Cambridge Assessment International Education

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CANDIDATE NAME

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MATHEMATICS **0580/41**

Paper 4 Calculator (Extended) **May/June 2025**

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 or correction fluid.
- 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 **16** pages.

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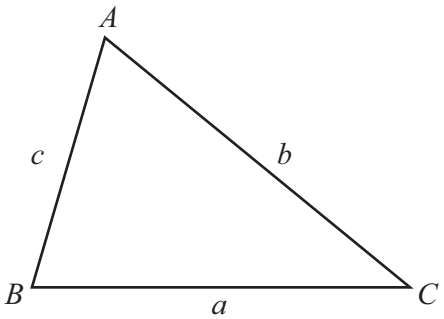
[Turn over

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 Solve.

$4c - 9 = 13$

$c =$ ..... [2]

2 Work out.

$$\frac{16.71 + 46.13}{\sqrt{8.6^2 - 3.5^2}}$$

Give your answer correct to 2 significant figures.

..... [2]

3 In the USA, one gallon of fuel costs \$4.83 .
In the UK, one litre of fuel costs £1.62 .

The exchange rate is £1 = \$1.215 .
1 gallon = 3.785 litres

In which country does 1 litre of fuel cost more and by how much?
Give your answer in dollars.

..... by \$ ..... [3]

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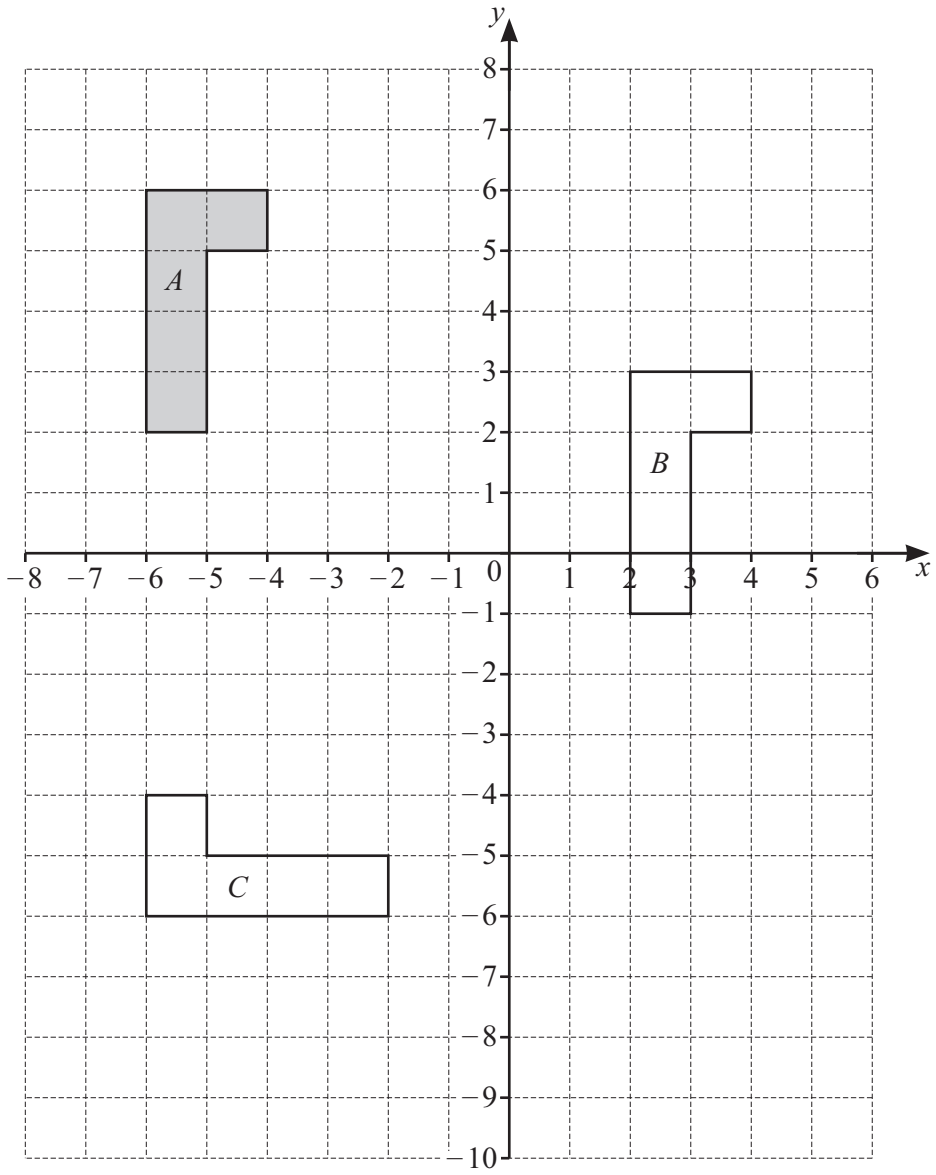

(a) Describe fully the **single** transformation that maps

(i) shape A onto shape B

.....

..... [2]

(ii) shape A onto shape C.

.....

..... [3]

(b) On the grid, draw the image of shape A after a reflection in the line $x = -2$. [2]

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5 **(a)** These are the first 5 terms of a sequence.

1 8 27 64 125

Find the 10th term of this sequence.

..... [1]

(b) These are the first 5 terms of a different sequence.

5 8 13 20 29

Find the *n*th term of this sequence.

..... [2]

(c) The **sum of the first *n* terms** of another sequence is $\frac{n}{2}(5n-1)$.

(i) Use $n = 2$ to find the sum of the first two terms in this sequence.

..... [1]

(ii) Find the 3rd term of this sequence.

..... [2]

6 Expand.

$5x^2(3x-2)$

..... [2]

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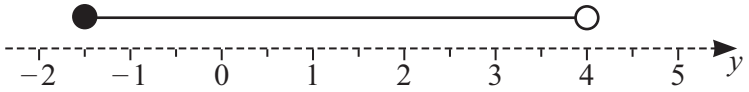

Write down the inequality in y shown by the number line.

..... [2]

8 Hadi buys a dishwasher.
He can either pay a single payment of \$980 or he can pay using a monthly plan.
The monthly plan is 20% of \$980 **plus** 12 payments of \$75.25 .

(a) Hadi uses the monthly plan.

Calculate the total amount Hadi pays.

\$ ..... [2]

(b) Find the percentage increase in the cost using the monthly plan compared to a single payment.

..... % [2]

9 In a sale, the original price of a sewing machine is reduced by \$38.
This is an 8% reduction in the original price.

Work out the original price of the sewing machine.

\$ ..... [2]

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10 **(a)** Write down **all** the factors of 18.

..... [2]

(b) Factorise.

$3y - xy + 15 - 5x$

..... [2]

(c) $3y - xy + 15 - 5x = 18$

where x and y are positive integers.

Using your answers to **part (a)** and **part (b)**, find one possible value of x and the corresponding value of y.

$x =$ ..... , $y =$ ..... [2]

11 A warehouse has a floor area of 800 m^2.
The plan of the warehouse is drawn to a scale of 1 : 50.

Calculate the floor area on the plan.
Give your answer in square centimetres.

..... cm^2 [3]

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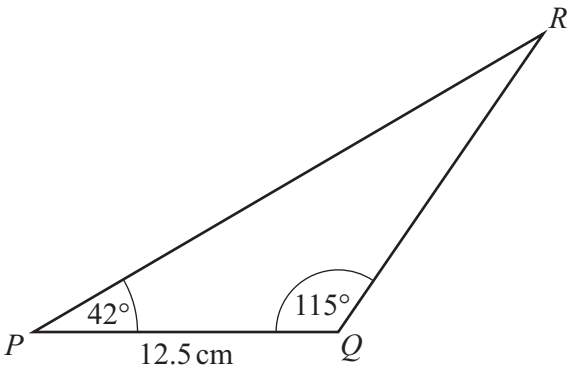

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The diagram shows triangle PQR.

Calculate the shortest distance from Q to PR.

..... cm [3]

13 Make x the subject of this formula.

$$A = w^2 + 5x^2$$

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

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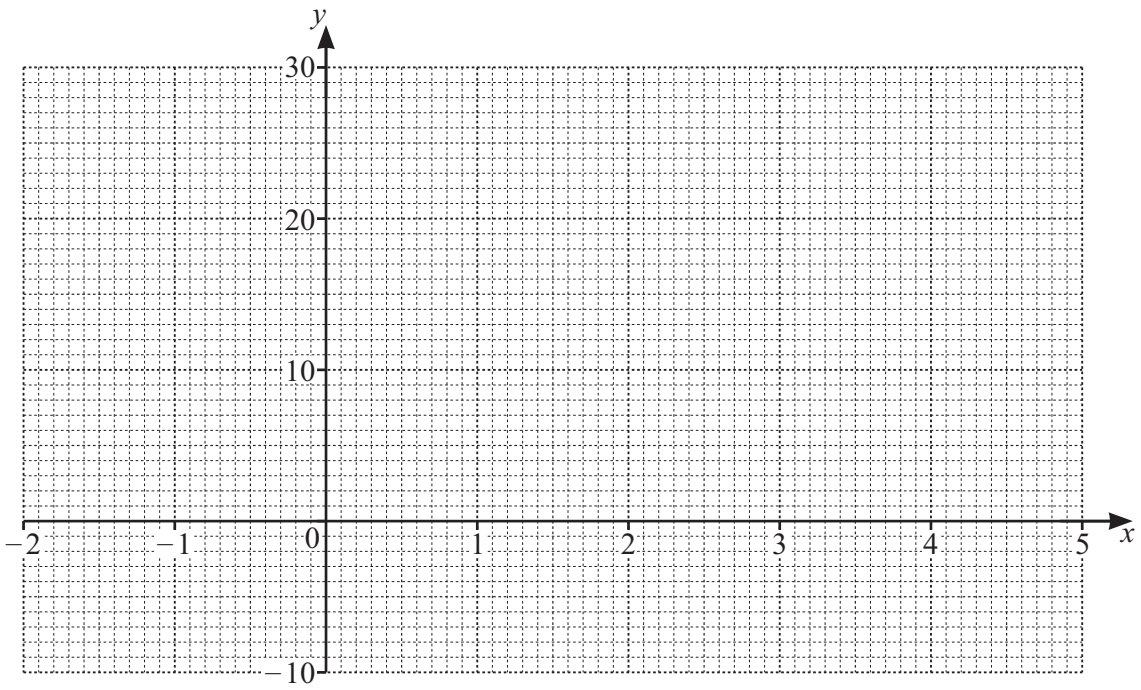
14 The table shows some values for $y = 5x^2 - x^3 - 4$.

x	-2	-1	0	1	2	3	4	5
y	24		-4		8	14		-4

(a) Complete the table. [3]

(b) On the grid, draw the graph of $y = 5x^2 - x^3 - 4$ for $-2 \leqslant x \leqslant 5$.



[4]

(c) By drawing a suitable straight line on the grid, solve the equation $x^3 - 5x^2 - x + 14 = 0$.

$x =$ ..... or $x =$ ..... or $x =$ ..... [4]

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15 The height of each of 140 basketball players is recorded.
The table shows the results.

Height (h cm)	$160 < h \leqslant 180$	$180 < h \leqslant 185$	$185 < h \leqslant 190$	$190 < h \leqslant 200$	$200 < h \leqslant 210$
Frequency	7	12	31	70	20

(a) Calculate an estimate of the mean height.

..... cm [4]

(b) Two of the players are chosen at random.

Find the probability that both players have a height greater than 190 cm and no more than 200 cm.

..... [2]

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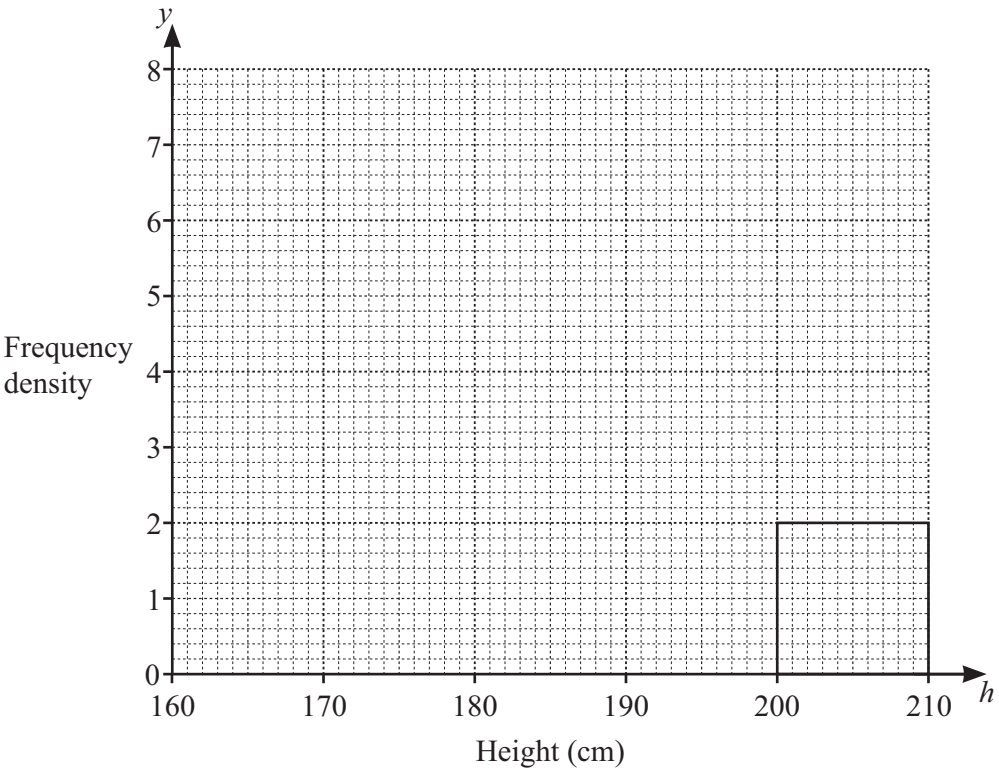
(c) Complete the histogram to show the information in the frequency table.



[3]

16 Mateo invests \$1250 at a rate of r% per year compound interest.
At the end of 6 years the total value of his investment is \$1484.

Calculate the value of r.

$r =$ ..... [3]

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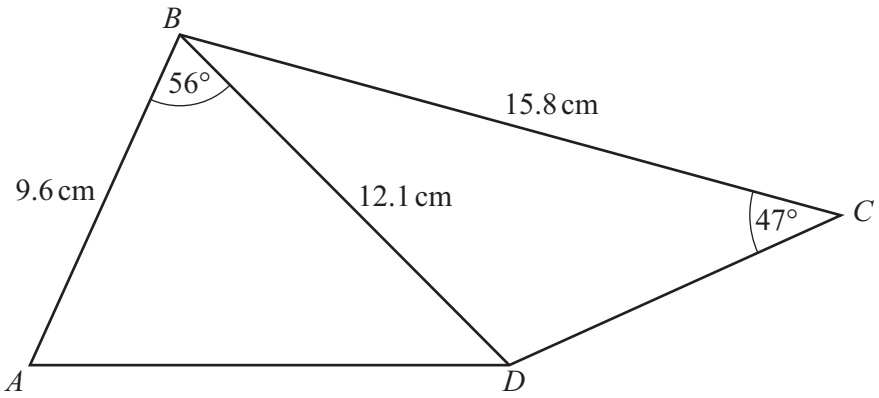

NOT TO SCALE

The diagram shows a quadrilateral $ABCD$.

(a) Calculate AD.

$AD =$ ..... cm [3]

(b) Calculate the obtuse angle BDC.

Angle $BDC =$ ..... [4]

(c) Calculate the area of the quadrilateral.

..... cm^2 [3]

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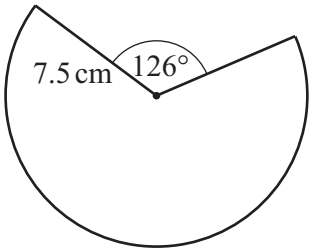
18 $2x^2 + 12x - 2$ can be written in the form $a(x+b)^2 - c$.

Find the values of a, b and c.

$a =$ ..... , $b =$ ..... , $c =$ ..... [3]

19



NOT TO SCALE

The diagram shows a major sector of a circle with radius 7.5 cm.

Calculate the perimeter of the major sector.

..... cm [4]

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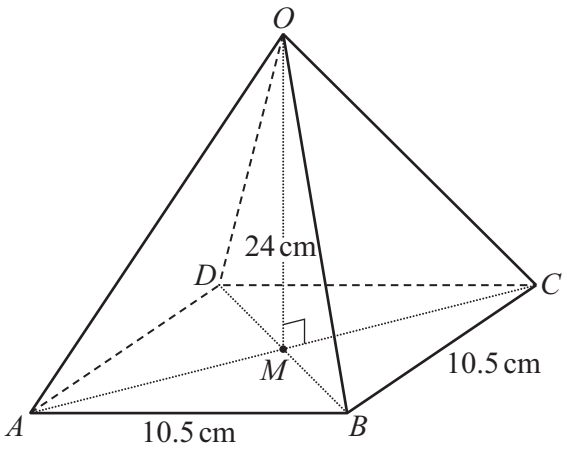

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The diagram shows a pyramid $OABCD$.
The pyramid has a square base, $ABCD$, with sides 10.5 cm.
The vertex O is vertically above the centre of the base, M.
The height of the pyramid is 24 cm.

(a) Calculate the angle that OA makes with the base.

..... [4]

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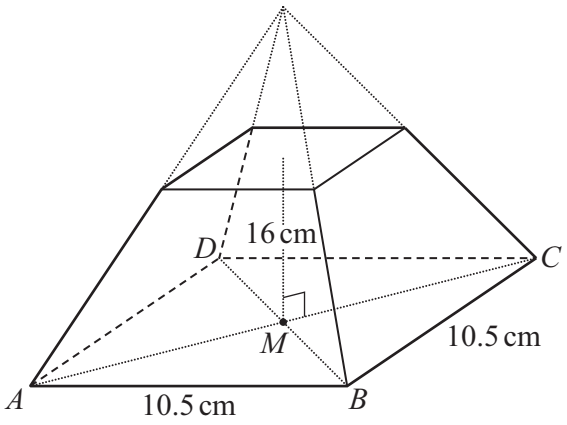
(b)



NOT TO SCALE

The diagram shows a frustum of the pyramid *OABCD*.
The height of the frustum is 16 cm.

Calculate the volume of the frustum.

..... cm^3 [5]

Question 21 is on page 16.

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21 $\dfrac{16^{5m}}{4} = 64^{2n}$

Find m in terms of n.

$m =$ ..... [3]

22 $I = \dfrac{V}{R}$

V is 50, correct to the nearest 10.
R is 13, correct to the nearest integer.

Calculate the upper bound of I.

..... [3]

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