CAMBRIDGE
International Education

Cambridge O Level

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

0312918659

MATHEMATICS (SYLLABUS D) **4024/22**

Paper 2 Calculator **May/June 2026**

2 hours

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. Do **not** use correction fluid or tape.
- Do **not** write on any bar codes.
- You should use a scientific calculator where appropriate.
- You may use tracing paper.
- You must show all necessary working clearly.
- 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 either your calculator value or 3.142.

INFORMATION

- The total mark for this paper is 100.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **20** pages.

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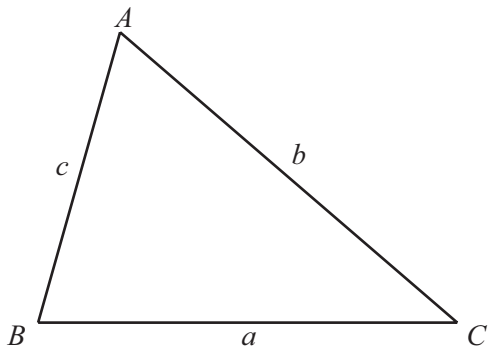
List of formulas

Area, A, of triangle, base b, height h.	$A = \frac{1}{2}bh$
Area, A, of circle of radius r.	$A = \pi r^2$
Circumference, C, of circle of 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.	$A = \pi rl$
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.	$V = \frac{4}{3}\pi r^3$
For the equation $ax^2 + bx + c = 0$, where $a \neq 0$	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

For the triangle shown,



$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$a^2 = b^2 + c^2 - 2bc\cos A$$

$$\text{Area} = \frac{1}{2}ab\sin C$$

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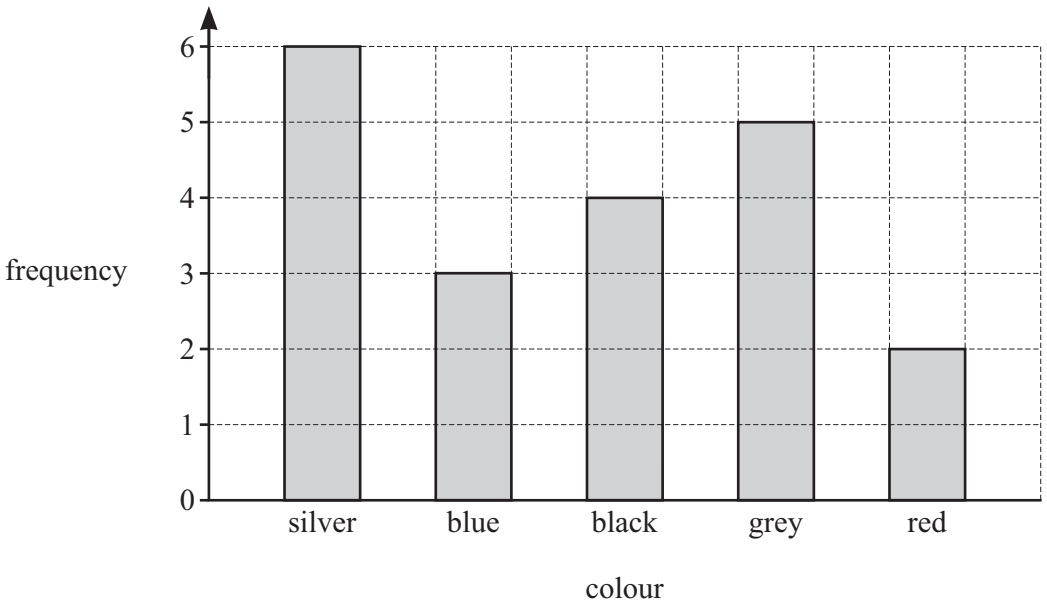
1 Write these numbers in order of size, starting with the smallest.

$\frac{2}{5}$ 0.42 38%

..... , ... , ... [1]

smallest

2 Maison records the colours of all the cars in a car park.
The results are shown in the bar chart.



(a) Write down the colour of car that is recorded the least number of times.

..... [1]

(b) Find the total number of cars in the car park.

..... [1]

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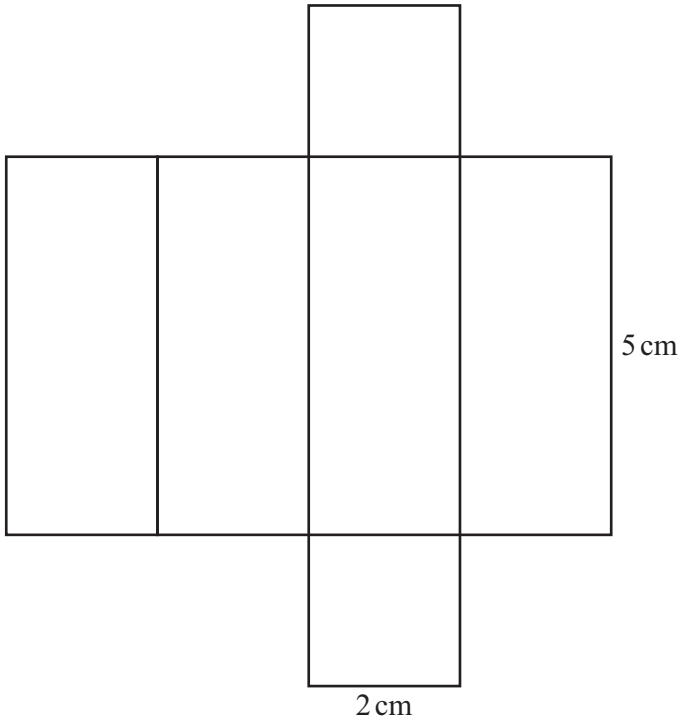
3 The diagram shows the net of a cuboid made from four congruent rectangles and two congruent squares.



Find the total length of the edges of the cuboid.

..... cm [2]

4 Calculate.

$$\frac{2.5^4}{3.09 + \sqrt{16.98}}$$

Give your answer correct to 2 decimal places.

..... [2]

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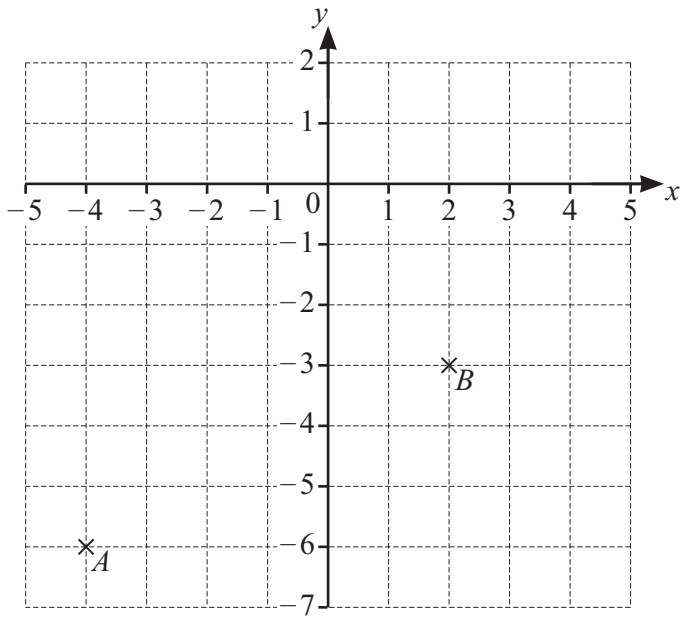
5 Point A and point B are plotted on the grid.



(a) Write down the coordinates of point B.

(..... , ...) [1]

(b) Work out the gradient of AB.

..... [2]

(c) Find the coordinates of the midpoint of the line AB.

(..... , ...) [1]

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6 Sara and Bill share some money in the ratio 5 : 6.
Sara receives $60.

(a) Calculate the amount Bill receives.

$ ..... [2]

(b) Sara uses her $60 to buy books.
Each book costs $7.

Find the maximum number of books she can buy.

..... [2]

7 **(a)** $\mathbf{c} = \begin{pmatrix} 1 \\ 5 \end{pmatrix}$ $\mathbf{d} = \begin{pmatrix} -2 \\ 3 \end{pmatrix}$

Write $\mathbf{c} - 2\mathbf{d}$ as a column vector.

$\begin{pmatrix} \quad \\ \quad \end{pmatrix}$ [2]

(b) Point P has coordinates (1, 5) and $\overrightarrow{PQ} = \begin{pmatrix} -4 \\ 10 \end{pmatrix}$.

Find the coordinates of point Q.

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

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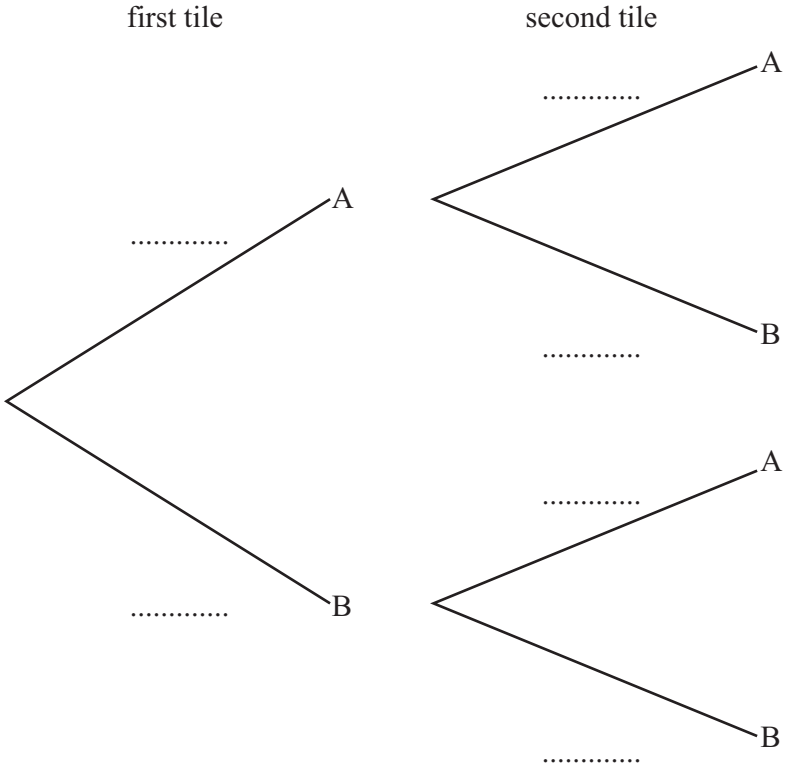
8 A bag contains 7 tiles labelled A and 5 tiles labelled B.
A tile is chosen at random from the bag and is then replaced.
A second tile is then chosen at random from the bag.

(a) Complete the tree diagram.



[2]

(b) Work out the probability that both tiles are labelled A.

..... [1]

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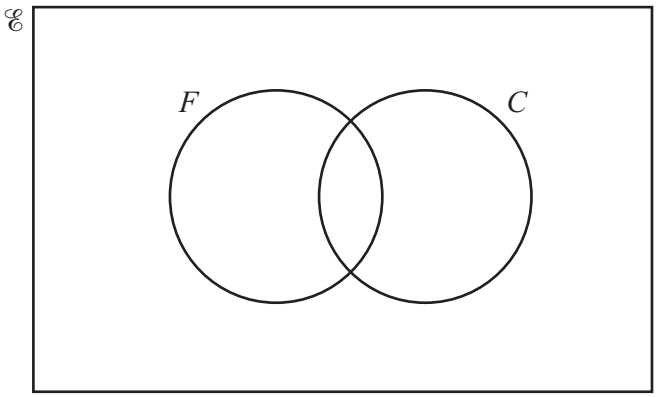
9 Amira walks from her home to her friend's house.
She leaves home at 09 35.
She walks a total of 8 km at an average speed of 5 km / h.

Work out the time she arrives at her friend's house.

..... [3]

10 $\mathscr{E} = \{x : x \text{ is an integer and } 1 \leqslant x \leqslant 9\}$
$F = \{x : x \text{ is a factor of } 6\}$
$C = \{x : x \text{ is a cube number}\}$

(a) Complete the Venn diagram.



[2]

(b) Find $n(F \cup C)'$.

..... [1]

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11 In a sale, a shop reduces all prices by 32%.
Before the sale, a dress costs \$56.

Work out the sale price of the dress.

\$ ..... [2]

12 Solve.

(a) $5k - 2 = 12$

$k =$ ..... [2]

(b) $5(2y - 1) = 4(3y + 1)$

$y =$ ..... [3]

13 $f(x) = 2x + 3$ $g(x) = \frac{1}{x-2}$, $x \neq 2$

(a) Find $f(-4)$.

..... [1]

(b) Find $gf(1)$.

..... [2]

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14 The population of a village is 1260.
The population grows exponentially at a rate of 1.7% per year.

Calculate the increase in the population at the end of 3 years.

..... [3]

15 Simplify.

(a) $a^5 \times a^3$

..... [1]

(b) $b \div b^6$

..... [1]

(c) $\left(\frac{4x}{y^2}\right)^3$

..... [2]

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16 The table gives information about the speeds of 60 cars travelling along a road.

speed (s km/h)	$20 < s \leqslant 24$	$24 < s \leqslant 40$	$40 < s \leqslant 58$	$58 < s \leqslant 70$
frequency	4	22	28	6

Calculate an estimate of the mean.

..... km/h [4]

17 **(a)** f is inversely proportional to the square of h.

When $f = -\frac{3}{4}$, $h = 2$.

Find f when $h = -5$.

$f =$ ..... [3]

(b) c is directly proportional to d^2.

Complete the statement.

If d is multiplied by 4, then c is multiplied by ..... [1]

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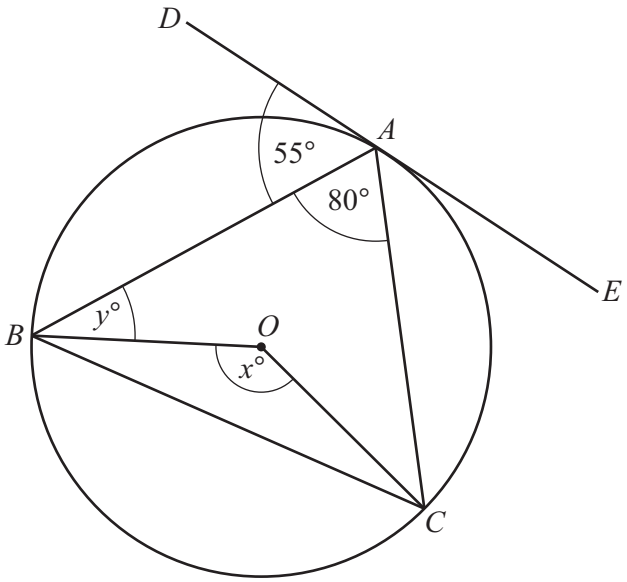

NOT TO SCALE

A, B and C lie on a circle, centre O.
DE is a tangent to the circle at A.
Angle $BAC = 80°$ and angle $BAD = 55°$.

(a) Find the value of x.

Give a geometrical reason for your answer.

$x =$ ..... because .....

..... [2]

(b) Find the value of y.

$y =$ ..... [2]

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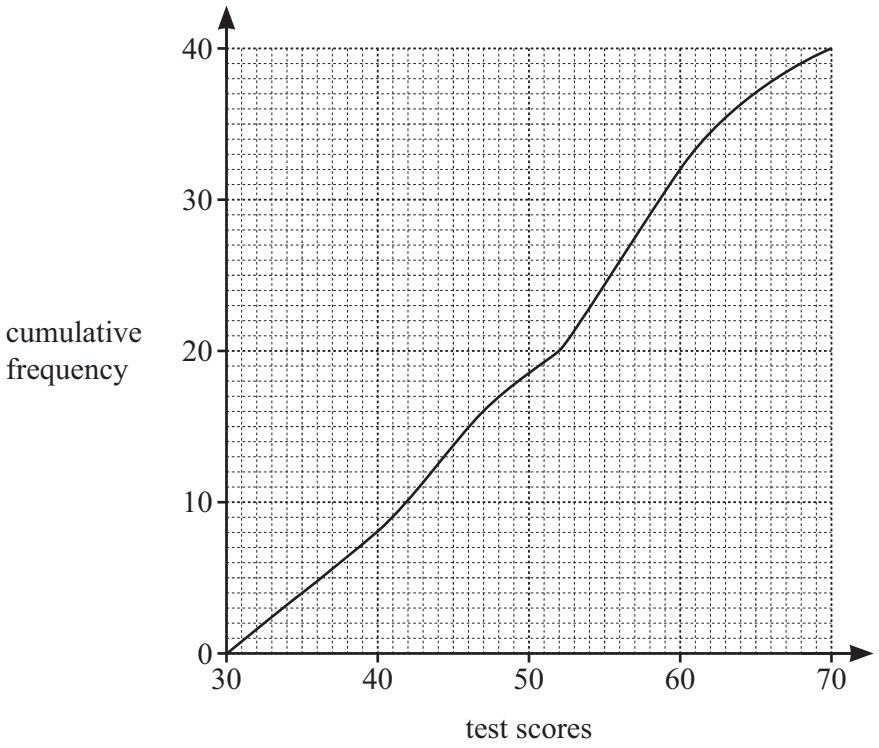
19 The cumulative frequency diagram shows information about the test scores for a group of students.



(a) Use the diagram to find an estimate for the median score.

..... [1]

(b) In this group, 60% of the students pass the test.

Use the diagram to find the minimum score needed to pass the test.

..... [2]

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20 The area of a rectangle is $69.5\,\text{m}^2$, correct to the nearest $0.5\,\text{m}^2$.
The width of the rectangle is 3.8 m, correct to the nearest 0.1 m.

Calculate the upper bound of the length of the rectangle.

..... m [3]

21 Simplify.

(a) $\dfrac{8}{32x}$

..... [1]

(b) $\dfrac{2f^2 - 8f}{f^2 - 16}$

..... [3]

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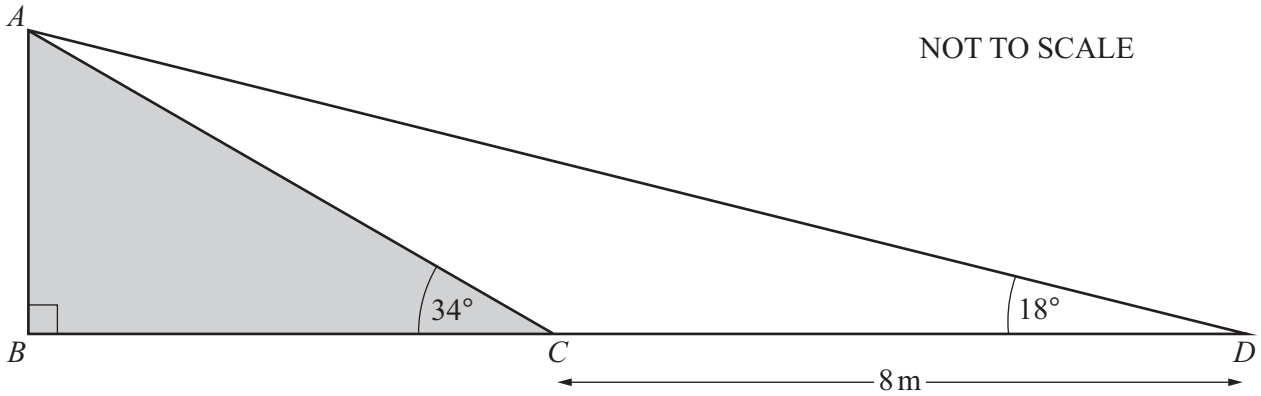
22 The diagram shows a triangular garden *ABD*.
A path from *A* meets *BD* at point *C*.



$CD = 8\,\text{m}$, angle $ADC = 18°$, angle $ACB = 34°$ and angle $ABC = 90°$.

(a) Calculate the area of triangle *ABC*.

..... m^2 [6]

(b) The shaded area *ABC* is covered with grass seed.
A box of grass seed costs \$6.
Each box contains enough grass seed to cover an area of $5\,\text{m}^2$.

Calculate the total cost of the boxes needed to cover this area with seed.

\$ ..... [2]

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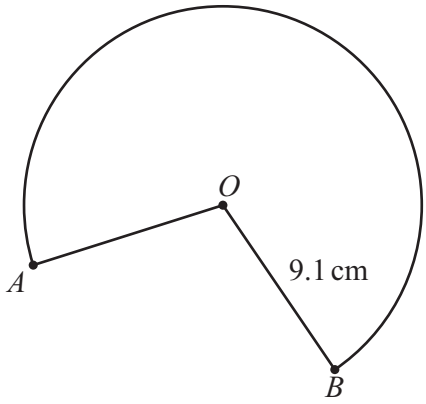


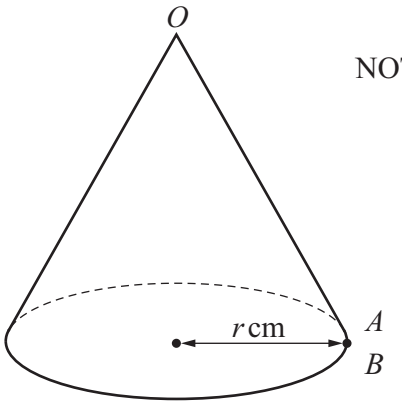
NOT TO SCALE

The diagram shows a sector of a circle with centre O and radius 9.1 cm.
The length of the major arc AB is 44 cm.

(a) Find the angle of the major sector AOB.

..... [3]

(b) Jamila joins OA to OB to form the curved surface of a cone.



NOT TO SCALE

(i) Show that the radius, r, of the cone is 7.0 cm, correct to 1 decimal place.

[2]

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(ii) Calculate the volume of the cone.

..... cm^3 [4]

(iii) Oliver has a cone that is mathematically similar to Jamila's cone.
The volume of Oliver's cone is $2387\,cm^3$.

Calculate the radius of Oliver's cone.

..... cm [3]

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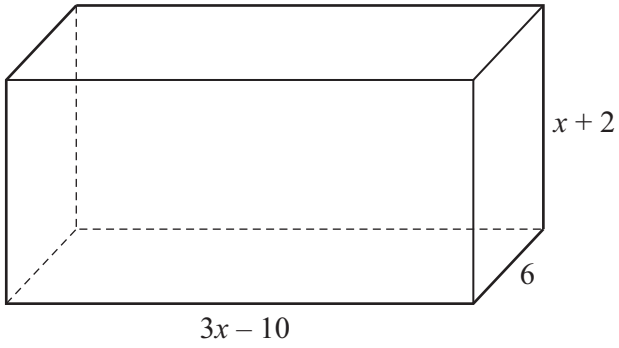
24 The diagram shows a solid cuboid.
All the lengths are in centimetres.



NOT TO SCALE

(a) The volume of the cuboid is $720\,\text{cm}^3$.

Show that $3x^2 - 4x - 140 = 0$.

[3]

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(b) Use the quadratic formula to solve $3x^2 - 4x - 140 = 0$.
Show all your working and give your answers correct to 2 decimal places.

$x =$ ..... or $x =$ ..... [3]

(c) Calculate the area of the top face of the cuboid.

..... cm^2 [2]

Question 25 is on the back page.

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25 **(a)** Write $2x^2 - 8x + 7$ in the form $a(x-b)^2 + c$.

..... [3]

(b) Write down the coordinates of the turning point of the graph of $y = 2x^2 - 8x + 7$.

(..... , ...) [1]

(c) The equation $2x^2 - 8x + 7 = k$ has two solutions.

Complete the inequality for k.

$k >$ ..... [1]

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