

## INTUITION EDUCATION

HSC 2026 · PREDICTED PRACTICE PAPER

# 2026 HSC Mathematics Standard 2

*Original practice material — not a NESA paper***Total marks: 100****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

**Section I — 15 marks (Questions 1–15)**

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

**Section II — 85 marks (Questions 16–40)**

Attempt Questions 16–40. Allow about 2 hours and 5 minutes for this section.

**HOW THIS PAPER WAS BUILT**

This full-length practice paper was synthesised from a six-model AI consensus (Fable, Opus, GPT-5.6 Sol, Gemini 3.1 Pro, Grok, DeepSeek) over 165 question-level predictions for the 2026 HSC Mathematics Standard 2 examination. Every consensus cluster with agreement probability  $\geq 0.55$  is realised as a question below (all fourteen clusters qualified), with the remaining marks drawn from the panel's watch list; all questions are original Intuition Education compositions in NESA style — no question is reproduced from a past HSC paper. A prediction provenance table follows the marking notes.

**Answers and marking notes are published as a separate PDF** — sit the paper first, then download the solutions from [intuitioneducation.com.au/hsc-2026/maths-standard-2](https://intuitioneducation.com.au/hsc-2026/maths-standard-2).

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## Section I

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

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

### Question 1

Muesli is sold in four packet sizes.

| Packet | 500 g  | 750 g  | 1 kg   | 1.25 kg |
|--------|--------|--------|--------|---------|
| Price  | \$2.60 | \$3.60 | \$5.10 | \$6.25  |

Which packet is the best buy?

- A. The 500 g packet
- B. The 750 g packet
- C. The 1 kg packet
- D. The 1.25 kg packet

### Question 2

A network has 5 vertices. Every pair of vertices is joined by exactly one edge.

How many edges does the network have?

- A. 5
- B. 20
- C. 25
- D. 10

### Question 3

Given the formula  $a = \frac{2b - c}{5}$ , which of the following makes  $b$  the subject?

- A.  $b = \frac{5a + c}{2}$
- B.  $b = \frac{5a - c}{2}$
- C.  $b = 5a + \frac{c}{2}$
- D.  $b = \frac{a + c}{5}$

**Question 4**

What is the compass bearing  $S48^\circ W$  as a three-figure true bearing?

- A.  $132^\circ$
- B.  $138^\circ$
- C.  $228^\circ$
- D.  $312^\circ$

**Question 5**

A biased spinner landed on red 36 times in 120 spins.

Using this relative frequency, how many times would the spinner be expected to land on red in 300 spins?

- A. 36
- B. 75
- C. 90
- D. 108

**Question 6**

The time  $t$  taken to travel a fixed distance varies inversely with the average speed  $v$ .

Which graph best represents  $t$  as a function of  $v$ ?

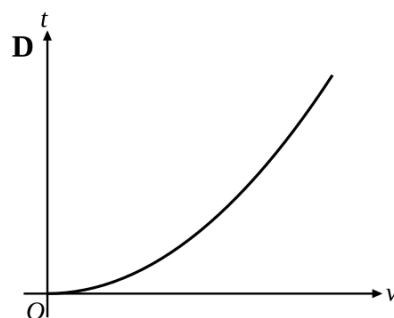
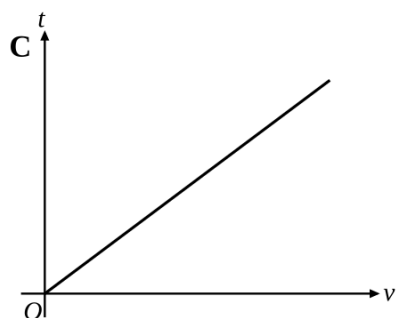
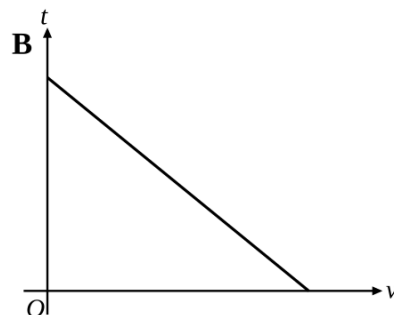
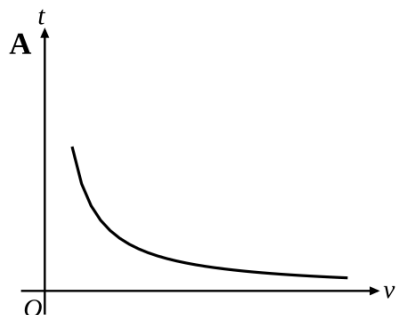


DIAGRAM PROVIDED IN THE EXAM

- A. Graph A
- B. Graph B
- C. Graph C
- D. Graph D

**Question 7**

\$8000 is invested for 4 years at 6% per annum, compounding monthly.

Which expression gives the value of the investment at the end of 4 years?

- A.  $8000(1.06)^4$
- B.  $8000(1.06)^{48}$
- C.  $8000(1.005)^4$
- D.  $8000(1.005)^{48}$

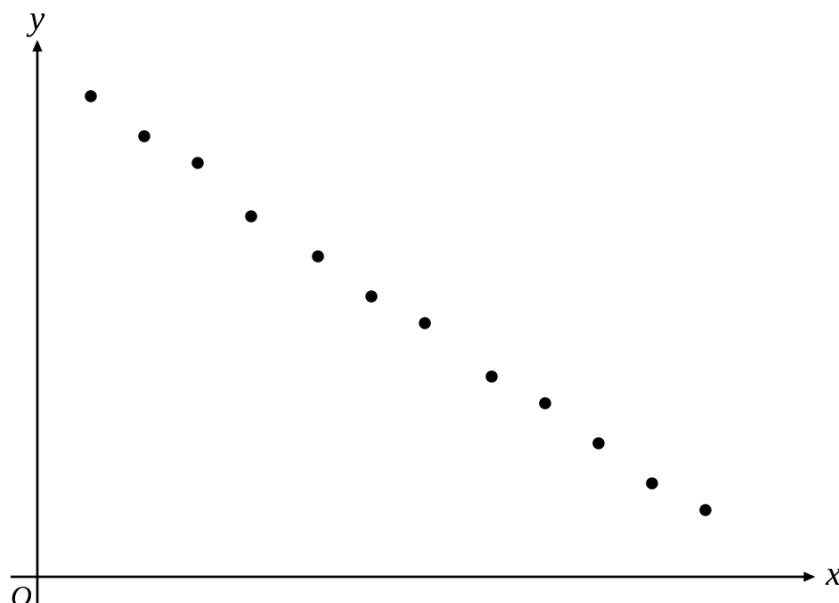
**Question 8**

DIAGRAM PROVIDED IN THE EXAM

Which of the following is the most likely value of Pearson's correlation coefficient for this data set?

- A. 0.85
- B.  $-0.85$
- C.  $-0.30$
- D.  $-1.00$

**Question 9**

The heights of a large group of plants are normally distributed.

What percentage of the plants have a height with a  $z$ -score less than 1?

- A. 34%
- B. 50%
- C. 68%
- D. 84%

**Question 10**

The length of a bolt is measured as 6.4 cm, correct to the nearest millimetre.

What is the percentage error in this measurement, correct to two decimal places?

- A. 0.05%
- B. 0.78%
- C. 1.56%
- D. 7.81%

**Question 11**

Ali sat tests in four subjects. The table shows his mark, the class mean and the class standard deviation for each subject.

| Subject     | Ali's mark | Mean | Standard deviation |
|-------------|------------|------|--------------------|
| English     | 75         | 65   | 8                  |
| Mathematics | 72         | 60   | 10                 |
| Music       | 68         | 60   | 5                  |
| Science     | 80         | 70   | 12                 |

Relative to his class, in which subject did Ali perform best?

- A. English
- B. Mathematics
- C. Music
- D. Science

**Question 12**

In a triangle, the angle  $\theta$  is known to be obtuse and  $\sin \theta = 0.5$ .

What is the value of  $\theta$ ?

- A.  $30^\circ$
- B.  $60^\circ$
- C.  $120^\circ$
- D.  $150^\circ$

**Question 13**

A data set has a Pearson's correlation coefficient of 0.9, with the least-squares regression line drawn.

A new data point is added with a large  $x$ -value, lying well BELOW the regression line.

What is the effect of the new point?

- A. The correlation coefficient and the gradient both increase.
- B. The correlation coefficient increases and the gradient decreases.
- C. The correlation coefficient and the gradient both decrease.
- D. The correlation coefficient decreases and the gradient increases.

**Question 14**

To estimate the number of fish in a dam, 40 fish were caught, tagged and released. Later, a sample of 60 fish was caught, of which 8 were tagged.

What is the estimate of the fish population of the dam?

- A. 108
- B. 192
- C. 300
- D. 480

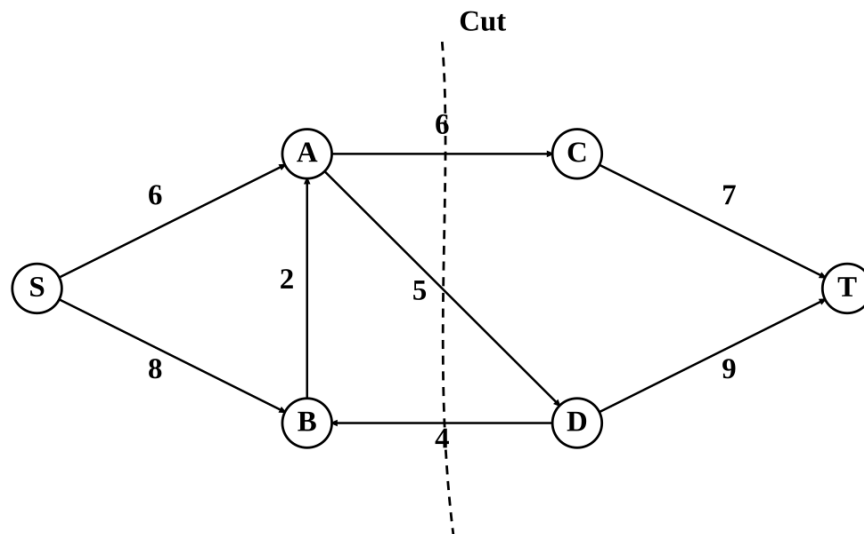
**Question 15**

DIAGRAM PROVIDED IN THE EXAM

What is the capacity of the cut shown?

- A. 11
- B. 7
- C. 15
- D. 5

**Section II**

**85 marks — Attempt Questions 16–40 — Allow about 2 hours and 5 minutes for this section**

Answer the questions in the spaces provided. Your responses should include relevant mathematical reasoning and/or calculations.

**Question 16**

(2 marks)

A supermarket receipt shows a total of \$87.45, which includes \$4.50 of GST. GST of 10% is charged only on the taxable items on the receipt.

Find the total value of the GST-free items on the receipt. **(2 marks)**

**Question 17***(3 marks)*

A heater is rated at 900 W. Electricity costs 32 cents per kilowatt-hour.

- (a) The heater runs for 5 hours per day for 30 days. Calculate the total cost of running the heater. **(2 marks)**
- (b) In another month, the same heater cost \$21.60 to run. For how many hours did it run in that month? **(1 mark)**

**Question 18***(3 marks)*

A bag contains 5 red discs and 3 blue discs. Two discs are drawn at random, without replacement.

- (a) Draw a tree diagram showing the probabilities on each branch. **(1 mark)**
- (b) Find the probability that the two discs are the same colour. **(2 marks)**

**Question 19***(4 marks)*

The table shows the lengths, in kilometres, of the roads directly joining five towns. A dash indicates that there is no direct road.

|          | <i>A</i> | <i>B</i> | <i>C</i> | <i>D</i> | <i>E</i> |
|----------|----------|----------|----------|----------|----------|
| <i>A</i> | –        | 7        | 5        | 9        | –        |
| <i>B</i> | 7        | –        | 6        | –        | 8        |
| <i>C</i> | 5        | 6        | –        | 4        | 10       |
| <i>D</i> | 9        | –        | 4        | –        | 3        |
| <i>E</i> | –        | 8        | 10       | 3        | –        |

- (a) Draw a network to represent the information in the table. **(1 mark)**
- (b) Draw a minimum spanning tree for the network and state its total length. **(2 marks)**
- (c) The road joining *A* and *C* is closed by flooding. State the shortest route from *A* to *E*, listing every town passed through, and its length. **(1 mark)**

**Question 20***(3 marks)*

The time  $t$  hours needed to drain a flooded worksite varies inversely with the number of pumps  $n$  used. With 4 pumps, draining takes 18 hours.

- (a) Find the equation relating  $t$  and  $n$ . **(1 mark)**
- (b) How long would draining take with 6 pumps? **(1 mark)**
- (c) What is the smallest number of pumps needed to drain the site in no more than 8 hours? **(1 mark)**

**Question 21****(3 marks)**

The table shows income tax rates for a financial year.

| Taxable income      | Tax payable                                        |
|---------------------|----------------------------------------------------|
| 0–\$18,200          | Nil                                                |
| \$18,201–\$45,000   | 19 cents for each \$1 over \$18,200                |
| \$45,001–\$120,000  | \$5,092 plus 32.5 cents for each \$1 over \$45,000 |
| \$120,001–\$180,000 | \$29,467 plus 37 cents for each \$1 over \$120,000 |

Jo's taxable income for the year was \$87,500. In addition to income tax, Jo must pay a Medicare levy of 2% of her taxable income.

Calculate the total amount Jo must pay, including the Medicare levy. **(3 marks)**

**Question 22****(3 marks)**

The revenue  $\$R$  from selling tickets to a concert at a price of  $\$p$  per ticket is modelled by

$$R = -5p^2 + 200p, \quad 0 \leq p \leq 40.$$

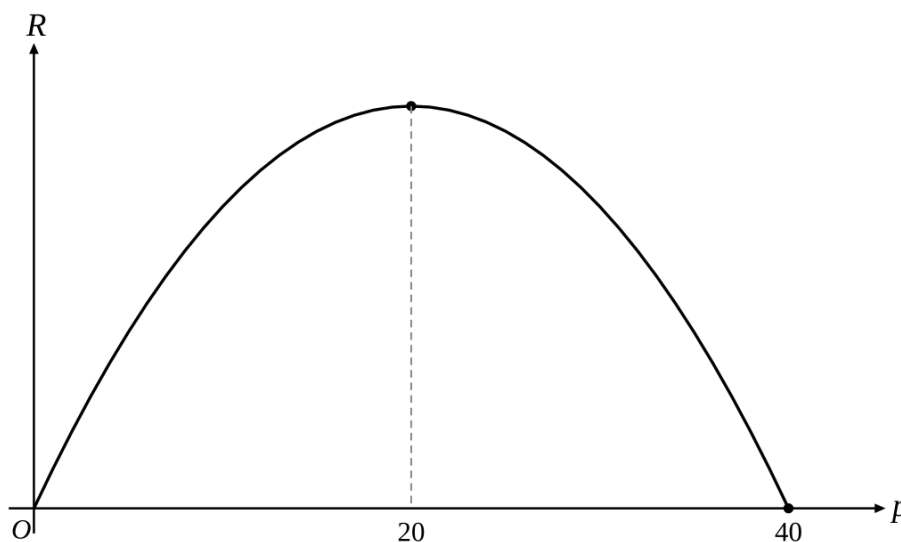


DIAGRAM PROVIDED IN THE EXAM

- (a) Find the ticket price that gives the maximum revenue. **(1 mark)**
- (b) Find the maximum revenue. **(1 mark)**
- (c) Find BOTH ticket prices for which the revenue is \$1500. **(1 mark)**

**Question 23***(3 marks)*

Sydney is in time zone UTC+10 and Los Angeles is in time zone UTC−7.

A flight leaves Sydney at 9:50 am on Tuesday, Sydney time. The flight takes 13 hours and 40 minutes.

Find the local time and day in Los Angeles when the flight arrives. **(3 marks)**

**Question 24***(2 marks)*

Priya's credit card charges interest at 18.25% per annum, compounding daily, with an interest-free period of 55 days.

Priya makes a single purchase of \$840 and pays her account in full 75 days after the purchase, so interest is charged on 20 days.

Calculate the interest charged, correct to the nearest cent. **(2 marks)**

**Question 25****(5 marks)**

The scatterplot shows the number of hours of revision,  $x$ , and the examination mark,  $y$  (out of 100), for a class of students. The least-squares regression line has been drawn.

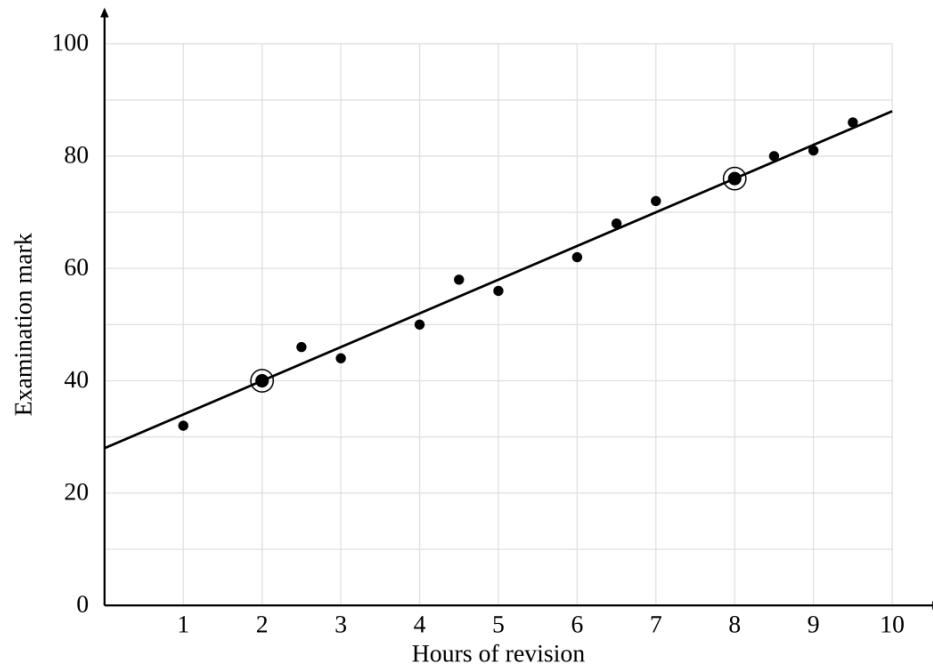
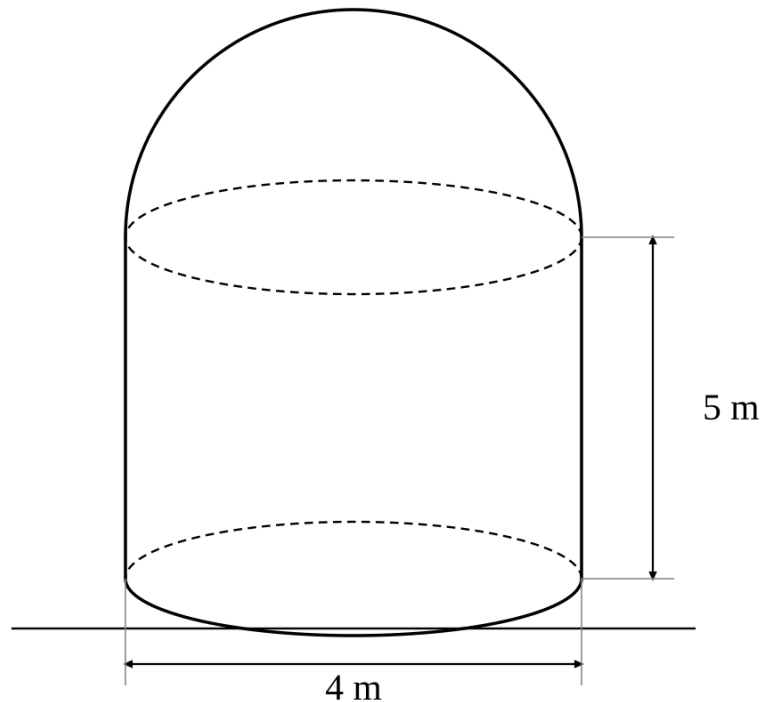


DIAGRAM PROVIDED IN THE EXAM

- (a) Using the two marked points, find the equation of the regression line. **(2 marks)**
- (b) Interpret the gradient of the line in the context of the data. **(1 mark)**
- (c) Use the equation to predict the mark of a student who revised for 5 hours. **(1 mark)**
- (d) Explain why the equation should NOT be used to predict the mark of a student who revised for 20 hours. **(1 mark)**

**Question 26****(4 marks)**

A grain silo is made from a cylinder of diameter 4 m and height 5 m, with a hemisphere of the same diameter on top.



**DIAGRAM PROVIDED IN THE EXAM**

- (a)** Show that the volume of the silo is  $79.6 \text{ m}^3$ , correct to one decimal place. **(3 marks)**
- (b)** Find the capacity of the silo in litres, correct to three significant figures. **(1 mark)**

**Question 27****(3 marks)**

The table shows the future value of an annuity of \$1 per period.

| Periods | 0.5%   | 0.75%  | 3%     |
|---------|--------|--------|--------|
| 8       | 8.141  | 8.213  | 8.892  |
| 12      | 12.336 | 12.508 | 14.192 |
| 16      | 16.614 | 16.932 | 20.157 |
| 24      | 25.432 | 26.188 | 34.426 |

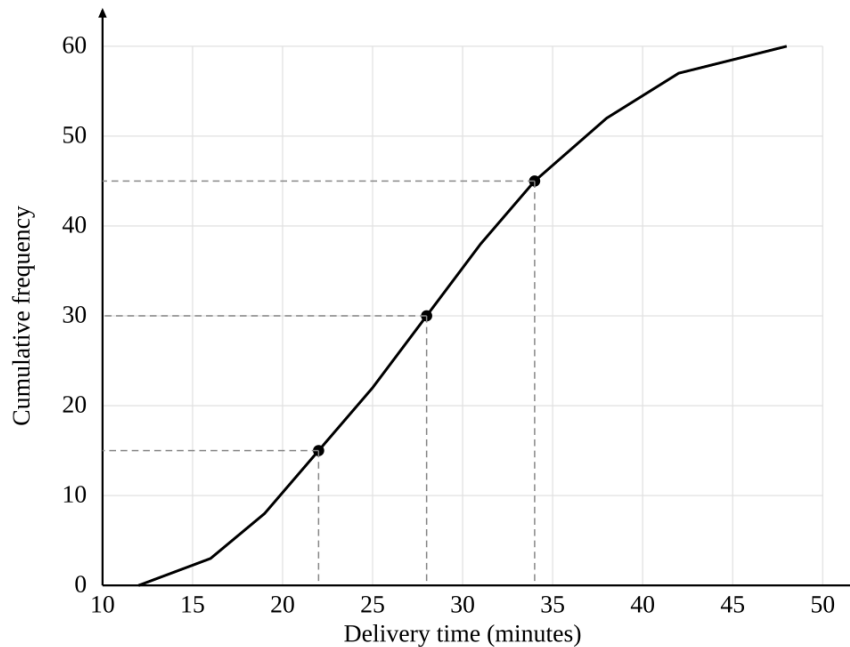
Zoe wants to save \$20,000 in 4 years. She will deposit an equal amount at the end of every quarter into an account earning 3% per annum, compounding quarterly.

**(a)** Use the table to find the amount Zoe must deposit each quarter, correct to the nearest dollar. **(2 marks)**

**(b)** Find the total interest Zoe will earn, correct to the nearest dollar. **(1 mark)**

**Question 28***(3 marks)*

The cumulative frequency graph shows the delivery times, in minutes, of 60 pizza deliveries. The fastest delivery took 12 minutes and the slowest took 48 minutes.

**DIAGRAM PROVIDED IN THE EXAM**

**(a)** Use the graph to find the median and the quartiles of the delivery times. **(2 marks)**

**(b)** Draw a box-plot of the delivery times on the scale provided. **(1 mark)**

**Question 29***(2 marks)*

For the delivery times in Question 28, determine, with calculations, whether the slowest delivery time of 48 minutes is an outlier. **(2 marks)**

**Question 30****(4 marks)**

The blood alcohol content of a male can be estimated using the formula

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

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

Marco has a mass of 68 kg. Between 8:30 pm and 11:30 pm he drinks 4 glasses of wine. Each glass contains 1.5 standard drinks.

- (a) Show that Marco's estimated blood alcohol content at 11:30 pm is 0.081, correct to three decimal places. **(2 marks)**
- (b) The time in hours for blood alcohol content to fall to zero is estimated by  $\text{time} = \frac{BAC}{0.015}$ . Using the answer from part (a), find this time in hours and minutes. **(1 mark)**
- (c) Hence find the earliest time at which Marco's blood alcohol content is estimated to be zero. **(1 mark)**

**Question 31****(4 marks)**

A delivery van is bought for \$48,000. Its value can be depreciated using either

the straight-line method, at \$6,000 per year, or  
the declining-balance method, at 15% per annum.

- (a) Find the value of the van after 4 years using the straight-line method. **(1 mark)**
- (b) Find the value of the van after 4 years using the declining-balance method, correct to the nearest cent. **(2 marks)**
- (c) Which method gives the higher value after 4 years, and by how much? **(1 mark)**

**Question 32****(3 marks)**

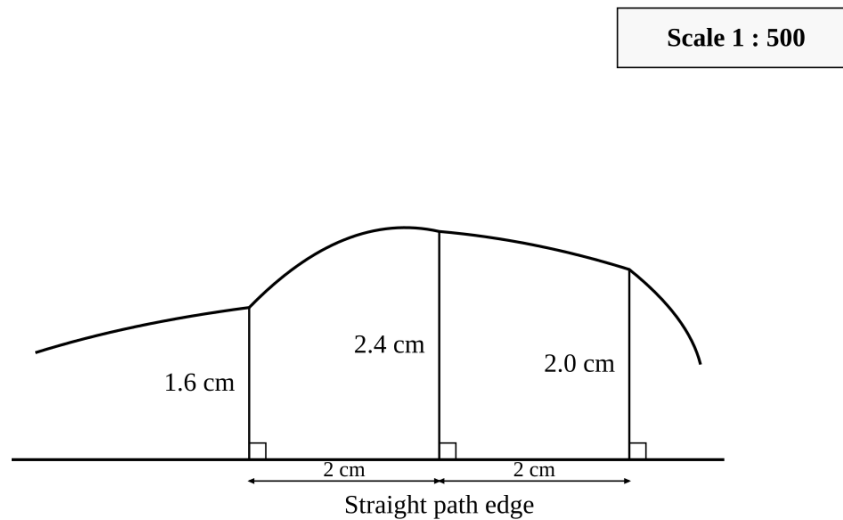
The lifetimes of a brand of battery are normally distributed. It is known that

16% of batteries last longer than 660 hours, and  
2.5% of batteries last less than 540 hours.

Find the mean and standard deviation of the lifetimes. **(3 marks)**

**Question 33****(4 marks)**

The diagram shows a scale drawing of a garden bed beside a straight path, drawn at a scale of 1 : 500.



**DIAGRAM PROVIDED IN THE EXAM**

- (a) Show that the three offsets represent actual distances of 8 m, 12 m and 10 m, and that they are 10 m apart. **(1 mark)**
- (b) Use two applications of the trapezoidal rule to estimate the area of the garden bed. **(2 marks)**
- (c) The garden bed is to be covered with topsoil to a depth of 0.15 m. Find the volume of topsoil needed, correct to two significant figures. **(1 mark)**

**Question 34****(3 marks)**

The diagram shows two triangular garden beds,  $ABC$  and  $ACD$ , which share the boundary  $AC$ .

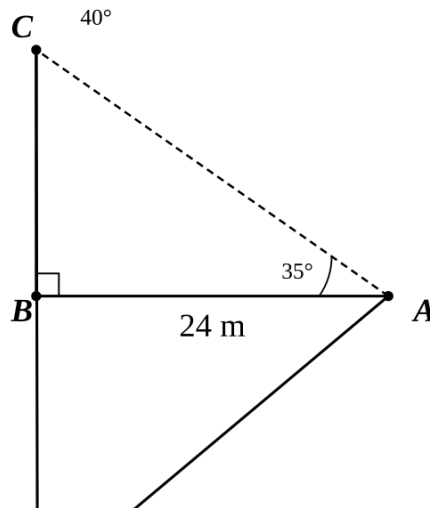


DIAGRAM PROVIDED IN THE EXAM

In triangle  $ABC$ , angle  $ABC = 90^\circ$ ,  $AB = 24$  m and angle  $BAC = 35^\circ$ . In triangle  $ACD$ , angle  $ACD = 40^\circ$  and angle  $ADC = 65^\circ$ .

- (a) Show that  $AC = 29.3$  m, correct to one decimal place. **(1 mark)**
- (b) Find the length of  $AD$ , correct to one decimal place. **(2 marks)**

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

Erin prints T-shirts. Her costs are \$400 for equipment plus \$12 per T-shirt, so the cost of producing  $n$  T-shirts is  $C = 400 + 12n$ . She sells the T-shirts for \$28 each, so her revenue is  $R = 28n$ .

- (a) Complete the table of values for  $C$  and  $R$  for  $n = 0, 10, 20, 30, 40$ . **(1 mark)**
- (b) Draw the graphs of  $C = 400 + 12n$  and  $R = 28n$  on the grid provided, for  $0 \leq n \leq 40$ . **(1 mark)**
- (c) How many T-shirts must Erin sell to break even? **(1 mark)**
- (d) Find Erin's profit if she sells 40 T-shirts. **(1 mark)**

**Question 36****(4 marks)**

The masses of adult echidnas are normally distributed with a mean of 4.2 kg and a standard deviation of 0.5 kg.

The table gives values of  $P(Z < z)$  for a standard normal variable  $Z$ .

| $z$        | 1.2    | 1.3    | 1.4    | 1.5    | 1.6    |
|------------|--------|--------|--------|--------|--------|
| $P(Z < z)$ | 0.8849 | 0.9032 | 0.9192 | 0.9332 | 0.9452 |

- (a) Find the  $z$ -score of an echidna with a mass of 4.9 kg. **(1 mark)**
- (b) Using the table, find the probability that a randomly chosen adult echidna has a mass greater than 4.9 kg. **(2 marks)**
- (c) In a population of 250 adult echidnas, how many would be expected to have a mass greater than 4.9 kg? **(1 mark)**

**Question 37****(4 marks)**

The network shows the activities in a project, with the duration of each activity in days.

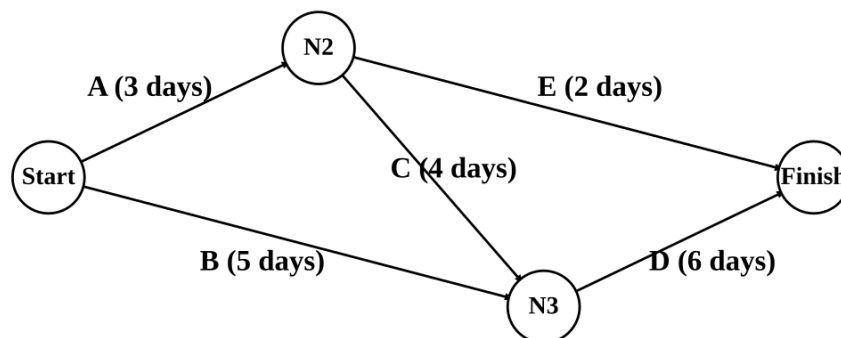
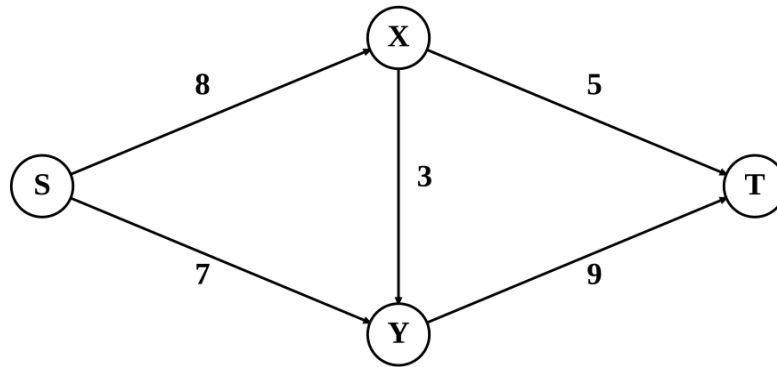


DIAGRAM PROVIDED IN THE EXAM

- (a) Find the minimum completion time of the project and state the critical path. **(2 marks)**
- (b) Find the float time of activity  $B$ . **(1 mark)**
- (c) The duration of activity  $B$  increases from 5 days to 8 days. Explain, using your answer to part (b), why the critical path changes, and state the new minimum completion time. **(1 mark)**

**Question 38****(3 marks)**

The network shows a system of water pipes from a source  $S$  to a sink  $T$ , with the capacity of each pipe in litres per minute.

**DIAGRAM PROVIDED IN THE EXAM**

- (a)** Find the capacity of the cut that separates  $S$  from all other vertices. **(1 mark)**
- (b)** The maximum flow from  $S$  to  $T$  is 14 litres per minute. Identify a cut with capacity 14, justifying why the maximum flow cannot exceed 14. **(1 mark)**
- (c)** The capacity of ONE pipe can be increased. Which pipe should it be, in order to increase the maximum flow? Justify your answer. **(1 mark)**

**Question 39****(5 marks)**

From a port  $P$ , boat  $X$  sails 25 km on a bearing of  $048^\circ$  and boat  $Y$  sails 32 km on a bearing of  $122^\circ$ .

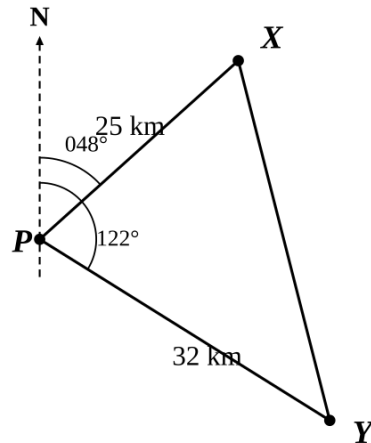


DIAGRAM PROVIDED IN THE EXAM

- (a) Show that angle  $XPY = 74^\circ$ . **(1 mark)**
- (b) Find the distance between the two boats, correct to one decimal place. **(2 marks)**
- (c) Find angle  $PXY$ , correct to the nearest degree. **(1 mark)**
- (d) Hence find the bearing of boat  $Y$  from boat  $X$ , correct to the nearest degree. **(1 mark)**

**Question 40****(4 marks)**

The table shows the present value of an annuity of \$1 per year.

| Years | 3%    | 4%    |
|-------|-------|-------|
| 5     | 4.580 | 4.452 |
| 10    | 8.530 | 8.111 |

Ivy is setting up a fund earning 4% per annum, compounding yearly, from which she will withdraw \$2,000 at the end of each year for the first 5 years, and then \$3,000 at the end of each year for the following 5 years.

- (a) Find the present value of the first 5 years of withdrawals. **(1 mark)**
- (b) Explain why the present value of the second 5 years of withdrawals is given by  $3000 \times (8.111 - 4.452)$ , and evaluate it. **(2 marks)**
- (c) Hence find the minimum amount Ivy needs to open the fund with, correct to the nearest dollar. **(1 mark)**

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Built by a six-model AI panel and backtested against the hidden 2025 papers before publication — method at [intuitioneducation.com.au/hsc-2026/how-we-did-it](https://intuitioneducation.com.au/hsc-2026/how-we-did-it). Scored publicly in November 2026. Independent Intuition Education material from publicly available NESA documents; not affiliated with or endorsed by NESA.