

NAME: _____



Blacktown Boys' High School

Year 12 2025

Trial Examination

Mathematics Standard 2

General Instructions

- Reading time – 10 minutes
- Working time – 2 hours and 30 minutes
- Write using black pen
- Calculators approved by NESA may be used
- A reference sheet is provided for this paper
- In Questions in Section II, show all relevant mathematical reasoning and/or calculations

Total marks: 100

Section I – 15 marks (pages 3-8)

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

Section II – 85 marks (pages 10-28)

- Attempt Questions 16 – 37
- Allow about 2 hours and 5 minutes for this section

Assessor: Mrs. Chhabra

Students are advised that this is a trial examination only and cannot in any way guarantee the content or format of the 2025 Higher School Certificate Examination.

Section I

15 marks

Attempt Questions 1–15

Allow about 25 minutes for this section

Use the multiple choice answer sheet for Questions 1–15.

- 1 The distance between Hillgrove and Riverpoint is 105 km. A driver travels from Hillgrove to Riverpoint at an average speed of 60 km/h. How long does it take the driver to complete the journey?
- A. 1 hour 10 minutes
- B. 1 hour 25 minutes
- C. 1 hour 45 minutes
- D. 2 hours

- 2 What is 0.0003641 expressed in standard form with two significant figures?
- A. 3.6×10^{-5}
- B. 3.64×10^{-4}
- C. 3.6×10^{-4}
- D. 3.7×10^{-5}

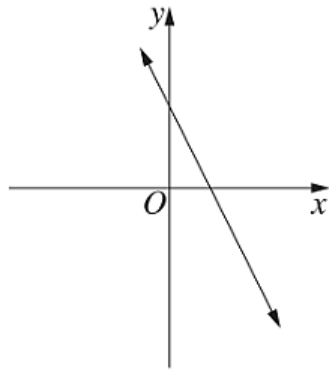
- 3 Which of the following expresses p as the subject of the formula

$$q = \frac{mp + n}{2}$$

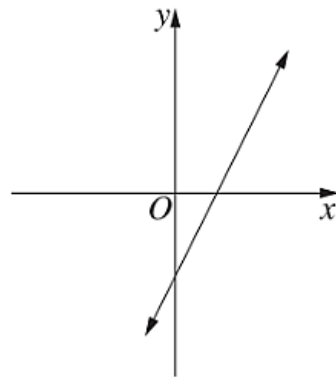
- A. $p = \frac{2q - n}{m}$
- B. $p = \frac{q + n}{2m}$
- C. $p = \frac{2q + n}{m}$
- D. $p = \frac{q - n}{m}$

- 4 Which of the following could be the graph of $y = 5x - 5$?

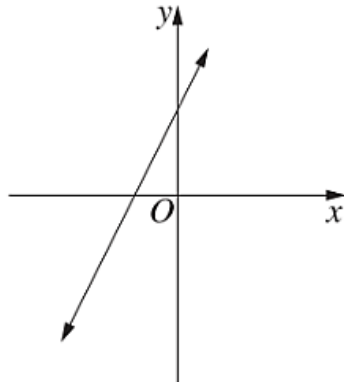
A.



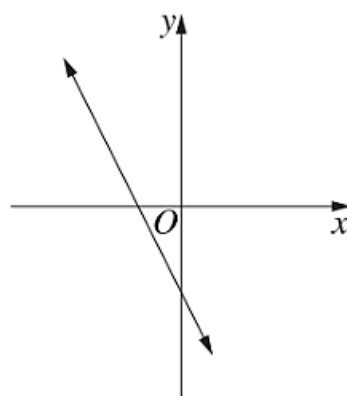
B.



C.



D.



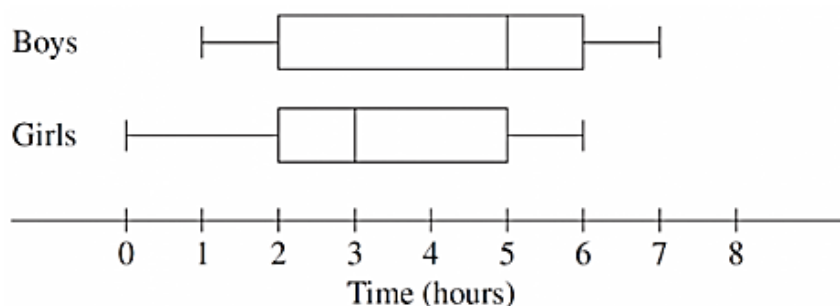
- 5 Alex invests \$800 for 18 months at a simple interest rate of 3% per annum in a fixed term deposit. What is the value of the investment after 18 months?

- A. \$24
- B. \$36
- C. \$432
- D. \$836

- 6 A doctor prescribes 900 grams of medication per day to be taken every 3 hours. The medication is provided in liquid form with a concentration of 60 grams per 6 millilitres. How many millilitres should the patient take per dose?

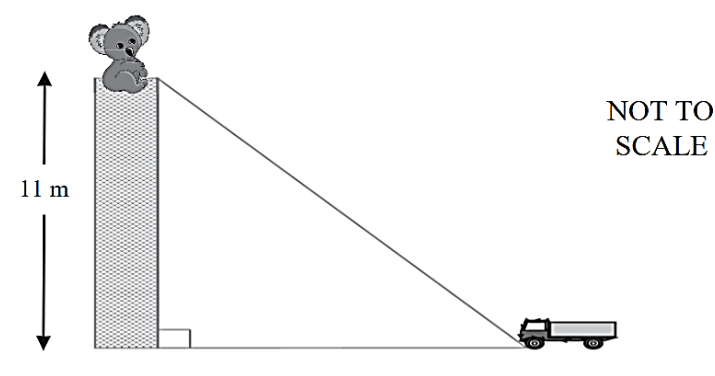
- A. 15 *ml*
- B. 11.25 *ml*
- C. 5 *ml*
- D. 2.5 *ml*

- 7 A small business purchased a delivery van five years ago to assist with local transport operations. Since its purchase, the van has depreciated in value by \$2300 per year under the straight-line method of depreciation. At the end of the five-year period, the current (salvage) value of the van is estimated to be \$7500. What was the original purchase price of the van?
- A. \$11500
- B. \$13800
- C. \$19000
- D. \$21300
- 8 A fitness study recorded the time spent exercising each weekend by a group of Year 12 boys and girls. The results are displayed in the box-and-whisker plots below. Which of the following best describes the patterns in exercise duration for boys and girls?



- A. The boys' exercise times are positively skewed, while the girls' times are symmetrical.
- B. The girls' data is more variable, with a wider interquartile range than the boys.
- C. The girls' distribution is positively skewed, while the boys' distribution is symmetrical.
- D. The median exercise time for boys is higher than that for girls.
- 9 Suppose $y = -4 + 3x$. When the value of x increases by 4, the value of y increases by:
- A. 3
- B. 7
- C. 12
- D. 16

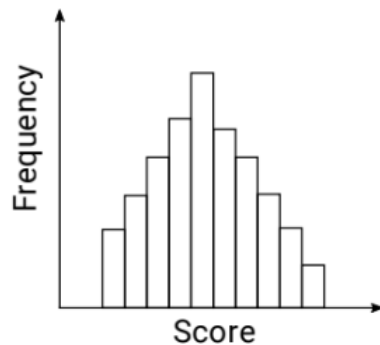
- 10** A group of 8 volunteers can pack food hampers in 12 hours. The time taken to complete the task varies inversely with the number of volunteers working at a constant rate. How long would it take a group of 7 volunteers to complete the same task?
- A. 13.5 hours
B. 13.7 hours
C. 13.8 hours
D. 14 hours
- 11** A homeowner received a written quotation of \$18250 from a builder to complete renovation work. This amount includes 10% GST. The builder offers a cash payment option in which the GST is not charged. How much would the homeowner pay if they choose to pay in cash?
- A. \$18250
B. \$17250
C. \$16590.91
D. \$16500
- 12** A koala is stranded on top of an 11 metre telegraph pole. From the top of the telegraph pole, the angle of depression of the rescue vehicle is 30° . How far from the base of the telegraph pole is the rescue vehicle, to the nearest metre?



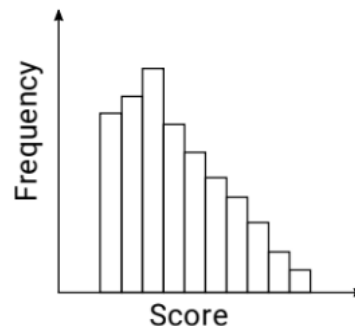
- A. 14
B. 17
C. 19
D. 22

- 13 A school is analysing the results of a recent Year 12 Mathematics Assessment. The results indicate that many students scored poorly, likely due to poor time management and avoidable errors, while only a small number achieved high results. Four histograms have been produced to represent possible distributions of these scores. Which histogram represents the above scenario?

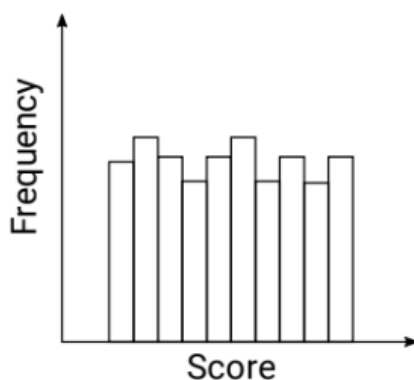
A.



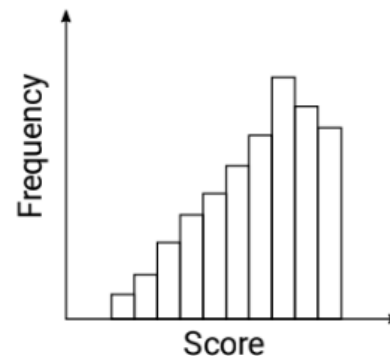
B.



C.



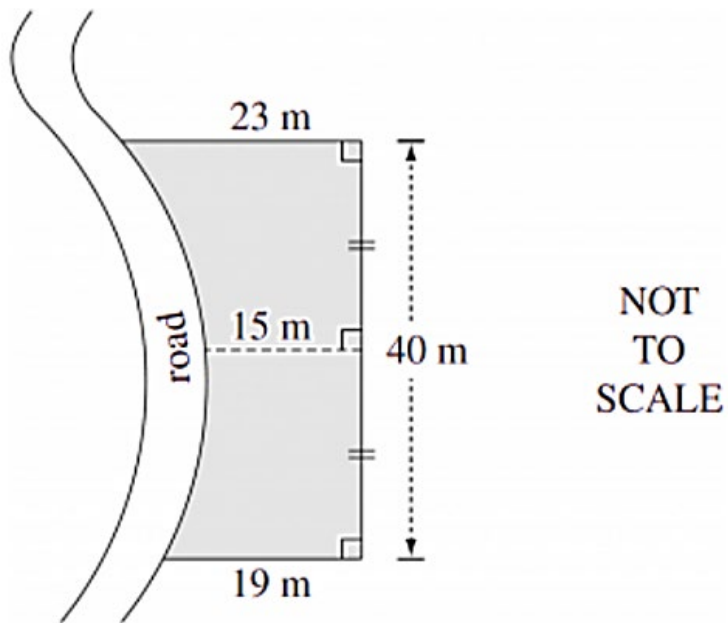
D.



- 14 The expected life of an Ever charge battery is normally distributed with a mean of 10 hours. What is the standard deviation if 95% of Evercharge batteries are expected to last between 8.8 and 11.2 hours?

- A. 0.6 hours
- B. 3.8 hours
- C. 7.6 hours
- D. 9.5 hours

- 15 A local council is estimating the area of a section of land that borders a curved road. To do this, surveyors take three perpendicular measurements from the road to the opposite edge of the land, 20 m apart. The recorded distances are 23m, 15m and 19m.



Which of the following is the approximation for the area of this block of land in square kilometres, using two applications of the trapezoidal rule?

- A. 1440 m^2
- B. 1140 m^2
- C. 880 m^2
- D. 720 m^2

End of Section I

Question 16 (2 marks)

Ali invests \$500 into a savings account that earns 4% per annum, compounded quarterly. What will be the value of Ali's investment be after 2 years? **2**

.....

.....

.....

.....

Question 17 (2 marks)

On 14 April 2025, Damien used his credit card to purchase a flight ticket valued at \$2150. He made no other purchases on his credit card during that month. He paid the outstanding amount in full on 6 May 2025. His credit card account does not offer an interest-free period, and interest is charged daily at an annual rate of 20.5%, including the date of purchase and the date of payment. How much interest did Damien pay on this transaction? Round your answer to the nearest cent. **2**

.....

.....

.....

.....

Question 18 (2 marks)

On Monday, 5 February, Liam boards a flight from Brisbane (27°S, 153°E) to Seoul (37°N, 127°E). **2**
His plane departs Brisbane at 9:45 pm and the journey takes 9 hours and 50 minutes. At that time of year, Seoul is 1 hour behind Brisbane.
Determine the local day and time when Liam will land in Seoul.

.....

.....

.....

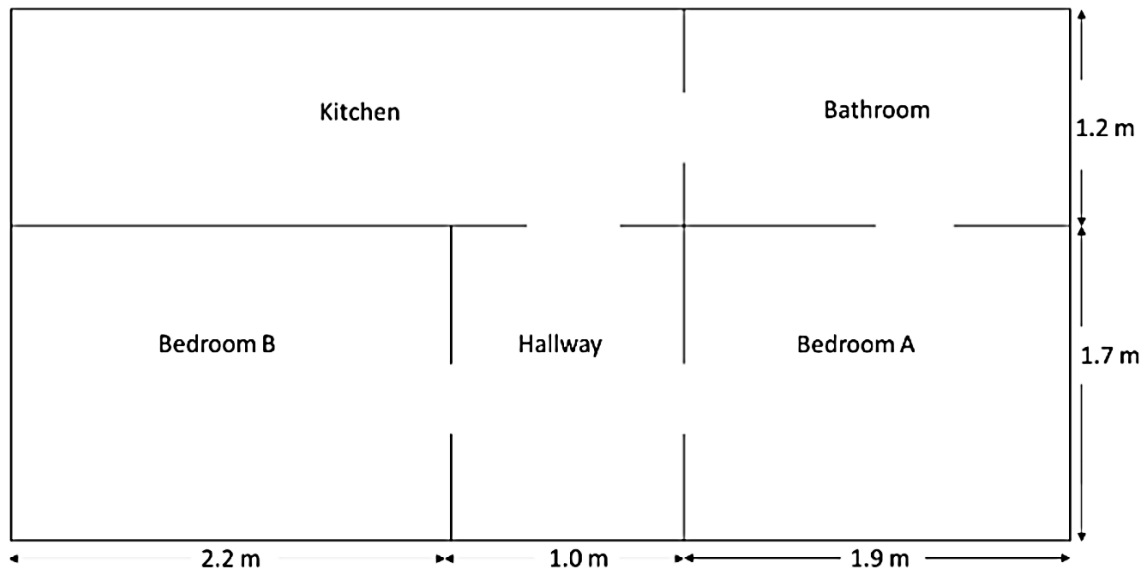
.....

.....

.....

Question 19 (4 marks)

Orlando has decided to move into a shared apartment. The dimensions of the apartment are shown below.



- a) Orlando uses the Bathroom, Bedroom A, Hallway and the Kitchen regularly. The apartment rent is decided by the area of the rooms that Orlando uses regularly. He has to pay \$200/ m^2 that he uses per month. What is Orlando's rent per month? 2

.....

.....

.....

.....

- b) Due to a leak, the kitchen floor needs to be renovated. Orlando has lodged a formal complaint, and the property owner has agreed to have the floor retiled. Each tile measures 0.2 m by 0.2 m and is sold in boxes containing 15 tiles. Each box costs \$100. Only full boxes may be purchased. Calculate the total cost of the tiles required for the renovation. 2

.....

.....

.....

.....

.....

.....

Question 20 (3 marks)

Mr Fabricato asked ten Year 11 students to record their average daily screen time and study time over the course of a school week. Screen time included activities such as using phones, watching television, playing video games, and browsing social media. Study time referred specifically to time spent on homework or academic revision outside of regular class hours.

Mr Fabricato intended to use this information to support a discussion on effective time management during the school's study skills program.

Student	A	B	C	D	E	F	G	H	I	J
Average screen time (hours) x	5	6	4	7	3	6	8	5	4	7
Average study time (hours) y	2	1.5	2.5	1	3	1.5	0.5	2	2.5	4

- a) Calculate the Pearson's correlation coefficient, correct to two significant figures. **1**

.....

- b) The equation of the least-squares regression line of y in terms of x is given by **2**
 $y = -0.3x + A$

Find A and interpret the vertical intercept and the gradient in context of the data.

.....

.....

.....

.....

.....

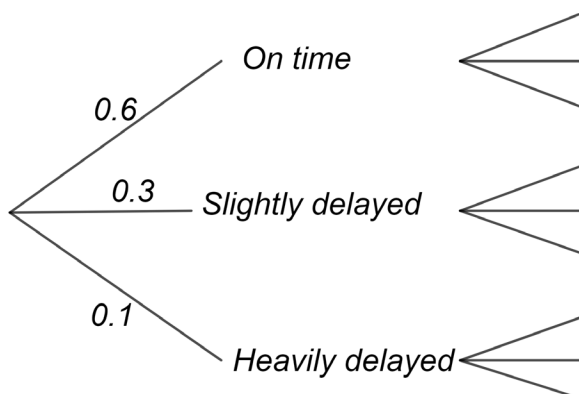
Question 21 (6 marks)

Ethan takes the train to school on both Monday and Tuesday. Each day, the train can arrive in one of three ways:

- On time with a probability of 0.6
- Slightly delayed with a probability of 0.3
- Heavily delayed with a probability of 0.1

Assume the outcome on each day is not affected by the previous day.

- a) Complete the probability tree diagram to illustrate all possible outcomes over the two days. 3
- Using your diagram or otherwise, calculate the probability that the train is on time for one day and slightly delayed on the other day, in either order.



.....

.....

.....

- b) Ethan claims that the probability of the train being heavily delayed on both days is 0.2. Use an appropriate mathematical calculation to evaluate his claim and explain whether it is correct. 2

.....

.....

.....

- c) Calculate the probability that the train is not heavily delayed on either day. 1

.....

.....

Question 22 (2 marks)

Nitin has a regular workweek of 40 hours and earns \$48 per hour. He is paid double time for any overtime hours. One week, he worked overtime and received a total pay of \$3072. How many overtime hours did Nitin work that week?

2

.....

.....

.....

.....

.....

.....

.....

Question 23 (3 marks)

Electricity is charged at 29.85 cents per kWh. A household uses the following appliances:

3

- A 2.2 kW dryer for 1.5 hours, three times in one week
- A 900 W fridge running 24 hours a day

Calculate the total electricity cost to run both appliances for a full 7-day week.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Question 24 (4 marks)

The table below shows the number of standard drinks in various types of alcoholic beverages:

Drink Type	Small Glass	Large Glass
White Wine	0.9	1.4
Red Wine	1.0	1.5

Clara, who weighs 64 kg, consumed two large glasses of white wine and one small glass of red wine over a period of time.

At 10:00 pm, her blood alcohol content (BAC) was measured at 0.045.

The formula below can be used to estimate the BAC (Blood Alcohol Content) for females:

$$BAC_{female} = \frac{10N - 7.5H}{5.5M}$$

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

- a) Calculate how many standard drinks Clara consumed. 1

.....
.....

- b) Determine how many hours prior to 10:00 pm she began drinking? 2

.....
.....
.....
.....
.....
.....

- c) What time did Clara start drinking if she finished drinking at 8:30 pm. 1

.....
.....

Question 25 (4 marks)

Emma deposits \$30000 into a new savings account. Each month she contributes an additional \$600 to the account before interest is applied. The account earns 0.7% interest per month, applied to the new total after the deposit. The amount in the account after the n^{th} deposit can be determined using the recurrence relation

$$A_n = (A_{n-1} + 600) \times 1.007$$

where $n = 1, 2, 3, 4, \dots$ and $A_0 = 30000$

- a) Calculate the amount of money in the account after the third month. 2

.....

.....

.....

.....

.....

.....

.....

- b) Calculate the interest earned in the first three months. 2

.....

.....

.....

.....

.....

.....

.....

Question 26 (3 marks)

A table of future value interest factors for an annuity of \$1 is shown below.

Period	Interest rate per period				
	2.5%	3%	3.5%	4%	4.5%
1	1.0000	1.0000	1.0000	1.0000	1.0000
2	2.0250	2.0300	2.0350	2.0400	2.0450
3	3.0756	3.0909	3.1062	3.1216	3.1370
4	4.1525	4.1836	4.2149	4.2465	4.2782
5	5.2563	5.3091	5.3625	5.4163	5.4707
6	6.3877	6.4684	6.5502	6.6330	6.7169

- a) Danny is saving for a holiday by contributing \$600 every six months into an annuity that pays interest at the rate of 8% p.a., compounded every six months. Use the table above to determine how much she will have in 2 years' time.

1

.....

.....

.....

- b) James is saving for the same trip but needs \$5000 in total. How much more than Danny does he need to contribute every six months, using the same interest rate, if he wishes to have enough money in 2 years' time?

2

.....

.....

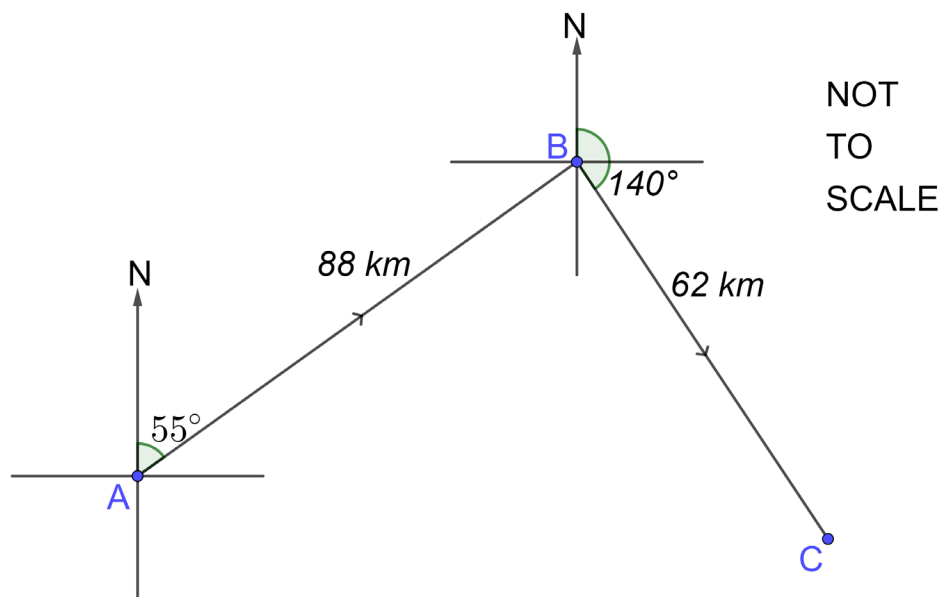
.....

.....

.....

Question 27 (6 marks)

A coastal ferry departs from Dock A near Newcastle at 6:00 AM and travels 88 km on a bearing of 055° to reach Buoy B, a navigational marker at sea. At Buoy B, the ferry changes direction and travels 62 km on a bearing of 140° to reach Harbour C, located near a regional tourist inlet. The Maritime Authority is reviewing this route for efficiency and safety. The diagram provided (not to scale) shows the ferry's journey.



- a) Show that the size of $\angle ABC = 95^\circ$.

1

.....

.....

- b) Using the cosine rule, find the distance from Dock A to Harbour C. Give your answer correct to the nearest whole number.

2

.....

.....

.....

.....

.....

Question 27 continued

- c) Using the sine rule, calculate $\angle CAB$ to the nearest degree.

2

.....

.....

.....

.....

.....

- d) What is the bearing of Harbour C from Dock A to the nearest degree?

1

.....

.....

.....

Question 28 (3 marks)

The daily water consumption (in litres) per household in a suburb is normally distributed with a mean of 900 L and a standard deviation of 100 L. The local council offers rebates to households that consume between 600 L and 1100 L per day. If there are 8000 households in the suburb, approximately how many are expected to qualify for the rebate?

3

.....

.....

.....

.....

.....

.....

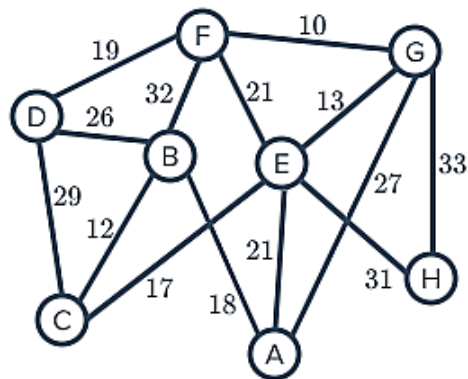
.....

.....

.....

Question 29 (5 marks)

A theme park is planning to install an emergency communication system. Each emergency station needs to be connected with cables. The network diagram shows all the possible cable connections and their respective lengths. Due to budget constraints, Project Manager Lee must ensure that the total length of cable used is minimised.



- a) Draw a minimum spanning tree and find the length of the cable required. 3

.....

.....

- b) Due to environmental restrictions, the cable connection between stations F and G cannot be used. Lee informs his team that this change will reduce the total cabling required by only 10 units. Is he correct? Justify your answer with mathematical calculations. 2

.....

.....

.....

Question 30 (5 marks)

A water tank is being filled by a continuous flow. At the start, the tank contains 50 litres, and after 1 hour, it contains 60 litres.

- a) What is the percentage increase in the amount of water in the tank after one hour? **1**

.....

.....

- b) The volume of water in the tank continues to increase according to the formula:

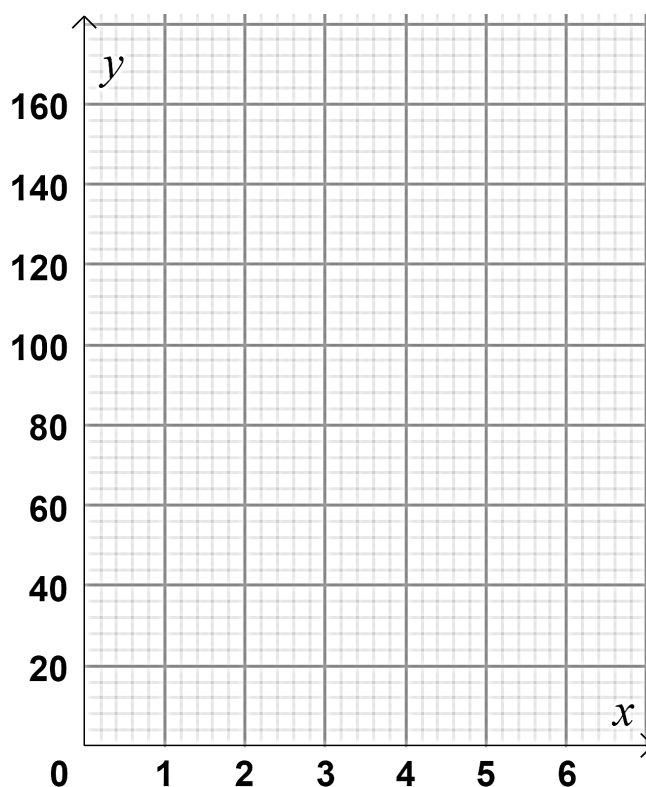
$$V = 50(1.2)^t$$

where V is the volume in litres and t is the time in hours.

- i. What is the initial volume of water in the tank? **1**

.....

- ii. On the axes below, draw the graph of the volume against time, showing the points at $t = 0$ to $t = 4$ **2**



- iii. Using your graph or otherwise, estimate how long it will take for the tank to contain 150 litres. **1**

.....

.....

Question 31 (4 marks)

The table below shows the income tax rates for the financial year 2024-2025

2024–25 Tax Rates for Australian Residents

Taxable Income	Tax Rate
\$0 – \$18,200	0% (Tax-free threshold)
\$18,201 – \$45,000	16% on each dollar over \$18,200
\$45,001 – \$135,000	\$4,288 + 30% on each dollar over \$45,000
\$135,001 – \$190,000	\$31,288 + 37% on each dollar over \$135,000
\$190,001 and over	\$51,638 + 45% on each dollar over \$190,000

Lucas earned a taxable income of \$165000 during the financial year. His total tax liability includes the Medicare levy. Over the course of the year, he paid \$2800 per month in Pay As You Go (PAYG) instalments. Determine whether Lucas is entitled to a tax refund or if he is required to pay additional tax. Calculate the amount of the refund or the amount owing.

4

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Question 32 (6 marks)

Darryl and Anna are considering taking out a home loan of \$400000. The interest rate is 7.5% *p. a.* The length of the loan is 25 years. The table below shows the repayment per \$1000 on a monthly reducible loan.

Term in Years	7%	7.25%	7.5%	7.75%	8%
5	19.8012	19.9194	20.0379	20.1570	20.2765
10	11.6108	11.7401	11.8702	12.0011	12.1328
15	8.9883	9.1286	9.2701	9.4128	9.5566
20	7.7530	7.9036	8.0559	8.2095	8.3644
25	7.0678	7.2281	7.3899	7.5533	7.7182
30	6.6530	6.8218	6.9921	7.1641	7.3377

- a) Find the monthly repayment. 2

.....

.....

.....

- b) Find the total amount to be repaid. 1

.....

- c) Find the interest paid on the loan. 1

.....

- d) Both Darryl and Anna agree that they will take out the loan if repayments are no more than 25% of their gross salary. Their combined gross salary is \$210000. Should they take out the loan? Justify your answer using mathematical calculations. 2

.....

.....

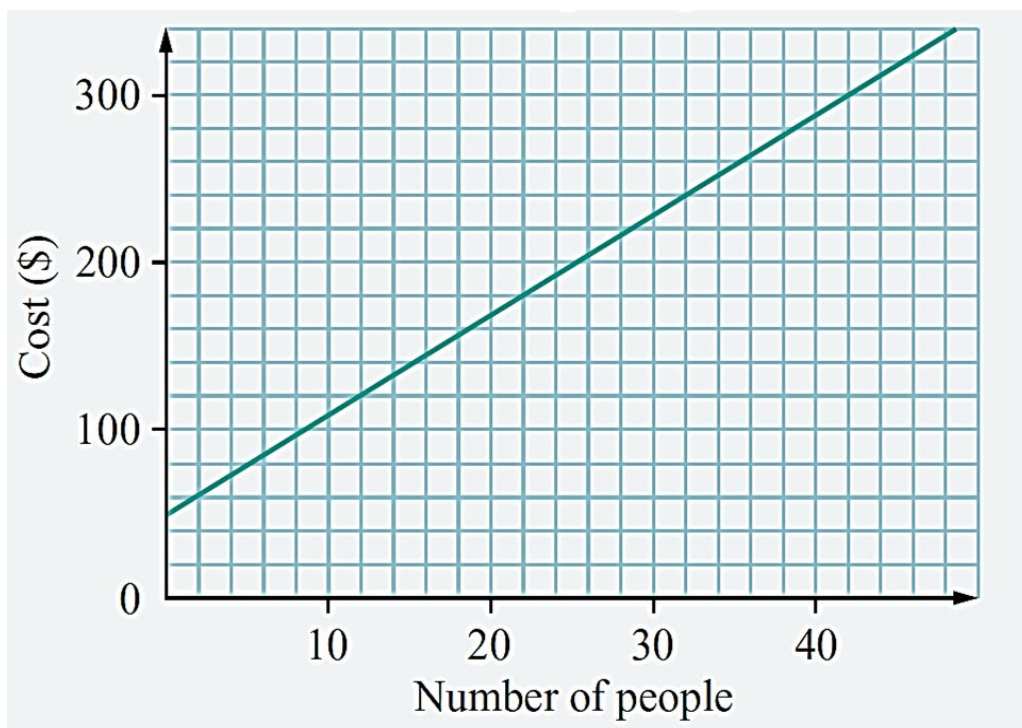
.....

.....

Question 33 (5 marks)

Two companies offer guided day tours for private groups.

- Coastline Tours charges a fixed setup fee plus a cost per person. The total cost $\$C$ depends on the number of people n and is shown on the graph.
- Explore Away charges $\$8$ per person with no setup fee, represented by the formula: $C = 8n$



- a) Find the gradient and the y-intercept of the Coastline Tours.

2

.....

.....

- b) On the graph given above, draw the line representing Explore Away's cost model.

1

.....

- c) Determine the number of people for which Coastline Tours and Explore Away charge the same total amount. Hence, state the corresponding cost.

2

.....

.....

Question 34 (4 marks)

Emily intends to purchase a new hybrid vehicle priced at \$38000. She pays a 25% deposit and finances the remaining balance through a reducing balance loan over a period of 4 years. As part of a special promotional offer, no repayments are required for the first 2 months. From the 3rd month onwards, Emily will make equal monthly repayments until the end of the loan term. The lender charges 9% per annum, compounded monthly.

Use the Table of Present Value Interest Factors, to answer the following:

Table of Present Value Interest Factors						
r	0.0060	0.0065	0.0070	0.0075	0.0080	0.0085
N						
45	39.33406	38.90738	38.48712	38.07318	37.66545	37.26383
46	40.09350	39.64965	39.21263	38.78231	38.35859	37.94133
47	40.84841	40.38714	39.93310	39.48617	39.04622	38.61311
48	41.59882	41.11986	40.64856	40.18478	39.72839	39.27924
49	42.34475	41.84785	41.35905	40.87820	40.40515	39.93975
50	43.08623	42.57113	42.06459	41.56645	41.07653	40.59470

- a) Calculate the amount that Emily needs to finance after paying the deposit. **1**

.....
.....

- b) Calculate the monthly repayment. Round your answer to the nearest dollar. **2**

.....
.....
.....

- c) Calculate the total interest Emily will pay over the life of the loan. **1**

.....
.....

Question 35 (4 marks)

A 6 L container contains a mixture of juice and water in the ratio 2:4. After removing 2 L of the mixture, more water is added to refill the container. What is the final ratio of juice to water in the mixture?

4

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Question 36 (5 marks)

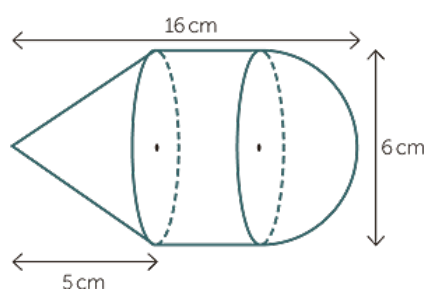
A company designs a small decorative rocket to be used as a garden ornament. The rocket is made by combining three parts:

- A cone-shaped nose,
- A cylindrical body, and
- A hemispherical base.

The dimensions are:

- The cylindrical body has a diameter of 6 cm.
- The cone has the same base diameter as the cylinder
- The hemispherical base also has a diameter of 6 cm.

The company needs to paint the entire outer surface of the rocket (excluding the areas where the parts are joined).



- a) Calculate the total surface area to be painted, correct to two decimal places.

3

.....

.....

.....

.....

.....

.....

.....

.....

- b) If 1 litre of paint covers 2 m^2 , determine how many millilitres of paint are needed to paint one rocket. (Give your answer correct to the nearest millilitre.)

2

.....

.....

.....

Question 37 (3 marks)

The delivery times (in hours) for packages sent by an online store are normally distributed with a mean of 48 and a standard deviation of 6 hours. The table below gives the cumulative probability that a standard normal variable is less than a given z-score.

Z	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3
P	0.7257	0.7580	0.7881	0.8159	0.8413	0.8643	0.8849	0.9032

- a) Explain why the percentage of deliveries between 42 hours and 54 hours is double the percentage of deliveries between 48 hours and 54 hours. **1**

.....

.....

.....

.....

- b) Using the values in the tables, estimate the delivery time a customer could expect to fall within the fastest 15% of deliveries. **2**

.....

.....

.....

.....

.....

.....

.....

END OF PAPER

2025 Mathematics Standard 2 Trial Solutions

Multiple Choice

1) C

$$\frac{105}{60} = 1.75 = 1 \text{ hr } 45 \text{ min}$$

2) C

3) A

$$2q = mp + n$$

$$\frac{2q - n}{m} = p$$

4) B

5) D

$$800 + \frac{800 \times 18 \times 3\%}{12} = 838$$

6) B

$$900 \div 8 \div 10 = 11.25 \text{ mL}$$

7) C

$$S = V_0 - Dn$$

$$7500 = V_0 - 2300 \times 5$$

$$7500 + 2300 \times 5 = \$19000$$

8) D

9) C

$$y = -4 + 3x$$

$$y = -4 + 3(x+4)$$

$$= -4 + 3x + 12$$

10) B

$$t \propto \frac{1}{n}$$

$$t = \frac{96}{n}$$

$$12 = \frac{k}{8}$$

$$k = 96$$

$$= \frac{96}{7}$$

$$= 13.71$$

11) C

$$18250 \div 1.1 = 16590.909$$

12) C

$$\tan 30^\circ = \frac{11}{x}$$

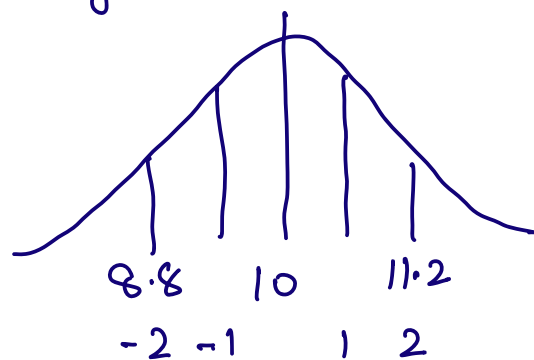
$$x = 19.05$$

13) B

positively skewed

14) A

$$\frac{1.2}{2} = 0.6$$



15) D

$$\text{Area} = \frac{20}{2} (23+15) + \frac{20}{2} (15+19) \\ = 720 \text{m}^2$$

$$\begin{aligned} 16) \quad A &= 500 \left(1 + \frac{4\%}{4}\right)^{2 \times 4} \\ &= 500 \left(1 + 1\%\right)^8 \\ &= 541.428 \end{aligned}$$

1 mark - correct application
of compounded quarterly
to rate and time period

2 mark - correct answer

$$\begin{aligned} 17) \quad \text{Daily interest rate} &= \frac{20.5\%}{365} \\ &= 0.0005616 \end{aligned}$$

1 mark
- correct daily
interest rate or
number of days

$$\text{Days} = 17 + 6 = 23$$

$$A = 2150 (1 + 0.0005616)^{23} = 2188.976$$

2 mark
- correct solution

$$I = 38.976 = \$ 38.98$$

18) Brisbane
9:45 pm + 9 hrs 50 min

1 mark -
Some progress

7:35 am (Tuesday)

Seoul 7:35 - 1 hr = 6:35 am

2 mark -
Correct solution

$$19 a) \text{Area}_{\text{bathroom}} = 1.9 \times 1.2$$

$$\text{Area}_{\text{bedroom A}} = 1.9 \times 1.7$$

$$\text{Hallway} = 1.7 \times 1$$

$$\text{Kitchen} = 3.2 \times 1.2$$

$$\text{Total area} = 11.05 \text{ m}^2 \quad \text{--- 1 mark}$$

$$\text{Rent} = 200 \times 11.05 = \$2210 \quad \text{--- 1 mark}$$

$$b) \text{ No of tiles} = \frac{3.2 \times 1.2}{0.2 \times 0.2} = \frac{3.84}{0.2 \times 0.2}$$

$$= 96 \div 15$$

$$= 6.4$$

7 boxes required

$$\text{Cost} = \$700$$

$$20 a) -0.4685 \quad \text{--- 1 mark}$$

$$= -0.47 \quad \text{--- 1 mark}$$

$$b) y = -0.3x + 3.7$$

Screen time 0 hrs has Study time
3.7 hrs

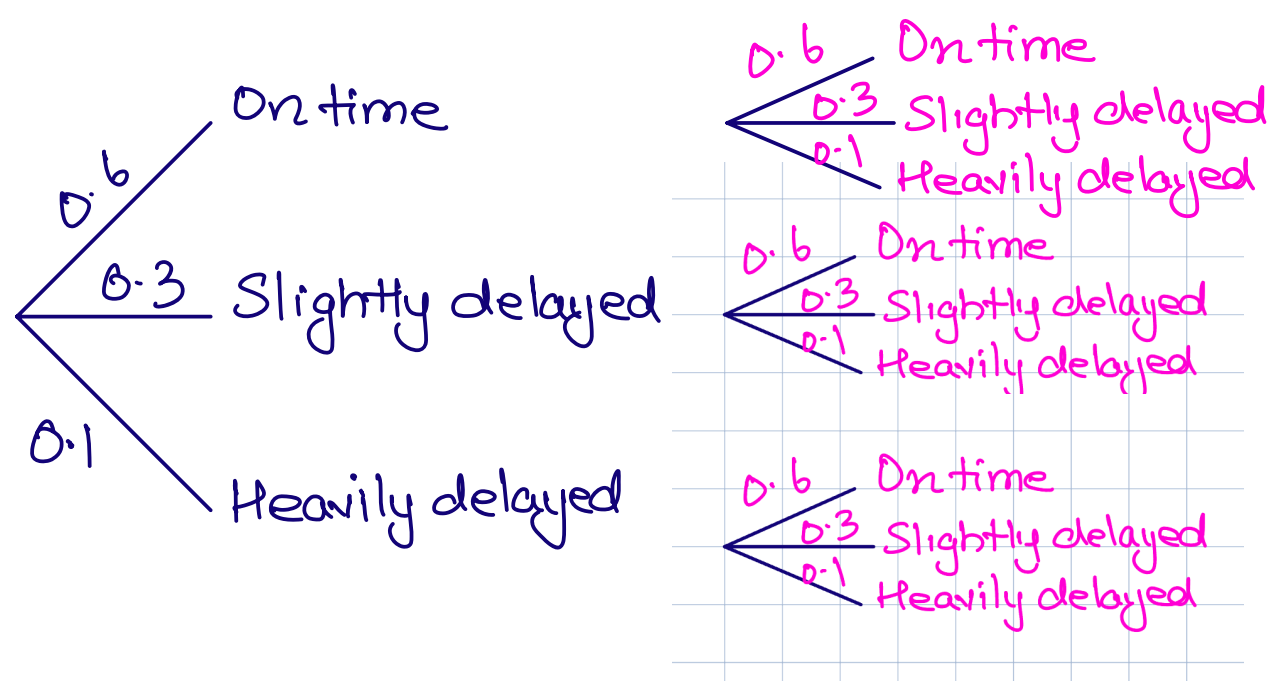
Increase in screen time correlates to
decrease in study time

1 mark -
any one
piece correct

2 mark -
all correct

21)

a)



1 mark
Some progress
in completion
of tree diagram

2 mark
all correct

$$P(\text{on time, slightly delayed}) = 0.6 \times 0.3 + 0.3 \times 0.6 \\ = 0.36 \quad \text{— 1 mark}$$

$$b) P(\text{heavily delayed, heavily delayed}) = 0.1 \times 0.1 \\ = 0.01 \quad \text{— 1 mark}$$

Ethan is incorrect as $0.1 \times 0.1 = 0.01$ and not
0.2 — 1 mark

$$c) P(\text{not heavily delayed on either day}) = 1 - 0.01 \\ = 0.99 \quad \text{— 1 mark}$$

22) Total pay = 3072

$$3072 = 40 \times 48 + x \times 2 \times 48$$

1 mark - correct
normal pay

$$3072 = 1920 + 96x$$

$$\frac{3072 - 1920}{96} = x$$

$$\frac{1152}{96} = x$$

2 mark - correct
solution

$$12 = x$$

23) Dryer

$$\text{Energy cost} = 2.2 \times 1.5 = 3.3 \text{ KWh/day}$$

$$3 \text{ days} = 3 \times 3.3 = 9.9 \text{ KWh}$$

$$\text{Cost} = 9.9 \times 0.2985 = \$2.95515$$

1 mark -
correct
cost for
either
dryer or
fridge

Fridge

$$\text{Energy cost} = 0.9 \text{ KW} \times 24 \times 7 = 151.2 \text{ KWh}$$

$$\text{Cost} = 151.2 \times 0.2985 = \$45.13$$

2 mark
correct
conversion
W → KW

$$\text{Total cost} = 2.95515 + 45.13 = \$48.09$$

3 mark
all correct

24) a) $2 \times 1.4 + 1.0 = 3.8$ — 1 mark

b) $0.045 = \frac{10(3.8) - 7.5H}{5.5 \times 64}$

$$\frac{0.045 \times 5.5 \times 64 - 38}{-7.5} = H$$

$$2.9547 = H \quad (2 \text{ hrs } 57 \text{ min})$$

1 mark - correct substitution and some progress

c) $8.30 - 2 \text{ hr } 57 \text{ min} = 5.33 \text{ pm}$

25 a)

$$A_1 = (30000 + 600) \times 1.007 = 30814.20$$

$$A_2 = (30814.20 + 600) \times 1.007 = 31634.09$$

$$A_3 = (31634.09 + 600) \times 1.007 = 32460.74$$

1 mark -
Amount correct for any one month
2 mark
correct solution

b) $I_1 = 30814.20 - (30000 + 600) = 214.20$

$$I_2 = 31634.09 - (30814.20 + 600) = 219.89$$

$$I_3 = 32460.74 - (31634.09 + 600) = 226.85$$

1 mark
Interest correct for any one month
2 mark
correct solution

$$26) a) \quad 8\% \div 2 = 4\% \\ 2 \times 2 = 4$$

$$600 \times 4.2$$

— 1 mark

$$b) \quad 5000$$

.44 — 1 mark

$$1177.44 - 600 = 5577.44 \quad \text{— 1 mark}$$

$$27a) \quad \angle ABC = 140 - 55 = 95^\circ$$

$$b) \quad AC^2 = 88^2 + 62^2 - 2(88)(62)\cos 95^\circ \quad \text{1 mark}$$

$$AC = \sqrt{12539.043}$$

$$= 111.97$$

$$= 112 \text{ km} \quad \text{1 mark}$$

$$c) \quad \frac{\sin \angle CAB}{62} = \frac{\sin 95^\circ}{111.97} \quad \text{— 1 mark}$$

$$= 33^\circ 28' 39.79''$$

$$= 33^\circ \quad \text{— 1 mark}$$

$$d) \quad 55 + 33 = 88^\circ$$

28) - 3 SD below mean

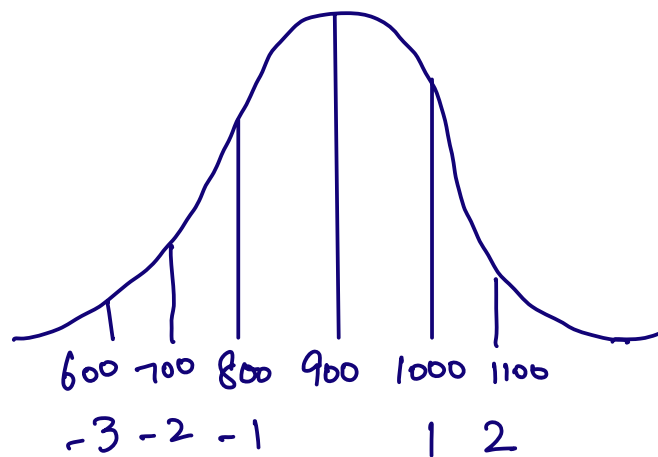
$$\frac{99.7\%}{2} = 49.85\%$$

2 SD above

$$\frac{95}{2} = 47.5$$

$$49.85 + 47.5 = 97.35\%$$

$$8000 \times 97.35\% = 7788$$



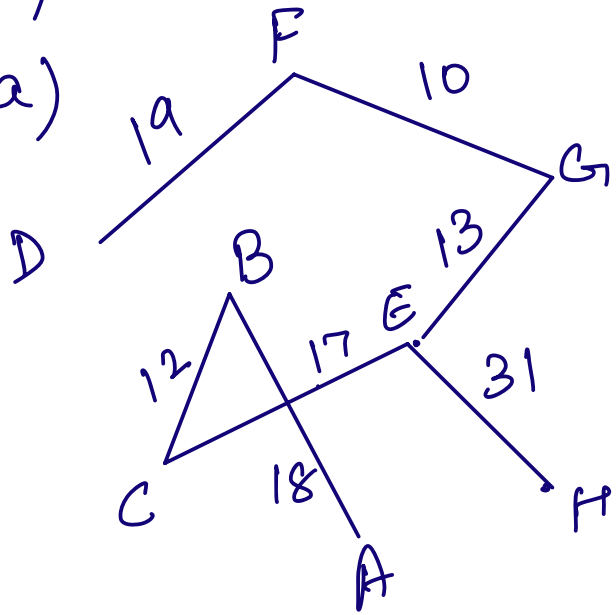
1 mark -
arrives at either 49.85%
or 47.5%.

2 mark - further
progress

3 mark - correct solution

29)

a)



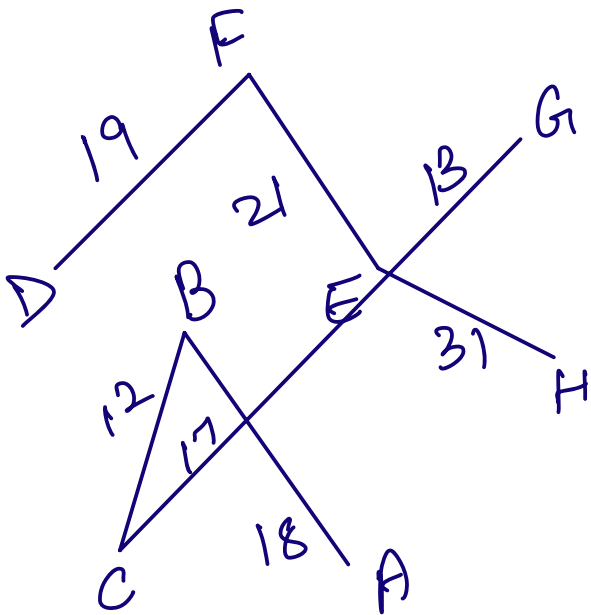
1 mark - At least 4 correct edges

2 mark - correct spanning tree

Length = 120

1 mark

b)



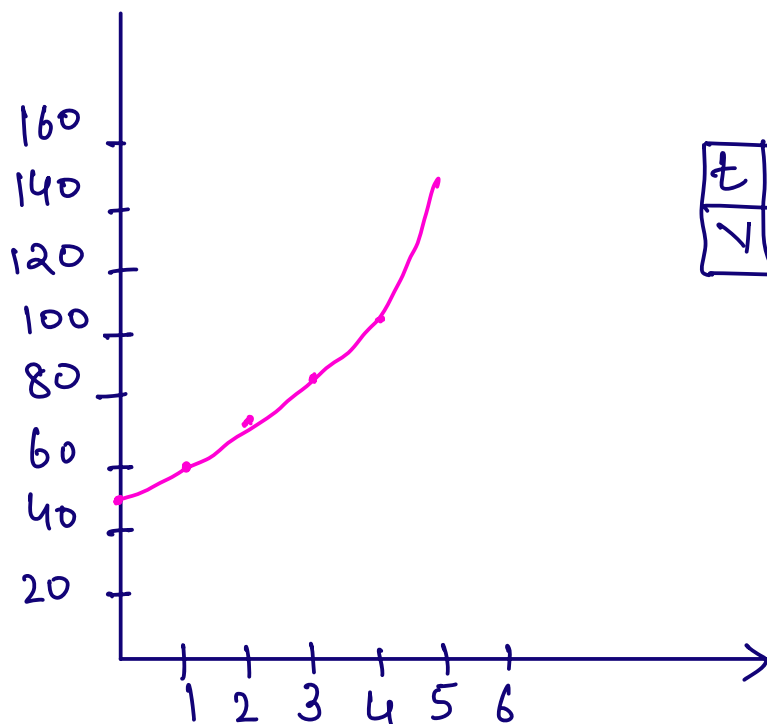
Length = 131 — (1)

Lee is incorrect as total cable required increased by 11 units — (1)

30) a) $\frac{60-50}{50} = 20\%$ — 1 mark

b) i) $V=50$ — 1 mark

ii)



t	0	1	2	3	4
V	50	60	72	86.4	103.68

$$iii) 150 = 50(1.2)^t$$

$$3 = 1.2^t$$

$$\therefore t \leq 6$$

$$31) 31,288 + 37\% (165000 - 135000)$$

$$= \$42388 \quad \text{--- 1 mark}$$

$$\text{Medicare levy} = 2\% \times 165000 \\ = 3300$$

$$\text{Total tax payable} = 42388 + 3300 \\ = \$45688 \quad \text{--- 1 mark}$$

$$2800 \times 12 = 33600 \quad \text{--- 1 mark}$$

$$\text{Additional tax} = 45688 - 33600 \\ = \$12088 \quad \text{--- 1 mark}$$

$$32 a) 400 \times 7.3899 = 2955.96$$

1 mark - reads
correct value from
table

2 mark -
correct solution

$$b) 2955.96 \times 25 \times 12 = 886788 \quad \text{--- 1 mark}$$

$$c) I = 886788 - 400000 = 486788 \quad \text{--- 1 mark}$$

$$d) 210000 \div 12 = 17500$$

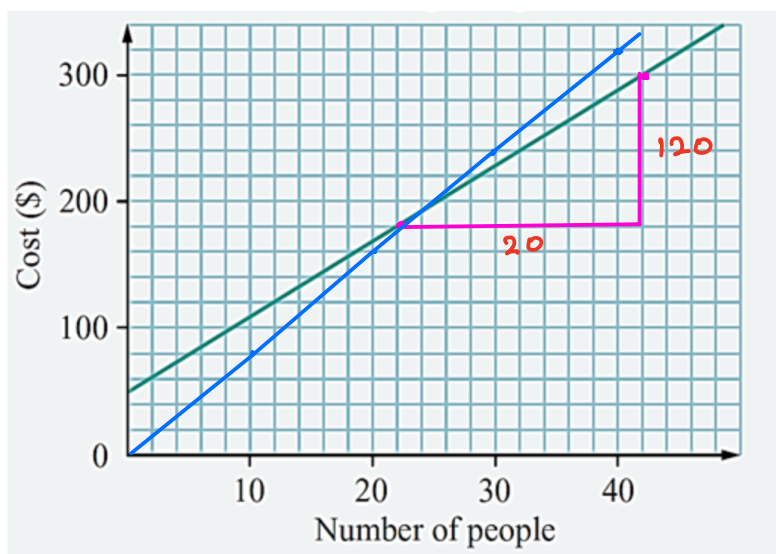
$$25\% \times 17500 = 4375$$

1 mark - some
progress

2 mark - correct
solution

Darryl and Anna take out the loan as their
repayment is less than \$4375

33)



a)

$$m = \frac{120}{20} = 6 \quad - 1 \text{ mark}$$

$$y\text{-intercept} = 50 \quad - 1 \text{ mark}$$

c) $6n + 50 = 8n$

$$50 = 2n$$

$$25 = n$$

$$(25, 200)$$

34) a) $25\% \text{ of } 38000 = \$9500$

$$38000 - 9500 = \$28500 \quad - 1 \text{ mark}$$

b) $\frac{9.1}{12} \approx 0.0075 \quad - 1 \text{ mark}$

$$\frac{28500}{38.7823} = \$734.87 \approx \$735 \quad - 1 \text{ mark}$$

c) $735 \times 46 = \$33804.07201$

$$33804.07201 - 28500 = \$5304.07 \quad - 1 \text{ mark}$$

35) Total parts = 6

Original mixture

$$\text{juice} = \frac{2}{6} \times 6 = 2\text{L}$$

$$\text{water} = \frac{4}{6} \times 6 = 4\text{L}$$

1 mark - calculates correct quantity of juice and water in original mixture

Composition of juice and water in 2L mixture

$$\text{juice} = \frac{2}{6} \times 2 = \frac{2}{3}$$

$$\text{water} = \frac{4}{6} \times 2 = \frac{4}{3}$$

2 mark - calculates correct quantity of juice and water in 2L mixture

Remaining juice in the container $= 2 - \frac{2}{3} = \frac{4}{3}\text{L}$

Remaining water in the container $= 4 - \frac{4}{3} = \frac{8}{3}\text{L}$

3 mark - calculates correct quantity of juice and water remaining

2 L water added to refill
the container

4 mark - correct
solution

New amount of water

$$\frac{8}{3} + 2 = \frac{14}{3} \text{ L}$$

Ratio of juice to water

$$\frac{\frac{4}{3}}{\frac{14}{3}} = \frac{2}{7} = 2:7$$

3b) a) Curved S.A hemisphere $= 2\pi r^2$
 $= 2 \times \pi \times 3^2 = 18\pi$

1 mark -
correct SA
of hemisphere
or
cylinder

Curved SA cylinder $= 2\pi r h$
 $= 2 \times \pi \times 3 \times 8 = 48\pi$

$$l = \sqrt{3^2 + 5^2} = 5.83$$

2 mark -
correct slant
height

Curved SA cone $= \pi r l$
 $= \pi \times 3 \times 5.83$
 $= 17.49\pi$

3 mark -
correct
solution

Total area $= 17.49\pi + 48\pi + 18\pi$
 $= 262.29 \text{ cm}^2$

b) $1 \text{ m}^2 = 10000 \text{ cm}^2$

$$\frac{262.29}{20000} = 0.0131145 \text{ litres}$$

↓ mL

$$= 13.11 \text{ mL}$$
$$= 13 \text{ mL}$$

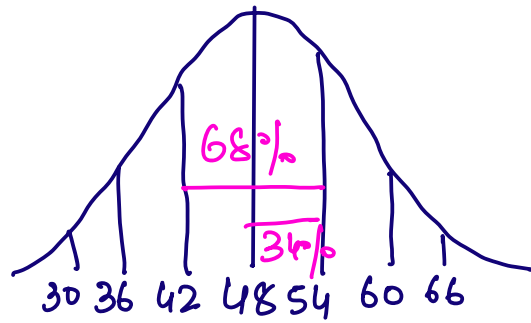
1 mark - some
progress

2 mark - correct
solution

37) a) Between 42 and 54
68%

Between 48 and 54
34%

as symmetrical about
the mean



b) $100\% - 15\% = 85\%$

$$1 - 0.8643 = 0.1357 \\ = 13.57\%$$

$$1.1 = \frac{x - 48}{6}$$

$$x = 54.6$$

Delivery time = 54.6 hrs

1 mark - some
progress

2 mark - correct
solution