Student Number

Hunters Hill High School

2024 Trial Examination

Mathematics Standard 2

General Instructions

Reading time – 10 minutes
Working time – 2 hours and 30 minutes
Write using black pen
NESA approved calculators may be used
A reference sheet is provided at the back of this paper
For questions in Section II, show relevant mathematical reasoning and/or calculations

Total Marks: 100

Section I – 15 marks (pages 3 – 10)
Attempt all Questions 1 – 15
Allow about 25 minutes for this section

Section II – 85 marks (pages 11 – 35)
Attempt All Questions 16 – 41
Allow about 2 hours and 5 minutes for this section

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Section I

15 marks
Attempt Questions 1 – 15
Allow about 25 minutes for this section

Use the multiple-choice answer sheet for Question 1 – 15.

1. What is 0.004085 expressed in scientific notation, correct to 2 significant figures?

A. 4.09×10^{-2}

B. 4.1×10^{-2}

C. 4.09×10^{-3}

D. 4.1×10^{-3}

2. An amount of \$5500 is invested at a simple interest rate of 3% per annum.

How much interest is earned in the first two years?

A. \$11 330

B. \$3 300

C. \$330

D. \$165

3. Jennifer is paid \$22.75 an hour, as well as a meal allowance if \$15.30 per day.

What is Jennifer's total earnings if she works 8 hours per day for 7 days?

A. \$1 381.10

B. \$1 289.30

C. \$1 016.05

D. \$129.85

4. Which of the following correctly expresses y as the subject of the formula $2x - 5y - 3 = 0$?

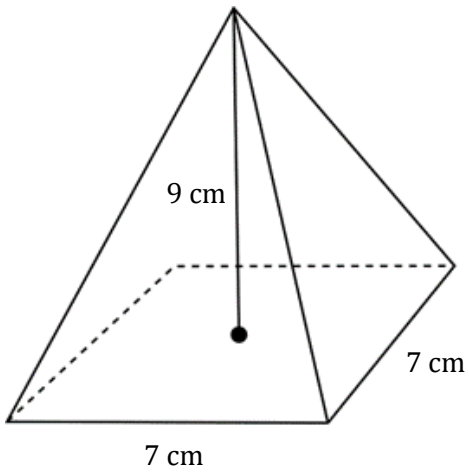
A. $y = \frac{2}{5}x - 3$

B. $y = \frac{2}{5}x + 3$

C. $y = \frac{2x - 3}{5}$

D. $y = \frac{2x + 3}{5}$

5. A square pyramid has a base with sides of length 7 cm and a height of 9 cm.



What is the volume of the pyramid?

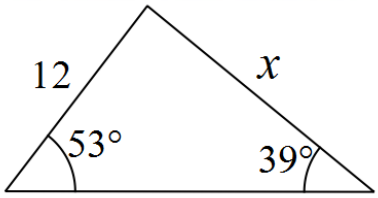
A. 63 cm^3

B. 147 cm^3

C. 252 cm^3

D. 441 cm^3

6. Which calculation would give the length of side x in the triangle below?



NOT TO SCALE

A. $12 \times \tan 53°$

B. $\dfrac{12}{\tan 53°}$

C. $\dfrac{12 \times \sin 53°}{\sin 39°}$

D. $\dfrac{12 \times \sin 39°}{\sin 53°}$

7. Amy was studying the butterfly population at a park. She caught and marked 20 butterflies and released them back into the park. Later, she caught 40 butterflies, of which 5 were already marked.

Based on the number of butterflies Amy has caught and marked, what is the most likely estimate for the butterfly population in the park?

A. 10 butterflies

B. 100 butterflies

C. 160 butterflies

D. 200 butterflies

8. Maggie bought a car for \$44 000 in 2013 and sold it after 10 years in 2023. It was depreciated using the declining-balance method, at a rate of 7% per annum.

Approximately how much had the car depreciated when Maggie sold it?

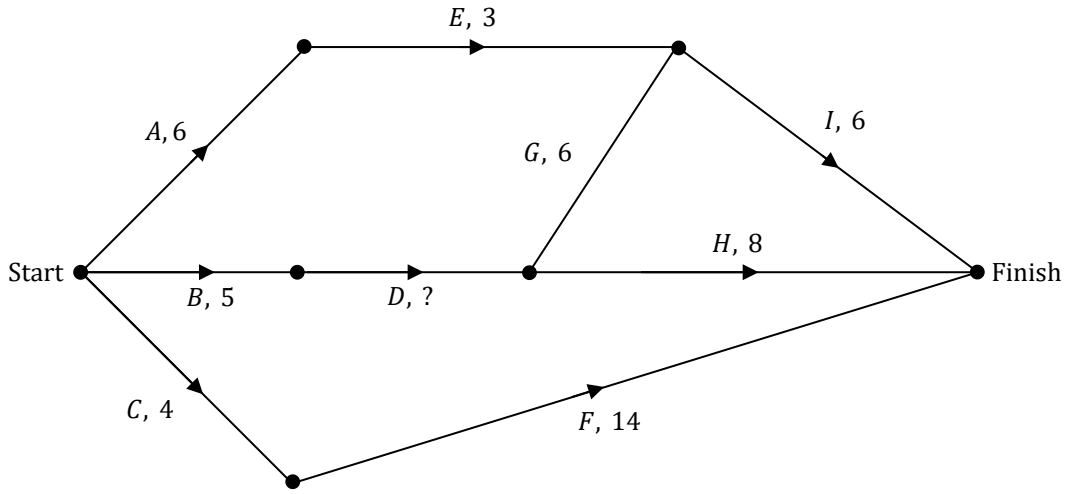
A. \$13 200

B. \$21 295.22

C. \$22 704.78

D. $30 800

9. A network diagram for a project with 9 activities is shown below with the duration (hours) for each activity indicated. The duration of activity D is missing.



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If the minimum completion time is 20 hours, what is the duration of activity D?

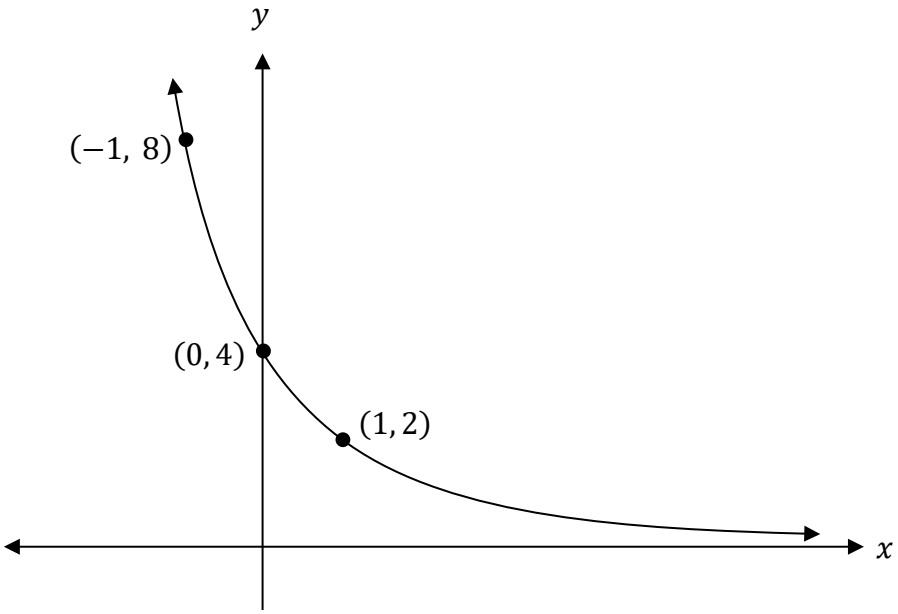
A. 7

B. 5

C. 4

D. 3

10. Which of the following could be the equation of the graph?



A. $y = \frac{2}{x}$

B. $y = 2^{-x}$

C. $y = 4 \times 2^{-x}$

D. $y = 2^{x} + 3$

11. A passenger plane is 77 metres long.

A toy model of the same plane is 38.5 cm long.

What is the scale of the toy model?

A. 1:500

B. 1:200

C. 1:50

D. 1:20

12. Daniel is recording the number of fish in some ponds. The number of fish in the first ten ponds are given below.

3 4 5 6 2 4 3 7 3 6

The 11^{th} pond has 4 fish.

Which of the following is true when the 11^{th} pond is included?

A. The mode will decrease.

B. The median will stay the same.

C. The median will decrease.

D. The mean will increase.

13. Lisa is a sales representative and earns \$750 per week plus a commission based on sales of any amount over \$2500 per week.

In a particular week, Lisa's sales were \$3000 and she earned \$850 including her commission.

What percentage commission did she receive from her employer?

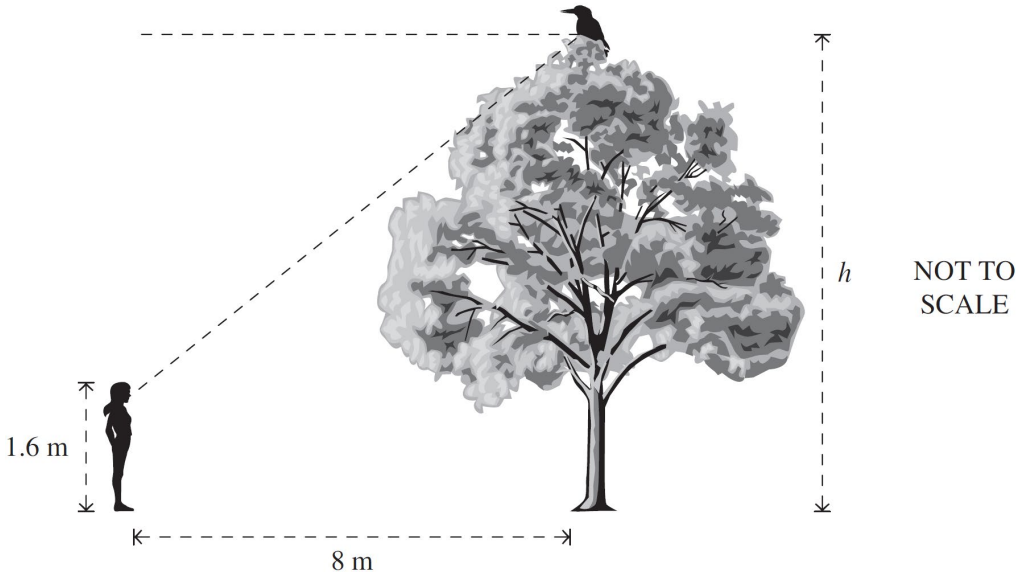
A. 10%

B. 12.5%

C. 15%

D. 20%

14. Nadia is watching a bird at the top of a tree. Nadia is 1.6 m tall and is standing 8 metres away from the tree, as shown in the diagram.



If the angle of depression of Nadia from the bird is 73°, what is the height of the tree, correct to one decimal place?

A. 27.8 m

B. 26.2 m

C. 9.3 m

D. 7.7 m

15. The length, width and height of a rectangular prism are measured to be 2 cm, 4 cm and 5 cm, to the nearest centimetre.

By first finding the lower and upper bound for the length, width and height, what is the lower and upper bound for the volume of the rectangular prism?

A. 23.625 cm^3 and 61.875 cm^3

B. 36.309 cm^3 and 43.911 cm^3

C. 38.127 cm^3 and 41.927 cm^3

D. 35 cm^3 and 135 cm^3

End of Section I

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Student Number

2023 Trial HSC Examination

Mathematics Standard 2

Section II Answer Booklet

85 marks
Attempt Questions 16 – 41
Allow about 2 hour and 5 minutes for this section

Instructions

- Answer the questions in the spaces provided. These spaces provide guidance for the expected length of response.
- Your responses should include relevant mathematical reasoning and/or calculations.
- Extra writing space is provided at the back of the booklet. If you use this space, clearly indicate which question you are answering.

Marks

Question 16 (2 marks) **2**

Adam, Beth and Caleb share $640 000 in the ratio of 7 : 5 : 4.
How much will be received by Adam?

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Question 17 (2 marks) **2**

The fuel consumption for a car is 6.5 L/100 km. On a road trip, the car travels a distance of 1860 km and the fuel cost is $1.80 per litre.

What is the total fuel cost for this trip?

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Question 18 (2 marks) **Marks 2**

Michelle bought a laptop 4 years ago. It depreciated by $220 each year using the straight-line method of depreciation. The salvage value of the laptop is now $180.

Calculate the original amount that Michelle paid for the laptop.

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Question 19 (3 marks) **3**

Sydney is 10 hours ahead of Coordinated Universal Time (UTC +10) and New York is 5 hours behind Coordinated Universal Time (UTC −5).

Sasha travels from Sydney to New York. Her plane leaves Sydney at 9:30 pm on Thursday local time, and flies non-stop to New York.

The flight takes 20 hours and 30 minutes.

What time and day is it in New York when the plane lands?

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Question 20 (2 marks) **Marks 2**

The child dosage of a particular medicine can be calculated using the formula

$$C = \frac{aD}{a + 12}$$

where C is the child dosage in mL, a is the age of the child in years, and D is the adult dosage in mL.

If the adult dosage of the medicine is 15 mL, what is the dosage for a 30-month-old child? Give your answer correct to one decimal place.

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Marks

Question 21 (3 marks)

Mary recorded the time (in seconds) it takes her to run 100 metres on ten separate occasions. Her times are shown below.

10.1, 11.2, 12.0, 12.8, 13.5, 14.5, 14.5, 15, 15.1, 23

(a) Find the third quartile (Q_3). **1**

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(b) Is Mary's time of 23 seconds considered to be an outlier? Justify your answer with calculations. **2**

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Marks

Question 22 (4 marks)

The time taken, t, to build a house is inversely proportional to the number of people, n, working on the task. A team of six people can build the house in 30 days.

(a) Find the equation relating t and n. **2**

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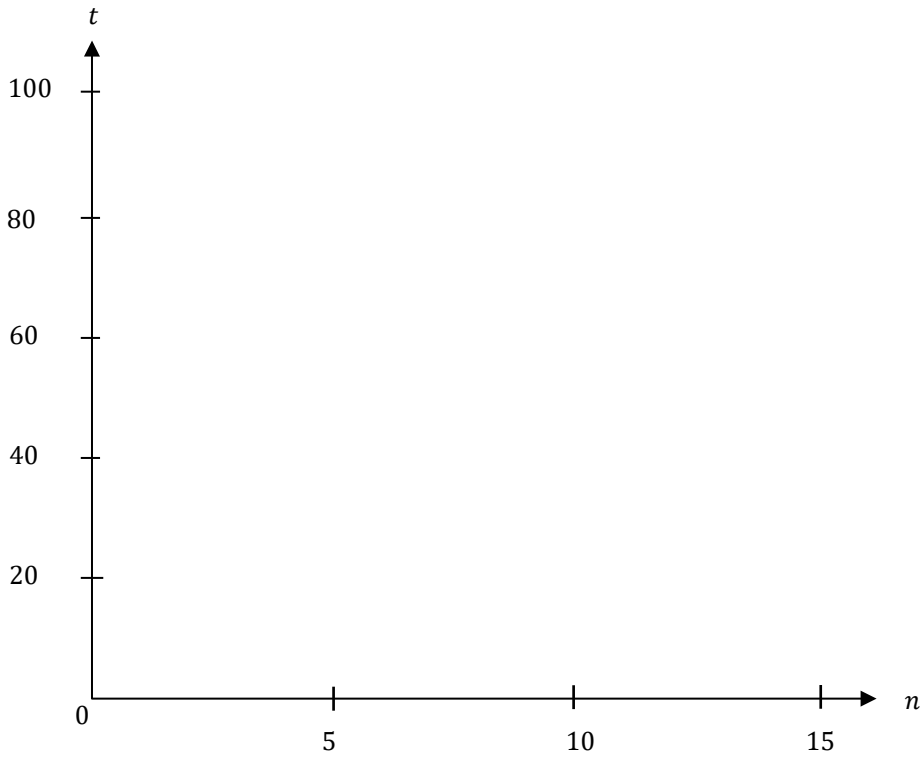
(b) By first completing the table of values, graph the relationship between the number of people and the time taken from $n = 5$ to $n = 15$ people. **2**

n	5	10	15
t			



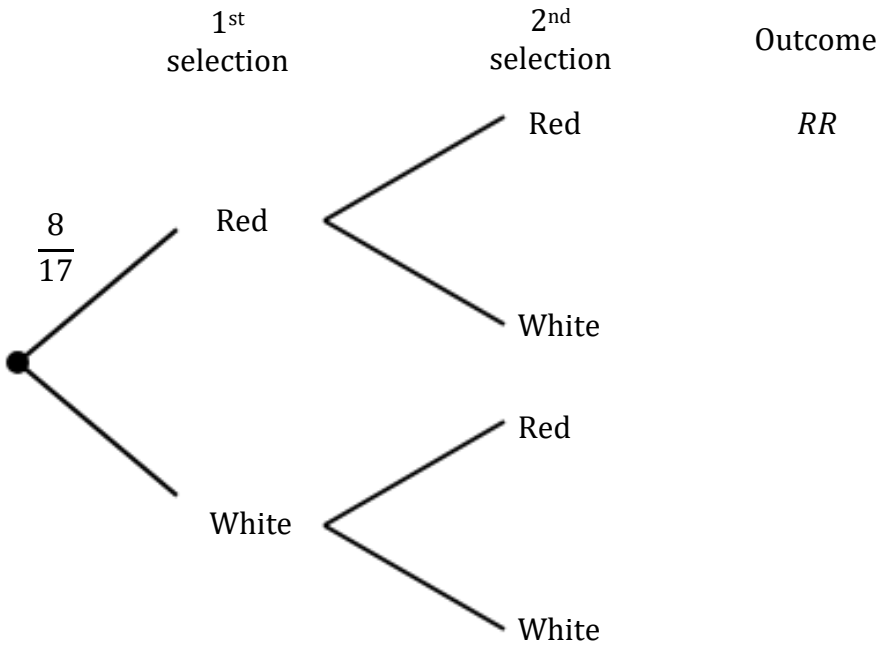
Marks

Question 23 (4 marks)

A bag contains 17 marbles. Eight of them are red, and the others are white. Sarah randomly takes out one marble from the bag, and without replacing it, selects a second marble.

(a) A partially completed tree diagram is shown. **2**

Complete the probability tree diagram, by writing probabilities on each of the branches and listing the outcomes.



(b) Find the probability that both marbles are red. **1**

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(c) Find the probability that both marbles selected are of different colours. **1**

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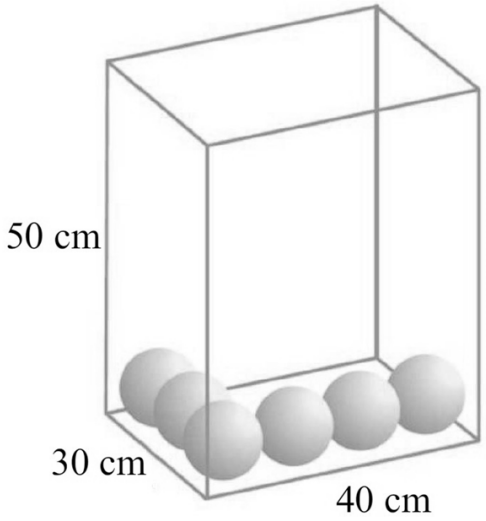
Marks

Question 24 (3 marks)

Spherical balls of diameter 10 cm are stacked inside a box as shown below. The box is in the shape of a rectangular prism such that 12 balls with fit snuggly in each layer.



(a) If the balls are stacked in the same manner as in the bottom layer until the box is full, calculate the volume of the space occupied by the balls. Give your answer correct to the nearest cubic centimetre. **2**

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(b) What percentage of the box is occupied by the balls? Give your answer correct to the nearest percentage. **1**

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Marks

Question 25 (3 marks) **3**

Jonathan has a credit card which has no interest-free period. Interest is charged at 24% per annum, compounding daily, on the amount owing.

At the beginning of the month, Jonathan owes $680 on his credit card. He makes no other purchases using the credit card, but 16 days later, he repays $400.

Calculate the amount owing on the credit card immediately after the $400 is made. Express your answer in dollars, to the nearest cent.

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Question 26 (3 marks) **Marks 3**

The blood alcohol content (BAC) of an adult male can be calculated using the formula

$$BAC_{\text{male}} = \frac{10N - 7.5H}{6.8M}$$

where N is the number of standard drinks consumed, H is the number of hours over which the drinks were consumed and M is the person's weight in kilograms.

The number of hours required for a person to reach a BAC of 0.00 after they stop consuming alcohol is given by the formula

$$\text{Time} = \frac{BAC}{0.015}$$

Tom attended a party where he drank 9 standard drinks between 7 pm and midnight. He slept at his friend's house for the night, then woke up at 7 am the next day and decided to drive back home. Tom weighs 80 kg. He holds a provisional driver license, which means that he must have a BAC of 0.00 to drive.

Determine whether Tom was able to drive at 7 am. Justify your answer with appropriate mathematical calculations.

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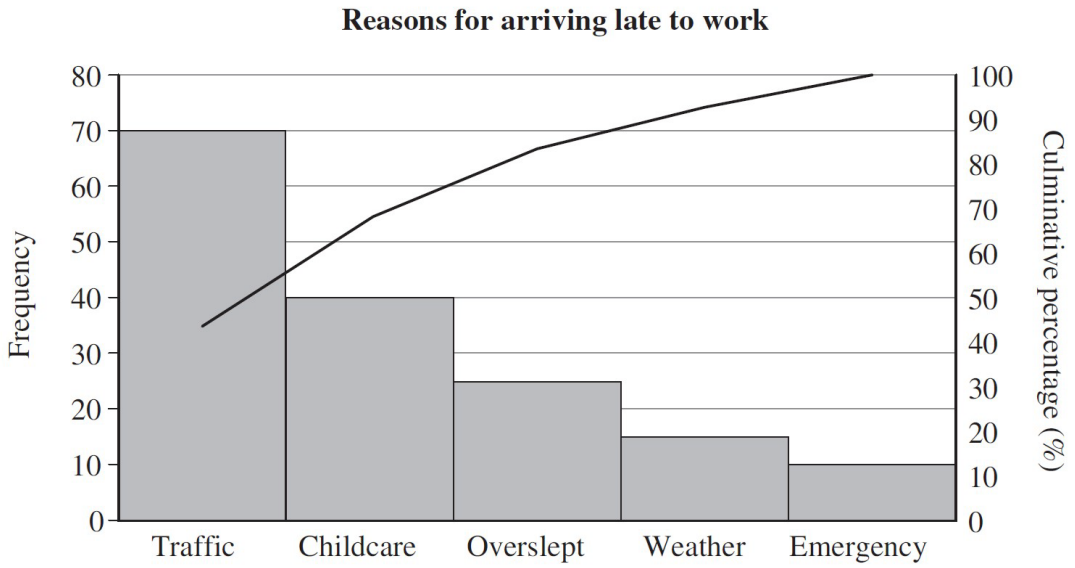
Marks

Question 27 (2 marks) **2**

A company records the reasons for its employees arriving late to work.
The results are shown in the Pareto chart below.



Approximately what percentage of issues were due to “Childcare” or “Overslept”?

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Marks

Question 28 (2 marks) **2**

Charlie purchased 700 shares in a technology company. The shares have a market price of $12.15. He received a total dividend of $532.

Calculate the dividend yield, correct to two decimal places.

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Question 29 (2 marks) **2**

Eva is a cabinet maker. She uses an 800 W electric drill for 2.5 hours every day. Her electricity plan is paid at a rate of 28.6 cents per kWh.

How much will it cost Eva to use the drill for 90 days? Give your answer correct to 2 decimal places.

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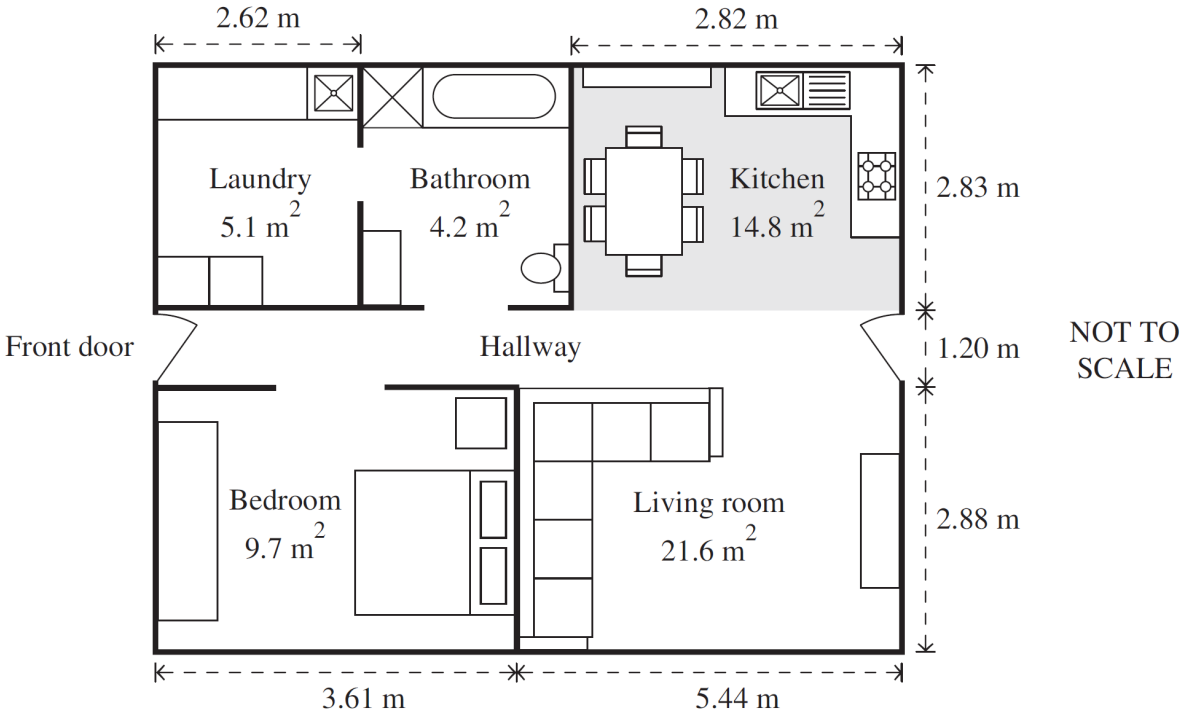
Marks

Question 30 (2 marks)

The floor plan for a building is shown.



(a) Kelly enters the house through the front door and stands in the hallway, next to the bedroom entrance. **1**

Which room can she NOT see inside?

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(b) Find the width of the bathroom, in metres, correct to 2 decimal places. **1**

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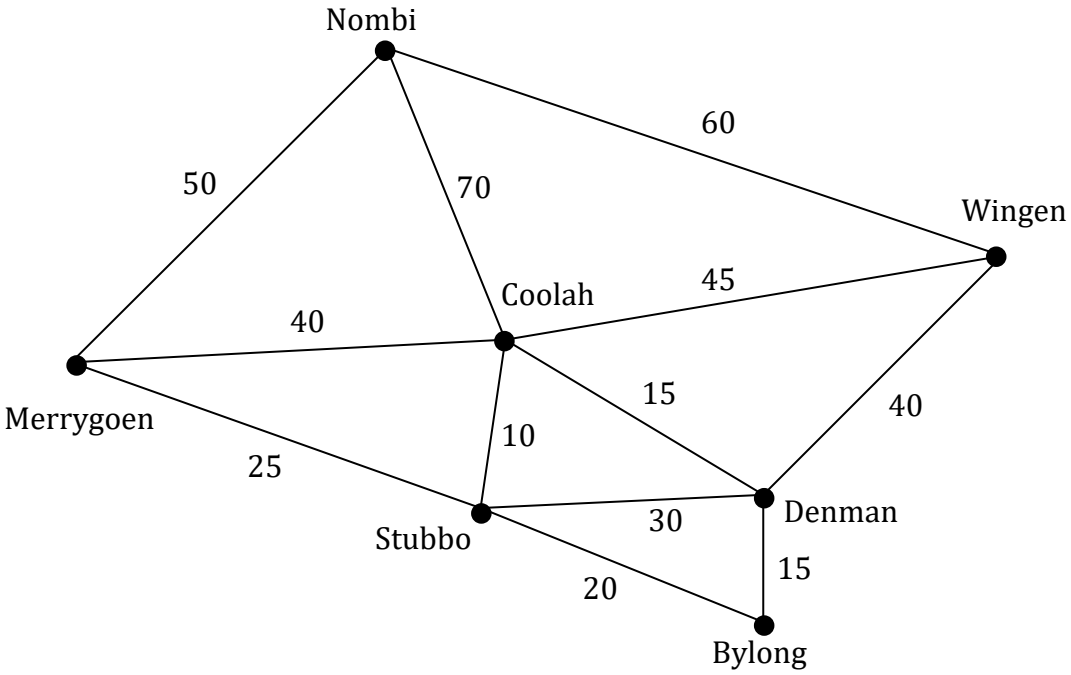
Marks

Question 31 (4 marks)

The network diagram below shows the travel times, in minutes, along roads connecting a number of towns.



(a) Draw a minimum spanning tree for this network and determine its length. **3**

Length of minimum spanning tree = ...

(b) How long does it take to travel from Merrygoen to Wingen using the fastest route? **1**

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Marks

Question 32 (4 marks)

The tax table shows the income tax rates for the 2023-2024 financial year.

Taxable income	*Tax payable*
$0 – $11 000	Nil
$11 001 – $42 400	20 cents for each $1 over $11 000
$42 401 – $78 800	$6280 plus 33 cents for each $1 over $42 400
$78 801 – $108 400	$18 292 plus 44 cents for each $1 over $78 800
$108 401 and over	$31 316 plus 48 cents for each $1 over $108 400

Lisa has a gross annual salary of $93 000.

(a) If Lisa has annual tax deductions of $1200 for home-office equipment, and $575 for union fees, calculate her taxable income. **1**

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(b) Hence, calculate Lisa's tax payable. **2**

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(c) Lisa must also pay a Medicare Levy of 2% of her taxable income. What is her total tax payable, including the Medicare Levy? **1**

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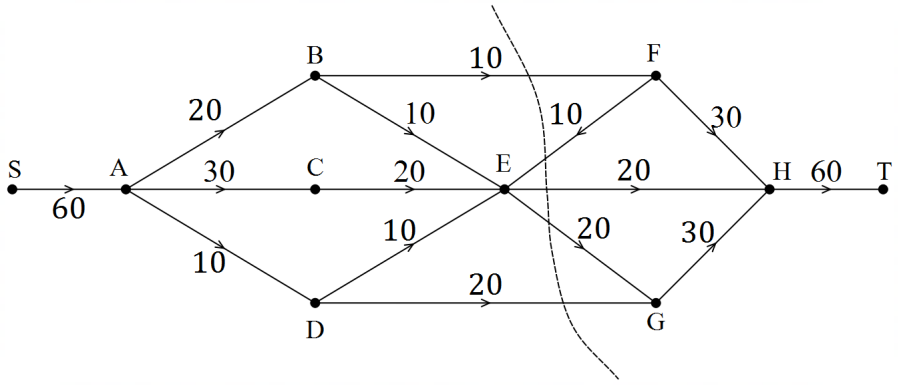
Marks

Question 33 (5 marks)

The flow diagram shows the capacity of corridors in an exhibit. The entrance (source) is S and the exit (sink) is T.



(a) Determine the capacity of the cut shown by the dashed line in the diagram. **1**

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(b) The minimum cut is known to include the corridor connecting A and B. **2**
Draw the minimum cut and explain why this gives the maximum flow of the network.

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(c) One corridor is to be extended such that the maximum flow through the network is 60 people. **2**

Find the corridor, and state how much the flow through the corridor can be increased by.

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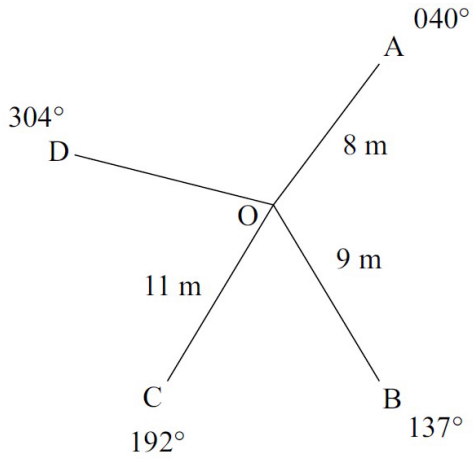
Marks

Question 34 (3 marks) **3**

The diagram below shows a compass survey of the field $ABCD$.



A surveyor was unable to measure the distance OD, but was able to locate the area of the park sections.

If the area of ΔDOA is 24 m^2, what is the length OD? Give your answer correct to the nearest metre.

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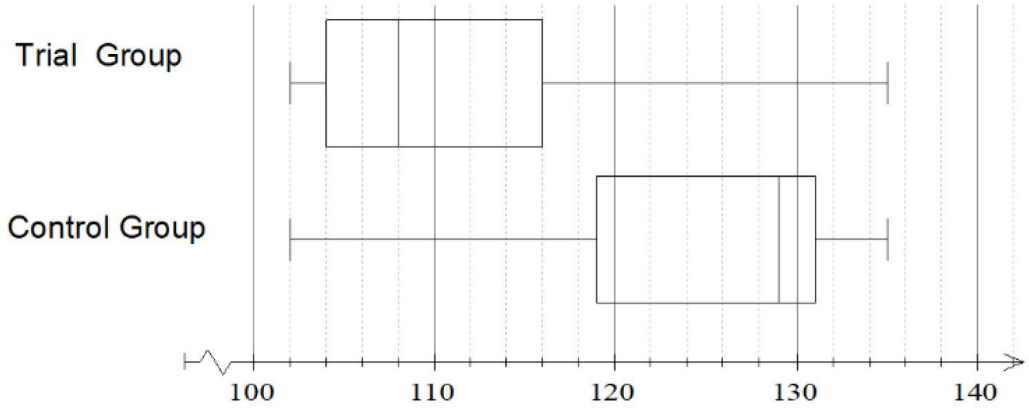
Question 35 (4 marks) **Marks 4**

The graphs below compare the blood pressure of two groups of volunteers in a medical study. The trial group undertook a structured program of exercise and diet, while the control group maintained their previous habits.



Compare and describe the data provided in both box plots, with reference to the context given.

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Marks

Question 36 (5 marks)

A company wanted to investigate the strength of the relationship between the amount of money spent on advertising each week and the number of visitors the company's website receives each week. Data was collected over a 15-week period.

(a) Pearson's correlation coefficient for the data set is $r = 0.8895$. Describe the strength and direction of this linear correlation. **1**

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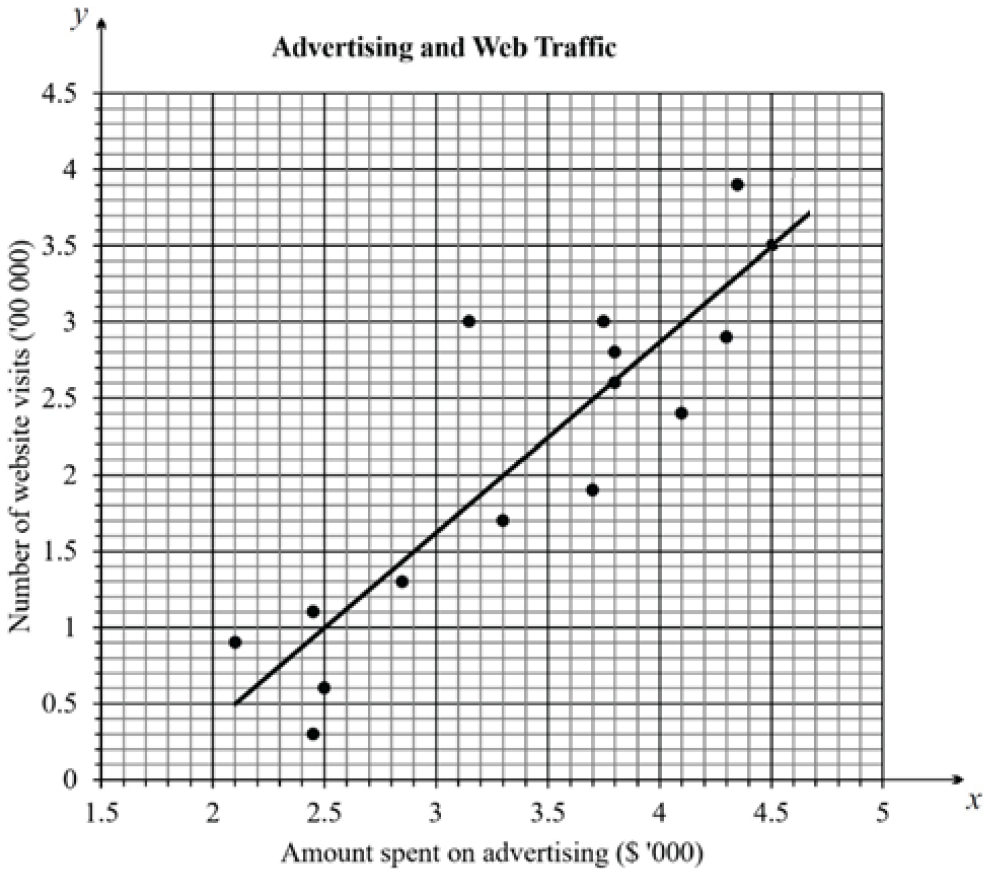
(b) The graph below shows a scatterplot and the regression line for the data. **2**



Use the graph to calculate the equation of the regression line.

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(c) Predict the number of visitors the website will receive for a week in which \$3000 was spent on advertising. **1**

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(d) Explain why the model is not useful for predicting the number of visitors for weeks in which \$1500 was spent on advertising. **1**

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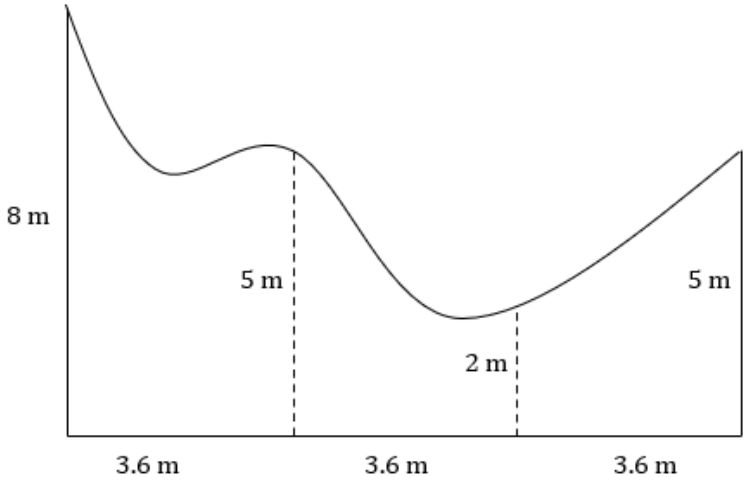
Marks

Question 37 (4 marks)

In a garden, a pond is to be installed with the dimensions shown in the diagram.



(a) Using three applications of the trapezoidal rule, calculate the area of the pond. **2**

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(b) The pond is initially empty. During a storm, 20 mm of rain falls into the pond. **2**

Calculate the amount of water in the pond immediately after the storm. Give your answer in cubic metres.

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Marks

Question 38 (6 marks)

A large group of people undertook a survey regarding the number of hours of sleep they had in a certain week.

The results of the survey were normally distributed with 2.5% of the people indicating that they had less than 42 hours of sleep per week and 2.5% of the people indicating that they had more than 54 hours of sleep per week.

(a) Determine the mean number of hours of sleep per week of the group. **1**

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(b) What was the standard deviation? **1**

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(c) A person from the group has a z-score of -2.15. How many hours of sleep per week did they have? **2**

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(d) A person is selected randomly from the group. Determine the probability as percentage that they had between 51 and 57 hours of sleep per week. **2**

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Marks

Question 39 (4 marks)

A clothing manufacturer receives \$10 for each pair of shorts it produces. Thus, the manufacturer's profit is given by $y = 10x$, where x is the number of shorts produced and y is the profit.

(a) Each week, the clothing manufacturer's production costs include a fixed cost of \$240 plus an additional \$2 per pair of shorts produced for labour and materials. **1**

Let x be the number of shorts produced each week and y the production costs per week.

Find the equation to represent the cost of production.

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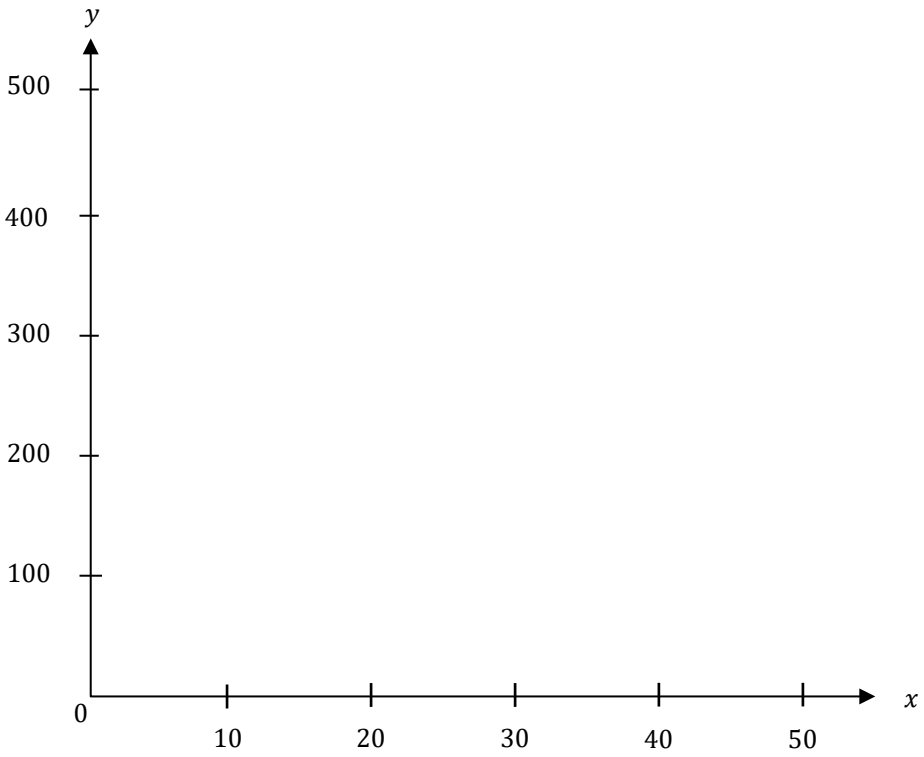
(b) On the grid below, sketch the graphs of $y = 10x$ and the graph of the equation found in part **(a)**. **2**



(c) How many pairs of shorts does the manufacturer need to produce each week to generate a profit? **1**

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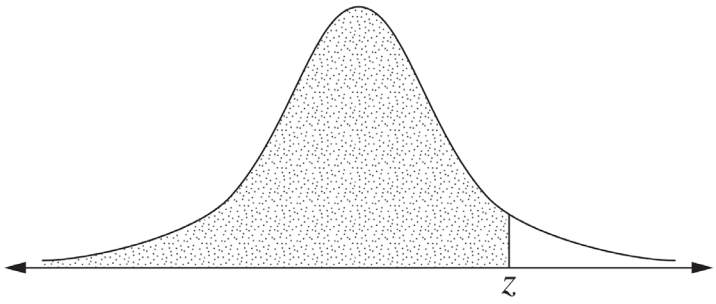
Question 40 (3 marks) **Marks 3**

A random variable is normally distributed with mean 0 and standard deviation 1. The table below gives the probability that this random variable lies below z for different values of z.

z	.0	.1	.2	.3	.4	.5	.6	.7	.8	.9
0	0.500	0.540	0.579	0.618	0.655	0.691	0.726	0.758	0.788	0.816
1	0.841	0.864	0.885	0.903	0.919	0.933	0.945	0.955	0.964	0.971

The probability values given in the table for different values of z are represented by the shaded area in the following diagram.



A factory fills bottles with water. The actual amount of water in each bottle is normally distributed with a mean of 602 mL and a standard deviation of 2.5 mL.

Out of 1000 bottles, how many would you expect to contain more than 603 mL?

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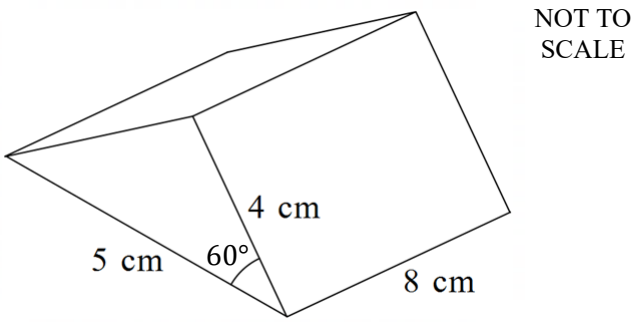
Question 41 (4 marks) **Marks 4**

A triangular prism is shown in the diagram.

Two of the sides of the triangular base are 4 cm and 5 cm.

The height of the prism is 8 cm.



Find the surface area of the prism, correct to one decimal place.

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End of Paper

Hunters Hill High School – Standard 2 –2024 Trial HSC Examination

Marking Guidelines

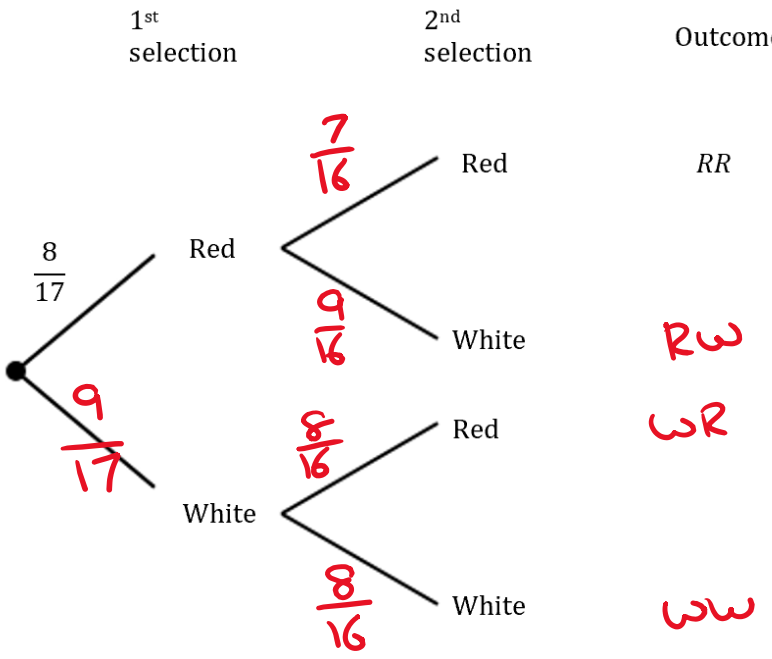
Section I

Q	Solution	
1	D	
2	C	
3	A	
4	C	
5	B	
6	C	
7	C	
8	C	
9	D	
10	C	
11	B	
12	B	
13	D	
14	A	
15	A	

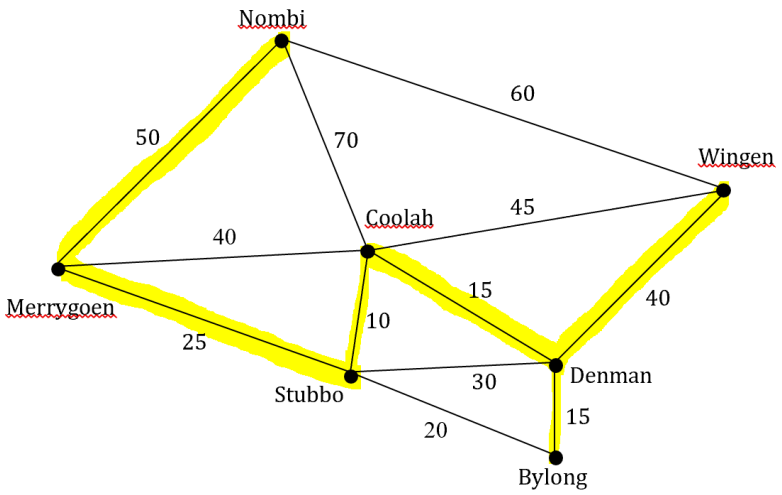
Section II

16	16 parts = \$640 000 1 part = \$40 000 7 parts = \$280 000	**2 marks**: Correct answer with working. **1 mark**: Correct mathematical working towards answer.
17	$6.5L/100$ km $\rightarrow$ \$11.70/100 km $\$11.70 \times 18.6 = \$217.62$	**2 marks**: Correct answer with appropriate mathematical working.

		1 mark: Correct cost or amount of petrol determined.
18	$S = V_0 - Dn$ $180 = V_0 - 220 \times 4$ $180 = V_0 - 880$ $V_0 = 1060$	**2 marks**: Correct answer with appropriate mathematical working. **1 mark**: Correct mathematical working towards solution, or only solution provided.
19	15 hour difference **Sydney Time** 9:30 pm Thursday + 20 hours & 30 minutes = 6 pm Friday **NY Time** 6 pm Friday Sydney – 15 hours (or ANS from a)) = 3 am Fri	**3 marks**: Correct solution with mathematical working provided. **2 mark:** Correct mathematical working towards solution provided. **1 mark**: Determines travel time or time difference or applies flight time
20	$C = \frac{aD}{a + 12}$ Note: 30 months = 2.5 years $C = \frac{2.5 \times 15}{2.5 + 12}$ $= 2.59 \text{ mL} = 2.6 \text{ mL}$	**2 marks**: Correct answer with working **1 mark**: Correct mathematical working towards solution.
21a	$Q_3 = 15$	**1 mark**: Correct solution determined.
21b	23 is an outlier if it is more than $Q_3 + 1.5 \times IQR$ $Q_3 + 1.5 \times IQR = 15 + 1.5 \times (15 - 12)$ $= 19.5$ Since 23 is more than 19.5, then 23 is an outlier.	**2 mark:** Correct solution determined with mathematical working 1 mark: Correct application of outlier rule or IQR determined.
22a	Inverse variation $\rightarrow y = \frac{k}{x}$ $t = \frac{k}{n}$	**2 mark**: Correct equation determined with mathematical working or correct solution

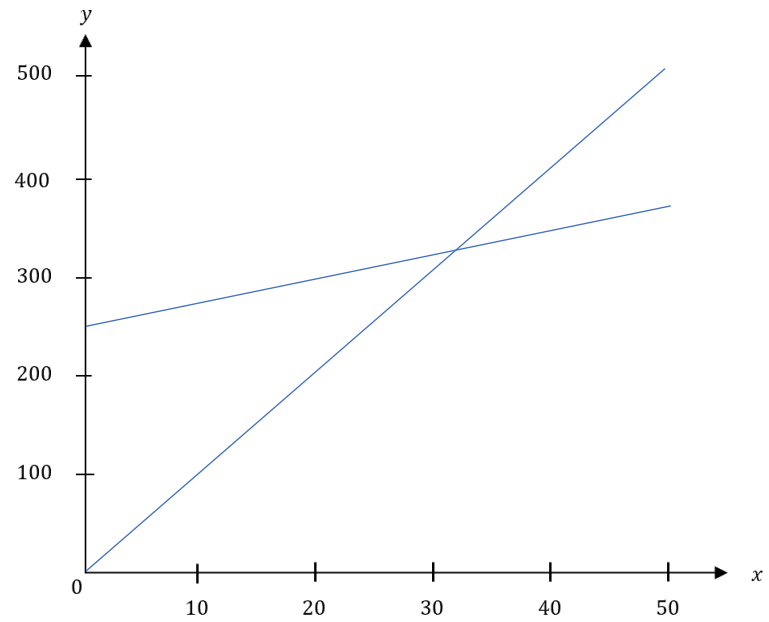
	6 people build house in 30 days, $30 = \frac{k}{6}$ $k = 180$ $\therefore t = \frac{180}{n}$	**1 mark**: Correctly identifies inverse relationship or mathematical working towards solution provided.
22b	<table><tr><td>n</td><td>5</td><td>10</td><td>15</td></tr><tr><td>t</td><td>36</td><td>18</td><td>12</td></tr></table> 	**1 mark**: table and graph correlate to relationship Graph drawn correctly
23a		**2 marks**: Correct diagram labelled with all probabilities and outcomes. **1 mark**: Correct outcomes determined, or correct probabilities provided.
23b	$P(RR) = \frac{8}{17} \times \frac{7}{16} = \frac{7}{34}$	**1 mark**: Correct answer provided.
23c	$P(RW) + P(WR) = \frac{8}{17} \times \frac{9}{16} + \frac{9}{17} \times \frac{8}{16}$	**1 mark**: Correct answer determined with mathematical working.

	$= \frac{9}{17}$	
24a	Volume of 1 Ball $= \frac{4}{3}\pi \times 5^3$ $= 523.599 \text{ cm}^3$ Can fit 60 balls (3 by 4 by 5) $60 \times 523.599 = 31416 \text{ cm}^3$	**2 marks:** Correct solution determined with mathematical working. **1 mark:** Correct mathematical working towards solution provided.
24b	Volume of Box $= 30 \times 40 \times 50 = 60000 \text{ cm}^3$ $\therefore$ % taken up by balls $= \frac{31416}{60000}$ $= 52.36\% = 52\%$	**1 marks:** Correct solution determined with mathematical working.
25	Amount owing $= 680\left(1 + \frac{24\%}{365}\right)^{16} = 687.189$ After payment, owes \$287.19	**3 marks:** Correct solution determined with mathematical working. **2 marks:** Correct mathematical working towards solution provided with 1 error. **1 mark:** Correct application of compound interest formula, or units converted for compounding daily.
26	$BAC_{\text{male}} = \frac{10N - 7.5H}{6.8M}$ $BAC_{\text{male}} = \frac{10 \times 9 - 7.5 \times 5}{6.8 \times 80}$ $= 0.0965$ Now, Time $= \frac{0.0965}{0.015}$ $= 6.433$ h He will reach 0 right before 7 am.	**3 marks:** Correct solution determined with mathematical working. **2 marks:** Correctly provides most mathematical working towards solution. **1 mark:** Correct application of BAC formula, or time formula.
27	~45% to 80 to 85% = 40%	**2 marks**: Correct answer with working

	OR Childcare + Overslept = 40 + 25 = 65 Total = 70 + 40 + 25 + 15 + 10 = 160 $\therefore \frac{65}{160} = 40.625\%$ Childcare is ¼ and overslept is 15.625%	**1 mark**: Correctly determines % of one of them, or mathematical working towards solution.
28	Dividend per share: \$532 ÷ 700 = \$0.76 per share $\text{Div. yield} = \frac{\text{dividend}}{\text{market price}}$ $= \frac{0.76}{12.15} = 0.06255 = 6.26\%$	**2 marks**: Correct solution provided with mathematical working. **1 mark**: Correct mathematical working provided (Works out price per share, or total cost per share)
29	800 W = 0.8 kW Amount of electricity = 0.8 kW × 2.5 × 90 = 180 kW Cost = 180 kW × 28.6c/kWh = 5148c = \$51.48	**2 marks**: Correct solution provided with mathematical working. **1 mark**: Correct mathematical working provided. -1 rounding
30a	Laundry	**1 mark**: Correct solution provided.
30b	$4.2 = 2.83 \times w$ $w = 1.48$ m ALSO ACCEPT 3.61 m	**1 mark**: Correct solution provided with mathematical working.
31a	 Length = 155	**3 marks**: Correct tree, and length provided. **2 marks**: 1 error with tree, correct length ECF. **1 mark**: Attempt to construct MST with errors or correctly determines length.

31b	80 minutes (M-S-C-W)	**1 mark**: Correct answer provided.
32a	Taxable income $= 93000 - 1200 - 575 = \$91225$	**1 mark**: Correct answer provided.
32b	Tax payable $= 18292 + 0.44 \times (91225 - 78800)$ $= \$23759$	**2 marks**: Correct solution provided with mathematical working. **1 mark**: Correct mathematical working provided.
32c	$2\% \times 91225 = \$1824.50$ Total tax payable $= \$1824.50 + \$23759 = \$25583.50$	**1 mark**: Correct solution provided with mathematical working provided.
33a	70	**1 mark**: Correct solution provided.
33b	Minimum cut is equal to the maximum flow (50). *Cut passes AB, CE, AD.*	**2 marks**: Correct cut provided in diagram and explanation. **1 mark:** One of the above.
33c	AD, by 10. Or from 50 to 60.	**2 marks:** Correct edge and change in flow provided. **1 mark**: One of the above.
34	$56 + 40 = 96°$ $A = \frac{1}{2}ab\sin C$ $24 = \frac{1}{2} \times OD \times 8 \times \sin 96°$ $OD = 6$ m	**3 marks**: Correct solution provided with mathematical working. **2 marks:** Error made with mathematical working towards solution. **1 mark**: Only determines angle or states area formula. **0 mark**: Uses A = bh/2 to get answer.
35	Median of Trial: 108 and Control: 129 Correctly compares min/max/range.	**4 marks:** 4 different things 3: 3

	Correctly compares quartiles, IQR or %s. Trial: Positively skewed. Control: Negatively skewed.	2: 2 1: 1
36a	Strong, positive.	1 mark: Correct solution provided.
36b	Gradient $\approx \frac{0.5}{0.4} \approx 1.25$ Using the point $(2.5, 1)$ $y = mx + b$ $1 = 1.25 \times 2.5 + b$ $b = -2.125$ $\therefore y = 1.25x - 2.125$	2 marks: Correct solution determined with mathematical working. 1 mark: Correct mathematical working towards solution provided.
36c	~160 000	**1 mark**: Correct solution provided.
36d	At \$1500 spent, there is almost 0 (or negative) visitors.	**1 mark**: Correct solution provided.
37a	$A = \frac{3.6}{2}(8 + 5) + \frac{3.6}{2}(5 + 2) + \frac{3.6}{2}(2 + 5)$ $= 48.6 \text{ m}^2$	**2 marks**: Correct answer with working **1 mark**: Makes significant progress towards the solution.
37b	$20 \text{ mm} = 2 \text{ cm} = 0.02 \text{ m}$ $V = A \times h$ $48.6 \times 0.02 = 0.972 \text{ m}^3$	2 marks: Correct solution determined with mathematical working. 1 mark: Correct mathematical working towards solution provided.
38a	48 (Draw a normal curve, or average of 42 and 54 since symmetrical)	1 mark: Correct solution provided.
38b	3	1 mark: Correct solution provided.
38c	$-2.15 = \frac{x - 48}{3}$	2 marks: Correct solution determined with mathematical working.

	$x - 48 = -6.45$ $x = 41.55$	1 mark: Correct mathematical working towards solution provided.
38c	51 to 57 $\rightarrow z = 1$ to 3 49.83% (0 to 3) – 34% (0 to 1) = 15.85%	2 marks: Correct solution determined with mathematical working. 1 mark: Correct mathematical working towards solution provided.
39a	Cost $= 240 + 2x$ OR $y = 240 + 2x$	1 mark: Correct equation provided.
39b		2 marks: Both graphs sketched correctly. 1 mark: Only one graph sketched correctly.
39c	30	1 mark: Correct solution provided.
40	$z = \frac{603 - 602}{2.5} = \frac{1}{2.5} = 0.4$ In the table, $z = 0.4 \rightarrow 0.655$ So, 65.5% of bottles are LESS than $z = 0.4$ / $x = 603$ So, 34.5% of bottles are more than $z = 0.4$ / $x = 603$ $1000 \times .655 = 655$ $1000 - 655 = 345$	**3 marks**: Correct solution determined using z score formula, table. **2 marks**: Correct mathematical working towards solution. **1 mark**: One correct step.

41	$SA = \frac{1}{2} \times 5 \times 4 \sin 60^\circ \times 2 + 4 \times 8 + 8 \times 5 + 4.582 \times 8$ $= 8.6602 \times 2 + 32 + 40 + 36.6$ $= 125.92 \text{ m}^2$ For 4.582 $x = \sqrt{4^2 + 5^2 - 2 \times 4 \times 5 \cos 60}$ $x = 4.582$	**4 marks:** Correct answer with mathematical working **3 marks:** Area of four faces calculated correctly with one incorrect area and with final area calculated **2 marks:** Area of three faces calculated correctly with one incorrect area and with final area calculated. **1 mark:** Side length calculated using cosine rule or using sin to calculate the area of a face.