

2018 Trial Examination

STUDENT NUMBER									Letter

FURTHER MATHEMATICS

Units 3 & 4 – Written examination 1

Reading time: 15 minutes

Writing time: 1 hour and 30 minutes

MULTIPLE-CHOICE QUESTION BOOK

Structure of book

<i>Section</i>	<i>Number of questions</i>	<i>Number of questions to be answered</i>	<i>Number of modules</i>	<i>Number of modules to be answered</i>	<i>Number of marks</i>
A – Core	24	24			24
B – Modules	32	16	4	2	16
					Total 40

- Students are permitted to bring into the examination room: pens, pencils, highlighters, erasers, sharpeners and rulers, one bound reference, one approved graphics calculator or approved CAS calculator or CAS software and, if desired, one scientific calculator.
- 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 29 pages.

Instructions

- Print your name in the space provided on the top of this page.
- All written responses must be in English.

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

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SECTION A – Core**Instructions for Section A**

Answer **all** questions in pencil on the answer sheet provided for multiple-choice questions. Choose the response that is **correct** for the question. A correct answer scores 1; an incorrect answer scores 0. Marks will **not** be deducted for incorrect answers. No marks will be given if more than one answer is completed for any question. Unless otherwise indicated, the diagrams in this book are **not** drawn to scale.

Data analysis**Question 1**

The data set below has a statistic equal to 5.4

3, 4, 7, 7, 8, 10, 11, 13, 13, 17, 21

This statistic is the:

- A. mean
- B. upper quartile
- C. standard deviation
- D. inter-quartile range
- E. range

Question 2

The seasonal indices for sales at a coffee shop are given below:

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
SI	1.5	1.2	0.9	0.9	0.6	0.8	0.6	0.6	0.7	0.9	<i>a</i>	<i>b</i>

Given that the seasonal index for December is 0.3 larger than the seasonal index for November then the seasonal indices for November and December, respectively are:

- A. 1.5 and 1.8
- B. 0.65 and 1.05
- C. 0.5 and 0.8
- D. 1.2 and 1.5
- E. 1.4 and 1.7

Question 3

The sales in March of 2017 for the coffee shop were 2168. The deseasonalised figure, using the seasonal indices given in question 2 is closest to:

- A. 1951
- B. 1952
- C. 2385
- D. 2408
- E. 2409

SECTION A – continued
TURN OVER

Question 4

The scores of boys and girls for a mathematics test are to be compared. The best way to represent this data would be a:

- A. Segmented bar chart
- B. Side by side bar charts
- C. Back-to-back stem and leaf plot
- D. Scatter plot
- E. Dot plot

Question 5

The correlation coefficient for a set of data with variables x and y is -0.75 . Which of the following statements is true?

- A. For each unit increase in x , y decreases by 0.75
- B. For each unit increase in x , y increases by 0.75
- C. 75% of the variation in x can be explained by variation in y
- D. The relationship between x and y is weak
- E. The gradient of the regression equation is negative

The following data is required for Questions 6 and 7

The data provided in the table below gives the unemployment rate in Australia for each quarter from 2015 until 2017.

2015				2016				2017			
Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
6.158	6.097	6.098	5.917	5.749	5.692	5.666	5.711	5.768	5.655	5.513	5.419

Question 6

The centred 4 point moving mean of this data for 2016 Q2 is closest to:

- A. 5.702
- B. 5.730
- C. 5.699
- D. 5.700
- E. 5.747

Question 7

The equation of the linear regression line for this data is given below:

$$\text{unemployment rate} = 6.182 - 0.061 \times \text{quarter number}$$

The predicted unemployment rate in the third quarter of 2018 is predicted to be:

- A. 5.389
- B. 5.328
- C. 5.267
- D. 5.999
- E. 5.206

Question 8

The following set of data was recorded by a student:

5, 17, 32, 44, 51, 53, 65

The student then completed univariate analysis on this data but then realised that the figure 32 was meant to be 23! What will be the effect of changing this value?

- A. The 5-figure summary will change.
- B. The IQR and range will both slightly decrease.
- C. There is no effect because the change is too small.
- D. Both the mean and median will slightly change
- E. The only change will be a slight decrease in the mean.

Question 9

The time a year level of students spend studying each night during the week is normally distributed with a mean of 120 minutes and a standard deviation $\sigma = 35$ minutes. If there are 124 students in the group the number of students who are expected to study between 85 and 190 minutes each night is closest to:

- A. 82
- B. 84
- C. 98
- D. 101
- E. 118

Question 10

The study scores of a group of students for Mathematics are show in the stem and leaf plot below:

stem	leaves										
1											
1	8										
2	0	0	1	2	3	4	4	4			
2	5	5	6	6	6	7	7	7	8		
3	0	0	1	1	1	2	2	3	4		
3	6	7									
4	1										
4											
5	0										

Key:

1|2=12

The best description of the distribution of study scores for this group of students is:

- A. Symmetrically skewed
- B. Positively skewed
- C. Positively skewed with an outlier
- D. Negatively skewed
- E. Negatively skewed with an outlier

Question 11

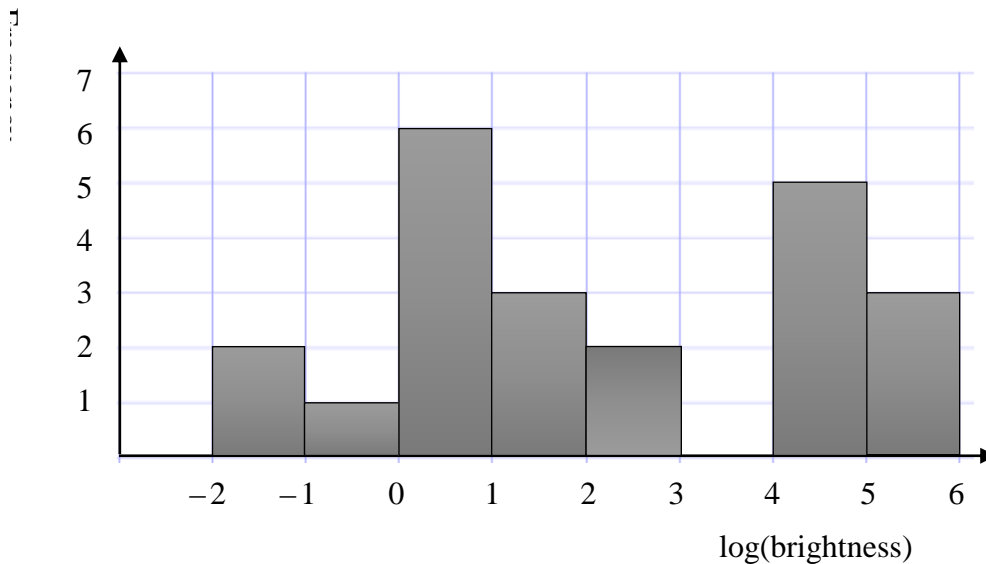
During an experiment the following data was collected:

Time	1	2	3	4	5	6	7	8
Weight	2.3	3.7	4.5	4.8	5.4	5.8	6.0	6.2

To linearise the data a $\log(\text{time})$ transformation is performed. The correlation coefficient for the transformed data is closest to:

- A. 0.998
- B. 0.996
- C. 0.953
- D. 0.907
- E. 0.952

The following information is required for Questions 12 and 13



The histogram above shows the brightness of a number of stars where brightness is measured by the amount of energy of a particular range of frequencies reaching the earth's surface from the star over a period of time.

Question 12

The number of stars represented in the histogram is:

- A. 6
- B. 7
- C. 21
- D. 22
- E. 23

Question 13

The median “brightness” is:

- A. 2 units
- B. between 1 and 2 units
- C. 100 units
- D. between 10 and 100 units
- E. 48 units

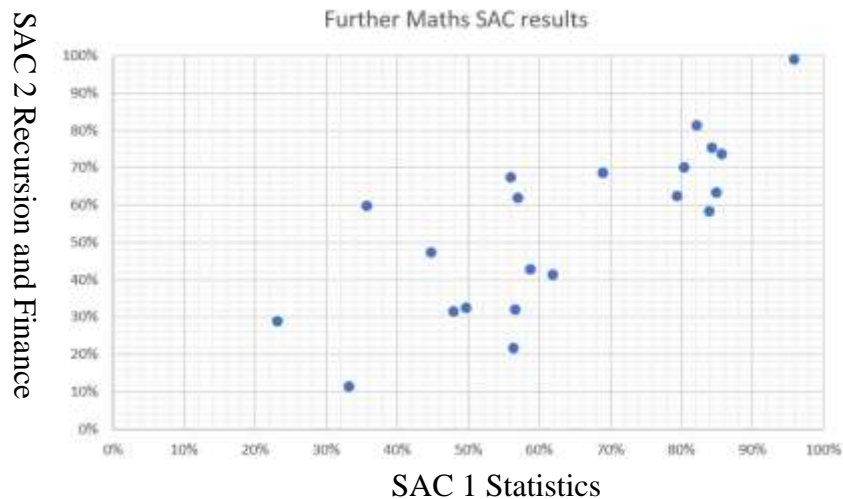
Question 14

For our closest star, the Sun, $\log(\text{brightness}) = 5.7$, and for the star Adhara $\log(\text{brightness}) = -0.7$. The Sun is x times brighter than Adhara. The value of x is closest to:

- A. 5
- B. 8
- C. 1 million
- D. 2.5 million
- E. 0.8 million

The following information is required for Questions 15 and 16

A Further Mathematics class of 21 students obtained the following scores for SAC 1 and SAC 2:



Question 15

For SAC 1 the mean 63.2 and the standard deviation is 20.1 and for SAC 2 the mean is 53.8 and standard deviation is 22.2. Given that the correlation coefficient is 0.765, then the equation of the least squares regression line is:

- A. $SAC2 = 0.400 + 0.844 \times SAC1$
- B. $SAC2 = 0.844 + 0.400 \times SAC1$
- C. $SAC2 = 0.400 + 0.845 \times SAC1$
- D. $SAC2 = 0.845 + 0.401 \times SAC1$
- E. $SAC2 = 0.401 + 0.845 \times SAC1$

**SECTION A – continued
TURN OVER**

Question 16

A Further Maths student from another class received a score of 73% on SAC2. The least squares regression line is used to predict the student's SAC1 score. Given that the student scored 82.5% on the first SAC, the residual for the SAC1 score is:

- A. -3.4
- B. 20.3
- C. -4.5
- D. 4.5
- E. 3.4

Recursion and financial modelling**Question 17**

Which one of the following recurrence relations will result in geometric decay?

- A. $V_0 = 42, V_{n+1} = V_n - 2.5$
- B. $V_0 = 42, V_{n+1} = 2.5 \times V_n$
- C. $V_0 = 42, V_{n+1} = -2.5 \times V_n$
- D. $V_0 = 42, V_{n+1} = 0.25 \times V_n$
- E. $V_0 = 42, V_{n+1} = -0.25 \times V_n + 12.5$

Question 18

A delivery company purchases a van for \$44,800. The van is depreciated at a rate of 35 cents per kilometre. The company replaces delivery vans when their depreciated value reaches \$10,000. The number of kilometres the van is expected to travel is closest to:

- A. 66,000 km
- B. 99,000 km
- C. 100,000 km
- D. 116,000 km
- E. 128,000 km

Question 19

Bank A offers investment rates of 17.2% p.a. with interest calculated weekly, Bank B offers investment rates of 17.24% p.a. with interest compounded monthly and Bank C offers investment rates of 17.49% p.a. with interest calculated quarterly. The bank which offers the best deal and difference between the two highest **effective** interest rates when comparing these investment options is:

- A. Bank A by 0.06%
- B. Bank C by 0.29%
- C. Bank B by 0.04%
- D. Bank A by 0.04%
- E. Bank C by 0.25%

SECTION A – continued

The following information is required for Questions 20 and 21.

Bronwyn invests \$120,000 in an annuity which attracts interest at 3.3% compounding monthly. She withdraws \$3,500 per month from the account.

Question 20

The recurrence relation for this investment is:

- A. $V_0 = 120000, V_{n+1} = 1.00275 \times V_n - 3500$
- B. $V_0 = 120000, V_{n+1} = 1.033 \times V_n - 3500$
- C. $V_0 = 120000, V_{n+1} = 1.00275 \times V_n + 3500$
- D. $V_0 = 120000, V_{n+1} = 0.033 \times V_n - 3500$
- E. $V_0 = 120000, V_n = 1.00275^n \times V_0 - 3500$

Question 21

Bronwyn will be able to continue withdrawing \$3,500 per month for:

- A. 36 years
- B. 34 years
- C. 2 years 10 months
- D. 2 years 11 months
- E. 3 years

Question 22

The recurrence relation $P_0 = 24500, P_{n+1} = 1.017 \times P_n - 5000$ could be:

- A. A perpetuity which earns 1.7% p.a. interest and pays \$5000 each year.
- B. An annuity which earns 1.7% p.a. interest compounded monthly with monthly withdrawals of \$5000.
- C. A reducing balance loan which accrues interest at a rate of 6.8% p.a. compounding monthly with repayments of \$5000 per month
- D. A reducing balance loan with quarterly payments of \$5000 and interest calculated at a rate of 6.8% p.a.
- E. An investment account where interest is accrued at 20.4% p.a. and deposits of \$5000 per month.

**SECTION A – continued
TURN OVER**

Question 23

The first four lines of an amortisation table for a 30 year reducing balance loan are shown below. The interest rate for this loan is 6.21% per annum compounding fortnightly. The loan is to be repaid with fortnightly payments of \$891.

Payment Number	Payment	Interest	Principal Reduction	Balance
0	-	-	-	\$ 315,000.00
1	\$891.00	\$ 752.37	\$ 138.63	\$ 314,861.37
2	\$891.00	\$ 752.03	\$ 138.97	\$ 314,722.40
3	\$891.00	\$ 751.70	\$ 139.30	\$ 314,583.10

The principal reduction for the 5th payment is closest to:

- A. \$139.63
- B. \$139.96
- C. \$139.89
- D. \$139.97
- E. \$139.88

Question 24

Sven borrows \$27,000 to purchase equipment for his business. The loan is to be paid out fully over 3 years with interest at 4.75% p.a. paid monthly. After 6 months of prescribed repayments Sven increases his repayments to \$900 per month so as to pay off his loan sooner. The number of months that Sven reduces the duration of the loan for is:

- A. 0 months
- B. 2 months
- C. 3 months
- D. 6 months
- E. 9 months

END OF SECTION A

SECTION B - Modules

Instructions for Section B

Select **two** modules and answer **all** questions within the selected modules.

Choose the response that is **correct** for the question.

A correct answer scores 1, an incorrect answer scores 0.

Marks will **not** be deducted for incorrect answers.

No marks will be given if more than one answer is completed for any question.

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SECTION B – continued
TURN OVER

Module 1 – Matrices

The following matrices will be used in Questions 1 to 4

$$A = \begin{bmatrix} -2 & -4 & 10 \\ -10 & 7 & 2 \\ -6 & 10 & 5 \end{bmatrix} \quad B = \begin{bmatrix} 9 & 9 \\ -7 & 0 \end{bmatrix} \quad C = \begin{bmatrix} -2 & 5 & -10 \\ -3 & 10 & -6 \end{bmatrix} \quad D = \begin{bmatrix} 9 & -6 \\ -3 & -10 \\ 9 & -8 \end{bmatrix} \quad E = \begin{bmatrix} 1 & 7 & 10 & -5 \\ -5 & -8 & -9 & 5 \end{bmatrix}$$

Question 1

The number of matrices shown above that can be transposed is:

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

Question 2

For the matrix multiplication $X \times C$, the matrices which could be represented by X are:

- A. B, D and E
- B. B and D only
- C. B and E only
- D. B, C and E
- E. B, C and D

Question 3

The number of matrices that have an inverse is:

- A. 0
- B. 1
- C. 2
- D. 3
- E. 4

Question 4

If the matrix equation $C \times Y + E$ is defined, then the order of matrix Y must be:

- A. 2×2
- B. 2×4
- C. 3×2
- D. 3×4
- E. The matrix equation cannot be defined

The following information is required for Questions 5, 6 and 7

In a rural town there are two major supermarkets, Colesworth and IGAmart. Colesworth has opened a brand new complex in the town and in the first week after opening, 80% of the locals shop at this new store. The transition matrix, T , is used to determine the percentage of the town's residents who will continue to shop at Colesworth and IGAmart in a given week.

$$T = \begin{matrix} & \begin{matrix} C & I \end{matrix} \\ \begin{matrix} C \\ I \end{matrix} & \begin{bmatrix} 0.78 & 0.14 \\ 0.22 & 0.86 \end{bmatrix} \end{matrix}$$

Question 5

The percentage of people who shop at Colesworth one week that shop at IGAmart the following week is:

- A. 22%
- B. 74%
- C. 26%
- D. 82%
- E. 18%

Question 6

The percentage of locals predicted to shop at the new Colesworth store in the fourth week after opening is closest to:

- A. 45%
- B. 50%
- C. 34%
- D. 54%
- E. 46%

Question 7

Prior to the opening, IGAmart had 68% of the market share in the town. In the long term, how much is the Colesworth market share expected to change?

- A. Decrease by 41%
- B. Decrease by 7%
- C. Remain the same
- D. Increase by 7%
- E. Increase by 41%

Question 8

Lila and Patsy went shopping for linen. Lila purchased 5 towels and 4 sheets for \$272.75 and Patsy purchased 3 sheets and 4 towels for \$210.80. Let t be the cost of a towel and s be the cost of a sheet.

The matrix $\begin{bmatrix} t \\ s \end{bmatrix}$ is equal to:

A. $\begin{bmatrix} -3 & 4 \\ 4 & -5 \end{bmatrix} \times \begin{bmatrix} 210.80 \\ 272.75 \end{bmatrix}$

B. $\begin{bmatrix} -3 & 4 \\ 4 & -5 \end{bmatrix} \times \begin{bmatrix} 272.75 \\ 210.80 \end{bmatrix}$

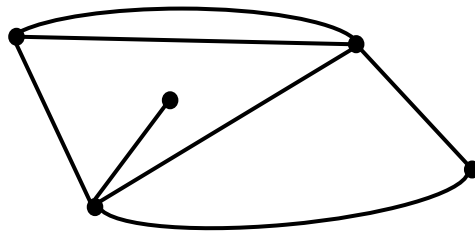
C. $\begin{bmatrix} \frac{1}{2} & -\frac{1}{2} \\ \frac{3}{8} & \frac{5}{8} \end{bmatrix} \times \begin{bmatrix} 272.75 \\ 210.80 \end{bmatrix}$

D. $\begin{bmatrix} 5 & 4 \\ 3 & 4 \end{bmatrix} \times \begin{bmatrix} 272.75 \\ 210.80 \end{bmatrix}$

E. $\begin{bmatrix} 5 & 4 \\ 4 & 3 \end{bmatrix} \times \begin{bmatrix} 272.75 \\ 210.80 \end{bmatrix}$

Module 2 – Networks and decision mathematics

Question 1

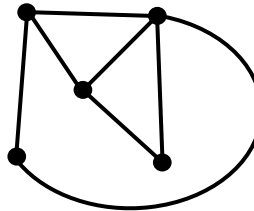


For the network shown above, which of the following descriptions is accurate?

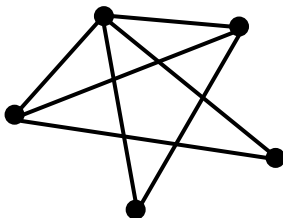
- A. Connected and planar
- B. Simple and connected
- C. Planar and simple
- D. Connected and complete
- E. Planar and complete

Question 2

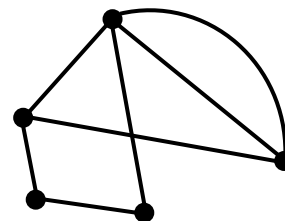
Which of the following networks is isomorphic to the one shown on the right?



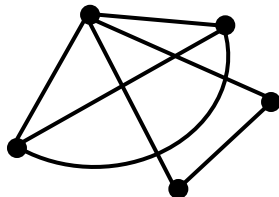
A.



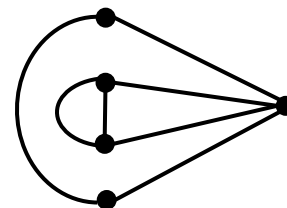
B.



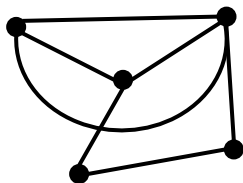
C.



D.



E.



**SECTION B – Module 2 - continued
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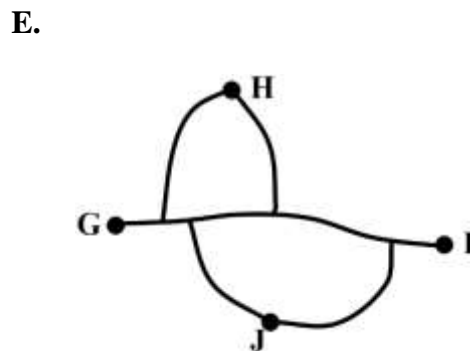
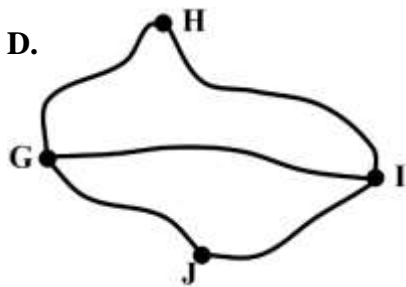
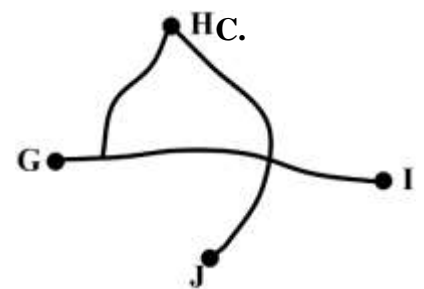
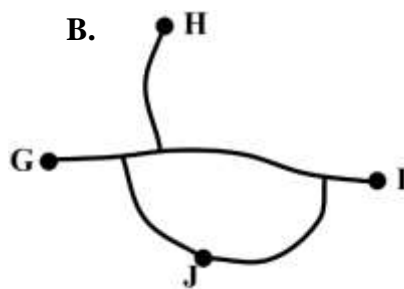
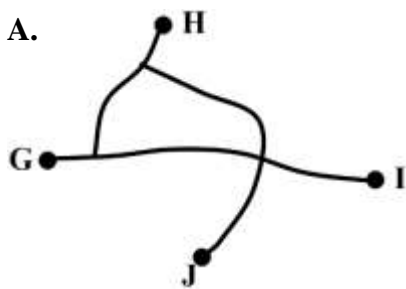
Question 3

The following matrix shows the number of different routes that can be driven between towns G, H, I and J. A route cannot cover the same section of road or pass through the same intersection more than once.

<i>G</i>	<i>H</i>	<i>I</i>	<i>J</i>	
<i>G</i>	0	2	1	1
<i>H</i>	2	1	2	2
<i>I</i>	1	2	0	1
<i>J</i>	1	2	1	0

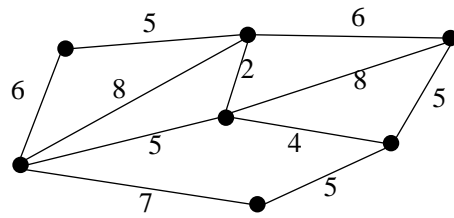
Which of the following networks replicates this adjacency matrix?

Exam 1 page 17:



Question 4

The total length of the minimum spanning tree for the following network is:



- A. 31
- B. 26
- C. 24
- D. 29
- E. 27

Question 5

The times (in minutes) for Warren, Xian, Yarra and Zeb to complete tasks A, B, C and D are given in the table below:

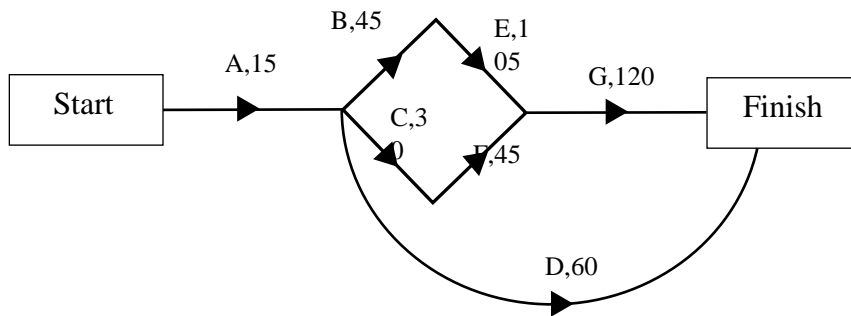
	A	B	C	D
Warren	10	13	19	14
Xian	15	14	19	20
Yarra	11	18	17	20
Zeb	12	15	17	21

The minimum total time for all of the tasks to be completed is 56 minutes with Zeb completing task C. It is determined that Zeb will not be able to complete task C in 17 minutes due to an injury, but is anticipated to take 4 minutes longer on this task. (His injury will not affect completion times of any other task). If the jobs are reallocated, by how much will the minimum total time increase?

- A. 0 minutes
- B. 1 minute
- C. 2 minutes
- D. 3 minutes
- E. 4 minutes

SECTION B – Module 2 - continued
TURN OVER

The following activity network is required for Questions 6 and 7



This network shows the times in hours for the steps involved writing a computer program for a business.

Question 6

The minimum completion time for this activity network is:

- A. 75 hours
- B. 210 hours
- C. 270 hours
- D. 275 hours
- E. 285 hours

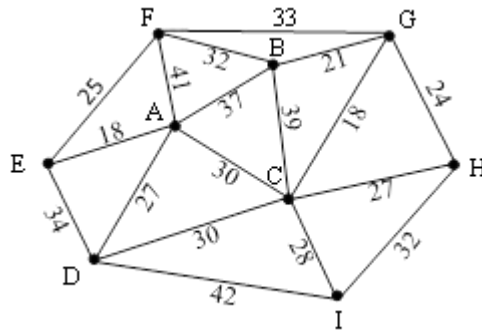
Question 7

The latest finishing time for activity C is:

- A. 30 hours
- B. 45 hours
- C. 90 hours
- D. 120 hours
- E. 15 hours

Question 8

Prim's algorithm is applied to the following network to determine the minimum spanning tree starting at vertex A. The third edge to be connected using this method is:

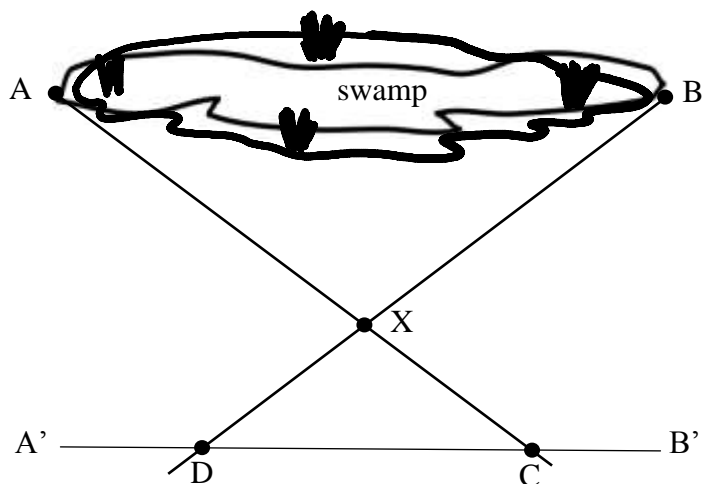


- A. A-D
- B. D-C
- C. F-G
- D. A-E
- E. C-G

**END OF MODULE 2 – SECTION B – continued
TURN OVER**

Module 3 – Geometry and measurement**Question 1**

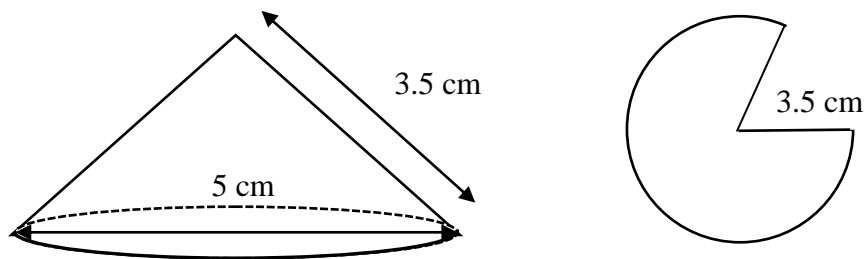
A farmer wants to determine the size of a swamp. He drives a stake in the ground at points A and B and then marks a line parallel to AB, labelled A'B' on the diagram below. He drives a stake into the ground at point X and then lines this stake up with the stakes at points A and B to determine the locations of points C and D.



The distance from A to C is measured to be 12.3 m, X to C is 4.7 m and D to C is 6.2 m. The distance from A to B is closest to:

- A. 16.2 m
- B. 12.6 m
- C. 10.0 m
- D. 12.4 m
- E. 14.6 m

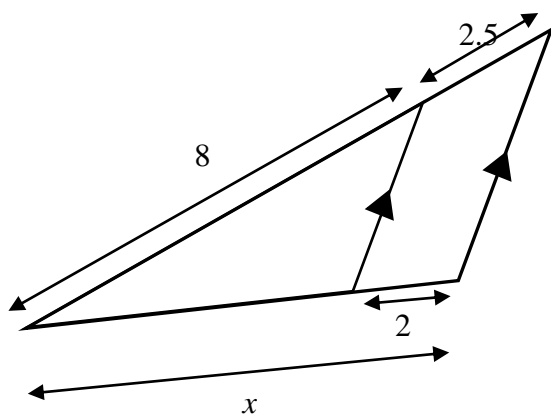
Question 2



The cone shown above has a slant edge of length 3.5 cm and the diameter of the circular base is 5 cm. The top section of the cone is made from the sector of a circle of radius 3.5 cm. The area of this sector is closest to:

- A. 38.5 cm^2
- B. 27.5 cm^2
- C. 19.6 cm^2
- D. 29.1 cm^2
- E. 28.3 cm^2

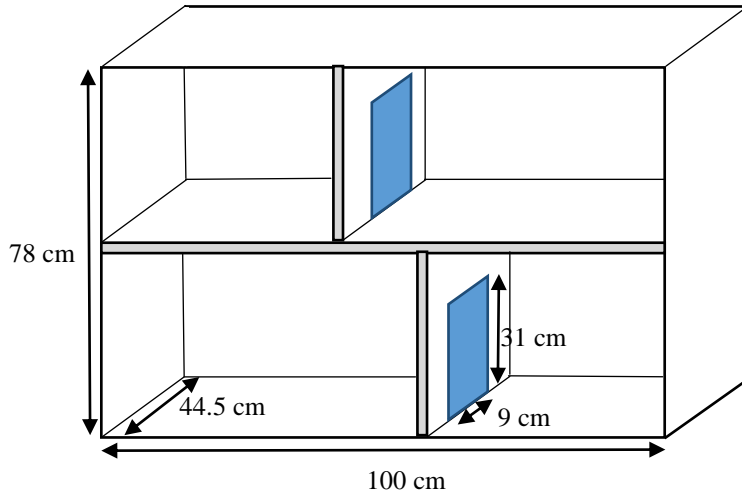
Question 3



The length x is closest to:

- A. 6.4
- B. 9.0
- C. 7.5
- D. 8.4
- E. 10.0

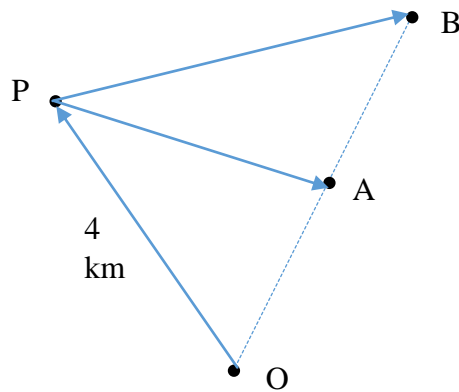
Question 4



Above is a diagram of a doll's house which is to be refurbished. The width of the shaded edges of the boards which form four rooms in the doll's house are 0.5 cm in width. The internal length of the house is 100 cm, and internal height is 78 cm. There are two doors connecting adjacent rooms each is 31 cm high and 9 cm wide. Floral contact is to be put on all interior walls (not including the ceiling, floor or doors). The total area to be "wall papered" is closest to:

- A. 2 m^2
- B. 21700 cm^2
- C. 20900 cm^2
- D. 20400 cm^2
- E. 14100 cm^2

Question 5



Points O, A and B lie on a straight line (in that order). The bearings of A and B from point O is $\text{N}20^\circ\text{E}$. A fourth point, P, is a distance of 4 km NW of O. The bearings of A and B from point P are $\text{E}22^\circ\text{S}$ and $\text{E}26^\circ\text{N}$ respectively. The distance from A to B is:

- A. 3.878 km
- B. 3.627 km
- C. 3.881 km
- D. 3.754 km
- E. 3.806 km

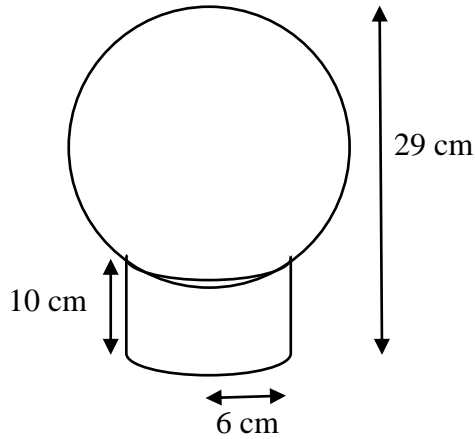
Question 6

The prime minister of Australia is taking a flight from Sydney to Dallas, Texas. Sydney is located Latitude 34°S and Longitude 151°E and Dallas has Latitude 33°N and Longitude 97°W . The flight is to depart Sydney airport at 2:40pm on Monday 4th June 2018 (EST) and is due to arrive in Dallas 15 hours and 20 minutes later. The time in Dallas when the flight is due to arrive is closest to:

- A. 1:00pm Monday 4th June
- B. 1:30pm Monday 4th June
- C. 2:00pm Monday 4th June
- D. 1:00pm Tuesday 5th June
- E. 7:00am Tuesday 5th June

Question 7

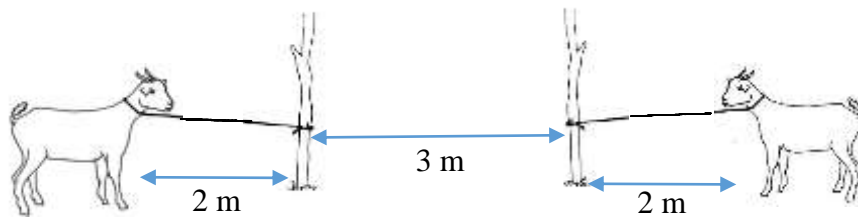
A ball sits in the top of an open cylinder as shown in the diagram below. The cylinder has a radius of 6 cm and height of 10 cm. If the total height of the ball and cylinder is 29 cm, then the radius of the ball is closest to:



- A. 9.5 cm
- B. 10.4 cm
- C. 10.5 cm
- D. 9.7 cm
- E. 10.0 cm

SECTION B – Module 3 – continued
TURN OVER

Question 8



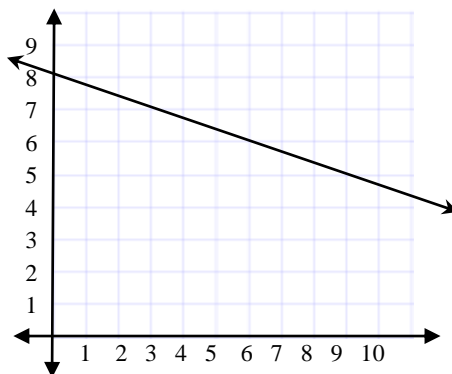
Two goats in a paddock are tethered to wooden pegs 3 metres apart. Their tethers are 2 metres long. The total area that the goats can graze is closest to:

- A. 25.13 m^2
- B. 26.54 m^2
- C. 23.32 m^2
- D. 24.23 m^2
- E. 28 m^2

END OF MODULE 3 - SECTION B – continued

Module 4 – Graphs and relations

Question 1



The x intercept for the graph above is:

- A. 8
- B. 15
- C. 19
- D. 24
- E. 27

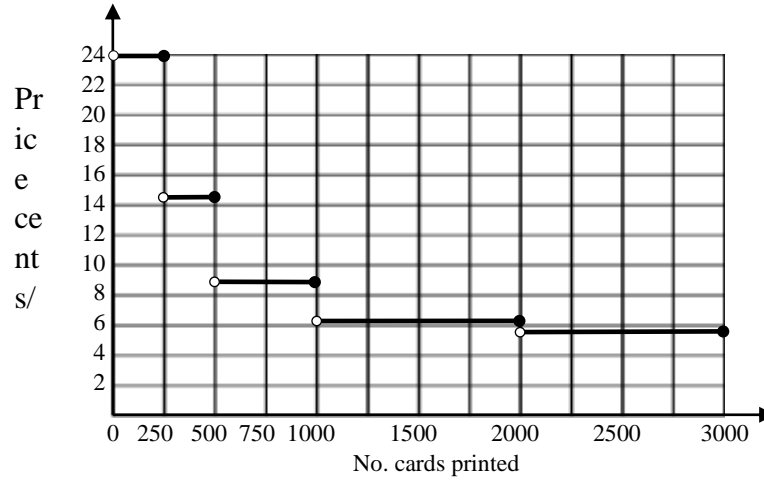
Question 2

The point which satisfies the equation $13x + 27y \geq 2480$ is:

- A. (126,31)
- B. (174,8)
- C. (189,0)
- D. (144,23)
- E. (136,26)

SECTION B – Module 4 – continued
TURN OVER

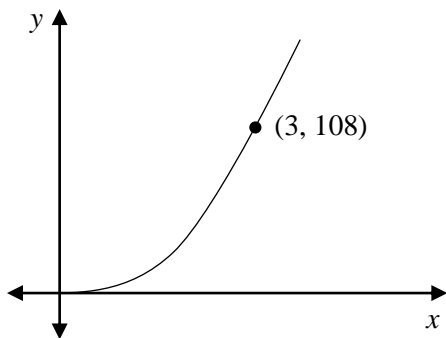
The cost of printing business cards, is shown in the graph below:



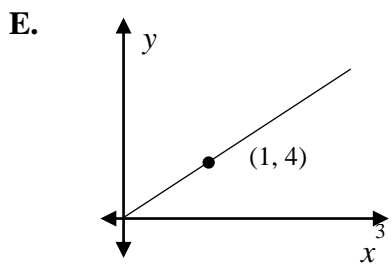
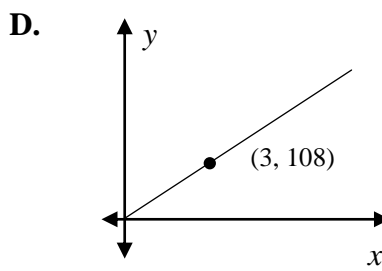
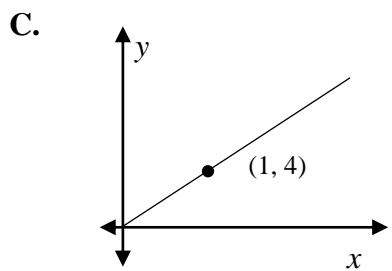
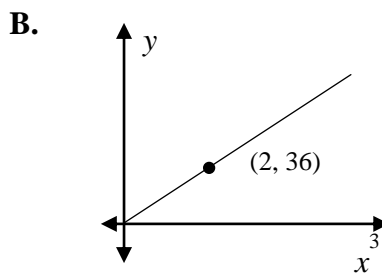
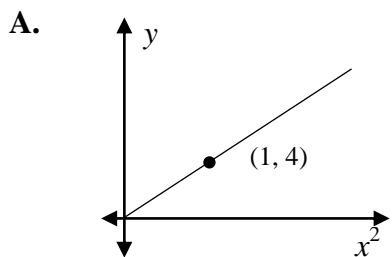
A real estate agency has two new agents that require business cards. They order 1000 business cards for one agent and 1500 for another. As each agent’s cards are different, they need to be ordered separately. The cost of the business cards will be closest to:

- A. \$140
- B. \$240
- C. \$160
- D. \$200
- E. \$180

Question 3



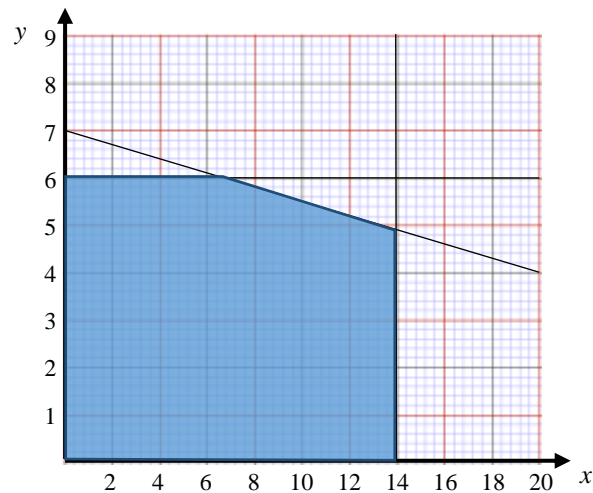
The point (3, 108) lies on the graph of the form $y = kx^n$ as shown above. Which of the following graphs also represents this relationship?



Question 4

A book publisher publishes produces hardcover and paperback books. Each week there is 4500 hours of time available in the binding department. A hard cover book requires 6.75 hours binding time and a paperback takes 2.25 hours. If the number of paperback books produced is x , and the number of hardcover books produced is y , then an inequality that represents this information is:

- A. $4500 \leq 6.75x + 2.25y$
- B. $9x + 27y \leq 4500$
- C. $4500 \leq 2.25x + 6.75y$
- D. $4500 \geq 6.75x + 2.25y$
- E. $x + y \leq 2000$

Question 5

The inequalities to define this feasible region (shaded) are:

- A. $x \geq 0, y \geq 0, x = 14, y = 6, y = \frac{-3}{20}x + 7$
- B. $x \geq 0, y \geq 0, x \leq 14, y \leq 6, 3x + 20y \leq 140$
- C. $x \geq 0, y \geq 0, x \leq 14, y \leq 6, 3x + 20y \geq 140$
- D. $x \leq 0, y \leq 0, x \geq 14, y \geq 6, 3x + 20y \leq 140$
- E. $x \geq 0, y \geq 0, x \geq 14, y \geq 6, 3x + 20y \geq 140$

Question 6

The constraints for production of two components are shown below, where x is the number of component A produced, and y is the number of component B produced.

$$x + y \leq 20$$

$$0.75x + 2y \leq 30$$

$$1.5x + y \leq 27.5$$

The profit function for components A and B is $P = 400x + 300y$

The number of components of each type that would maximise profit would be:

- A. 5 of component A and 15 of component B
- B. 15 of component A and 5 of component B
- C. 12 of component A and 8 of component B
- D. 16 of component A and 4 of component B
- E. 18 of component A and 2 of component B

Question 7

The cost of buying n business cards is given by the function below:

$$\text{Cost} = \begin{cases} 0.24n, & 0 < n \leq 250 \\ 20 + 0.16n, & 250 < n \leq a \\ k + 0.12n, & a < n \leq 1000 \end{cases}$$

Ben purchased 800 business cards for \$136. The value of a is:

- A. 700
- B. 650
- C. 600
- D. 500
- E. 400

END OF MULTIPLE CHOICE QUESTION BOOK