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CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/42**

Paper 4 Calculator (Extended) **February/March 2025**

1 hour 30 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. 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 either your calculator value or 3.142.

INFORMATION

- The total mark for this paper is 75.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **16** pages. Any blank pages are indicated.

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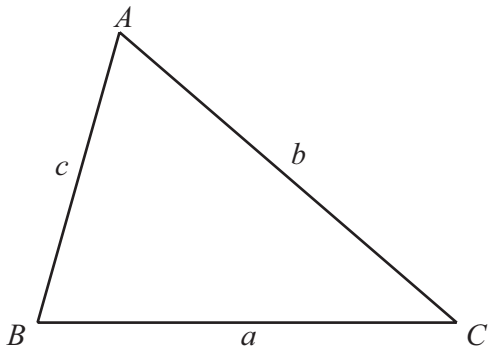
List of formulas

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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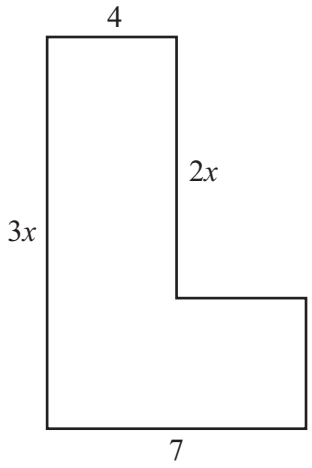
1 This shape is made using 2 rectangles.



NOT TO SCALE

(a) Find the perimeter of the shape.
Give your answer, in terms of x, in its simplest form.

..... [2]

(b) Find the area of the shape.
Give your answer, in terms of x, in its simplest form.

..... [2]

2 $Y is shared in the ratio 5 : 2.
The difference between the two shares is $108.

Work out the value of Y.

$Y =$ ..... [2]

3 Work out $5\frac{1}{6} \times \frac{24}{27}$.

Give your answer as a mixed number.

..... [1]

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4 $\mathbf{a} = \begin{pmatrix} 6 \\ 12 \end{pmatrix}$ $\mathbf{b} = \begin{pmatrix} 5 \\ -1 \end{pmatrix}$

(a) Work out $\frac{1}{3}\mathbf{a} - \mathbf{b}$.

( ) [2]

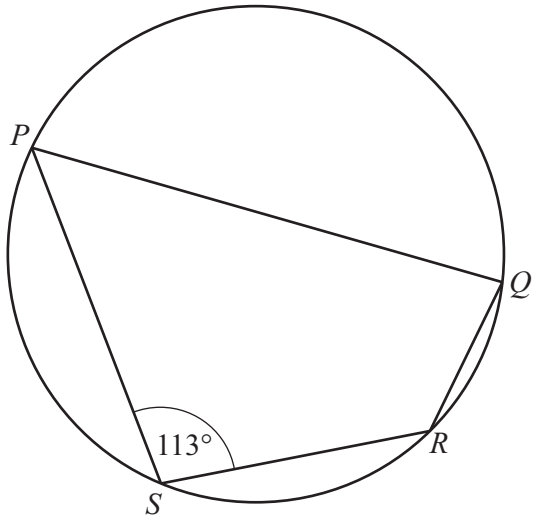
(b) Find $|\mathbf{b}|$.

..... [2]

5 Work out $\sqrt{25 - 7^{0.3} \times 1.5}$.

..... [1]

6



NOT TO SCALE

P, Q, R and S are points on the circle.

Find angle PQR.

Angle PQR = ... [1]

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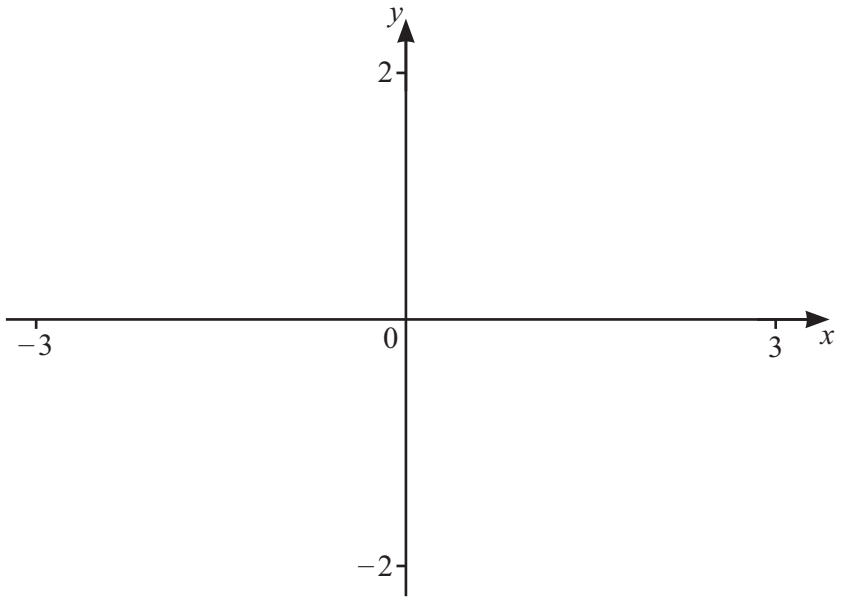
7 Write $7\,230\,000\,000$ in standard form.

..... [1]

8



$$f(x) = \frac{1}{x^2 + 1}$$

(a) On the diagram, sketch the graph of $y = f(x)$ for values of x between -3 and 3. [2]

(b) Solve $f(x) < x^2 + x - 1$.

..... [4]

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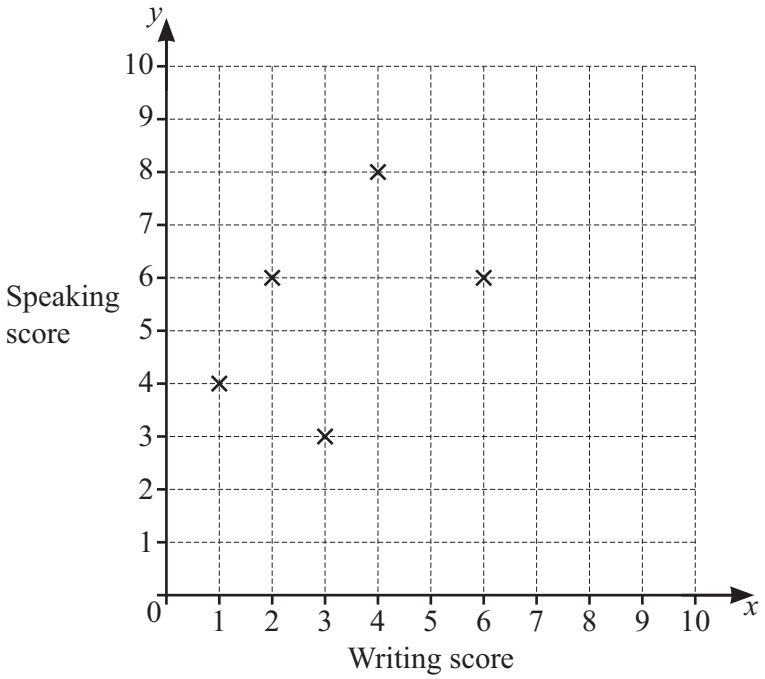
9 A class of students take a writing test and a speaking test.
The scores are shown in the table.

Writing score (x)	1	2	3	4	6	7	8	9	10
Speaking score (y)	4	6	3	8	6	7	7	8	9

(a) Complete the scatter diagram.
The first 5 points have been plotted for you.



[2]

(b) Find the equation of the line of regression for y in terms of x.

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

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10 The table shows the number of pens in each room in a school.

Number of pens	1	2	3	4	5	6
Frequency	14	5	3	x	2	1

The mean number of pens is 2.3 .

Find the value of x.

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

11 Vikram invests \$450 at a rate of 3.1% per year compound interest.

Calculate the number of complete years that it takes for the value of Vikram's investment to first be greater than \$900.

..... [4]

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12 A container is in the shape of a cuboid.
The cuboid measures 41 cm by 32 cm by 25 cm.

(a) Show that the capacity of the container is 32.8 litres.

[2]

(b) At 10 40 the container is empty.
Water flows into the container at a rate of 2 litres per hour until the container is full.

(i) At 12 10 there are x litres of water in the container.

Find x as a percentage of 32.8 .

..... % [3]

(ii) Find the time when the container is full.

..... [3]

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13 $f(x) = 4x - 2$ $g(x) = (x+1)^2$

(a) Find $f(3)$.

..... [1]

(b) Find $fg(x)$.
Simplify your answer.

..... [2]

(c) Find $f^{-1}(x)$.

$f^{-1}(x) =$ ..... [2]

(d) Find $ff^{-1}(5)$.

..... [1]

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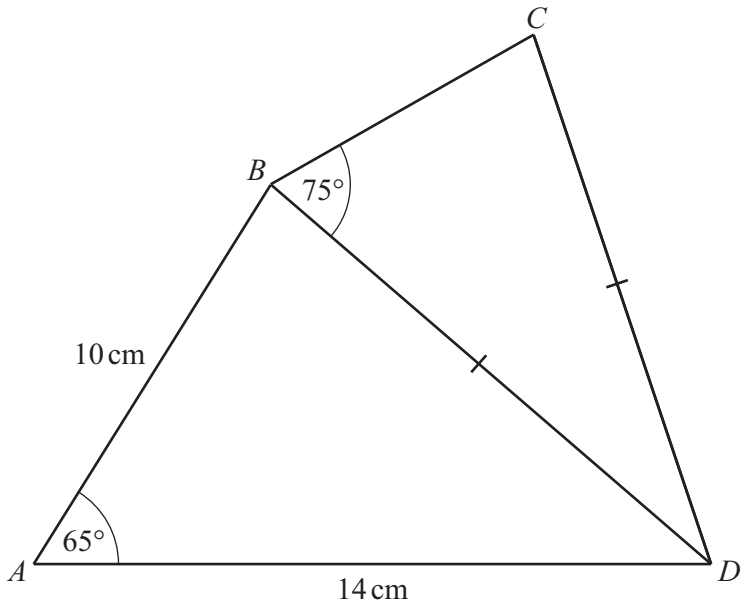

NOT TO SCALE

Triangle *BCD* is isosceles.

(a) Find the area of triangle *ABD*.

..... cm^2 [2]

(b) Find the shortest distance from *D* to *AB*.

..... cm [3]

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(c) Find the perimeter of *ABCD*.

..... cm [6]

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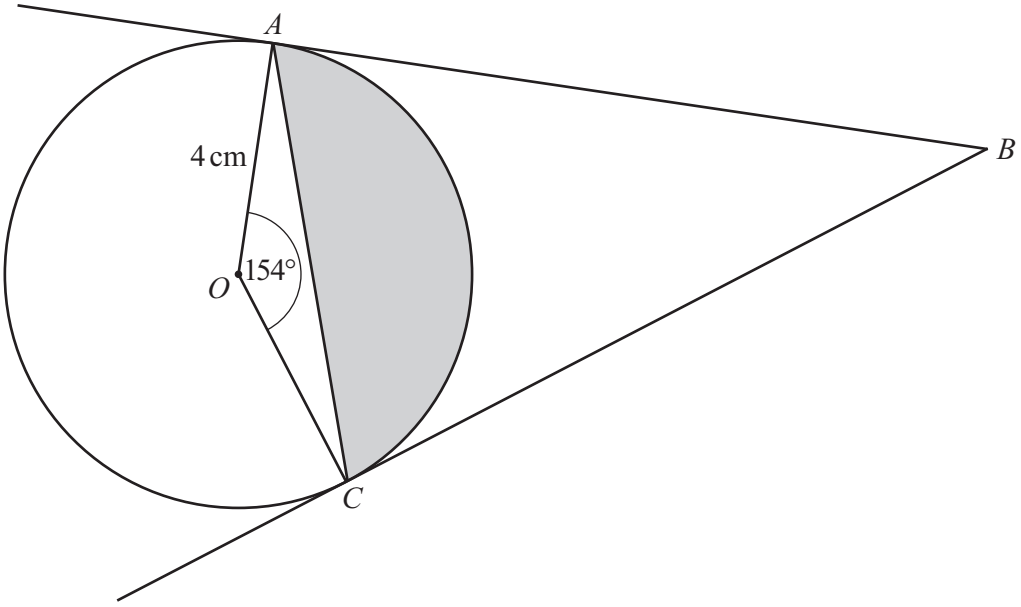

NOT TO SCALE

A and *C* are points on the circle, centre *O*.
BA and *BC* are tangents to the circle.
The radius of the circle is 4 cm.
Angle *AOC* = 154°.

(a) Write down the mathematical name of the quadrilateral *ABCO*.

..... [1]

(b) Calculate the area of the shaded segment.

..... cm^2 [3]

(c) Calculate the shortest distance from *B* to the circumference of the circle.

..... cm [3]

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16 Rupesh plays a game 3 times.
He can either win each game or lose each game.
The probability that Rupesh wins each game is 0.2 .

Find the probability that Rupesh loses the 3 games.

..... [2]

17 Simplify.

$\left(64a^6b^{-3}\right)^{\frac{2}{3}}$

..... [3]

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18 $\dfrac{10}{2x-5} - \dfrac{6}{x+1} = 1$

(a) Show that $2x^2 - x - 45 = 0$.

[4]

(b) Solve by factorising.

$2x^2 - x - 45 = 0$

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

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