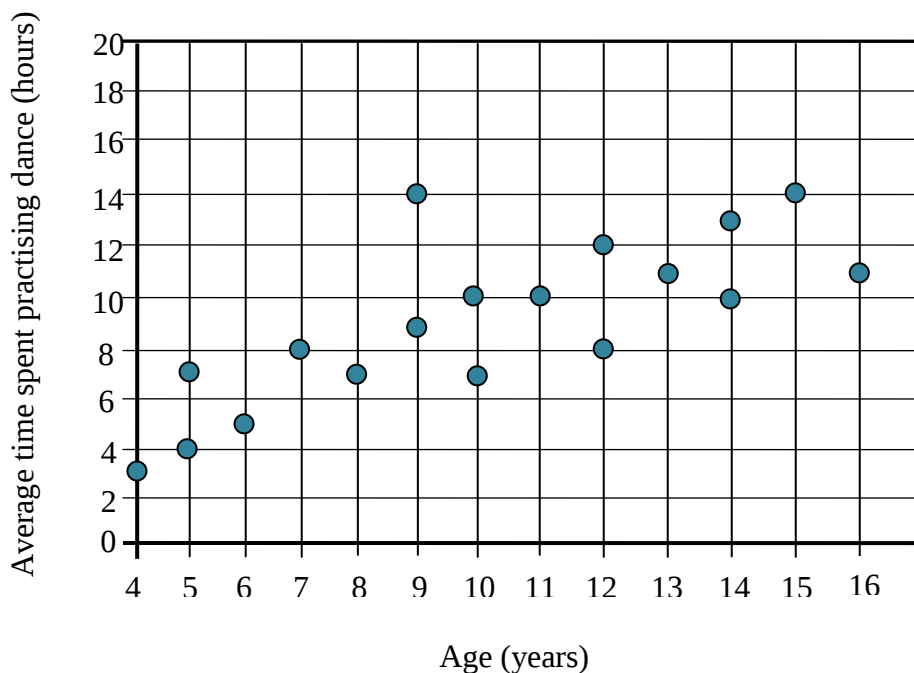
1 mark

- d. The birth year of Abigail is given as an outlier. This value is an error. Her real birth year is 2004. If the error is corrected, would Abigail's birth year still be an outlier? Give reasons for your answer showing an appropriate calculation.

1 mark

Question 4

In the scatter plot below, *average time spent practising dance each week*, in hours, is plotted against *age*, in years, of a random sample of 18 dance school students.



The equation of the least squares regression line for this data set is:

$$\text{average time spent practising dance} = 2.1696 + 0.6886 \times \text{age}$$

- a. Draw this least squares regression line on the scatter plot.

1 mark

- b.** One of the dance school students is 16 years old. The equation of the least squares regression line is used to predict the average time that this student spends practising dance each week.

Find the residual value for this prediction, in hours, correct to one decimal place and state whether this student's average weekly dance practice time is underestimated or overestimated by the least squares regression equation.

1 mark

- c.** The Pearson's product moment correlation coefficient for this data set is 0.7817.

- i.** Evaluate the coefficient of determination.

Write your answer, as a percentage, correct to two decimal places.

1 mark

- ii.** Interpret the coefficient of determination in terms of the variables *average time spent practising dance each week* and *age*.

1 mark

1 + 1 = 2 marks

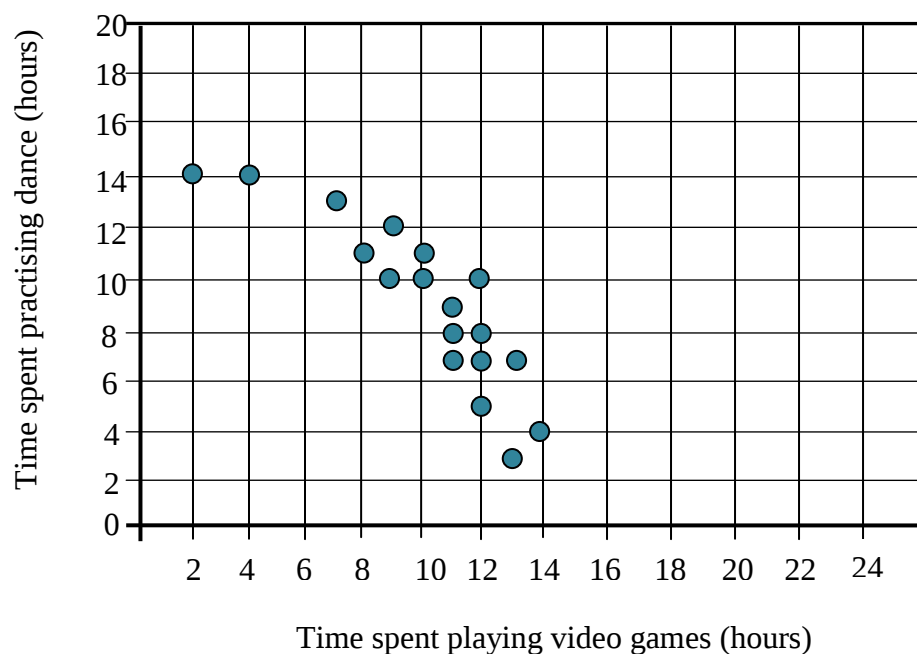
SECTION A – continued
TURN OVER

Question 5

Average time spent practising dance each week, in hours, and average time spent playing video games each week, in hours, were recorded for the same group of 18 dance school students.

The results are displayed in the table below and a scatterplot was constructed as shown.

Time spent playing video games (hours)	Time spent practising dance (hours)
2	14
4	14
7	13
8	11
9	10
9	12
10	10
10	11
11	7
11	8
11	9
12	5
12	7
12	8
12	10
13	3
13	7
14	4



The relationship between *time spent practising dance* and *time spent playing video games* is clearly nonlinear.

Applying a **squared** transformation to the variable, *time spent playing video games*, will linearise this scatterplot.

- a.** Apply the squared transformation to the data and determine the equation of the least squares regression line that allows *time spent practising dance* to be predicted from the square of *time spent playing video games*.

Write the coefficients correct to three decimal places.

2 marks

- b.** Use the least squares regression line to predict the number of hours that a dance school student who spends 6 hours per week playing video games spends practicing dance each week. Give your answer correct to one decimal place.

1 mark

Total 15 marks

**END OF CORE
END OF SECTION A**

**END OF SECTION A
TURN OVER**

SECTION B**Module 1: Number patterns****Question 1**

Gemma owns a flower shop. She opens her shop at 6:00 am every morning when she has 319 bunches of fresh flowers delivered to be sold daily. She manages to sell 37 bunches of flowers each hour.

- a. How many bunches of flowers will Gemma have in the shop at 9:00 am?

1 mark

- b. The number of bunches of flowers, A_n , remaining in the shop n hours after it opened can be written as $A_n = a - 37(n - 1)$.

What is the value of a ?

$$a = \boxed{}$$

1 mark

- c. Gemma needs to sell 180 bunches of flowers to break even. After every hour she checks the number of flowers left in the shop. At what time will she first notice that she is making profit?

1 mark

- d. For how many full hours can Gemma sell 37 bunches of flowers per hour?

1 mark

- e. The number of bunches of flowers, A_n , remaining in the shop n hours after opening the shop is given by the difference equation:

$$A_{n+1} = cA_n + d, \quad A_0 = e$$

Write the values of c , d and e in the boxes below.

$c =$

$d =$

$e =$

2 marks

Question 2

At the start of the day, Gemma sells each bunch of flowers for \$30. Every hour, she reduces this price by 20% in order to attract more customers.

- a. i. Brian wants to buy flowers for his daughter's engagement party. He goes to Gemma's flower shop at 9:00 am. How much is Brian going to pay for a bunch of flowers?

1 mark

- ii. Brian's budget for flowers is \$245. How many bunches of flowers can he afford with his budget?

1 mark

- iii. How many more bunches of flowers would Brian afford with his budget of \$245 if he bought them at 3:00 pm instead of at 9:00 am?

1 mark

1 + 1 + 1 = 3 marks

SECTION B – Module 1: Number patterns – continued
TURN OVER

- b.** How much money is Gemma going to earn from selling flowers in her shop's first 4 hours of operation? Write your answer correct to the nearest cent.

1 mark

- c.** Determine Gemma's total revenue from 10:00 am to 6:00 pm inclusive.
Write your answer correct to the nearest cent.

1 mark

Question 3

William also sells flowers. Just like Gemma, he opens his shop at 6:00 am every morning.

The difference equation below provides a model for predicting the price of a bunch of flowers in William's shop.

$$B_{n+1} = 1.4B_n - 5, \quad B_1 = 15$$

where B_n is the price of a bunch of flowers at the start of the n th hour after opening the shop.

- a.** Show that the sequence generated by this difference equation is neither arithmetic nor geometric.

1 mark

- b.** How much will a bunch of flowers cost at William's shop at 11:00 am?
Write your answer correct to the nearest cent.

1 mark

- c.** Determine how many hours after opening it will be before the price of a bunch of flowers in William's shop first exceeds the price of a bunch of flowers in Gemma's shop. At what time will this happen?

2 marks

Total 15 marks

END OF MODULE 1

SECTION B – continued

Module 2: Geometry and trigonometry

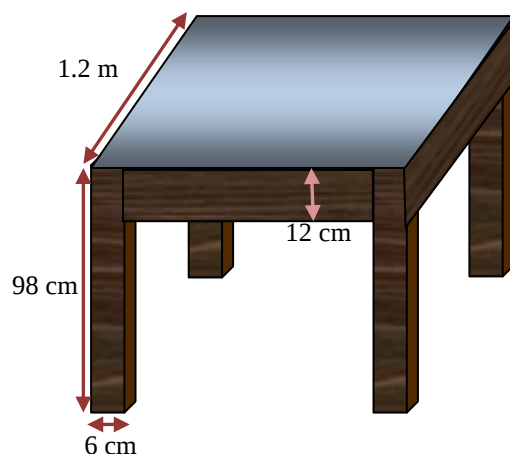
Question 1

Ryan bought a table shaped like a square with side lengths of 1.2 metres.

The table has a height of 98 centimetres and the table top is 12 centimetres thick.

The legs of the table are in the shape of four identical cuboids with square bases.

The side lengths of the bases of the legs are 6 centimetres each.



- a. On a model of the table, a 3 cm^2 area is used to represent 12 m^2 .

- i. What scale factor is used to make this model?

1 mark

- ii. What is the height of the model of the table?

1 mark

- iii. Find the volume of the table.

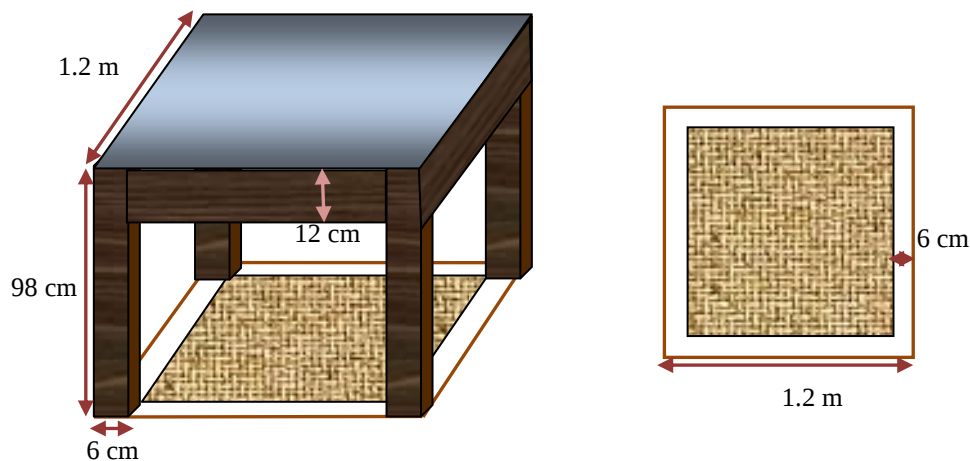
Write your answer in m^3 , correct to two decimal places.

2 marks

1+1+2=4 marks

SECTION B – Module 2: Geometry and Trigonometry – continued
TURN OVER

- b.** Ryan first lays a plastic floor mat under the table.
He then buys a square of carpet and places it on top of the floor mat.
The corners of the square of carpet touch the inside corners of the table legs.



- i.** Find the length of the diagonal of the square of carpet.
Give your answer in metres, correct to two decimal places.
- ii.** What is the area of the plastic floor mat that is not covered by the carpet
(including the part that is covered by the base of the table legs)?

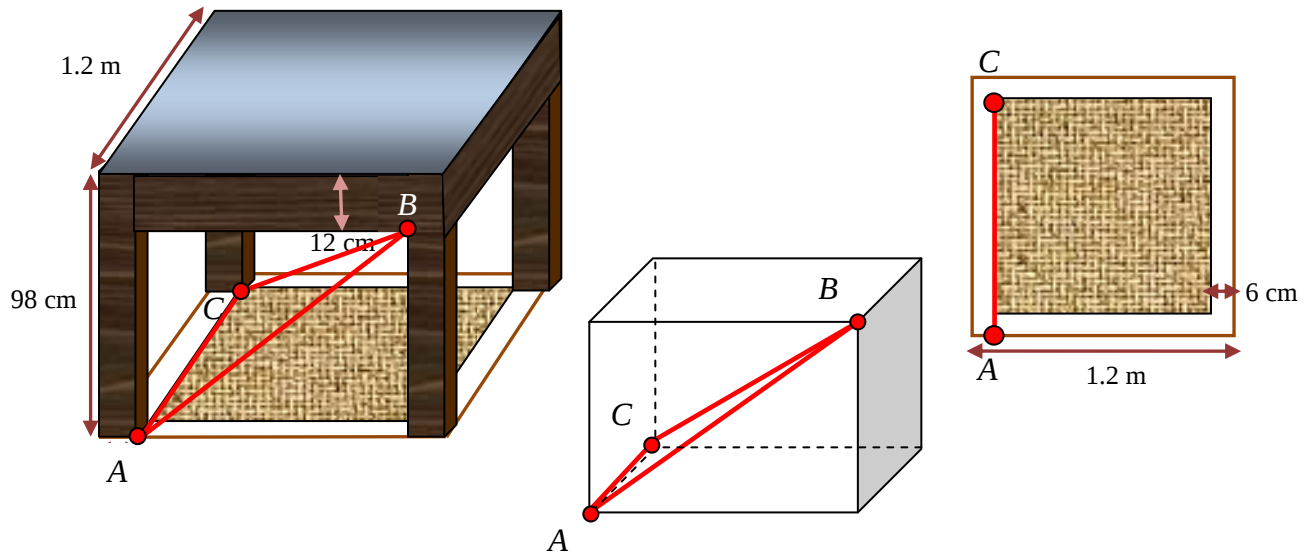
1 mark

1 mark

1+1=2 marks

- c. Find the area of the triangle that is formed by connecting the points A , B and C shown below.

Write your answer in cm^2 , correct to one decimal place.



2 marks

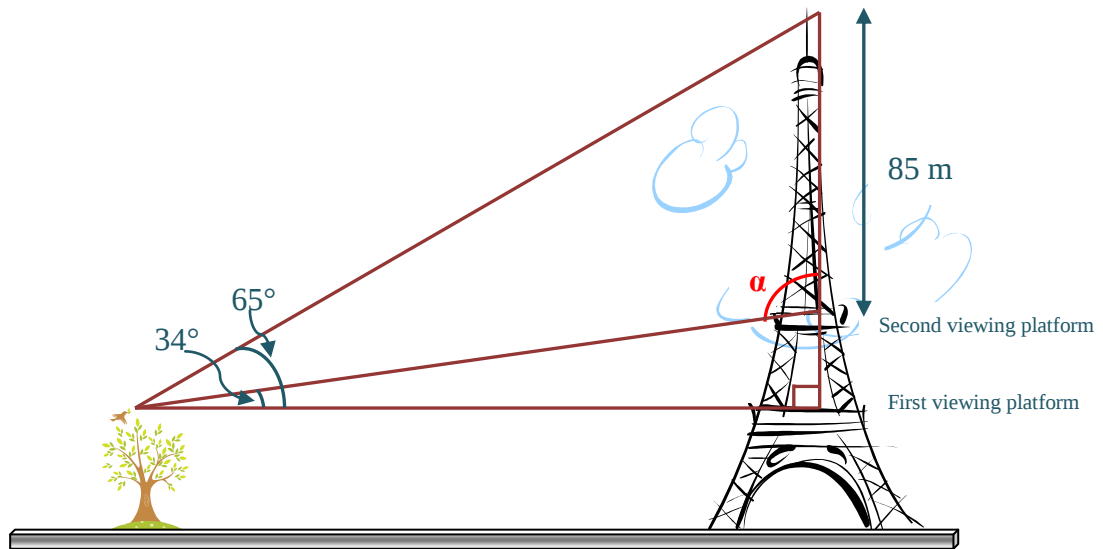
Question 2

From a bird in a tree the angle of elevation of the top of a tower is 65° and that of the second viewing platform of the tower is 34° .

The vertical distance between the second viewing platform and the top of the tower is 85 metres.

The bird is horizontally at the same level as the first viewing platform of the tower.

The diagram below shows the positions of the bird and the tower.



- a. Show that the size of angle α in the diagram above is 124° .
1 mark

- b. Calculate the area of the triangle that is formed between the bird, the top of the tower and the second viewing platform of the tower. Write your answer in m^2 , correct to one decimal place.
1 mark

- c. Calculate the vertical distance between the first and the second viewing platforms of the tower. Write your answer in metres, correct to one decimal place.
1 mark

Question 3

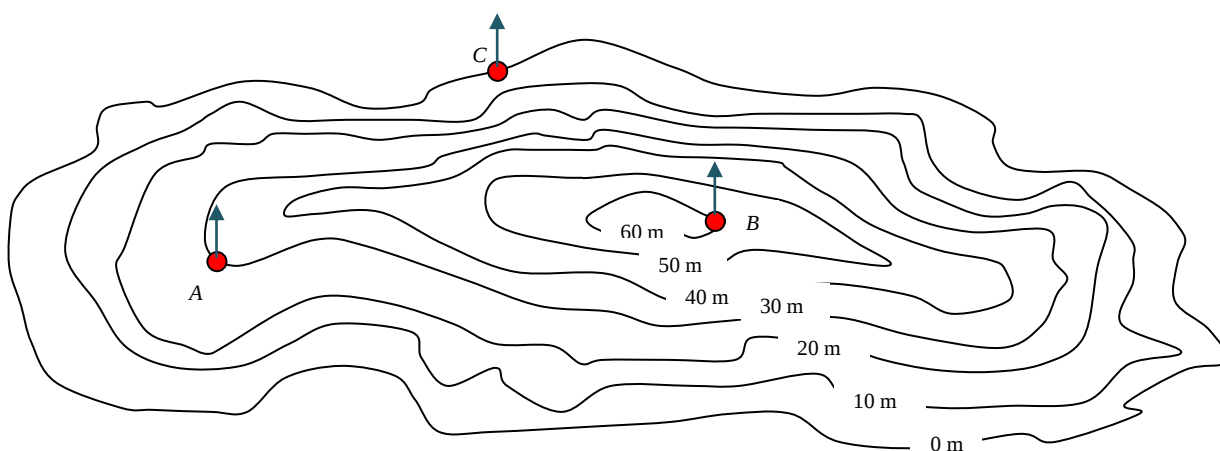
A reduced image of a contour map of a botanic garden is shown below. It has contours drawn at intervals of 10 metres.

The map shows three observation cafés, in three different spots: Café Alexander (A), Café Benjamin (B) and Café Chloe (C).

Eva measures the distance between Café Alexander and Café Chloe on the actual contour map as 15 centimetres and the distance between Café Chloe and Café Benjamin as 10 centimetres.

The bearing of Café Chloe from Café Alexander is 070°T and the bearing of Café Benjamin from Café Chloe is 135°T .

The arrows on the points are pointing in the north direction.



a. On the contour map, 1 centimetre represents 3 metres on the horizontal level.

i. Find the horizontal distance between Café Alexander and Café Benjamin.

Write your answer in metres, correct to three decimal places.

1 mark

ii. By using your answer from Question 3ai, find the bearing of Café Alexander from Café Benjamin. Give your answer correct to the nearest degree.

2 marks

b. Determine the angle of depression of a person looking at Café Chloe from Café Alexander. Give your answer correct to the nearest degree.

1 mark

Total 15 marks

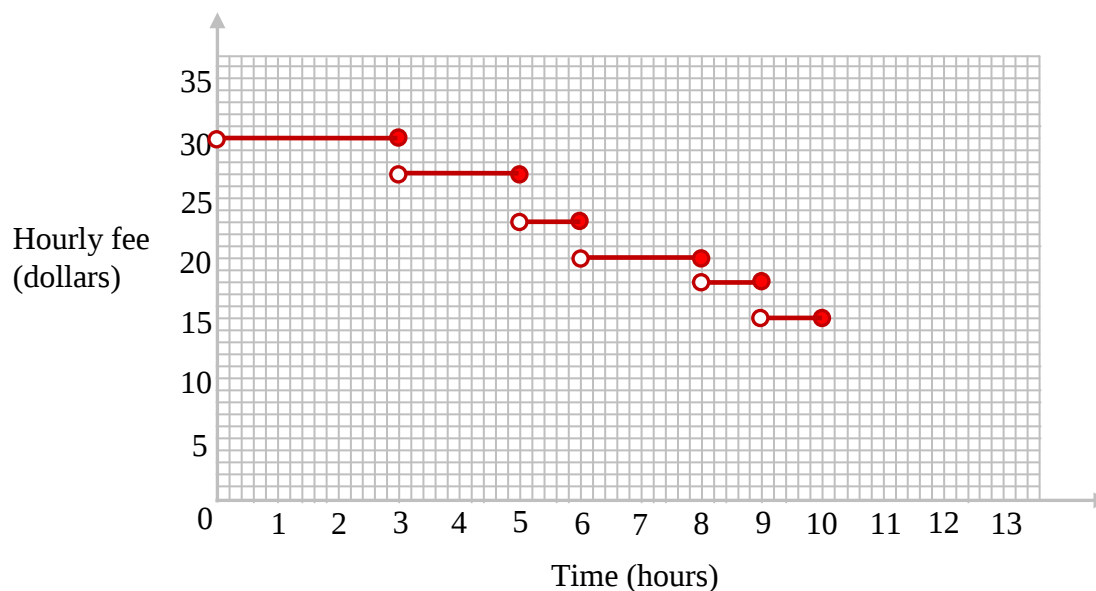
END OF MODULE 2

SECTION B – continued
TURN OVER

Module 3: Graphs and relations

Question 1

Sarah operates a house-cleaning service. The hourly fee she charges depends on the time it takes to clean the house. The hourly fees that Sarah's house-cleaning service charges for times up to 10 hours are shown on the graph below.



- a. How much would it cost if Sarah cleaned a house in six hours?

1 mark

- b. Sarah's house cleaning service charges \$13 per hour when customers require more than 10 hours of cleaning. Draw this information on the graph.

1 mark

Question 2

Sarah's brother Nathan manufactures and sells vacuum cleaners. When he first opened his business he spent \$5500 on the necessary equipment.

The cost of manufacturing one vacuum cleaner is \$300.

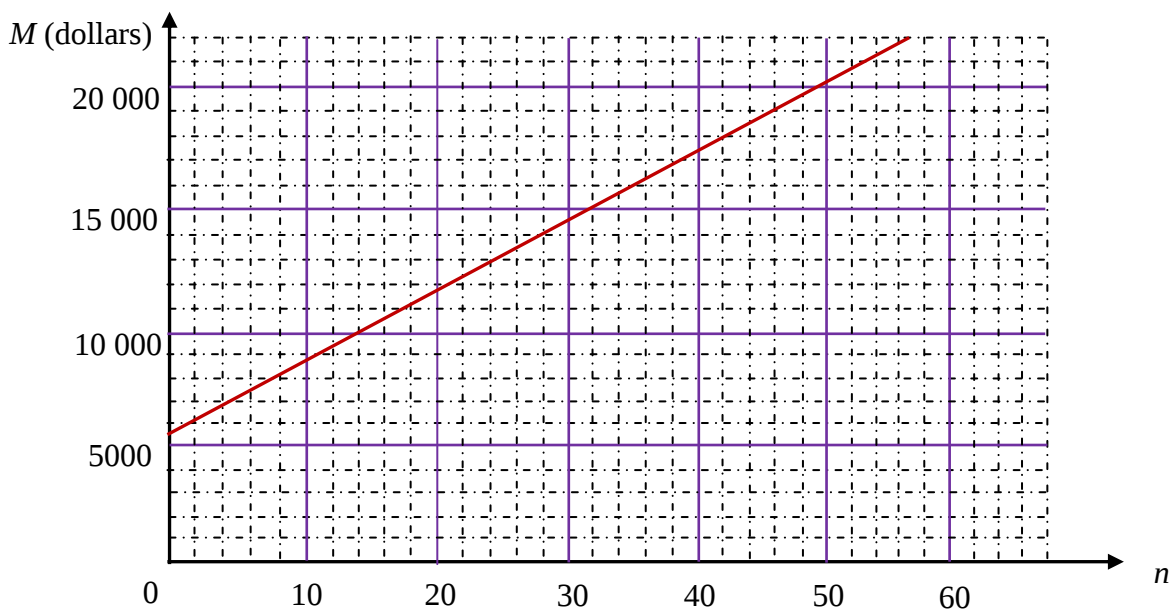
- a. Write an equation that gives the total amount of money, M dollars, that it costs Nathan to manufacture n vacuum cleaners.

1 mark

- b. Nathan sells the vacuum cleaners for \$520 each. Write an equation for the revenue, R dollars, that Nathan receives from the sale of n vacuum cleaners.

1 mark

The total amount of money, M , that Nathan pays to manufacture n vacuum cleaners is graphed below.



- c. Draw the graph of the revenue, R , that Nathan receives from the sale of n vacuum cleaners. From the graph, or using another method, find the smallest number of vacuum cleaners that Nathan needs to sell in order to make profit.

1 mark

- d. How many vacuum cleaners did Nathan sell if he made \$1100 profit?

1 mark

Question 3

Nathan's wife, Sandra is a hairdresser. She specialises in two areas, cutting hair and styling hair.

Let x be the number of customers who get a haircut from Sandra
and let y be the number of customers who get a hairstyle from Sandra.

It takes 40 minutes to cut hair and half an hour to style hair.

Sandra has 10 hours available each day to cut and style the customers' hair.

- a.** Write an inequality to describe this information in terms of x and y .

1 mark

- b.** A constraint is given by Inequality 2:

$$x \geq 2$$

Explain the meaning of Inequality 2 in terms of the context of this problem.

1 mark

- c.** Inequalities 3 to 5 below represent the remaining constraints.

Inequality 3: $x \geq 0$

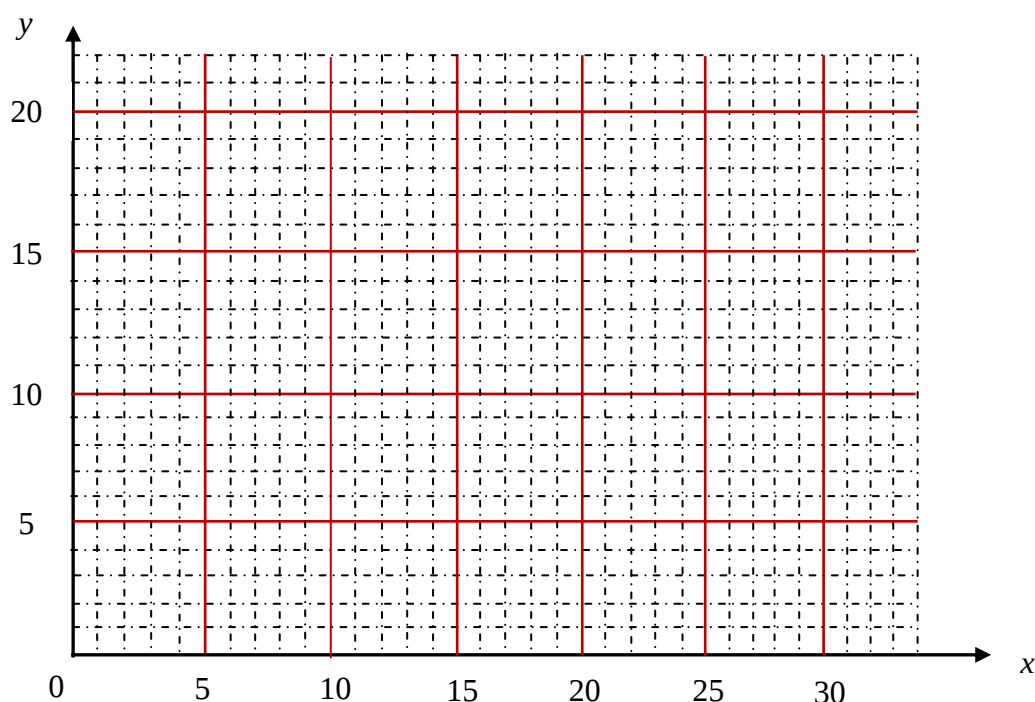
Inequality 4: $y \geq 0$

Inequality 5: $y \geq \frac{x}{3}$

By using the constraints given, find the maximum number of haircuts Sandra can perform on a day when she styles three customers' hair.

1 mark

- d. Draw a graph that represents $y = \frac{x}{3}$.



1 mark

- e. On the graph above, draw the boundaries of the region represented by Inequalities 1 to 4. Clearly shade the feasible region represented by these inequalities.

2 marks

The profit that Sandra receives from each haircut is \$65 and the profit that she receives from each hairstyle is \$50.

- f. Write an equation for the total profit, P , that Sandra receives in terms of x and y , when x is the number of haircuts and y is the number of hairstyles.

1 mark

- g. Determine the number of customers that Sandra needs to have their hair cut and the number of customers that she needs to have their hair styled for her to maximise her profit.

2 marks

Total 15 marks

END OF MODULE 3

Module 4: Business-related mathematics

SECTION B – continued
TURN OVER

Question 1

Gabrielle wants to buy a laptop for her daughter's birthday. She visits three different stores and compares their prices.

The first store has the laptop marked at \$2 500 but will give 22% discount if the payment is made in cash at the time of sale.

- a.** If Gabrielle decides to buy the laptop from the first store, what would she pay for it after the discount is applied, provided that she makes the payment in cash.

1 mark

- b.** A second store offers the same \$2 500 laptop under a hire-purchase agreement with \$350 deposit and 18 monthly instalments of \$152.

- i.** Determine the total amount that Gabrielle would pay if she decides to buy the laptop from the second store.

1 mark

- ii.** Find the total interest Gabrielle would pay over 18 months.

1 mark

- iii.** Determine the annual flat interest rate that would be applied to this hire-purchase agreement. Write your answer as a percentage, correct to one decimal place.

1 mark

1+1+1=3 marks

- c. The third store requires 35% deposit for the \$2 500 laptop. The balance is to be paid in 12 equal monthly instalments. No interest is charged.

- i. Determine the amount of deposit that Gabrielle would pay if she decides to buy the laptop from the third store.

1 mark

- ii. Determine the amount of each of the 12 instalments Gabrielle will pay.
Write your answer correct to the nearest cent.

1 mark

1+1=2 marks

Question 2

The bank statement below shows the transactions on Joshua's account for the month of April. Interest for this account is calculated on the minimum monthly balance at a rate of 5.3% per annum.

Date	Description of transaction	Withdrawals	Deposits	Balance
01 April	Opening balance			\$53 467
09 April	Withdrawal–internet transfer	\$4 538		\$48 929
12 April	Withdrawal–cash	\$12 890		\$36 039
17 April	Deposit–cash		\$13 485	\$49 524
20 April	Withdrawal–internet transfer			\$48 279
24 April	Deposit–cheque			\$51 365
28 April	Deposit–internet transfer		\$525	\$51 890
30 April	Closing balance			\$51 890

- a. Find the amount that was withdrawn from the account on 20 April and the amount that was deposited to the account on 24 April.

1 mark

- b. Calculate the interest for April, correct to the nearest cent.

1 mark

Question 3

Lucas has \$6 800 invested in an account which pays interest at the rate of 5.6% per annum compounding quarterly.

- a. Show that the interest rate per quarter is 1.4%.
1 mark
- b. Determine the value of a \$6 800 investment after five years.
Write your answer correct to the nearest cent.
1 mark
- c. Calculate the interest a \$6 800 investment will earn over 10 years.
Write your answer correct to the nearest cent.
1 mark

Question 4

Jessica takes out a reducing balance loan to purchase a house.

Interest on the loan will be calculated and paid monthly at the rate of 7.652% per annum.

- a. Jessica's loan will be fully repaid in equal monthly instalments of \$3264.40 over 30 years.
 - i. Find the amount Jessica borrowed from the bank.
Write your answer correct to the nearest dollar.
1 mark
 - ii. By using your answer from Question 4ai, calculate the total interest that will be paid over the 30-year term of Jessica's loan.
1 mark

1+1=2 marks
- b. Jessica reduces the principal of her loan to \$180 000 by making a lump sum payment after fifteen years. Her monthly repayments and the interest rate remain the same.
How many months, in total, will Jessica take to fully repay her home loan?
2 marks

Total 15 marks

END OF MODULE 4

Module 5: Networks and decision mathematics

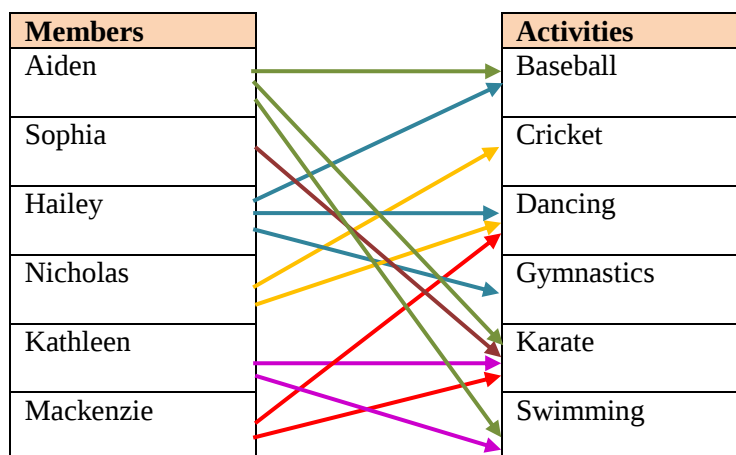
Question 1

Aiden, Sophia, Hailey, Nicholas, Kathleen and Mackenzie are members of a local youth club.

The youth club has six activities running at the same time.

Although the students make their preferences, each member can only do one activity and each activity must be done by one participant.

The following bipartite graph illustrates the activity preferences of the six youth club members.



- a. Who must do the dancing activity?

1 mark

- b. Complete the table below showing the names of the members who must do the following activities.

Members	Activities
	Baseball
	Karate
	Gymnastics
	Cricket
	Swimming

2 marks

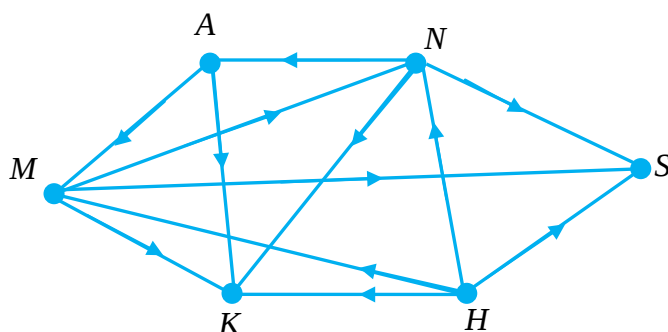
Question 2

The six youth club members from Question 1 decided to arrange a round-robin table tennis tournament among themselves.

- a. If each club member is to play table tennis with every other member once only, how many games will be played in the tournament?

1 mark

- b. The network graph below has been partially constructed to represent the results of the tournament. ($A \rightarrow K$ means Aiden defeated Kathleen.)



1 mark

- c. By representing 'defeated' by the element '1' and 'did not defeat' by the element '0', construct a dominance matrix, $\mathbf{M}$, for the results of the tournament.

1 mark

- d. Determine and write the dominance vector associated with the matrix $\mathbf{M} + \mathbf{M}^2$.

2 marks

Adding the elements in each row gives the dominance vector, i.e., the sum of the level 1 and level 2 wins in the table tennis tournament.

$$\text{dominance vector} = \begin{bmatrix} 6 \\ 3 \\ 15 \\ 7 \\ 2 \\ 8 \end{bmatrix}$$

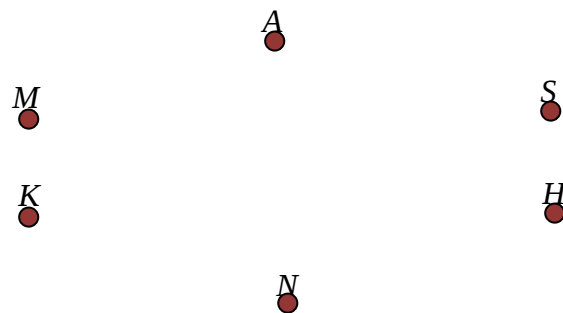
- e. Rank the club members in order, from first to last, for the table tennis tournament.

1 mark

Question 3

Aiden, Sophia, Hailey, Nicholas, Kathleen and Mackenzie are also neighbours.

Their houses are labelled A , S , H , N , K and M below.



To be able to communicate with each other comfortably, they want their houses to be connected by private telephone cables.

- a. What is the minimum number of edges needed to connect the six houses.

1 mark

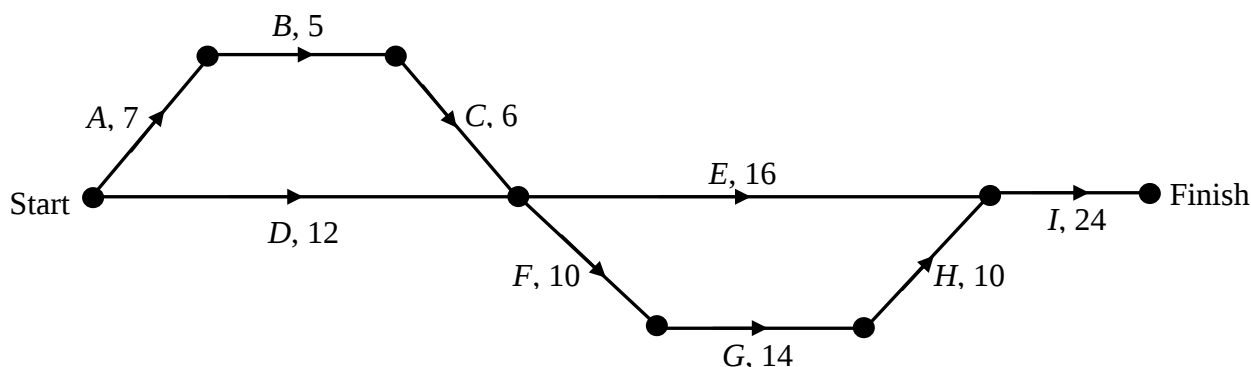
- b. On the diagram above, draw a connected graph with the number of edges you answered for **part a**.

1 mark

Question 4

The supervisor of the telephone cable connection project described in Question 3 has identified nine activities that must be performed in order to complete the connection job.

Those activities together with the times that they take to complete, in hours, are shown on the directed network below.



- a. Identify the critical path for this project.

1 mark

- b. What is the latest start time possible for activity D without delay resulting to the overall project?

1 mark

- c. The project supervisor correctly records the float time for each activity that can be delayed and makes a list of these times. Determine the longest float time in hours.

1 mark

- d. What is the minimum time in which the project can be completed?

1 mark

Total 15 marks

END OF MODULE 5

SECTION B – continued

Module 6: Matrices**Question 1**

Brook goes to the Sunday market to buy some vegetables. She needs to buy avocado, cucumber, pumpkin and cauliflower.

Z is a row matrix that represents the price (in dollars) of each vegetable.

$$\mathbf{Z} = [4 \ 2 \ 5 \ 6]$$

Brook buys 2 avocados, 3 cucumbers, 1 pumpkin and 4 cauliflowers.

- a.** Use a column matrix, **Y**, to show the number of each vegetable that Brook bought from the Sunday market.

1 mark

- b.** Matrix **X** is found by multiplying matrix **Z** with matrix **Y** so that:

$$\mathbf{X} = \mathbf{Z} \times \mathbf{Y}$$

Evaluate matrix **X**.

1 mark

- c.** In this context, what does the information in matrix **X** provide?

1 mark

- d.** Another matrix, **W**, is found by multiplying matrix **Y** with matrix **Z** so that:

$$\mathbf{W} = \mathbf{Y} \times \mathbf{Z}$$

What is the order of matrix **W**?

1 mark

Question 2

The student representative council of a high school is selling doughnuts to raise money for the Queensland flood appeal. They formed themselves into four groups and each group sold four different types of doughnuts.

The table below shows the number of doughnuts sold by each group and the total value of sales.

Types of doughnuts sold	Group 1	Group 2	Group 3	Group 4
Original glazed doughnut	51	56	35	14
Glazed cinnamon doughnut	27	18	37	41
Chocolate iced custard-filled doughnut	15	29	42	42
Cinnamon apple-filled doughnut	22	19	17	24
Total sales	\$284.90	\$304.80	\$342.90	\$333.30

An original glazed doughnut costs \$x.

A glazed cinnamon doughnut costs \$y.

A chocolate iced custard-filled doughnut costs \$z.

A cinnamon apple-filled doughnut costs \$w.

- a. The situation described above is represented in the matrix equation below.

Complete the missing information.

$$\begin{bmatrix} \\ \\ \\ \end{bmatrix} \times \begin{bmatrix} x \\ y \\ z \\ w \end{bmatrix} = \begin{bmatrix} 284.90 \\ 304.80 \\ 342.90 \\ 333.30 \end{bmatrix}$$

1 mark

- b.** Do the linear equations that are represented by the matrix equation in Question 2a have a unique solution?

Provide an explanation to justify your response.

1 mark

- c.** Use the matrix equation to find the cost of a chocolate iced custard-filled doughnut.

2 marks

Question 3

The bakery that makes the doughnuts sells 1 200 original glazed doughnuts (O), 900 glazed cinnamon doughnuts (G) and 1 900 chocolate iced custard-filled doughnuts (C) in the first week of its operation. The bakery starts making cinnamon apple filled doughnuts (A) in the second week.

The initial state matrix, S_1 , shows the number of each type of doughnut sold by the bakery in the first week.

$$S_1 = \begin{bmatrix} 1200 \\ 900 \\ 1900 \\ x \end{bmatrix} \begin{matrix} O \\ G \\ C \\ A \end{matrix}$$

- a.** What is the value of x in the initial state matrix?

1 mark

Each week some customers change their doughnut preferences and so the number of each type of doughnut sold changes accordingly. The transition matrix, $\mathbf{T}$, reflecting the changes in the doughnuts sales from one week to the next is shown below.

$$\mathbf{T} = \begin{array}{cccc|c} & O & G & C & A & \\ \hline & 0.65 & 0.45 & 0.30 & d & O \\ 0.20 & b & 0.25 & 0.10 & & G \\ a & 0.15 & 0.20 & 0.05 & & C \\ 0.05 & 0.20 & c & 0.35 & & A \end{array}$$

- b.** Find the sum of the values a , b , c and d in the transition matrix, $\mathbf{T}$.

1 mark

- c.** The store manager notices that each customer buys only one doughnut every week.

- i.** Determine how many customers are not expected to have changed their doughnut preference in the second week.

1 mark

- ii.** How many customers are expected to buy cinnamon apple-filled doughnuts in the fifth week?

1 mark

1 + 1 = 2 marks

- d.** Determine how many more cinnamon apple-filled doughnuts are expected to be sold in week five than in week six. Write your answer correct to the nearest whole number.
- 1 mark
- e.** In week 10, every person buying an original glazed doughnut or a chocolate iced custard-filled doughnut will be given a free cup of coffee (the numbers of customers are written correct to the nearest whole number).
- How many free cups of coffee, in total, are expected to be given away?
- 1 mark

In the first week, 1 200 original glazed doughnuts and 900 glazed cinnamon doughnuts were sold.

Suppose, instead, that 2 000 original glazed doughnuts and 1 000 glazed cinnamon doughnuts were sold in the first week.

- f.** Describe the way in which the number of original glazed doughnuts sold is expected to change over the next 60 or so weeks.
- 1 mark

Total 15 marks

END OF MODULE 6
END OF QUESTION AND ANSWER BOOK