Cambridge Assessment International Education

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4749790674

CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/31**

Paper 3 (Core) **May/June 2024**

1 hour 45 minutes

You must answer on the question paper.

You will need: Geometrical instruments

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You should use a graphic display calculator where appropriate.
- You may use tracing paper.
- You must show all necessary working clearly and you will be given marks for correct methods, including sketches, even if your answer is incorrect.
- Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place for angles in degrees, unless a different level of accuracy is specified in the question.
- For π, use your calculator value.

INFORMATION

- The total mark for this paper is 96.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **20** pages. Any blank pages are indicated.

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Formula List

Area, A, of triangle, base b, height h.	$A = \frac{1}{2}bh$
Area, A, of circle, radius r.	$A = \pi r^2$
Circumference, C, of circle, radius r.	$C = 2\pi r$
Curved surface area, A, of cylinder of radius r, height h.	$A = 2\pi rh$
Curved surface area, A, of cone of radius r, sloping edge l.	$A = \pi rl$
Curved surface area, A, of sphere of radius r.	$A = 4\pi r^2$
Volume, V, of prism, cross-sectional area A, length l.	$V = Al$
Volume, V, of pyramid, base area A, height h.	$V = \frac{1}{3}Ah$
Volume, V, of cylinder of radius r, height h.	$V = \pi r^2 h$
Volume, V, of cone of radius r, height h.	$V = \frac{1}{3}\pi r^2 h$
Volume, V, of sphere of radius r.	$V = \frac{4}{3}\pi r^3$

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Answer **all** the questions.

1 **(a)** Write fifty thousand and thirty-seven in figures.

..... [1]

(b) Write $7\frac{2}{5}$ as a decimal.

..... [1]

(c) Change \$325 into Euros (€) when the exchange rate is \$1 = €0.88 .

€ ..... [1]

(d) Divide 3600 in the ratio 5 : 6 : 7.

..... , ... , ... [3]

(e) Write down a prime number between 18 and 24.

..... [1]

(f) The price of an e-bike is \$2200.
In a sale, this price is reduced by 33%.

Work out the sale price of the e-bike.

\$ ..... [2]

(g) Work out the value of $3.62 \times 10^3 + 9.1 \times 10^2$.
Give your answer in standard form.

..... [2]

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2 Dagmar has a bag containing cards.
Each card is blue, yellow, pink, green or purple.
21 students each pick one card at random from the bag and Dagmar records the colour.

blue	blue	green	yellow	pink	blue	purple
purple	green	blue	yellow	purple	green	blue
blue	green	pink	yellow	blue	purple	green

(a) Complete the frequency table.

Colour	Frequency
blue	
yellow	
pink	
green	
purple	

[2]

(b) Write down the colour that was picked the most.

..... [1]

(c) Work out how many more purple cards were picked than yellow cards.

..... [1]

(d) Write down the fraction of the 21 cards picked that were green.

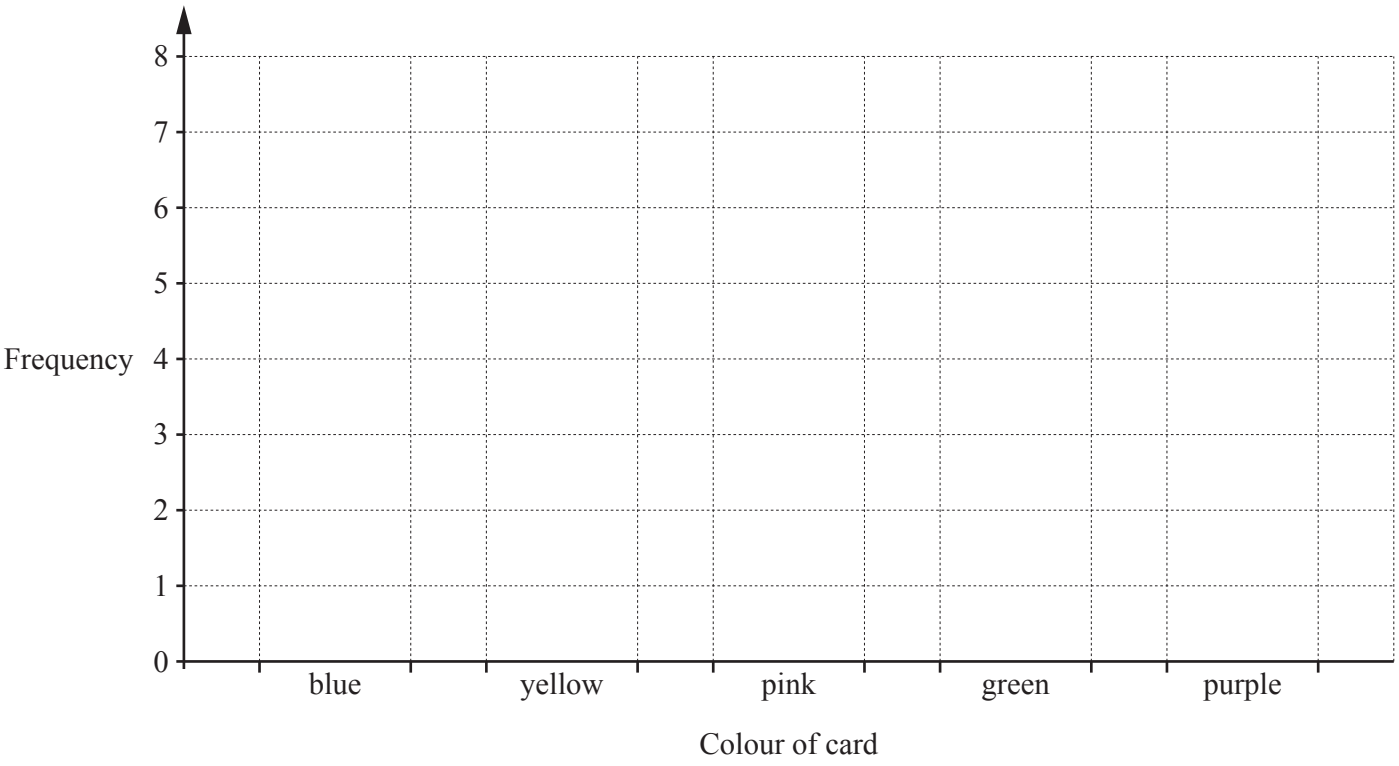
..... [1]

(e) Write down the probability of picking a red card from the bag.

..... [1]

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(f) Draw a bar chart to show the information in the table.



[2]

3 **(a)** Find 16% of 385.

..... [1]

(b) Write these in order of size, starting with the smallest.

$0.88 \qquad 80\% \qquad \frac{7}{8}$

.... [1]
smallest

(c) Work out 15.21^3.
Give your answer correct to 2 decimal places.

..... [2]

(d) Work out $2.3^2 + \sqrt{4.7}$.
Give your answer correct to 4 significant figures.

..... [2]

(e) Write $\frac{15}{54}$ as a fraction in its simplest form.

..... [1]

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(f) Si Jung walks 11 km to raise money.
She receives \$26.18 for each kilometre she walks.

Work out how much money she raises.

\$ ..... [1]

(g) One packet of football cards cost \$21.95 .

Work out the greatest number of these packets that Josh can buy with \$100 and how much change he receives.

..... packets and \$ ..... change [3]

(h) Work out, giving each answer as a fraction.

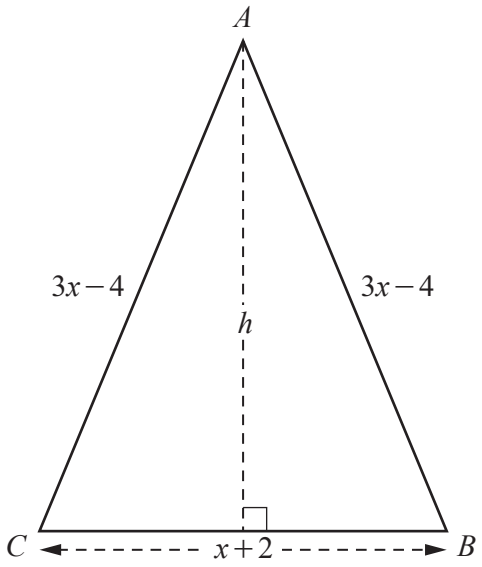
(i) $\frac{2}{3}+\frac{1}{2}$

..... [1]

(ii) $3\frac{1}{4}\times\frac{1}{26}$

..... [1]

4 In this question, all lengths are in centimetres.



NOT TO SCALE

ABC is an isosceles triangle.

(a) $AB = AC = 8\,\text{cm}$.

Work out the value of x.

$x =$ ..... [2]

(b) Work out the perimeter of the triangle.

..... cm [2]

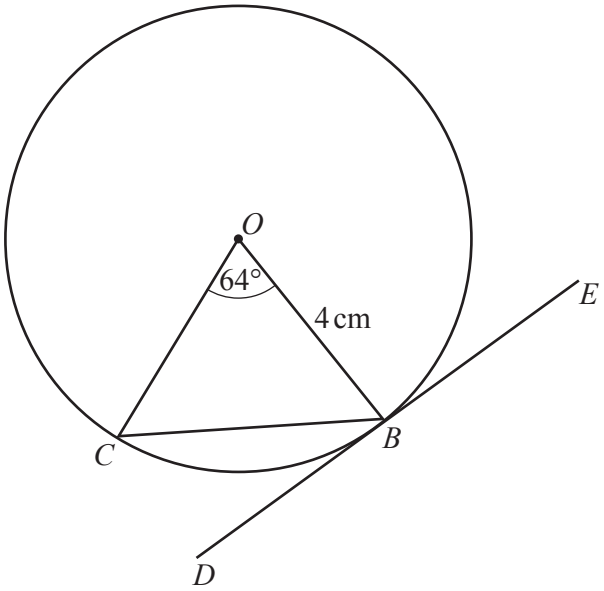
(c) The height of the triangle is h.

Calculate the area of the triangle.

..... cm^2 [4]

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5



NOT TO SCALE

The diagram shows a circle with centre O and radius 4 cm.
C and B are points on the circumference and DE is a tangent at B.
Angle $COB = 64°$.

(a) Find

(i) angle OBE

Angle $OBE =$ ..... [1]

(ii) angle OCB

Angle $OCB =$ ..... [2]

(iii) angle CBD

Angle $CBD =$ ..... [1]

(iv) reflex angle COB.

Reflex angle $COB =$ ..... [1]

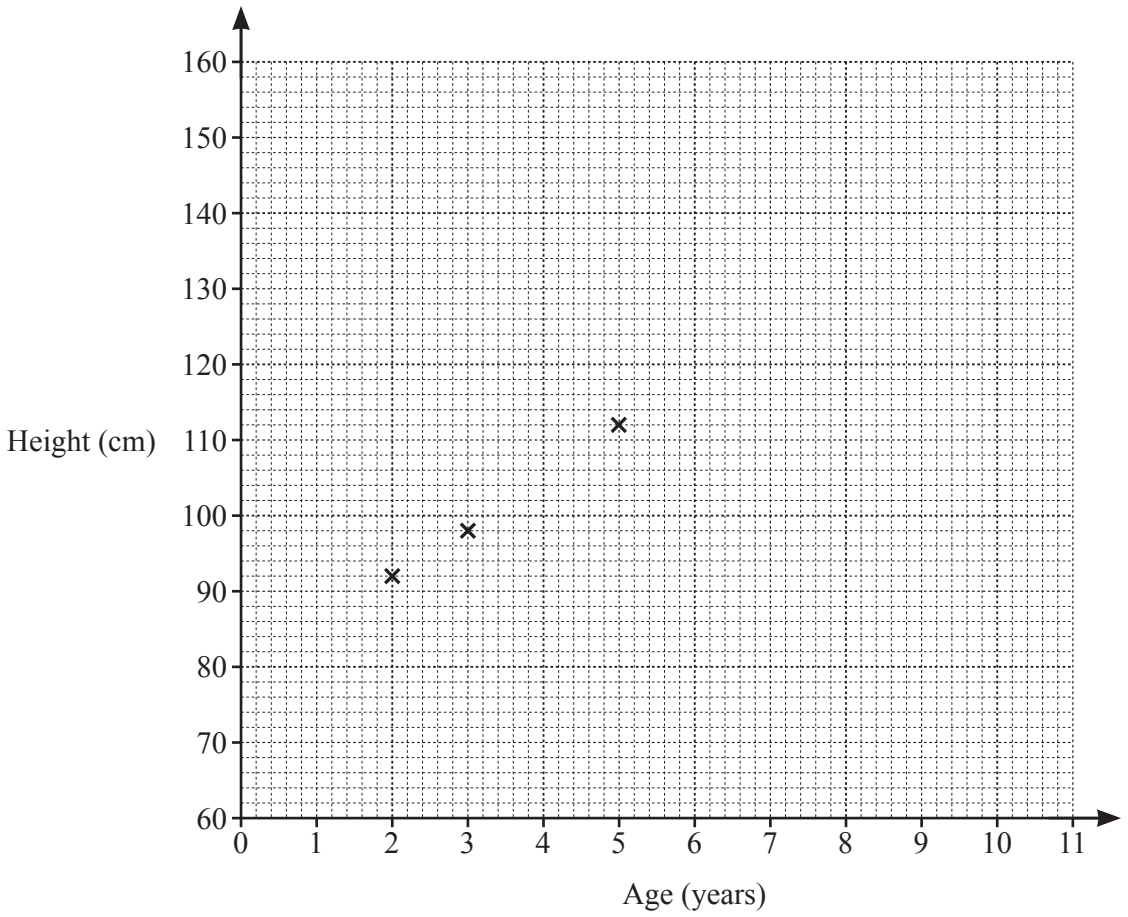
(b) Work out the length of the minor arc CB.

..... cm [2]

6 The age and the height of each of 7 children are shown in the table.

Age (years)	2	3	5	5	7	9	11
Height (cm)	92	98	112	118	128	140	152

(a) Complete the scatter diagram.
The first three points have been plotted for you.



[2]

(b) What type of correlation is shown in the diagram?

..... [1]

(c) Find

(i) the mean age

..... years [1]

(ii) the mean height.

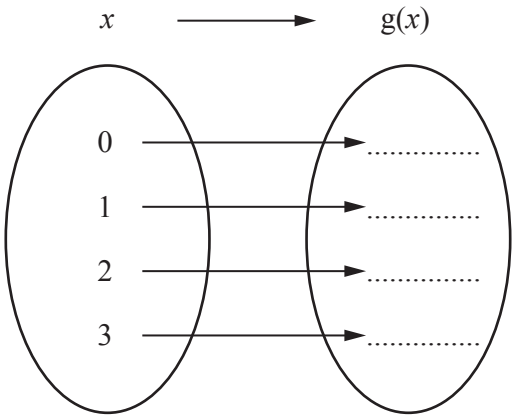
.....cm [1]

(d) On the diagram, draw a line of best fit. [2]

(e) Use your line of best fit to estimate the height of a child of age 8 years.

..... cm [1]

7 **(a)** Complete the mapping diagram for $g(x) = 3 - 2x$.



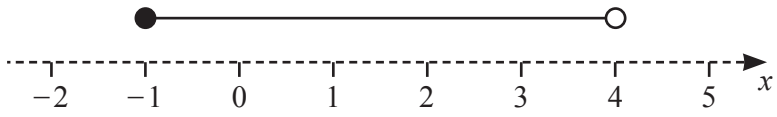
[2]

(b) $h(x) = 4 - x^3$

Find $h(-1)$.

..... [2]

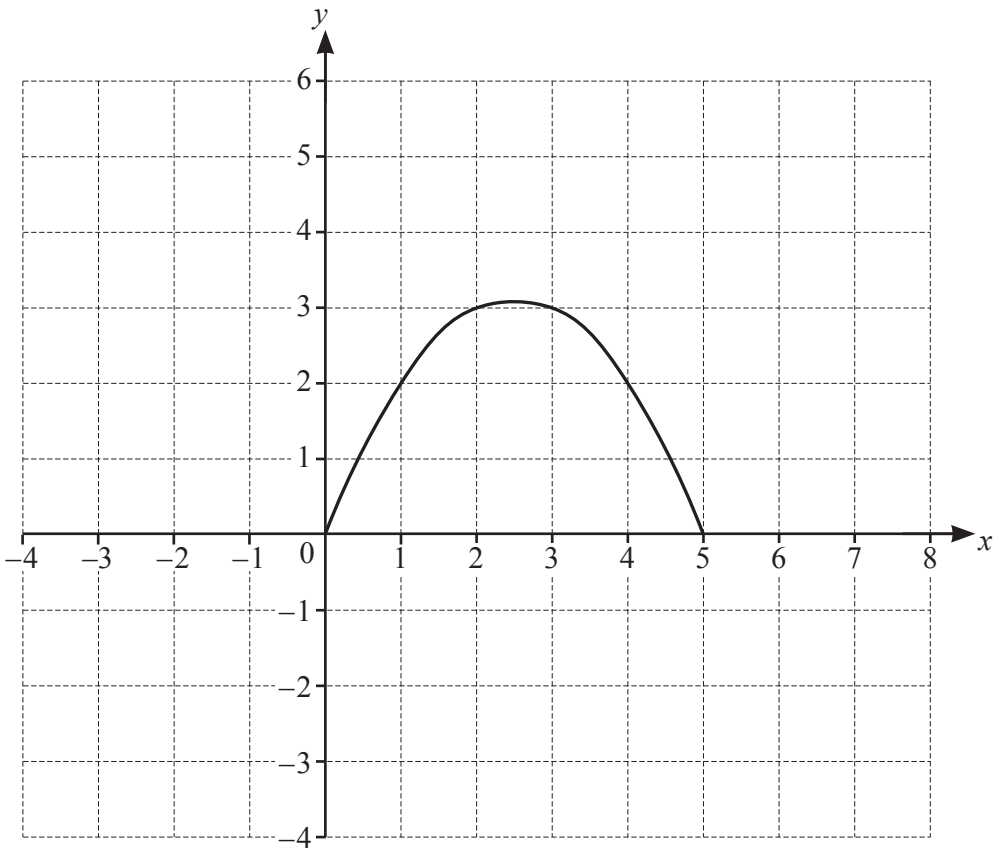
(c)



Write down the inequality represented on the number line.

..... [2]

(d)



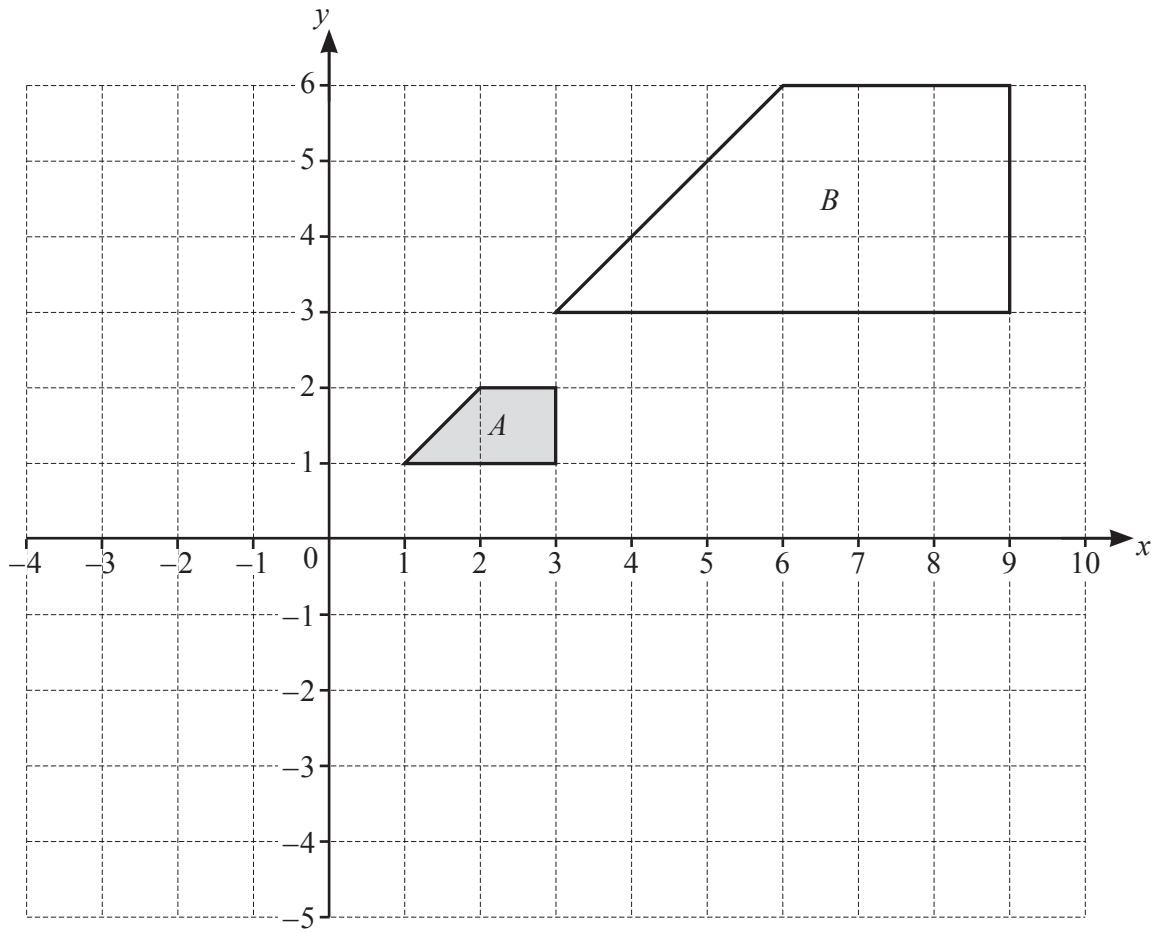
The diagram shows the sketch of $y = \mathrm{f}(x)$.

On the same diagram, draw the sketch of

(i) $y = \mathrm{f}(x) + 2$ [1]

(ii) $y = \mathrm{f}(x + 3)$. [1]

8



(a) Describe fully the **single** transformation that maps shape *A* onto shape *B*.

.....

..... [3]

(b) Rotate shape *A* 90° anticlockwise about (0, 0).
Label the image *C*. [2]

(c) Reflect shape *A* in the line $y = -1$.
Label the image *D*. [2]

(d) Translate shape *A* by the vector $\begin{pmatrix} -4 \\ -3 \end{pmatrix}$.
Label the image *E*. [2]

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9 **(a)** Solve.

(i) $3x > -6$

..... [1]

(ii) $3x - 4 = 11$

$x =$ ..... [2]

(b) Find each value of x.

(i) $8^x = 1$

$x =$ ..... [1]

(ii) $\frac{2^x}{2^5} = 2$

$x =$ ..... [1]

(c) Simplify fully.

(i) $\frac{2x}{3} - \frac{x}{5}$

..... [2]

(ii) $\frac{xy}{2} \div \frac{x}{4}$

..... [2]

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10 80 people climb a tower.
The time each person takes is recorded.
The table shows the results.

Time (t minutes)	Frequency
$2 < t \leqslant 4$	6
$4 < t \leqslant 6$	24
$6 < t \leqslant 8$	30
$8 < t \leqslant 10$	16
$10 < t \leqslant 12$	4

(a) Write down the modal class.

..... $< t \leqslant$ ..... [1]

(b) **(i)** Find the mid-point of the interval $2 < t \leqslant 4$.

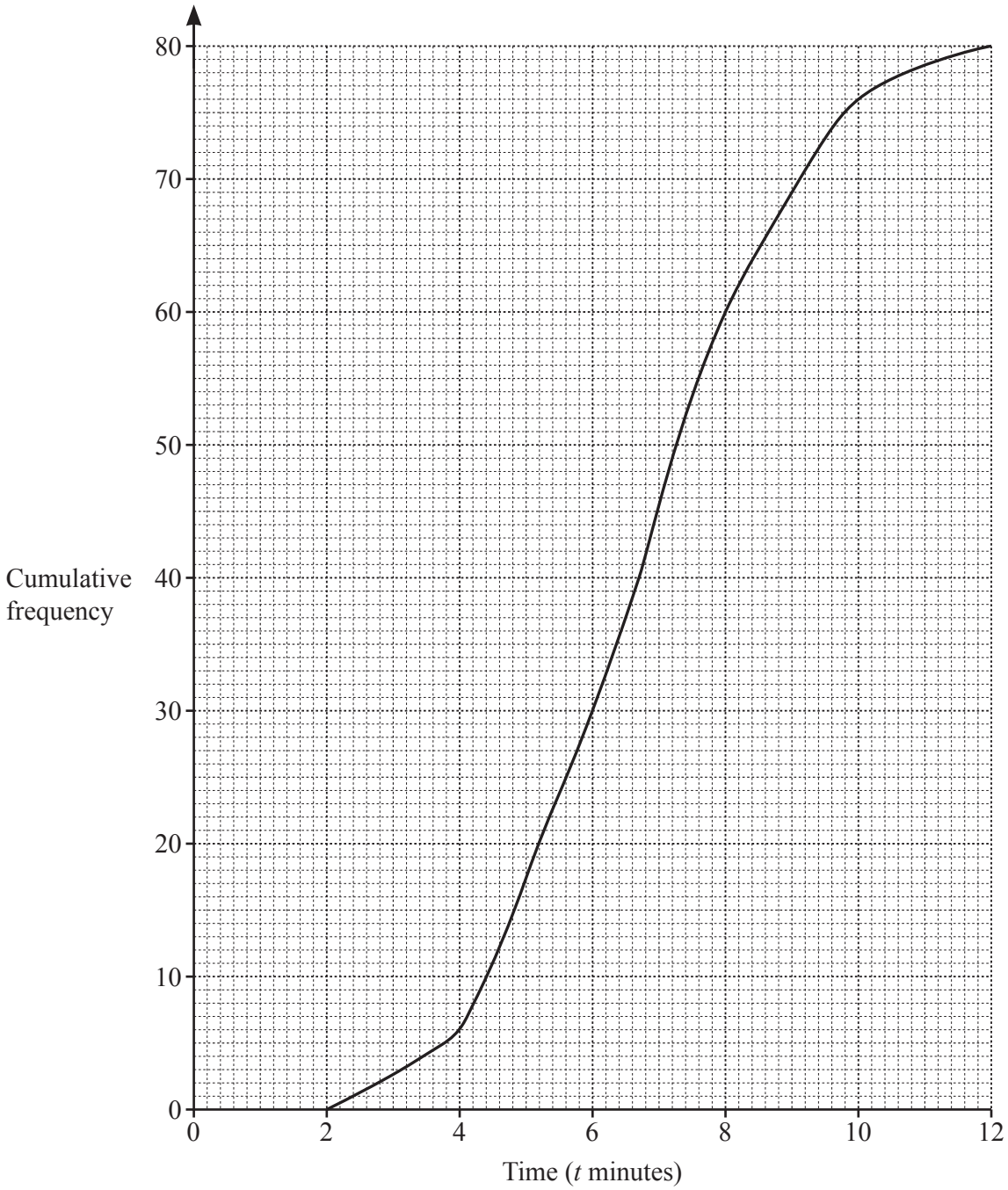
..... [1]

(ii) Calculate an estimate for the mean time.

..... min [2]

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(c) The cumulative frequency curve shows the times taken to climb the tower.



Use the cumulative frequency curve to find an estimate for

(i) the median

..... min [1]

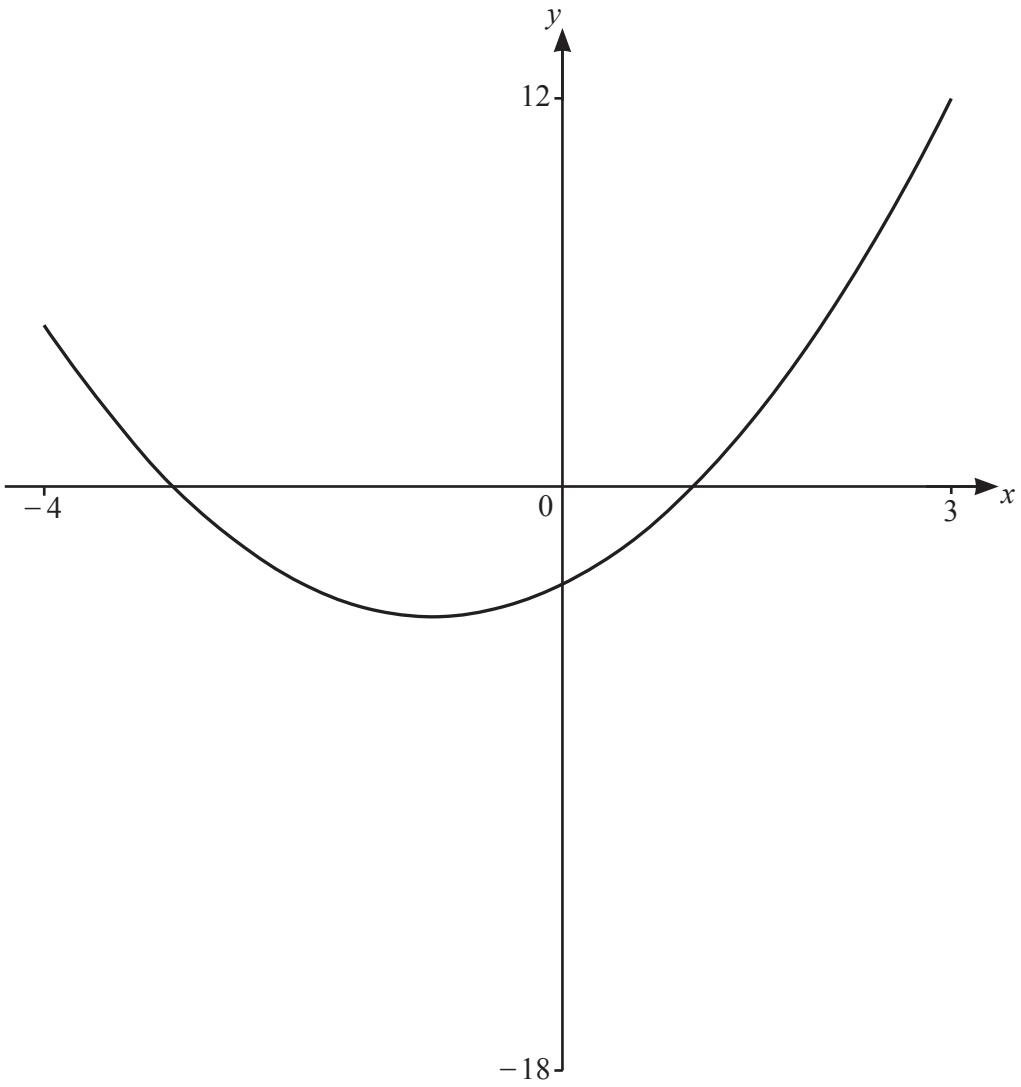
(ii) the lower quartile

..... min [1]

(iii) the number of people who took longer than 9 minutes to climb the tower.

..... [2]

11



The diagram shows a sketch of the graph of $y = x^2 + 2x - 3$ for $-4 \leqslant x \leqslant 3$.

(a) Draw this graph on your calculator and use it to find the coordinates of

(i) the points where the graph crosses the x-axis

(..... , ...) and (..... , ...) [2]

(ii) the local minimum point. (..... , ...) [1]

(b) On the same diagram, sketch the graph of $y = -x^2 + x + 2$ for $-4 \leqslant x \leqslant 3$. [2]

(c) Find the x-coordinate of each point of intersection of $y = x^2 + 2x - 3$ and $y = -x^2 + x + 2$.

$x =$ ..... and $x =$ ..... [2]

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