2011

VCE

Further Mathematics

Trial Examination 2

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PURPOSE OF THIS TRIAL EXAMINATION

This Further Mathematics Trial Examination is designed to assess

- understanding and communication of mathematical ideas
- interpretation, analysis and solution of routine problems
- interpretation, analysis and solution of non-routine problems

Assessment is by extended answer questions involving multi-stage solutions of increasing complexity.

IMPORTANT COPYRIGHT NOTICE

STUDENT NUMBER

										Letter
Figures										
Words										

VICTORIAN CERTIFICATE OF EDUCATION 2011

FURTHER MATHEMATICS

Trial Written Examination 2 (Analysis task)

Reading time: 15 minutes
Total writing time: 1 hour 30 minutes

QUESTION AND ANSWER BOOK

Structure of book

Core

Number of questions	Number of questions to be answered
4	4

Modules

Number of modules	Number of modules to be answered
6	3

- Students are permitted to bring into the examination room: pens, pencils, highlighters, erasers, sharpeners, rulers, one bound reference, one approved graphics calculator or approved CAS calculator or CAS software and, if desired, one scientific calculator.
Calculator memory DOES NOT need to be cleared.
- Students are NOT permitted to bring into the examination room: blank sheets of paper and/or white out liquid/tape.

Materials supplied

- Question and answer book of 39 pages.
- Working space is provided throughout the book.
- There is a detachable sheet of miscellaneous formula supplied.

Instructions

- Detach the formula sheet from the book during reading time.
- Write your **student number** in the space provided above on this page.
- All written responses must be in English.

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

FURTHER MATHEMATICS

Written examinations 1 and 2

FORMULA SHEET

Directions to students

Detach this formula sheet during reading time. This formula sheet is provided for your reference.

Further Mathematics Formulas

Core: Data analysis

standardised score: $z = \frac{x - \bar{x}}{s_x}$

least squares line: $y = a + bx$ where $b = r\frac{s_y}{s_x}$ and $a = \bar{y} - b\bar{x}$

residual value: residual value = actual value – predicted value

seasonal index: seasonal index $= \frac{\text{actual figure}}{\text{deseasonalised figure}}$

Module 1: Number patterns

arithmetic series: $a + (a+d) + \ldots + (a+(n-1)d) = \frac{n}{2}[2a + (n-1)d] = \frac{n}{2}(a+l)$

geometric series: $a + ar + ar^2 + \ldots + ar^{n-1} = \frac{a(1-r^n)}{1-r}, r \neq 1$

infinite geometric series: $a + ar + ar^2 + ar^3 + \ldots = \frac{a}{1-r}, |r| < 1$

Module 2: Geometry and trigonometry

area of a triangle: $\frac{1}{2}bc\sin A$

Heron's formula: $A = \sqrt{s(s-a)(s-b)(s-c)}$ where $s = \frac{1}{2}(a+b+c)$

circumference of a circle: $2\pi r$

area of a circle: πr^2

volume of a sphere: $\frac{4}{3}\pi r^3$

surface area of a sphere: $4\pi r^2$

volume of a cone: $\frac{1}{3}\pi r^2 h$

volume of a cylinder: $\pi r^2 h$

volume of a prism: area of base × height

volume of a pyramid: $\frac{1}{3}$ area of base × height

Pythagoras' theorem: $c^2 = a^2 + b^2$

sine rule: $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

cosine rule: $c^2 = a^2 + b^2 - 2ab\cos C$

Module 3: Graphs and relations

Straight line graphs

gradient (slope): $m = \frac{y_2 - y_1}{x_2 - x_1}$

equation: $y = mx + c$

Module 4: Business-related mathematics

simple interest: $I = \frac{\Pr T}{100}$

compound interest: $A = PR^n$ where $R = 1 + \frac{r}{100}$

hire purchase: effective rate of interest $\approx \frac{2n}{n+1} \times$ flat rate

annuities: $A = PR^n - \frac{Q(R^n - 1)}{R - 1}$, where $R = 1 + \frac{r}{100}$

Module 5: Networks and decision mathematics

Euler's formula: $v + f = e + 2$

Module 6: Matrices

determinant of a 2×2 matrix: $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$; $\det A = \begin{vmatrix} a & b \\ c & d \end{vmatrix} = ad - bc$

inverse of a 2×2 matrix: $A^{-1} = \frac{1}{\det A}\begin{bmatrix} d & -b \\ -c & a \end{bmatrix}$ where $\det A \neq 0$

END OF FORMULA SHEET

Specific Instructions

This task paper consists a core and six modules. Students should answer **all** questions in the core and then select **three** modules and answer **all** questions within the modules selected.

Core: Data analysis

Question 1

	Melbourne		Sydney	
Day	Max Temp ^{0}C	Evaporation mm	Max Temp ^{0}C	Evaporation mm
1	19.5	1.2	27.7	7.8
2	19.8	3.6	27.7	6.0
3	20.1	4.6	27.3	6.4
4	18.6	5.0	27.2	5.5
5	24.5	3.4	26.5	4.8
6	28.0	4.8	22.4	3.1
7	29.2	7.2	25.0	5.7
8	27.2	10.8	28.2	7.2
9	23.8	2.6	37.8	10.9
10	18.7	1.8	25.5	4.2
11	27.1	0.6	26.4	7.5
12	30.7	9.2	30.0	8.6
13	22.4	6.8	29.8	8.5
14	24.5	7.1	35.4	10.2

The above table shows the maximum temperatures in ^{0}C and the amount of evaporation in millimeters for Melbourne and Sydney over a two - week period.

a. For Melbourne's maximum temperature over this period what is the mean and standard deviation? Give your answers to one decimal place.

_____

1 mark

b. What percentage of Melbourne's maximum temperatures was above its mean maximum temperature during this period?

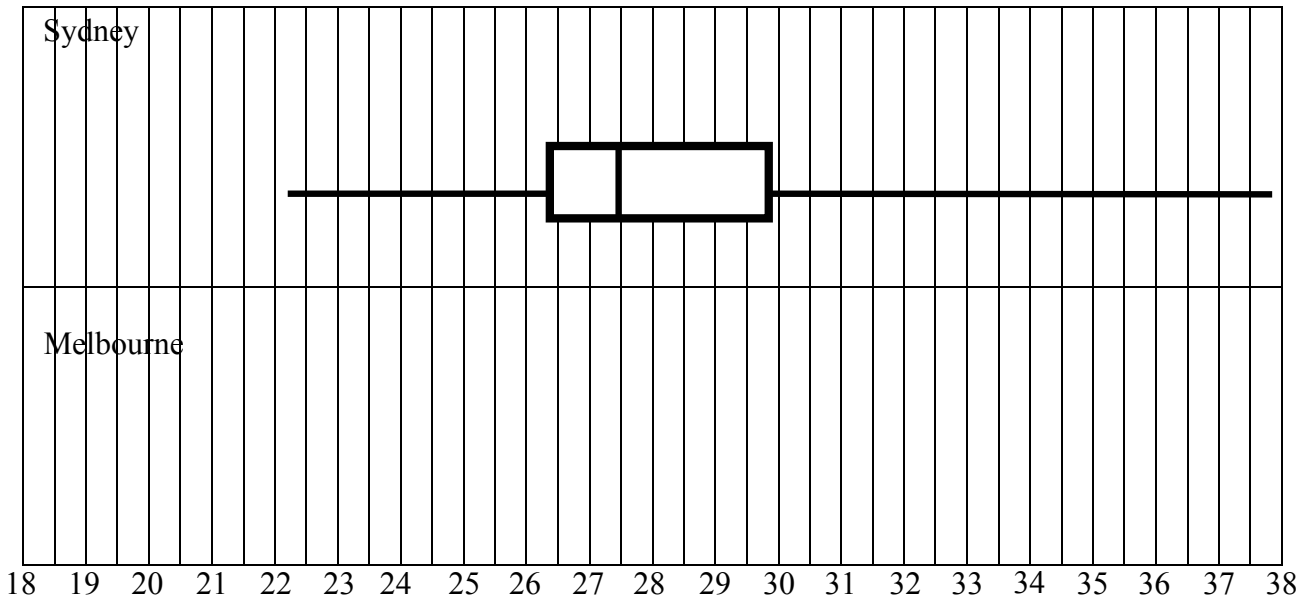
_____

1 mark

Core: Data analysis

Question 1 (continued)

c. In the space provided, draw the box plot for the maximum temperatures for Melbourne for this period.



2 marks

d. What is the interquartile range for Melbourne's maximum temperatures for this period?

_____

1 mark

e. Describe what the box plots show with regard to temperatures in the two cities.

_____

_____

_____

1 mark

Core: Data analysis

Question 2

a. Complete the following stem and leaf graph for Melbourne's evaporation over this two – week period.

0	
1	2 8
2	6
3	4 6
4	6 8
5	0
6	8
7	1 2
8	
9	2
1 0	8

1 mark

b. What is the median evaporation of Melbourne over this time?

_____

1 mark

c. Are there any outliers for Melbourne's evaporation over this time. Give reasons.

_____

_____

_____

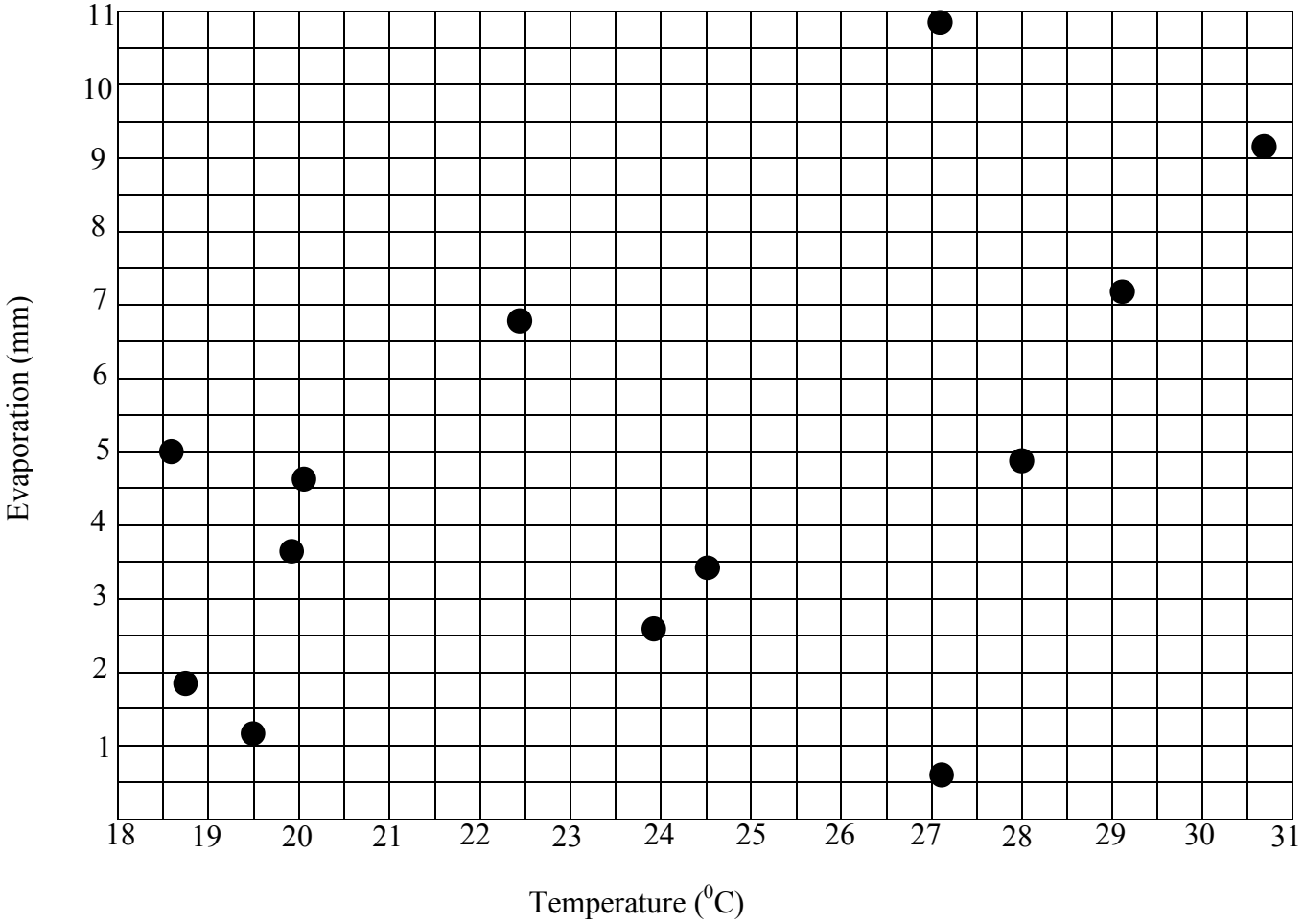
1 mark

Core: Data analysis

Question 3

The scatter plot below shows the evaporation and maximum temperature for Melbourne for the given fourteen days.

Melbourne



a. On the above scatter plot mark the point corresponding to the 14th day with an **X.**

1 mark

b. What is the equation of the least squares regression line? Give your answer in terms of temperature and evaporation. Give all numbers to one decimal place.

_____

1 mark

Core: Data analysis

Question 3 (continued)

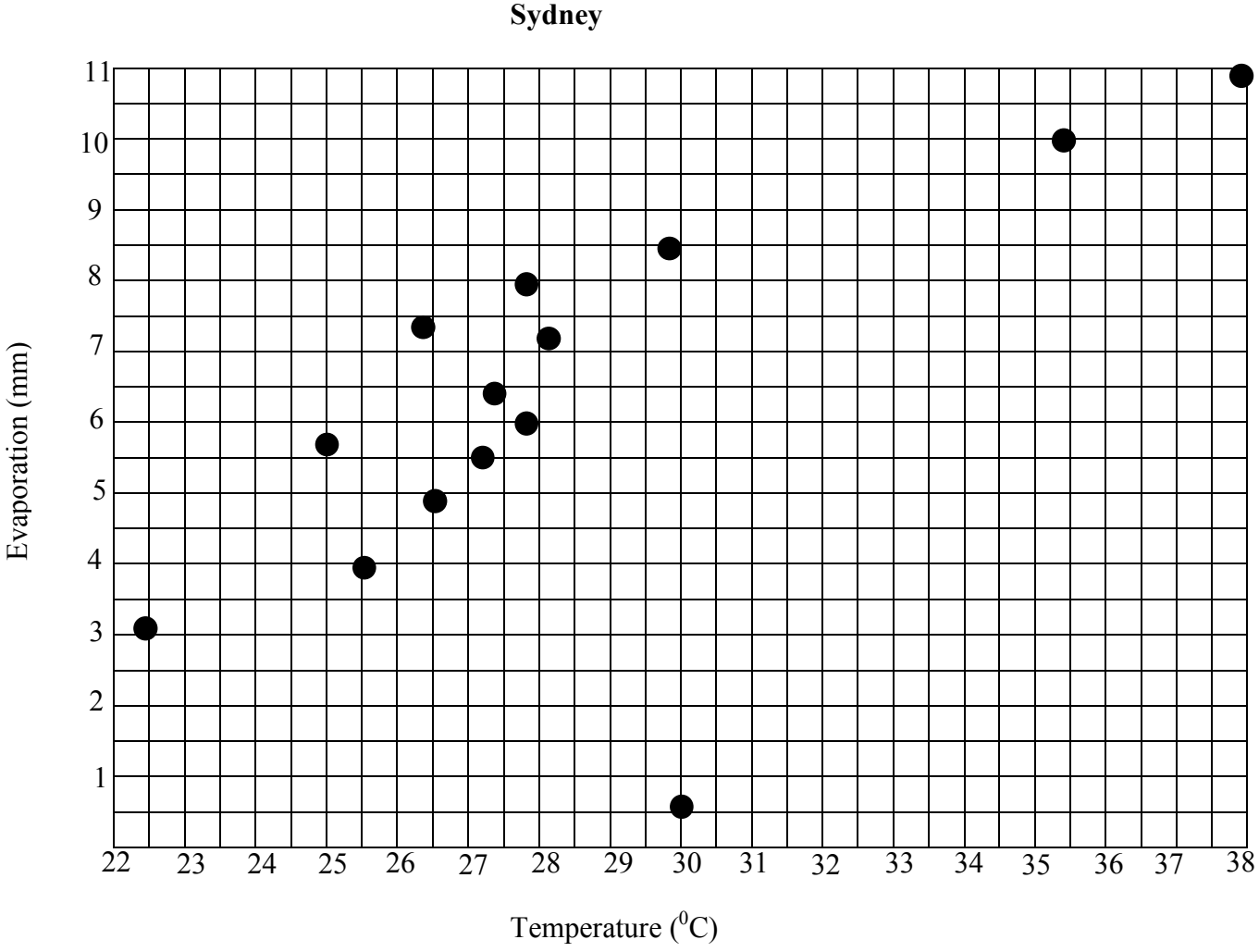
c. What is the strength of the linear relationship? Support your answer by using the appropriate statistic.

_____

1 mark

Question 4

The scatter plot below shows the evaporation and maximum temperature for Sydney for the given fourteen days.



Core: Data analysis

Question 4 (continued)

a. What are the coordinates of the two points used to determine the gradient of the three median line?

_____

1 mark

b. What is the gradient of this line? Give your answer to one decimal place.

_____

1 mark

c. From the three median line, by how many millimeters would you predict that the evaporation would increase for each additional 0.5^0C increase in temperature?

_____

1 mark

Total = 15 marks

End of Core: Data analysis

Module 1 : Number patterns and applications

If you choose this module, all questions are to be answered.

Question 1

Bess checks her emails every 20 minutes, starting at 9.00 am and notes the following pattern

Checking time	Number of new emails
9.00 am	2
9.20 am	5
9.40 am	8

If this pattern continues

a. i. How many new emails will she receive at 10.00 am?

_____

_____

1 mark

a. ii. How many new emails will she have when she checks her emails for the seventh time?

_____

_____

_____

1 mark

a. iii. At what time will Bess check her emails for the seventh time?

_____

1 mark

Module 1: Number patterns and applications

Question 1 (continued)

a. iv. At what time will Bess find 41 new emails on her computer?

_____

_____

_____

_____

_____

2 marks

a. v. How many emails will Bess have received between 9.00am and 2.00 pm inclusive?

_____

_____

_____

_____

_____

1 mark

Module 1: Number patterns and applications

Question 2

Bess responds to her emails every 20 minutes, starting at 9.20 am. She notes that the number of new emails she responds to follows a pattern.

Time responses start	Number of new emails responded to
9.20 am	1
9.40 am	2
10.00 am	4

If this pattern continues

a. i. How many emails will Bess respond to at 10.20 am?

_____

1 mark

a. ii. Of all the emails that will have come in by 9.40, how many will remain unanswered after Bess has done her 9.40 replies?

_____

_____

_____

1 mark

a. iii. How many emails altogether will Bess have answered after she has answered her emails at 10.40 am?

_____

_____

1 mark

a. iv. How many emails will remain unanswered after Bess has answered her emails at 10.40 am?

_____

_____

1 mark

Module 1: Number patterns and applications

Question 2 (continued)

a. v. What is the earliest time that Bess will not have sufficient emails to answer and so will be unable to continue the pattern of responses?

_____

_____

_____

1 mark

Question 3

At 10.40 am, Bess decides to change the pattern she is using to answer her emails so that the number of emails she and her assistants respond to from 10.40 on is given by the equation

$$E_n = 2E_{n-1} - a \qquad E_1 = 16$$

a.

i. What value of a would make the number of emails that Bess and her assistants respond to, in each 20 minute time slot, a constant?

_____

1 mark

b. If $a = 4$

i. Find E_2

_____

1 mark

ii. If from 11.30 am on, Bess and her assistants receive a total of 500 emails every 20 minutes, and the number of emails that they reply to at 12.20 pm is 388, find the number of emails that they replied to at midday.

_____

1 mark

Module 1: Number patterns and applications

Question 3 (continued)

c. Each day, the number of emails that Bess receives satisfies the difference equation $T_n = 0.1T_{n-1}$. If she receives p emails on the first day, then how many emails in terms of p will she receive in the long run?

_____

_____

_____

_____

_____

1 mark

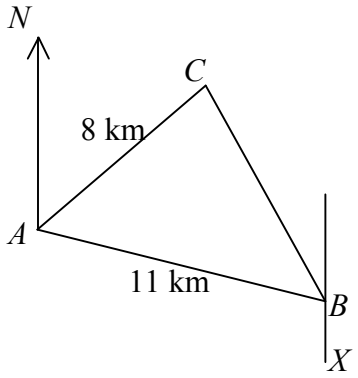
Total = 15 marks

End of Module 1: Number patterns and applications

Module 2: Geometry and trigonometry

If you choose this module, all questions are to be answered.

Question 1



The buoy, B, is on a bearing of 120^0 from the port, A. Chris sails 8 km from the port, A, on a bearing of 048^0 to the buoy, C. N is due north of A and X is due south of B.

a. What is the magnitude of $\angle NAC$?

_____

1 mark

b. Find $\angle CAB$.

_____

1 mark

c. Find the distance between the two buoys, B and C.
Give your answer to two decimal places.

_____

_____

1 mark

Module 2: Geometry and trigonometry

Question 1 (continued)

d. Find angle *ABX*.

_____

1 mark

e. Find the bearing of *C* from *B*. Give your answer to the nearest degree.

_____

_____

_____

1 mark

f. How far north of *B* is *C*? Give your answer to the nearest kilometre.

_____

_____

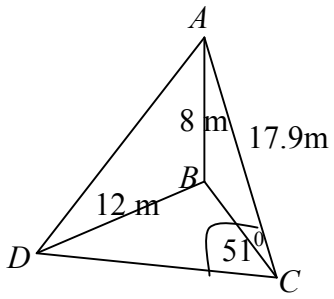
_____

1 mark

Module 2: Geometry and trigonometry

Question 2

At the harbour there is a restaurant with an outdoor floor area, *BCD*. A sailcloth stretches from *A* which is directly above **B** to *CD*. *AB* = 8 m, *BD* = 12 m, *AC* = 17.9 m and $\angle ACD = 51^0$,



a. Find *AD*, giving your answer to one decimal place.

_____

_____

1 mark

b. Show that $\angle DAC = 54^0$ to the nearest degree.

_____

_____

_____

_____

1 mark

c. How much material had to be purchased to make the sailcloth?
Give your answer to the nearest square metre.

_____

_____

_____

_____

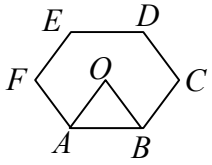
1 mark

Module 2: Geometry and trigonometry

Question 3

There is a play area for children at the restaurant. One of the pieces of play equipment is an hexagonal prism with a cylinder cut through the centre for children to crawl through.

a. Before the cylinder was cut from the hexagonal prism, the top of the prism was a regular hexagon of side length 1.5 m.



i. Find $\angle AOB$ where O is the centre of the hexagonal face, *ABCDEF*.

_____

1 mark

ii. What is the area of the hexagonal face, *ABCDEF*?
Give your answer to two decimal places.

_____

_____

_____

_____

_____

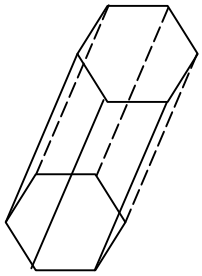
_____

1 mark

Module 2: Geometry and trigonometry

Question 3 (continued)

b.



If the hexagonal prism has a height of 2 m. what is the surface area of the prism before the cylinder has been cut out? Give your answer to two decimal places.

_____

_____

1 mark

c. A cylinder is cut through the centre of the hexagonal prism to allow space for the children to crawl through. If the base of the cylinder has a diameter of 1 m.

i. What area on the top of the hexagonal prism remains?
Give your answer to two decimal places.

_____

_____

1 mark

ii. What is the area of the curved surface of the cylinder?
Give your answer to one decimal place.

_____

1 mark

Module 2: Geometry and trigonometry

Question 3 (continued)

c.

iii. What is the total surface area of this piece of play equipment?
Give your answer to the nearest whole number.

_____

_____

1 mark

Total 15 marks

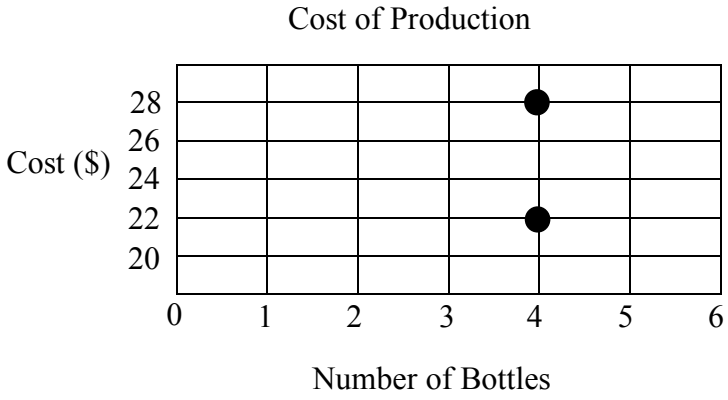
End of Module 2: Geometry and trigonometry

Module 3: Graphs and relations

If you choose this module, all questions are to be answered.

Question 1

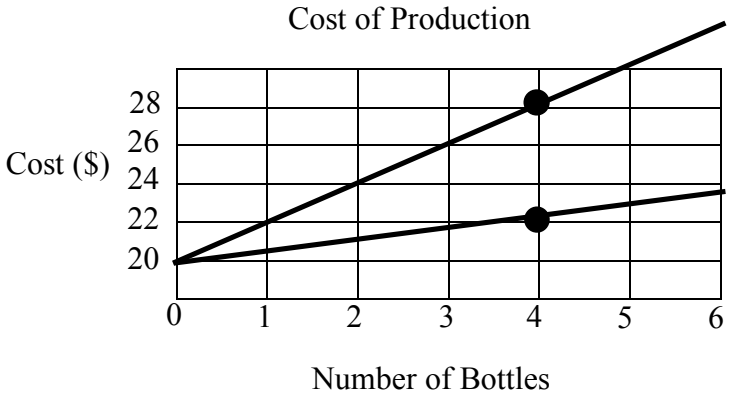
The Kleen Hair Company produces shampoo and conditioner where a bottle of shampoo costs more to produce than a bottle of conditioner. The production manager shows the cost of producing four bottles of each type of hair product on the graph below.



a. How much did four bottles of shampoo cost?

_____

1 mark



The company produces the above graph for their products.

b. i. What does the point (0,20) on both lines mean?

_____

1 mark

Module 3: Graphs and relations

Question 1 (continued)

b. ii. Write the equation for the cost of producing x bottles of shampoo.

_____

_____

1 mark

b. iii. If the Kleen Hair company makes 100 bottles of shampoo and 100 bottles of conditioner in one batch, what would be the cost of production of a batch?

_____

_____

_____

_____

1 mark

b. iv. In another batch, the company spends $517 making shampoo and conditioner. If the company spent $73 on the conditioner made in this batch, what was the total number of bottles of shampoo and conditioner made in this batch?

_____

_____

_____

_____

2 marks

Module 3: Graphs and relations

Question 2

The Kleen Hair Company produces 10,000 bottles of shampoo in a day and sells the shampoo for $20 a bottle.

a. What would be the revenue from selling x bottles of shampoo?

_____

1 mark

b. How much would it cost the Kleen Hair Company to produce 10,000 bottles of shampoo?

_____

1 mark

c. What would be the minimum number of bottles of shampoo that the Kleen Hair Company would have to sell each day in order not to make a loss for that day?

_____

_____

1 mark

Module 3: Graphs and relations

Question 3

The Smith family is going on an overseas holiday and Mrs. Smith wants to take a supply of the family's favourite shampoo and conditioner. She can buy the shampoo on special for $15 a bottle, while the conditioner costs $10 a bottle. Mrs. Smith wants to buy at least two bottles of shampoo and no more than three bottles of conditioner and she does not want to spend more than $150. In addition, she wants to spend at least twice as much on shampoo as she spends on conditioner. She buys x bottles of shampoo and y bottles of conditioner.

a. Write down an inequation involving x and y and the $150 that Mrs. Smith can spend.

_____

1 mark

Three of the other four inequalities are listed below

$$y \geq 0$$
$$y \leq 3$$
$$15x \geq 20y \Rightarrow 3x \geq 4y$$

b. Write down the remaining inequality.

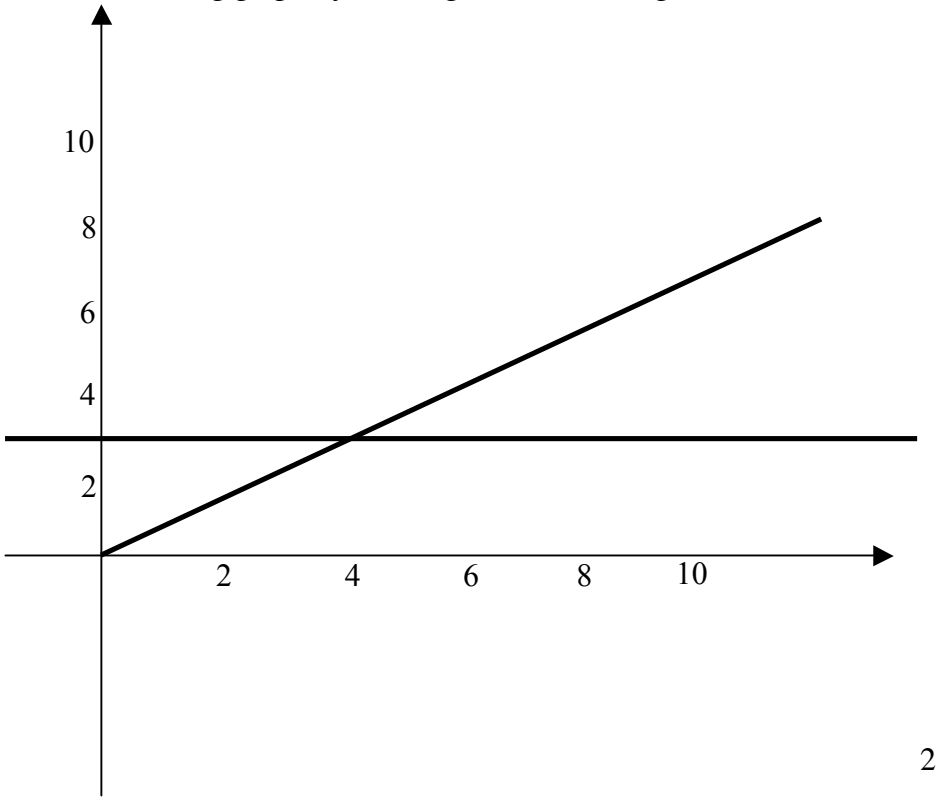
_____

1 mark

Module 3: Graphs and relations

Question 3 (continued)

c. Complete the following graph by drawing the two missing lines.



2 marks

d. On the above graph, shade the region that satisfies all the constraints.

1 mark

e. What is the maximum number of bottles of shampoo and conditioner that Mrs. Smith can buy?

_____

_____

_____

_____

1 mark

Total = 15 marks

End of Module 3: Graphs and relations

Module 4: Business-related mathematics

If you choose this module, all questions are to be answered.

Question 1

Paul and Polly own a small business and have bank accounts with different banks. Their monthly bank statement for one of these banks is shown below. The interest paid on this account is 4% per annum based on the minimum monthly balance.

Date	Details	Withdrawals	Deposits	Balance
1 June	Opening Balance			$2825.07
11 June	EFTPOS	204		
15 June	Deposit		6000	
23 June	ATM withdrawal			8441.07
28 June	Deposit		8000	
29 June	Phone banking transfer of funds	13000		
30 June	Interest for month of June			

Paul spilt his glass of water over the statement and some of the entries are illegible.

a. What was the minimum monthly balance for the month of June?

_____

_____

1 mark

b. How much money was withdrawn on the 23rd of June?

_____

1 mark

c. What was the interest rate for the month of June? Give your answer to two decimal places.

_____

1 mark

Module 4: Business-related mathematics

Question 1 (continued)

d. How much interest was paid into this account for the month of June? Give your answer to the nearest cent.

_____

_____

1 mark

e. What will the opening balance be for 1st July if no transactions are carried out that day by either Paul or Poppy?

_____

1 mark

Question 2

a. Paul and Polly need transport for their business. Paul suggests that they purchase a new truck valued at $39000 on hire purchase. They have savings of $10000 that they can use as a deposit and they would then have to pay a monthly instalment of $652.50 for 5 years.

i. How much will they actually pay for this car?

_____

1 mark

ii. How much interest will they pay?

_____

1 mark

iii. What is the interest rate per annum?

_____

_____

_____

1 mark

Module 4: Business-related mathematics

Question 2 (continued)

b. Polly says that she has seen a suitable second hand truck for $15000 at the car yard in the next suburb. She says that they could use their $10000 savings and borrow the remainder of the money at 6% per annum compounded monthly for five years. She said that they would not have to repay any money until the end of the five years.

i. How much money would they owe at the end of the five-year period if they made no repayments during this time? Give your answer to the nearest cent.

_____

1 mark

ii. If they repaid $100 a month how much would they owe at the end of the 5 year period? Give your answer to the nearest cent.

_____

1 mark

iii. If they repaid $652.50 a month how long would it take to repay the loan?

_____

1 mark

Module 4: Business-related mathematics

Question 3

a. The new truck that Paul chooses depreciates at 20% per annum on a reducing value. What will the book value of this truck be at the end of five years? Give your answer to the nearest dollar.

_____

_____

1 mark

b. The second hand truck that Polly chooses depreciates at a flat rate of $4.40 for every 100 km travelled. If the truck is expected to do 30,000 km per year, what will be the book value of this truck at the end of five years?

_____

_____

1 mark

c. What would the percentage depreciation per annum of Paul's truck need to be for both trucks to have the same book value at the end of the 5 years? Give your answer to one decimal place.

_____

1 mark

d. By how much would the flat rate depreciation for every 100 km travelled by Polly's truck need to change so that Polly's truck would have the same book value as Paul's truck at the end of 5 years?

_____

1 mark

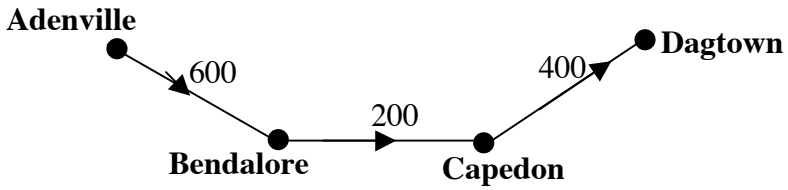
Total = 15 marks

End of Module 4: Business-related mathematics

Module 5: Networks and decision mathematics

If you choose this module, all questions are to be answered.

Question 1



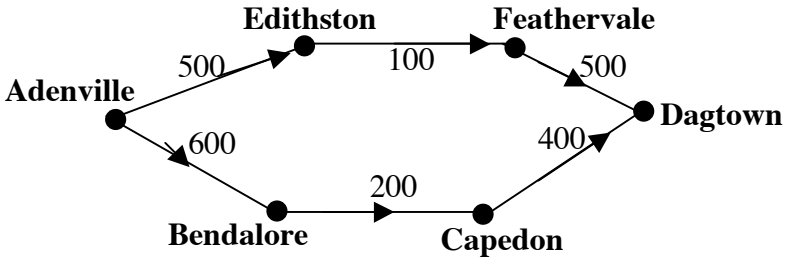
The above diagram shows the roads connecting four towns, Adenville, Bendalore, Capedon and Dagtown. The numbers on the graph show the number of vehicles that can travel along each section of road per hour.

a. What is the maximum number of cars that can travel from Adenville to Dagtown per hour?

_____

1 mark

The council adds more roads joining Adenville to Dagtown via Edithston and Feathervale.



b. What is the maximum number of cars that can now travel from Adenville to Dagtown per hour?

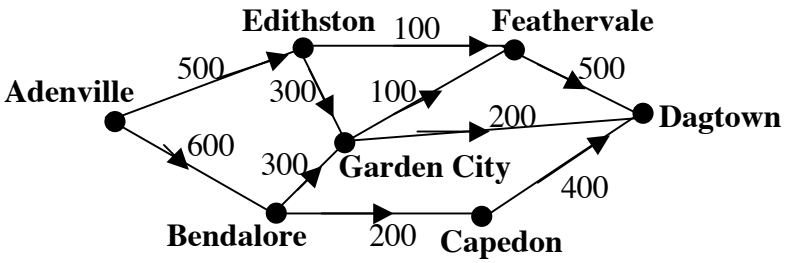
_____

1 mark

Module 5: Networks and decision mathematics

Question 1 (continued)

c. The council adds even more roads going through the town of Garden City.



i. What is the maximum number of cars that can now travel from Adenville to Dagtown per hour?

_____

1 mark

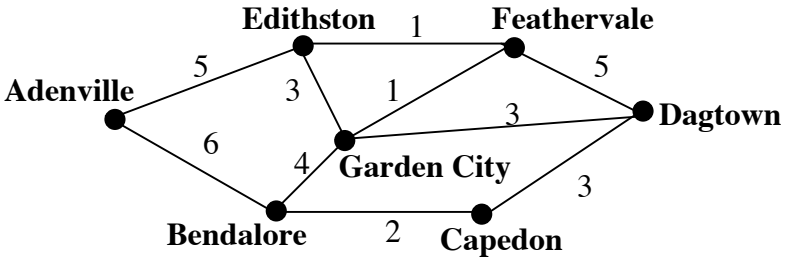
ii. Mark the minimum cut on the above graph.

1 mark

Module 5: Networks and decision mathematics

Question 1 (continued)

d.



The above graph shows the distances in kilometers between the seven towns. A telephone company wants to install new telephone wire to connect each of the above towns. The wires are to be laid above the roads required to connect all the towns. What would be the shortest length of wire required?

_____

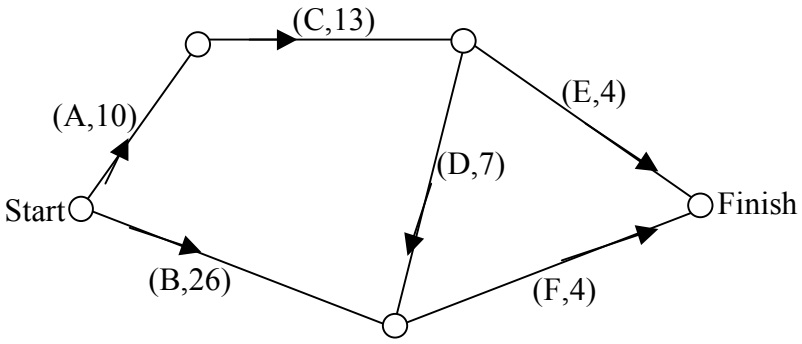
_____

1 mark

Module 5: Networks and decision mathematics

Question 2

Mr. Wong runs a manufacturing business in Dagtown. The following network shows the different activities that must be carried out in order to complete a single manufacturing item, the activities that must be completed before certain activities can start and the time in days for the completion of each activity.



a. Which activity must be completed before activity C can start?

_____

1 mark

b. Which activity does **not** have to be completed before activity F starts?

_____

1 mark

c. What is the critical path?

_____

1 mark

Module 5: Networks and decision mathematics

Question 2 (continued)

d. What is the minimum time it will take for Mr. Wong to complete a single manufacturing item?

_____

1 mark

e. What is the earliest time that activity F can commence?

_____

1 mark

f. What is the float time for activity E?

_____

1 mark

g. If activity E were delayed by another 10 hours,

i. How would this affect the completion time?

_____

_____

1 mark

ii. What would the latest start time now be for activity F

_____

1 mark

Module 5: Networks and decision mathematics

Question 2 (continued)

h. Assume there had been no extra delay in completing activity E and that the total cost of the manufacturing process for one item was $300 per day. Mr. Wong hires an extra person at $350 per day to help out with activity A. This extra person halves the completion time for activity A. How much would Mr. Wong save on the whole project, or how much extra would the whole project now cost him?

_____

_____

_____

_____

_____

2 marks

Total = 15 marks

End of Module 5: Networks and decision mathematics

Module 6: Matrices

If you choose this module, all questions are to be answered.

Question 1

A tennis shop sells racquets, balls, shorts and shirts. The following table gives information on quantities sold over a two-week period and the unit cost of each item.

Goods Sold	Quantity Sold		Unit Selling Price
	Week 1	Week 2	
Racquets	50	80	$120
Balls	1440	1000	$4
Shorts	70	90	$25
Shirts	80	85	$30

a. Write down the 2×4 matrix, A, that shows the quantity of the various goods sold for each of the two weeks.

$$A = \begin{bmatrix} & \\ & \end{bmatrix}$$

1 mark

b. Write down the column matrix, S, where S is the selling price matrix.

$$S = \begin{bmatrix} \\ \\ \\ \end{bmatrix}$$

1 mark

Module 6: Matrices

Question 1 (continued)

c. If $B = A \times S$ what information would matrix B provide?

_____

_____

_____

1 mark

Module 6: Matrices

Question 2

In a round robin five tennis teams, the Anchors, Bull Dogs, Condors, Dragons and Emus played each other. Some of the results were as follows

The Anchors defeated the Bull Dogs.
The Condors defeated the Anchors, Bull Dogs and Dragons.
The Dragons defeated the Anchors and Bull Dogs.

In order to rank the teams the following dominance matrix, D, was set up using all the results of the round robin

$$D = \begin{array}{c} \\ A \\ B \\ C \\ D \\ E \end{array} \begin{array}{c} \begin{array}{ccccc} A & B & C & D & E \end{array} \\ \begin{bmatrix} 0 & 1 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 & 1 \\ 1 & 1 & 0 & 1 & 0 \\ y & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 1 & 0 \end{bmatrix} \end{array}$$

a. Explain the meaning of 0 and 1 in the above matrix.

_____

_____

_____

1 mark

b. What is the value of y?

_____

1 mark

c. Who defeated the Emus?

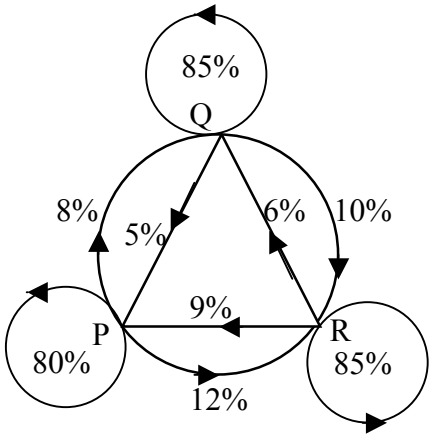
_____

1 mark

Module 6: Matrices

Question 3

There are three tennis centres in a certain town, Physical, Quality and Rigour. It has been noted that on 1st. January 2010, Physical had 50% of the market, while Quality and Rigour had 25% each.



The above diagram shows the movement of members from one tennis centre to another each year.

a. What percentage of members remains with Physical each year?

_____

1 mark

b. What percentage of members move from Rigour to Physical each year?

_____

1 mark

Module 6: Matrices

Question 3 (continued)

c. Complete the transition matrix that can be used to represent the information in the diagram.

$$\begin{array}{cc} & \begin{array}{ccc} \textit{From} & & \\ P & Q & R \end{array} \\ \begin{array}{c} \\ \textit{To} \\ \\ \end{array} & \begin{array}{c} P \\ Q \\ R \end{array} \begin{bmatrix} & 0.05 & \\ 0.08 & & \\ & & 0.85 \end{bmatrix} \end{array}$$

1 mark

d. If there are 800 members altogether in the three tennis centres, what is the column matrix, N, that shows the number of members at each tennis centre on 1st January 2010?

_____

1 mark

e. How many members would you expect to belong to the Physical tennis centre on 1st. January 2011?

_____

1 mark

Module 6: Matrices

Question 3 (continued)

f. How many more members would Rigour have on 1st. January 2011 than it had on 1st. January 2010?

_____

1 mark

g. How many members would you expect Quality to have on 1st. January 2015?

_____

1 mark

h. In the long term, which sports centre will have the least number of members?

_____

1 mark

i. How many members can Rigour expect to have in the long term?

_____

1 mark

Total = 15 marks

End of Module 6: Matrices

END OF QUESTION AND ANSWER BOOK
2011 Further Mathematics Trial Examination 2

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