

Year 2004

VCE

Further Mathematics

Trial Examination 1



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VICTORIAN CERTIFICATE OF EDUCATION 2004

FURTHER MATHEMATICS

Trial Written Examination 1 (Facts, skills and applications)

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

MULTIPLE-CHOICE QUESTION BOOK

Structure of book

Section	Number of questions	Number of questions to be answered	Number of modules	Number of modules to be answered
A	13	13		
B	45	27	5	3

Directions to students

Materials

Question book of 33 pages.

Answer sheet for multiple-choice questions.

There is a detachable sheet of miscellaneous formula supplied.

Working space is provided throughout the book.

You may bring to the examination up to four pages (two A4 sheets) of pre-written notes.

An approved scientific and/or graphics calculator may be used.

You should have at least one pencil and an eraser.

Detach the formula sheet from the book during reading time.

Please ensure that your **name and student number** as printed on your answer sheet for multiple-choice questions are correct, **and** sign your name in the space provided to verify this.

Answer **all** questions from Section A

You should select three modules from Section B and answer **all** questions within the modules selected.

Indicate the modules selected on the answer sheet for multiple-choice questions by shading the corresponding boxes.

There is a total of 13 marks available for Section A and 9 marks for each module in Section B

There is a total of 40 marks available for this examination.

All questions should be answered on the answer sheet for multiple-choice questions provided.

Unless otherwise indicated, the diagrams in this book are **not** drawn to scale.

You may retain this question book.

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

VCE FURTHER MATHEMATICS 2004

Trial Written Examination 1

ANSWER SHEET

NAME: _____

STUDENT
NUMBER _____

SIGNATURE _____

Instructions

- Write your name in the space provided above.
- Write your student number in the space provided above. Sign your name.
- Use a **PENCIL** for **ALL** entries.
If you make a mistake, **ERASE** it - **DO NOT** cross it out.
- Marks will **NOT** be deducted for incorrect answers.
- **NO MARK** will be given if more than **ONE** answer is completed for any question.
- All answers must be completed like **THIS** example.

A	B	C	D	E
---	---	---	---	---

Section A

1	A	B	C	D	E
2	A	B	C	D	E
3	A	B	C	D	E
4	A	B	C	D	E
5	A	B	C	D	E
6	A	B	C	D	E
7	A	B	C	D	E
8	A	B	C	D	E
9	A	B	C	D	E
10	A	B	C	D	E
11	A	B	C	D	E
12	A	B	C	D	E
13	A	B	C	D	E

Please turn over . . .

Section B (Shade the boxes of the three modules selected)

	Module 1 Number patterns and applications	1	A	B	C	D	E
		2	A	B	C	D	E
		3	A	B	C	D	E
		4	A	B	C	D	E
		5	A	B	C	D	E
		6	A	B	C	D	E
		7	A	B	C	D	E
		8	A	B	C	D	E
		9	A	B	C	D	E
	Module 2 Geometry and trigonometry	1	A	B	C	D	E
		2	A	B	C	D	E
		3	A	B	C	D	E
		4	A	B	C	D	E
		5	A	B	C	D	E
		6	A	B	C	D	E
		7	A	B	C	D	E
		8	A	B	C	D	E
		9	A	B	C	D	E
	Module 3 Graphs and relations	1	A	B	C	D	E
		2	A	B	C	D	E
		3	A	B	C	D	E
		4	A	B	C	D	E
		5	A	B	C	D	E
		6	A	B	C	D	E
		7	A	B	C	D	E
		8	A	B	C	D	E
		9	A	B	C	D	E
	Module 4 Business-related mathematics	1	A	B	C	D	E
		2	A	B	C	D	E
		3	A	B	C	D	E
		4	A	B	C	D	E
		5	A	B	C	D	E
		6	A	B	C	D	E
		7	A	B	C	D	E
		8	A	B	C	D	E
		9	A	B	C	D	E
	Module 5 Networks and decision mathematics	1	A	B	C	D	E
		2	A	B	C	D	E
		3	A	B	C	D	E
		4	A	B	C	D	E
		5	A	B	C	D	E
		6	A	B	C	D	E
		7	A	B	C	D	E
		8	A	B	C	D	E
		9	A	B	C	D	E

Please DO NOT fold, bend or staple this form

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

Business-related mathematics

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

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

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

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

Geometry and trigonometry

area of a triangle:
$$\frac{1}{2}bh$$

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

area of circle:
$$\pi r^2$$

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

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

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

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

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

Graphs and relations

Straight line graphs

gradient
$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

equation
$$y - y_1 = m(x - x_1)$$
 gradient-point form

$$y = mx + c$$
 gradient-intercept form

$$\frac{y - y_1}{x - x_1} = \frac{y_2 - y_1}{x_2 - x_1}$$
 two-point form

Number patterns and applications

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

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

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

linear difference equations:
$$\begin{aligned} t_n = at_{n-1} + b &= a^{n-1}t_1 + b \frac{(a^{n-1} - 1)}{a - 1}, a \neq 1 \\ &= a^n t_0 + b \frac{(a^n - 1)}{a - 1} \end{aligned}$$

Networks and decision mathematics

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

Statistics

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

END OF FORMULA SHEET

Specific Instructions for Section A

Section A consists of 13 questions

Answer **all** questions in this section.

A correct answer scores 1 mark, an incorrect answer scores 0. No mark will be given for a question if two or more letters are shaded for that question. Marks will not be deducted for incorrect answers and you should attempt every question.

Core

The following information relates to Questions 1, 2 and 3.

At a gymnastic competition, each performance was awarded points on a scale from 1 to 10. The table below shows the distribution of points scored.

Points scored	1	2	3	4	5	6	7	8	9	10
Number of students	2	1	2	3	7	7	6	5	3	2

Question 1

The mean of the points scored is closest to

- A. 1.5
- B. 4.1
- C. 5.5
- D. 6
- E. 7.2

Question 2

The number of scores that lie within one standard deviation of the mean is

- A. 5
- B. 20
- C. 23
- D. 25
- E. 28

Question 3

The upper quartile of the points scored is

- A. 5
- B. 6
- C. 7
- D. 8
- E. 9

Question 4

Information is collected on blood alcohol level and reaction time for 100 car drivers. The results are then graphed. The best type of graph to display these data is

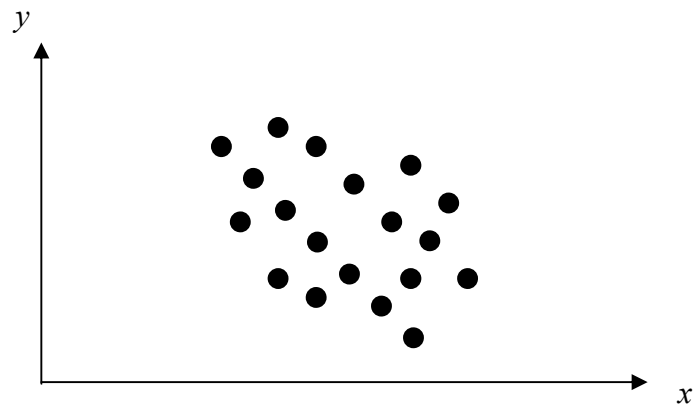
- A. stem and leaf
- B. histogram
- C. time series
- D. scatter plot
- E. box plot

Question 5

The scores in a mathematics examination when plotted, give a bell-shaped curve with a mean of 45 and a standard deviation of 13. The score above which about 2.5% of the students would lie is

- A. 45
- B. 58
- C. 71
- D. 77.5
- E. 84

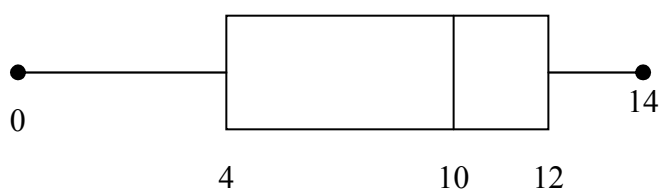
Question 6



In the scatter graph above 49% of the variation in y can be explained by the variation in x .
Pearson's product-moment correlation coefficient for this scatter graph is

- A. 0.49.
- B. -0.49
- C. 0.07
- D. -0.7
- E. 0.7

Question 7



Which one of the following statements about the above box plot is true?

- A. The box plot is symmetric.
- B. The box plot is positively skewed.
- C. A greater percentage of results lies between 0 and 4 than between 12 and 14.
- D. The percentage of results between 4 and 12 is less than the percentage of results between 0 and 4 and between 12 and 14.
- E. 75% of the results are less than 12.

The following information relates to questions 8 and 9.

Over the last 7 weeks, the sales manager of a large appliance retailer has had an advertising campaign on TV. She wishes to compare the number of major appliances sold each week with the number of minutes of advertising on TV for the week. Her results are shown in the Table below.

Time advertised on TV (minutes)	Number of Units Sold
30	17
20	14
34	22
17	16
38	27
26	33
31	25

Question 8

The least squares equation that would allow the manager to predict the number of units sold from the time of advertising on TV for these data, is closest to

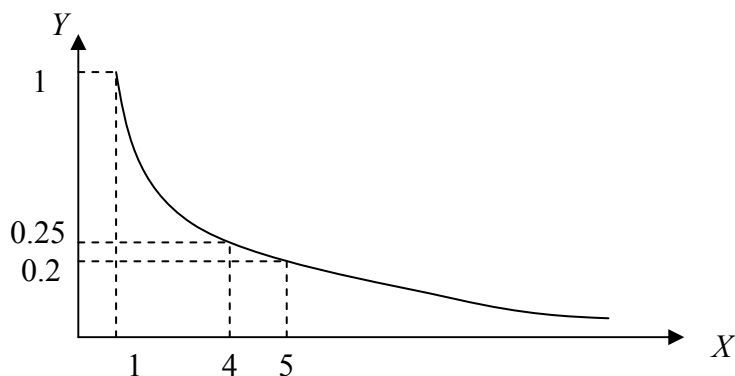
- A. number of units sold = $8.99 + 0.46 \times \text{TV time}$
- B. number of units sold = $0.46 + 8.99 \times \text{TV time}$
- C. number of units sold = $0.46 - 0.26 \times \text{TV time}$
- D. number of units sold = $15.66 + 0.56 \times \text{TV time}$
- E. number of units sold = $0.56 + 15.66 \times \text{TV time}$

Question 9

The value of Pearson's product-moment correlation coefficient for these data correct to 2 decimal places is

- A. 0.51
- B. 0.26
- C. 0.49
- D. - 0.49
- E. - 0.51

Question 10



To transform the curved graph above into a straight line, you would need to

- A. plot x^2 on the X axis against y on the Y axis.
- B. plot x on the X axis against $\log_{10} y$ on the Y axis
- C. plot x on the X axis against y^2 on the Y axis.
- D. plot x on the X axis against $\frac{1}{y}$ on the Y axis.
- E. plot $\frac{1}{x}$ on the X axis against y on the Y axis.

Question 11

The following data show the marketing performance over a seven year period for the sale of *Limoda* soft drink.

Year	Sales $\times$ \$100,000
1998	25
1999	23
2000	23
2001	21
2002	38
2003	44
2004	41

The 3-point median smoothing for the value of sales in 2001 is

- A. \$2,300,000
- B. \$230,000
- C. \$2,100,000
- D. \$210,000
- E. \$2,733,333

The following information relates to questions 12 and 13.

The seasonal indices for a Bicycle Shop are given in the Table below.

Season	Spring	Summer	Autumn	Winter
Index	1.3	1.5	0.7	

Question 12

The seasonal index for winter is

- A. 0.5
- B. 0.9
- C. 1.1
- D. 2.5
- E. 3.5

Question 13

The seasonally adjusted value for autumn when the value of the sales was \$1.2 million, is closest to

- A. \$0.84 million
- B. \$0.92 million
- C. \$1.56 million
- D. \$1.7 million
- E. \$1.8 million

END OF SECTION A

Specific Instructions for Section B

Section A consists of 5 modules

You should select 3 modules and answer **all** questions within the modules on the answer sheet for multiple-choice questions provided. Indicate the modules selected on the answer sheet for multiple-choice questions by shading the corresponding boxes.

A correct answer scores 1 mark, an incorrect answer scores 0. No mark will be given for a question if two or more letters are shaded for that question. Marks will not be deducted for incorrect answers and you should attempt every question within the modules selected.

Module	Page
Module 1: Number patterns and applications	8
Module 2: Geometry and trigonometry	12
Module 3: Graphs and relations	17
Module 4: Business-related mathematics	23
Module 5: Networks and decision mathematics	27

Module 1: Number patterns and applications

Before answering these questions you **must** shade the Number patterns and applications box on the answer sheet for multiple-choice questions

Question 1

The first four terms of a sequence are -9 , -5 , -1 , 3 , $\dots$. The twentieth term of this sequence is

- A. 58
- B. 67
- C. 76
- D. 85
- E. 580

Question 2

The sum to infinity of $12 + 4 + \frac{4}{3} + \dots$ is

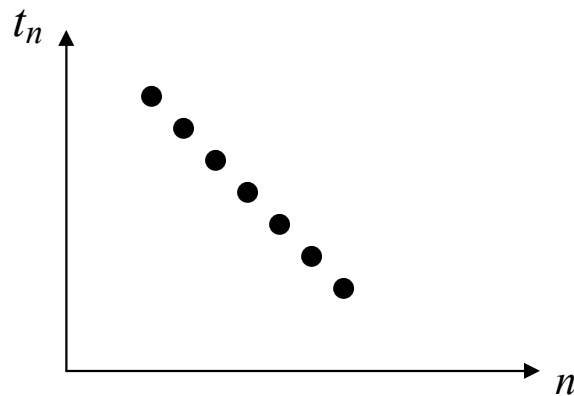
- A. 16
- B. 18
- C. 24
- D. 36
- E. 48

Question 3

The twelfth term in the sequence $100, 80, 64, \dots$ is closest to

- A. 3.4
- B. 4.2
- C. 6.9
- D. 8.6
- E. 457

Question 4



Which one of the following statements about the above graph is true?

- A. This represents a geometric sequence where the common ratio is a positive fraction.
- B. This represents a geometric sequence where the common ratio is a negative fraction.
- C. This represents a geometric sequence where the common ratio is larger than 1.
- D. This represents an arithmetic sequence where the common difference is positive.
- E. This represents an arithmetic sequence where the common difference is negative.

Question 5

If the third term of a geometric sequence is 27 and the sixth term is 8, then the first term is

- A. $\frac{2}{3}$
- B. $1\frac{1}{2}$
- C. 8
- D. 12
- E. $60\frac{3}{4}$

Question 6

The ratio of bananas to oranges in a bowl of fruit is 5 : 4. The ratio of oranges to apples is 3 : 2.
The ratio of bananas to apples is

- A. 5 : 2
- B. 2 : 5
- C. 10 : 4
- D. 15 : 8
- E. 5 : 6

Question 7

If the sum of the first five terms of an arithmetic sequence is 75 and the sum of the first ten terms of this same sequence is 175, then the sum of the first fifteen terms is

- A. 250
- B. 270
- C. 300
- D. 315
- E. 320

Question 8

The number of terms in the sequence 2 , - 6 , 18 , ... 13122 is

- A. 7
- B. 8
- C. 9
- D. 11
- E. 13

Question 9

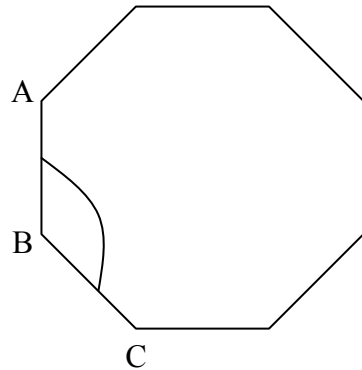
Jay walks 6 kilometres in the first hour and 5% less distance in each successive hour than he walked in the previous hour. The distance, in kilometres, that Jay walks in the sixth hour is closest to

- A.** 1.9
- B.** 3.6
- C.** 4.4
- D.** 4.6
- E.** 6.9

End of Module 1

Module 2: Geometry and trigonometry

Before answering these questions you **must** shade the Geometry and trigonometry box on the answer sheet for multiple-choice questions

Question 1

The size of the angle ABC in the above regular octagon is

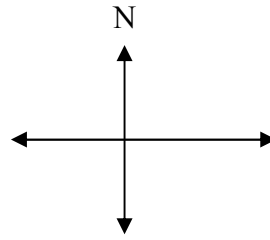
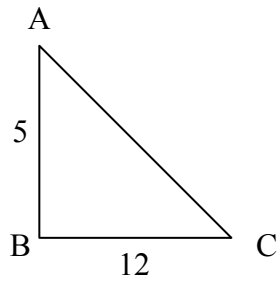
- A. 72°
- B. 108°
- C. 120°
- D. 135°
- E. 140°

Question 2

Cylinder A has a radius r and a height h . Cylinder B has a radius three times larger than cylinder A and a height double that of cylinder A. The ratio of the volume of cylinder A to the volume of cylinder B is

- A. 1 : 3
- B. 1 : 6
- C. 1 : 9
- D. 1 : 12
- E. 1 : 18

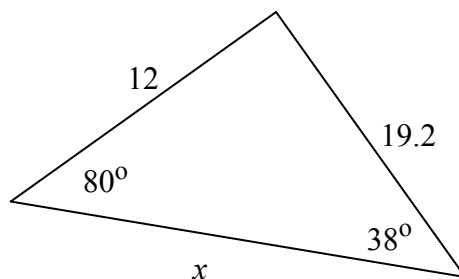
Question 3



If A is 5 km north of B and C is 12 km east of B, then the true bearing of C from A is closest to

- A. 67°
- B. 113°
- C. 115°
- D. 157°
- E. 159°

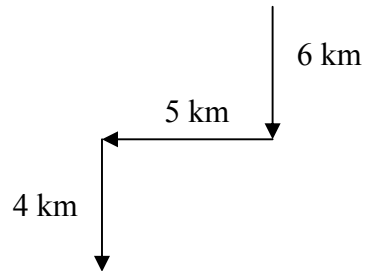
Question 4



The value of x in the diagram above is closest to

- A. 8.37
- B. 14.99
- C. 17.2
- D. 22.08
- E. 22.6

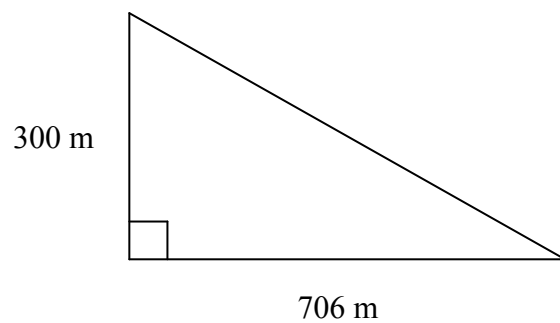
Question 5



A cyclist travels 6 km due south, then 5 km due west and 4 km due south. The distance the cyclist is now from his starting point, in kilometres, is closest to

- A. 6.30
- B. 11.18
- C. 11.21
- D. 14.18
- E. 14.21

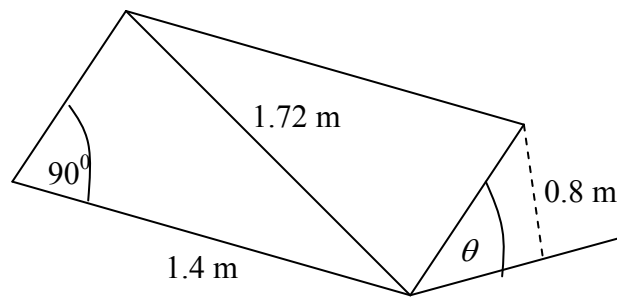
Question 6



A ship is 706 m out to sea as measured from the base of a 300 m vertical cliff. The angle of depression of the ship from the top of the cliff is closest to

- A. 23°
- B. 25°
- C. 34°
- D. 65°
- E. 67°

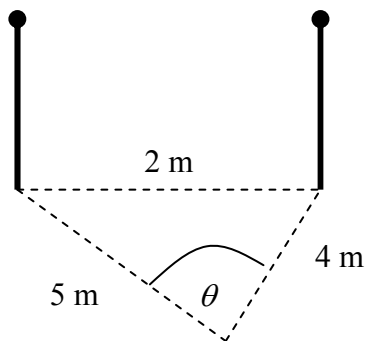
Question 7



A rectangular desk top of length 1.4 m has a diagonal 1.72 m. The height of the top of the desk above the horizontal is 0.8 m. The angle θ that the desk top makes with the horizontal is closest to

- A. 45°
- B. 50°
- C. 53°
- D. 65°
- E. 70°

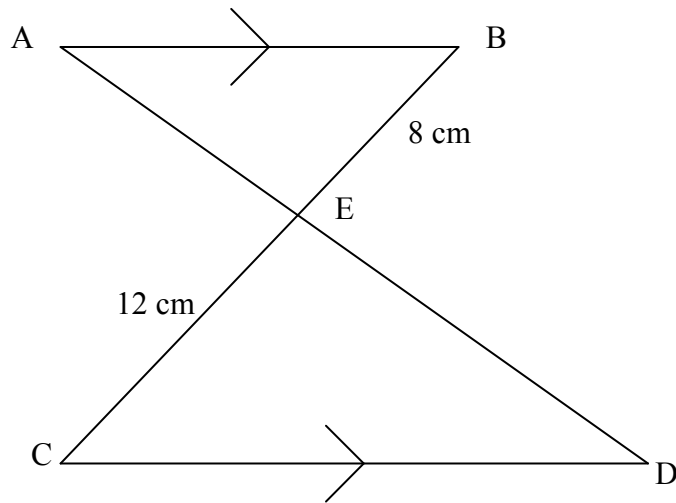
Question 8



For a certain sport, the goal posts are 2 m apart. A player shoots for goal from position X which is 4 m from one goal post and 5 m from the other goal post. The size of the angle θ within which the shot must be taken to score a goal is closest to

- A. 21.8°
- B. 22.3°
- C. 30°
- D. 76.2°
- E. 78.4°

Question 9



In the diagram above, AB is parallel to CD, BE = 8 cm and CE = 12 cm.
If AD = 25 cm, then the length of DE is

- A. $8\frac{1}{3}$ cm
- B. 10 cm
- C. 15 cm
- D. $16\frac{2}{3}$ cm
- E. 20 cm

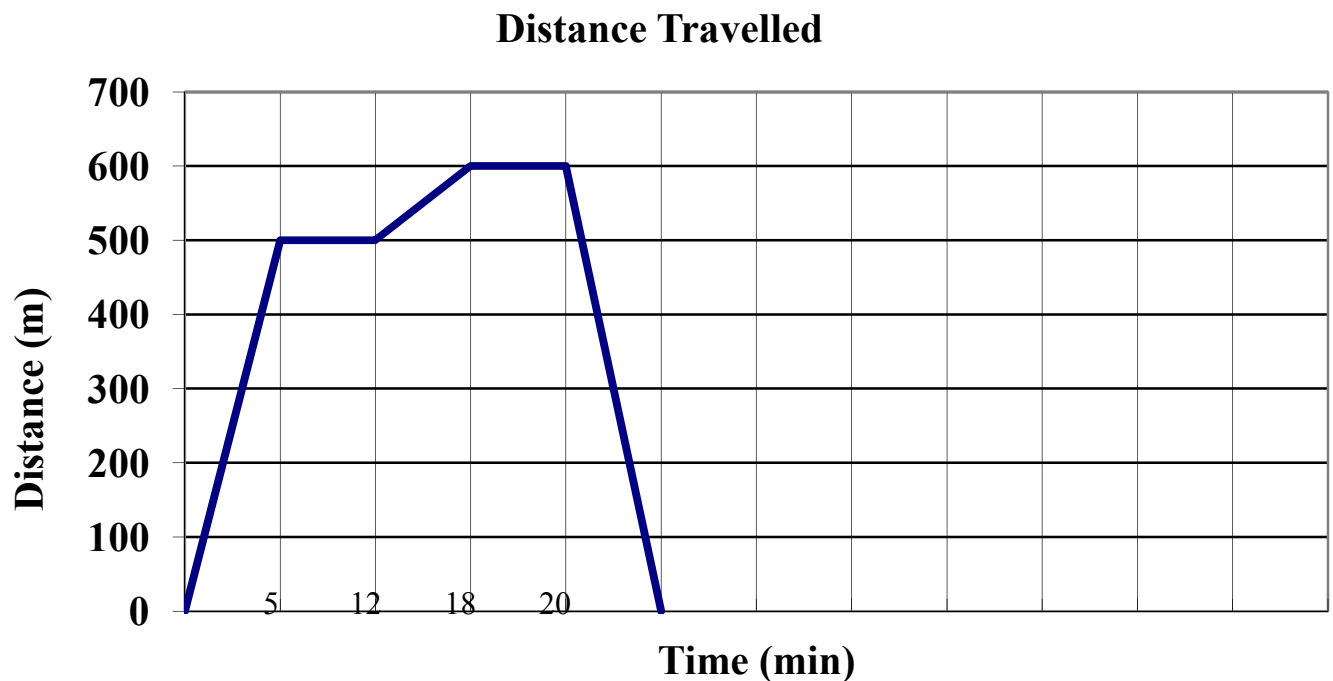
End of Module 2

Module 3: Graphs and relations

Before answering these questions you **must** shade the Graphs and relations box on the answer sheet for multiple-choice questions

The following graph and information relates to questions 1 , 2 and 3.

Tran leaves his house to go to the shop. On his way, he meets Maya and stops to talk to her. He then continues on to the shop where he buys an ice cream. He then returns home in half the time it took him to reach the shop.

**Question 1**

The distance from Tran's house to the shop was

- A. 18 m
- B. 20 m
- C. 100 m
- D. 500 m
- E. 600 m

Question 2

The time for the whole trip was

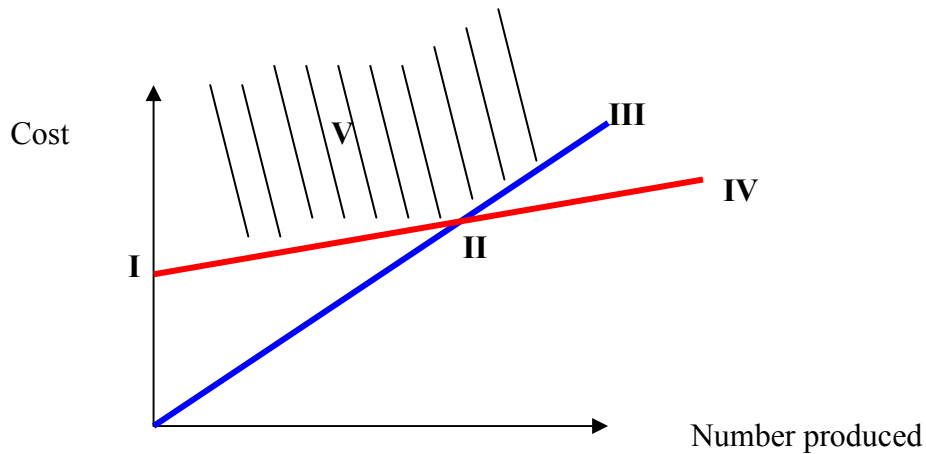
- A. 15 min
- B. 20 min
- C. 26 min
- D. 29 min
- E. 30 min

Question 3

The speed, in m/sec, at which Tran moved to the shop after he stopped to speak to Maya was

- A. $16\frac{2}{3}$.
- B. 30
- C. $41\frac{2}{3}$
- D. $66\frac{2}{3}$.
- E. 100

Question 4



The above graph shows two straight lines, one representing cost price and the other representing the selling price. The break even point is represented on the graph by

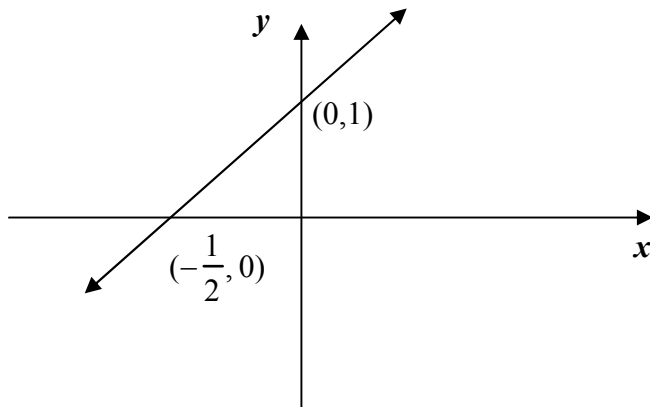
- A. I
- B. II
- C. III
- D. IV
- E. V

Question 5

The solution of $60 < 4(2x + 1) \leq 120$ is

- A. $3.5 < x \leq 11$
- B. $3.5 < x \leq 14.5$
- C. $7 < x \leq 14.5$
- D. $8 < x \leq 11$
- E. $8 < x \leq 15$

Question 6



The equation of the graph shown above is

- A. $y = 2x + 1$
- B. $y = 2x - 1$
- C. $y = -\frac{1}{2}x + 1$
- D. $y = \frac{1}{2}x + 1$
- E. $y = x - \frac{1}{2}$

The following information relates to Questions 7 and 8

The constraints for a graph are

$$2x - y \leq 6$$

$$x + 2y \leq 8$$

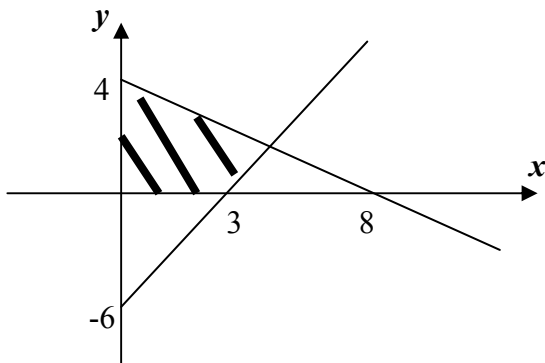
$$x \geq 0$$

$$y \geq 0$$

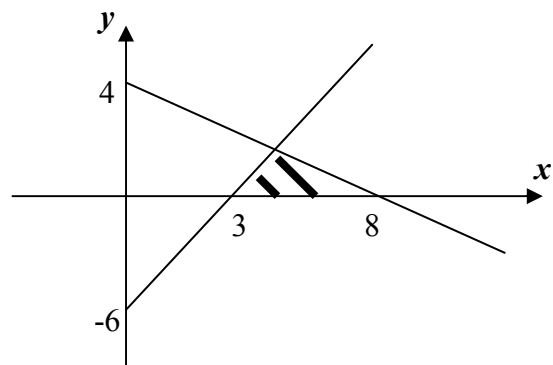
Question 7

The graph that has a shaded region which represents these constraints is

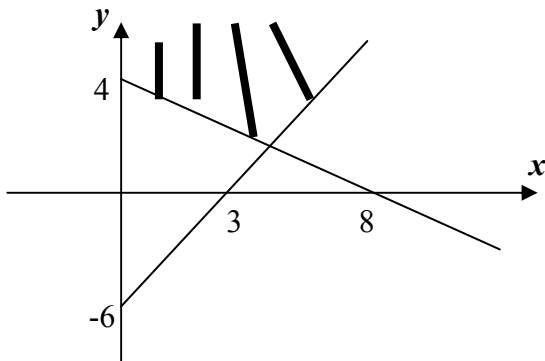
A.



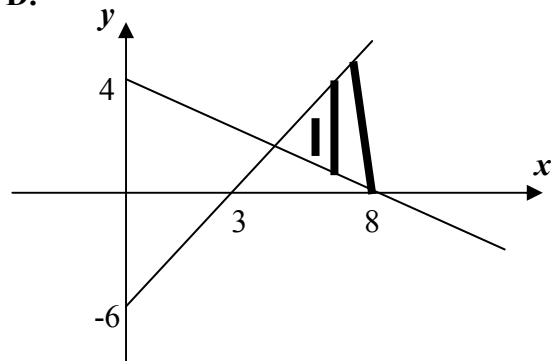
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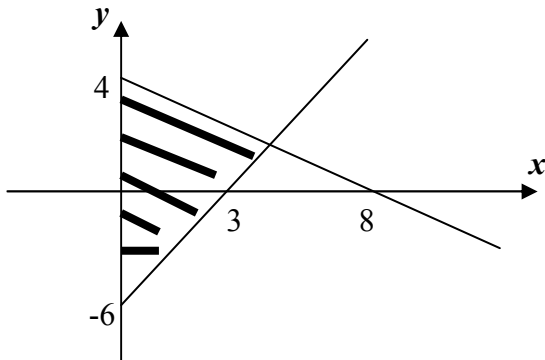
C.



D.



E.



Question 8

The y value of the co-ordinate where the two lines meet is

- A. 1
- B. 1.2
- C. 1.5
- D. 2
- E. 2.5

Question 8

Cans of Baked Beans are sent from two factories P and Q to three depots A , B and C for storage. The number of cans of Baked Beans sent to depots A , B and C is x , y and z respectively.

If the number of cans sent to depot A is at least double the number of cans sent to depot B and if the number of cans sent to depot C is no greater than one third of the number of cans sent to depot A, then which one of the following constraints would **NOT** be true?

- A. $x \geq \frac{1}{2}y$
- B. $x \geq 2y$
- C. $z \leq \frac{1}{3}x$
- D. $y \leq \frac{1}{2}x$
- E. $x \geq 3z$

End of Module 3

Module 4: Business-related mathematics

Before answering these questions you **must** shade the Business-related mathematics box on the answer sheet for multiple-choice questions

Question 1

Meg invests \$5,000 at 10% per annum simple interest for 4 years.
The value of her investment at the end of 4 years is

- A. \$2,000
- B. \$5,500
- C. \$6,000
- D. \$6,500
- E. \$7,000

Question 2

Darren bought a car for \$10,500. If it lost \$2,400 in value over the next twelve months, then the rate of depreciation per annum is closest to

- A. 1.91%
- B. 4.38%
- C. 4.39%
- D. 22.86%
- E. 22.87%

Question 3

Ian does not have to repay his loan of \$23,460 for 2 years. Interest is charged on this loan at 7.5% per annum compounded every 6 months. The amount owing on this loan after 2 years is

- A. \$25,252.49
- B. \$27,110.96
- C. \$27,181.94
- D. \$31,330.11
- E. \$41,876.10

Question 4

A car which is purchased for \$30,000 depreciates at a rate of 20c per kilometre. If the car averages 20,000 kilometres per year, the value of the car after 5 years is

- A. \$0
- B. \$2,000
- C. \$10,000
- D. \$18,000
- E. \$20,000

Question 5

A stereo system costing \$8,000 is being purchased on hire purchase over 3 years with monthly repayments and a flat interest rate of 12% per annum. The effective interest rate is closest to

- A. 18%
- B. 18.68%
- C. 23.35%
- D. 24.03%
- E. 26.67%

Question 6

Antonia invested some money in the Capable Bank where she received interest compounding quarterly at 10% per annum. If the investment was worth \$18,463 after 5 years, then the amount Antonia invested was closest to

- A. \$212.86
- B. \$6,049.96
- C. \$11,221.60
- D. \$11,267.43
- E. \$16,318.60

The following information relates to Questions 7 and 8

Date	Transaction Details	Withdrawals	Deposits	Balance
1 Dec	Opening balance			14,247.19
18 Dec	Pay		1,733.52	15,980.71
27 Dec	ATM withdrawal	100.00		15,880.71
21 Jan	Coles	106.21		15,774.50
24 Jan	Purchases	143.04		15,631.46
20 Feb	Payment for goods		276.00	15,907.46
24 Feb	Coles	127.97		15,779.49
27 Feb	ATM withdrawal	100.00		15,679.49

Question 7

The above statement shows the transaction details of a bank customer for the 3 months period December to February. The minimum monthly balance for the month of February is

- A. \$100
- B. \$15,907.46
- C. \$15,679.49
- D. \$15,779.49
- E. \$15,631.46

Question 8

Interest of 5% per annum is paid each month on the minimum monthly balance.
The interest paid for the month of December is

- A. \$59.36
- B. \$66.17
- C. \$86.68
- D. \$712.36
- E. \$794.04

Question 9

Emma buys a computer for \$3,500. She pays a 10% cash deposit and then pays a flat rate of 8.5% per annum paid on the balance over 3 years. The amount paid each month is

- A. \$105.46
- B. \$109.82
- C. \$112.14
- D. \$119.54
- E. \$122.02

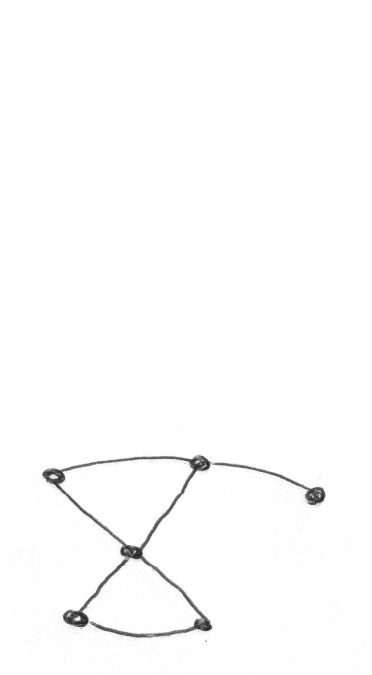
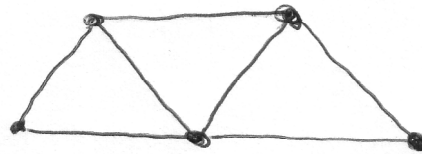
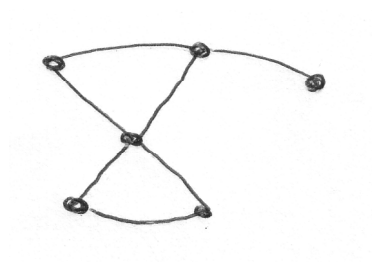
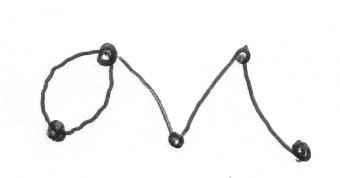
End of Module 4

Module 5: Networks and decision mathematics

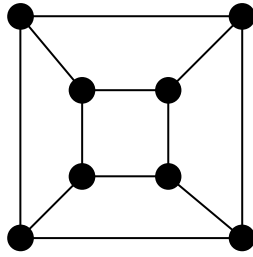
Before answering these questions you **must** shade the Networks and decision mathematics box on the answer sheet for multiple-choice questions

Question 1

Which one of the following is **NOT** a Hamiltonian Path

A.**B.****C.****D.****E.**

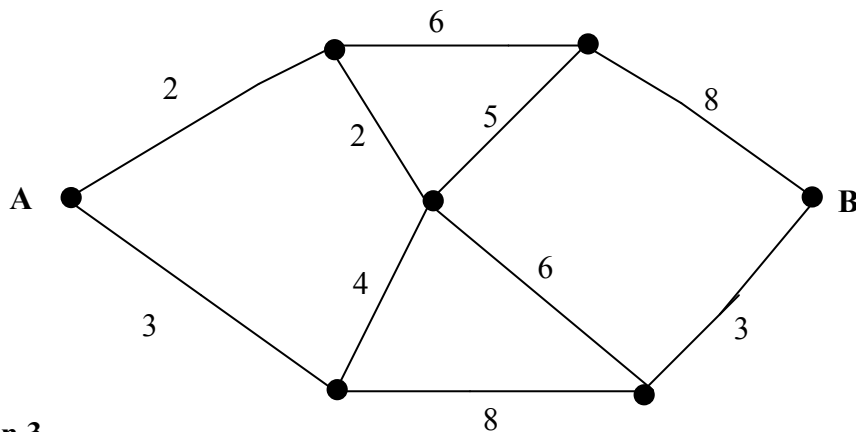
Module 5



Question 2

The number of faces in the above graph is

- A. 2
- B. 5
- C. 6
- D. 8
- E. 12

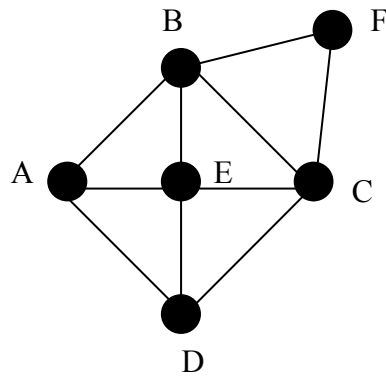


Question 3

The shortest distance from A to B in the above graph, where the distances along the various roads are given in kilometres, is

- A. 11 km
- B. 13 km
- C. 14 km
- D. 16 km
- E. 17 km

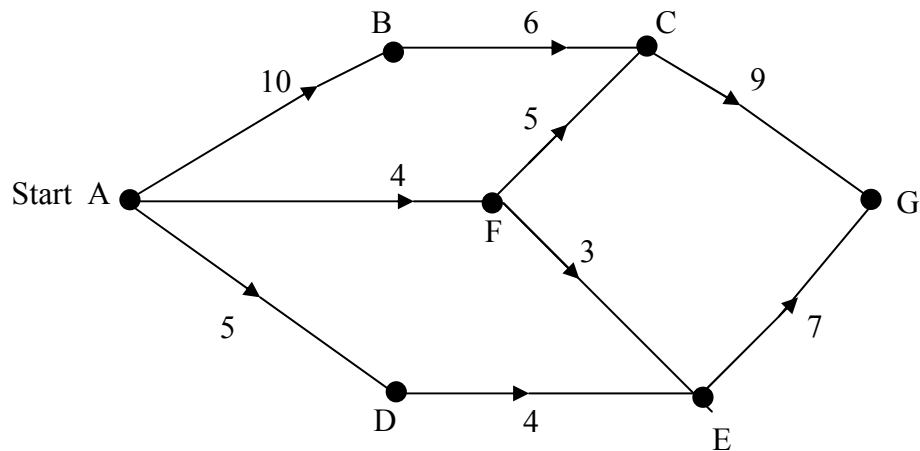
Question 4



For a Eulerian circuit to exist in the above graph, an edge would need to be added between

- A. B and F
- B. B and D
- C. B and A
- D. A and F
- E. A and D

The following information relates to Questions 5 and 6.



Question 5

The maximum flow possible from A to G is

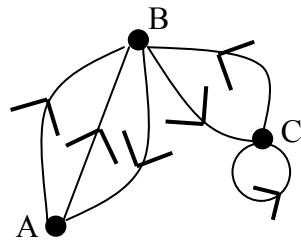
- A. 10
- B. 14
- C. 15
- D. 17
- E. 18

Question 6

When the maximum flow is occurring, the flow from D to E is

- A. 1
- B. 2
- C. 3
- D. 4
- E. 5

Question 7



The matrix for the above graph is

A.

$$\begin{bmatrix} 0 & 2 & 0 \\ 2 & 0 & 2 \\ 0 & 2 & 1 \end{bmatrix}$$

B.

$$\begin{bmatrix} 0 & 3 & 0 \\ 3 & 0 & 2 \\ 0 & 2 & 0 \end{bmatrix}$$

C.

$$\begin{bmatrix} 0 & 2 & 0 \\ 1 & 0 & 1 \\ 0 & 1 & 1 \end{bmatrix}$$

D.

$$\begin{bmatrix} 0 & 2 & 0 \\ 1 & 0 & 2 \\ 0 & 2 & 1 \end{bmatrix}$$

E.

$$\begin{bmatrix} 0 & 2 & 0 \\ 1 & 0 & 2 \\ 0 & 1 & 1 \end{bmatrix}$$

Question 8

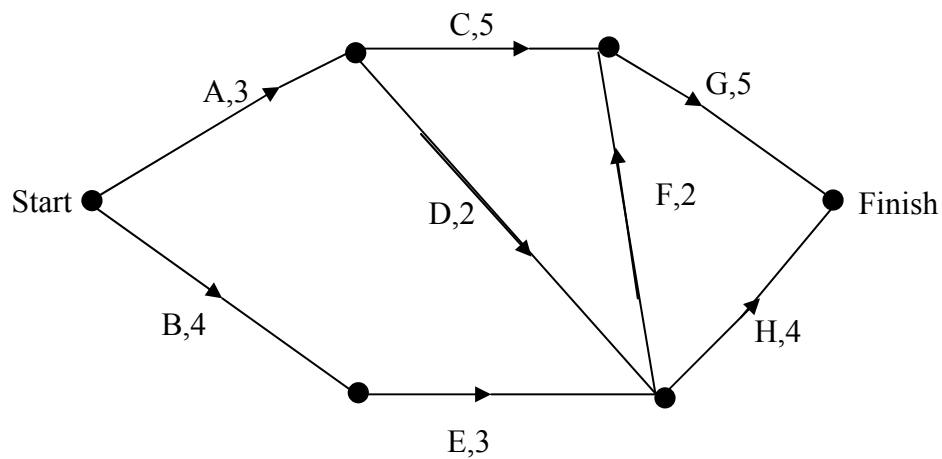
The following Table shows the time taken in hours by four people to make four different types of bicycles.

	Racing Bike	Mountain Bike	Non-geared Bike	Super Athlete Bike
Greg	5	4	3	6
Helen	9	10	6	9
Ida	10	13	8	7
Jake	6	9	10	10

Which one of the following assignments minimises the time taken to make the bikes?

- A.** Greg makes the Non-geared Bike, Ida the Super Athlete Bike, Jake the Racing Bike and Helen the Mountain Bike.
- B.** Ida makes the Non-geared Bike, Greg the Mountain Bike, Jake the Racing Bike and Helen the Super Athlete Bike.
- C.** Jake makes the Mountain Bike, Greg the Non-geared Bike, Ida the Super Athlete Bike and Helen the Racing Bike.
- D.** Greg makes the Mountain Bike, Helen the Non-geared Bike, Ida the Super Athlete Bike and Jake the Racing Bike.
- E.** Jake makes the Racing Bike, Greg the Mountain Bike, Helen the Non-geared Bike and Ida the Super Athlete Bike.

Question 9



The above graph represents the time in hours to complete a number of tasks in a furniture making factory. The times on the edges are in hours. The earliest time in hours that task G could start is

- A. 7
- B. 8
- C. 9
- D. 10
- E. 13

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Multiple Choice Question Book

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