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 ≥ 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.

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

A. $b = \dfrac{5a + c}{2}$

B. $b = \dfrac{5a - c}{2}$

C. $b = 5a + \dfrac{c}{2}$

D. $b = \dfrac{a + c}{5}$

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**Question 4**

What is the compass bearing $\mathrm{S}48^{\circ}\mathrm{W}$ 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

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**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 $v$?

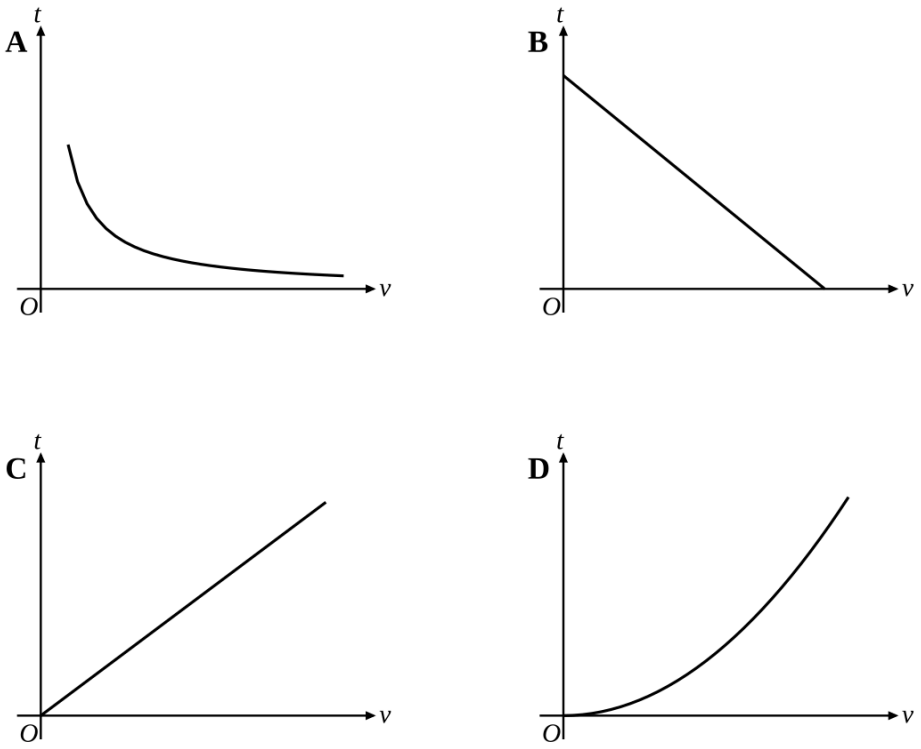


DIAGRAM PROVIDED IN THE EXAM

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. $8000(1.005)^{48}$

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## Question 8

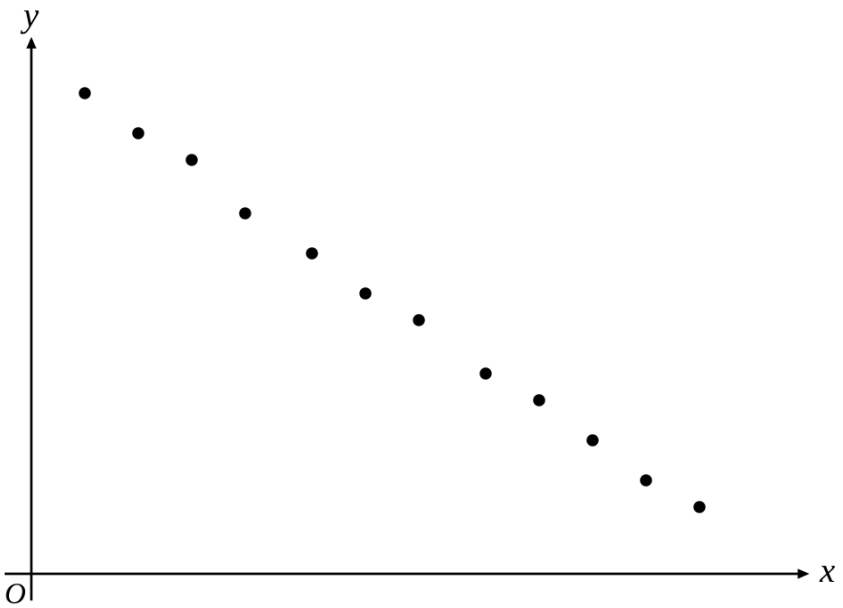


DIAGRAM PROVIDED IN THE EXAM

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. $84\%$

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**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. $150^\circ$

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**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. $480$

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### Question 15

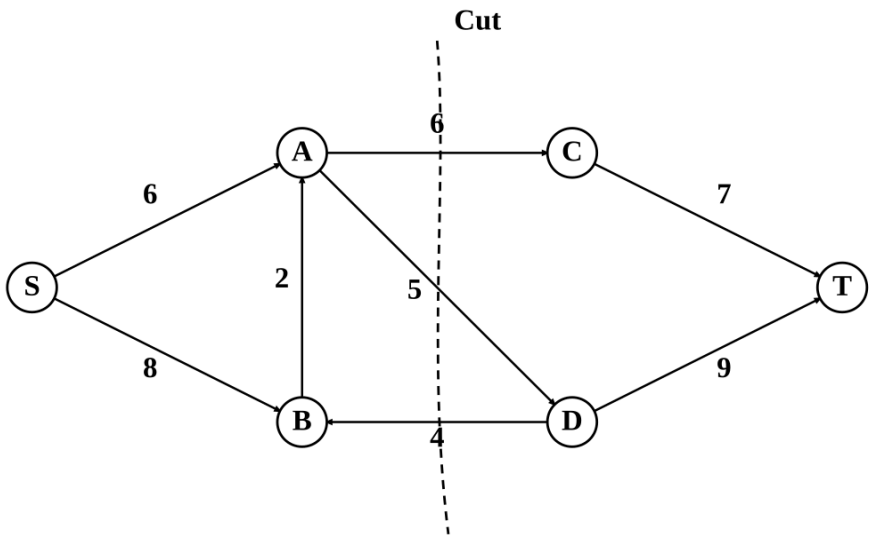


DIAGRAM PROVIDED IN THE EXAM

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)**

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**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.

| | $A$ | $B$ | $C$ | $D$ | $E$ |
|---|---|---|---|---|---|
| $A$ | – | 7 | 5 | 9 | – |
| $B$ | 7 | – | 6 | – | 8 |
| $C$ | 5 | 6 | – | 4 | 10 |
| $D$ | 9 | – | 4 | – | 3 |
| $E$ | – | 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)**

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**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

$$R = -5p^2 + 200p, \qquad 0 \le p \le 40.$$

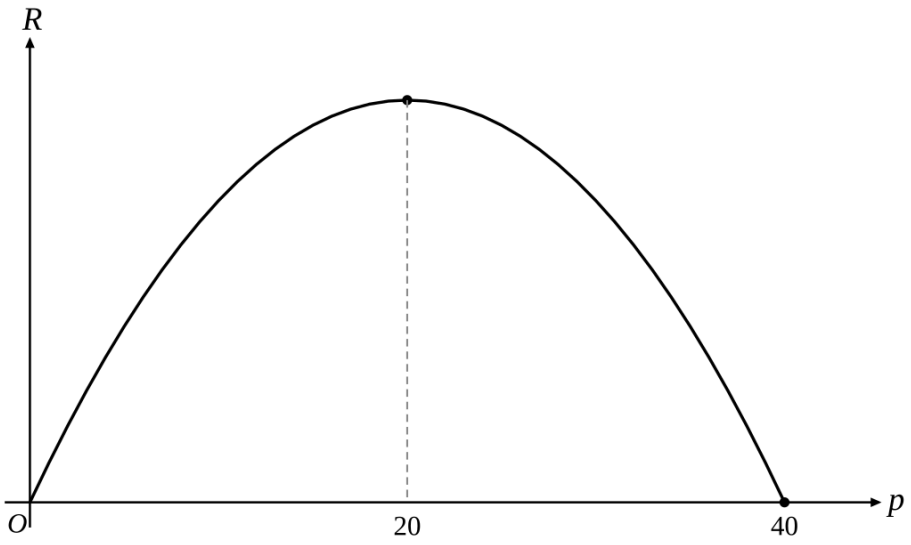


DIAGRAM PROVIDED IN THE EXAM

**(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)**

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**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)**

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**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.

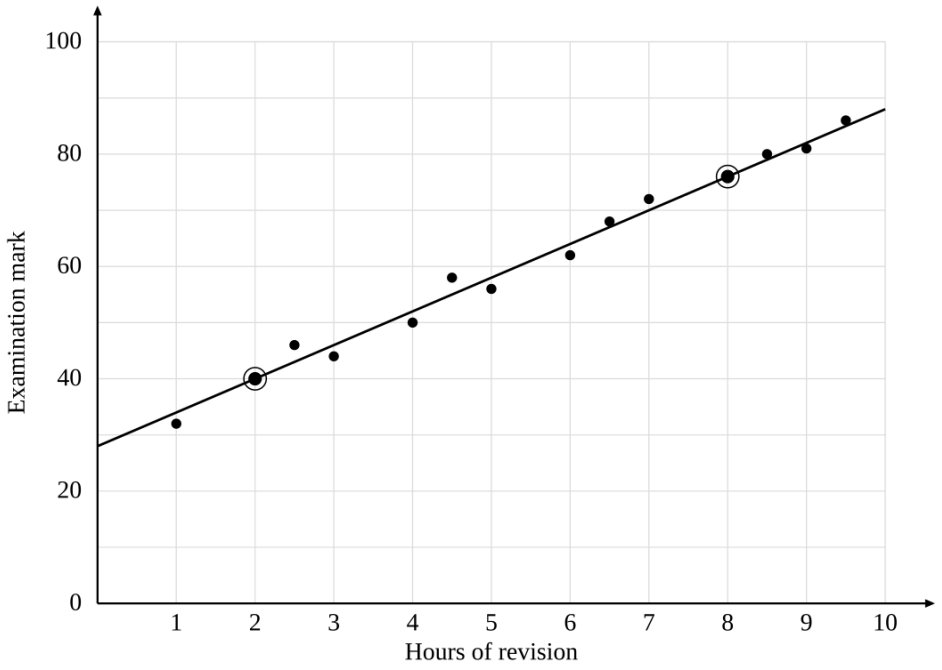


DIAGRAM PROVIDED IN THE EXAM

**(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)**

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**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.

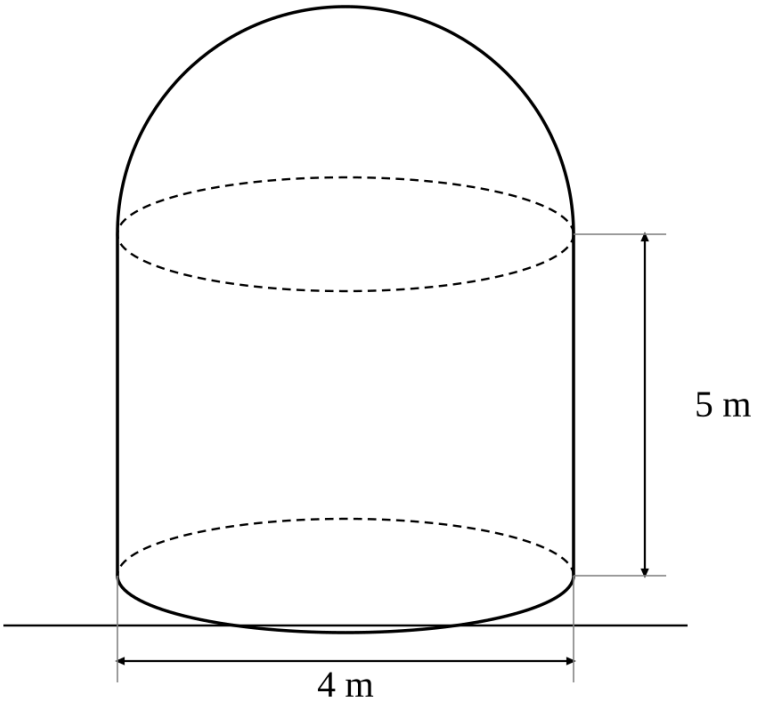


DIAGRAM PROVIDED IN THE EXAM

**(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)**

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**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)**

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**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.

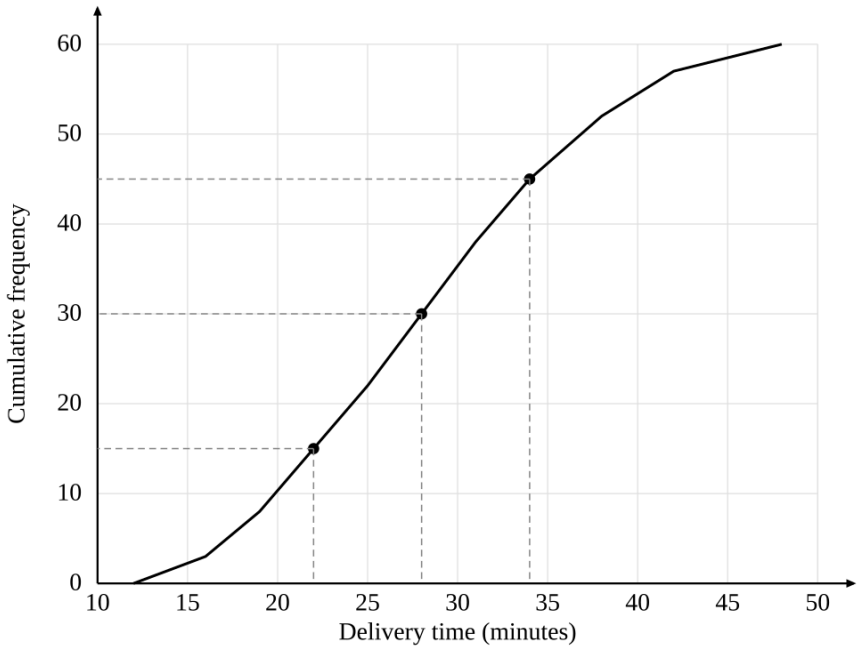


DIAGRAM PROVIDED IN THE EXAM

**(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)**

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**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)**

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**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.

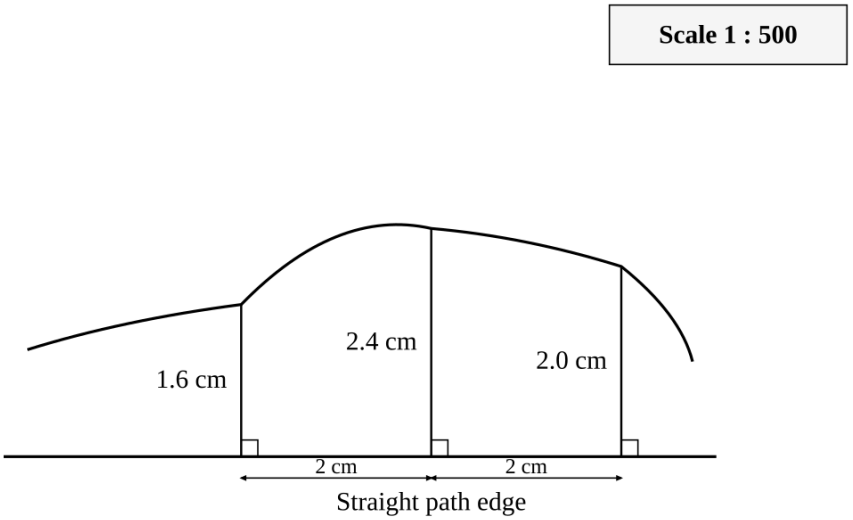


DIAGRAM PROVIDED IN THE EXAM

**(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)**

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

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

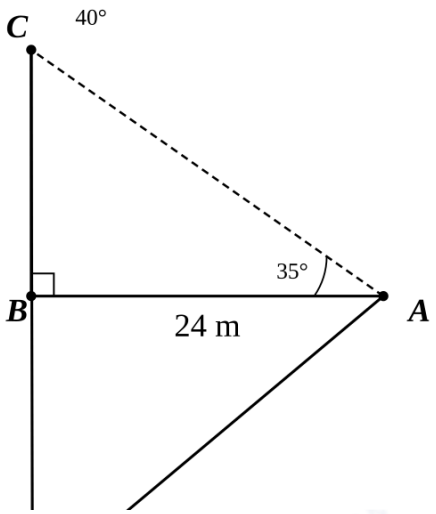


DIAGRAM PROVIDED IN THE EXAM

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)**

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**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.

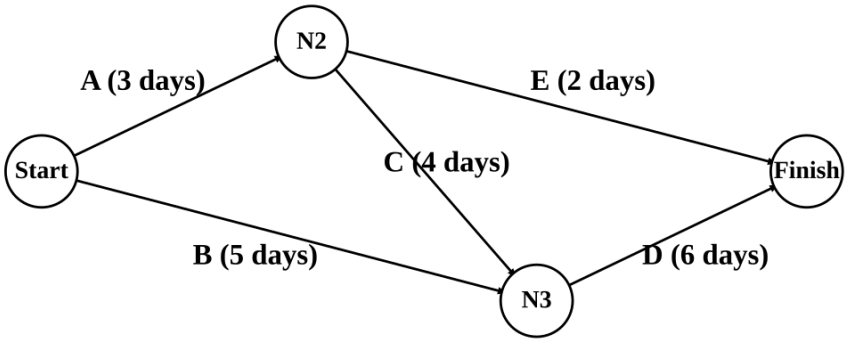


DIAGRAM PROVIDED IN THE EXAM

**(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)**

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**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.

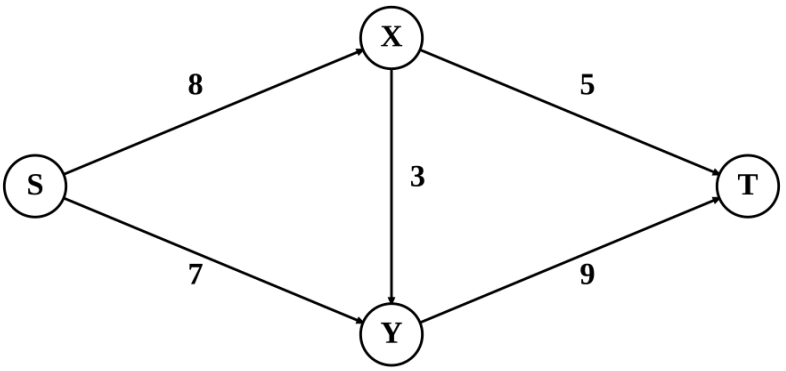


DIAGRAM PROVIDED IN THE EXAM

**(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)**

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**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 $122^\circ$.

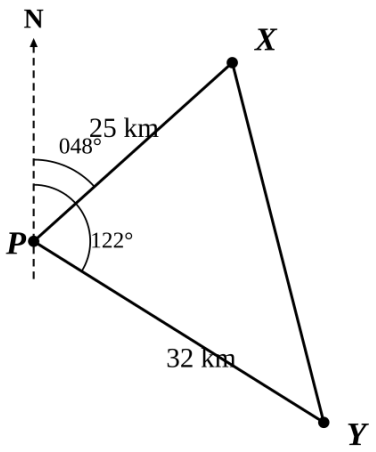


DIAGRAM PROVIDED IN THE EXAM

**(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)**

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**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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