



# Cambridge IGCSE™

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**MATHEMATICS**

**0580/02**

Paper 2 Non-calculator (Extended)

**For examination from 2025**

SPECIMEN PAPER

**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.
- Calculators must **not** be used in this paper.
- You may use tracing paper.
- You must show all necessary working clearly.

## 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 **18** pages. Any blank pages are indicated.

## 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  $h$ .  $V = \frac{1}{3}Ah$

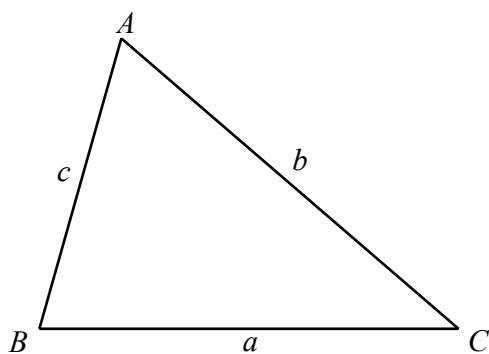
Volume,  $V$ , of cylinder of radius  $r$ , height  $h$ .  $V = \pi r^2 h$

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,



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

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

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

Calculators must **not** be used in this paper.

- 1 Work out  $(0.01)^2$ .

..... [1]

- 2 Write 57.3997 correct to 4 significant figures.

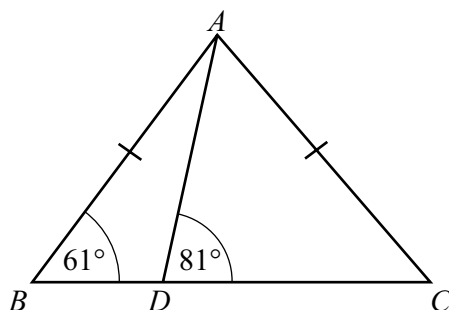
..... [1]

- 3 Aimee changes 250 euros into dollars.  
The exchange rate is 1 euro = \$1.10 .

Calculate the number of dollars Aimee receives.

\$ ..... [1]

- 4 The diagram shows two triangles,  $ABD$  and  $ADC$ .



NOT TO  
SCALE

$BDC$  is a straight line,  $AB = AC$ , angle  $ABD = 61^\circ$  and angle  $ADC = 81^\circ$ .

Work out angle  $DAC$ .

Angle  $DAC =$  ..... [2]

5 Convert  $0.17 \text{ m}^2$  into  $\text{cm}^2$ .

.....  $\text{cm}^2$  [1]

6 The mass of a solid metal cuboid is 4 kg. The volume of the cuboid is  $600 \text{ cm}^3$ .

Calculate the density of the metal, giving your answer in  $\text{g/cm}^3$ .

[Density = mass  $\div$  volume]

.....  $\text{g/cm}^3$  [2]

7  $\mathbf{u} = \begin{pmatrix} 3 \\ -2 \end{pmatrix}$   $\mathbf{v} = \begin{pmatrix} -12 \\ 5 \end{pmatrix}$

(a) Find  $\mathbf{u} - 2\mathbf{v}$ .

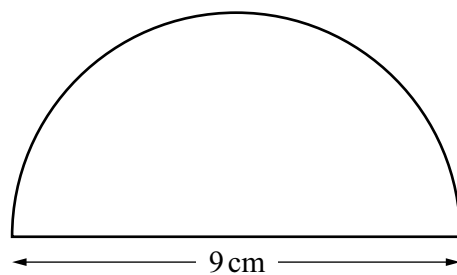
$\begin{pmatrix} \phantom{0} \\ \phantom{0} \end{pmatrix}$  [2]

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

..... [2]

5

8

NOT TO  
SCALE

The diagram shows a semicircle with diameter 9 cm.

Calculate the total perimeter of this semicircle.  
Give your answer in exact form.

..... cm [3]

9 In a sequence

$$T_1 = 17 \quad T_2 = 12 \quad T_3 = 7 \quad T_4 = 2.$$

Find

(a)  $T_5$

..... [1]

(b)  $T_n$ .

..... [2]

10 Work out  $2\frac{2}{3} + 3\frac{1}{2}$ .

Give your answer as a mixed number in its simplest form.

..... [3]

11 Find the value of  $64^{\frac{2}{3}}$ .

..... [2]

12 Work out, giving your answer in standard form,

(a)  $(7.1 \times 10^{-15}) \times (2 \times 10^3)$

..... [2]

(b)  $(5.2 \times 10^7) + (5.2 \times 10^6)$ .

..... [2]

13 Find the number of sides of a regular polygon with interior angle  $162^\circ$ .

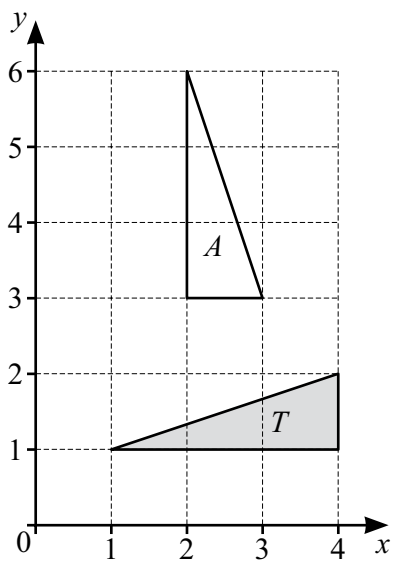
..... [2]

14 The range, mode, median and mean of five positive integers are all equal to 10.

Find one possible set of these five integers.

....., ....., ....., ....., ..... [4]

15



Describe fully the **single** transformation that maps triangle  $T$  onto triangle  $A$ .

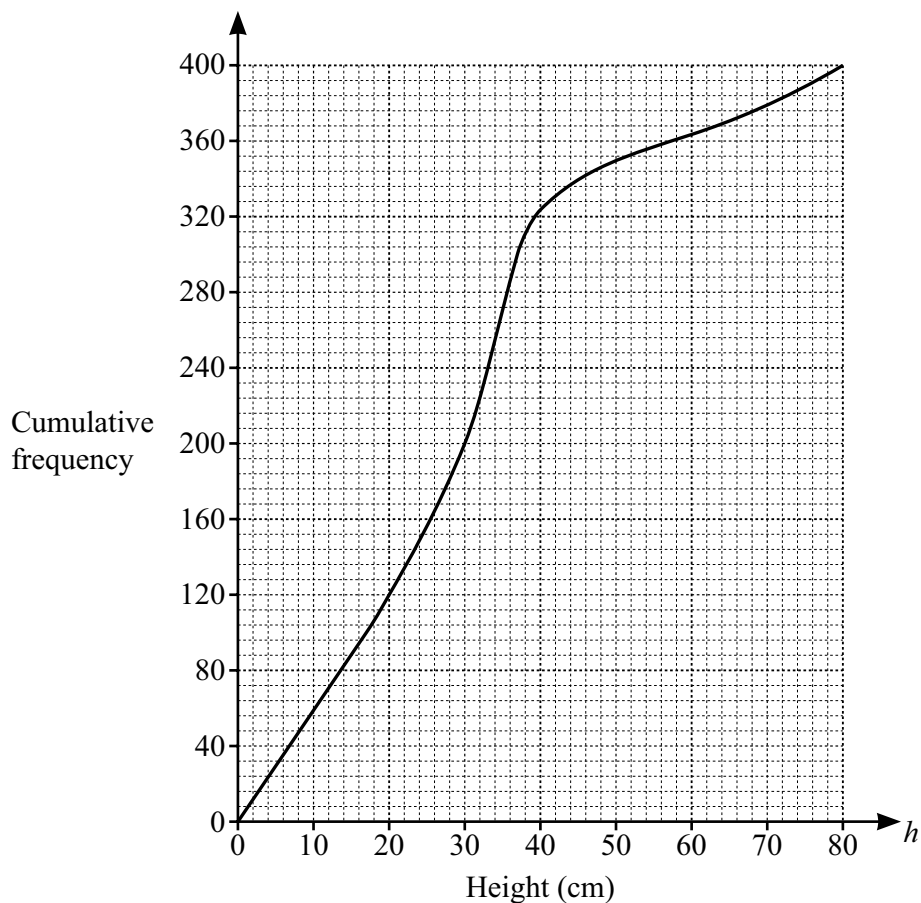
.....

..... [3]



16 A student measures the height,  $h$  cm, of each of 400 plants.

(a) The cumulative frequency diagram shows the results.



Use the diagram to find an estimate for

(i) the median

..... cm [1]

(ii) the interquartile range

..... cm [2]

(iii) the 80th percentile

..... cm [2]

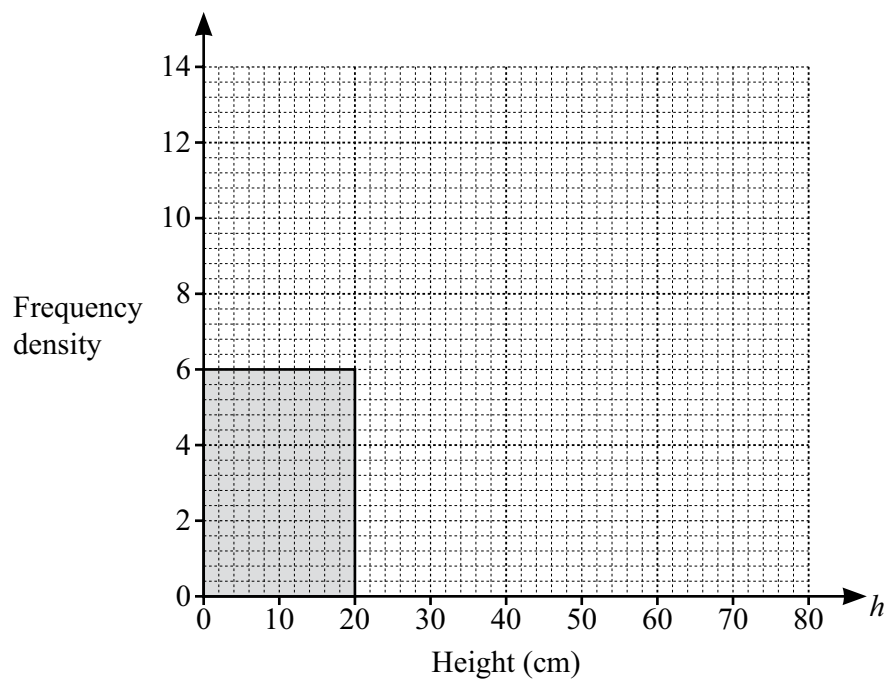
(iv) the number of plants with a height greater than 60 cm.

..... [2]

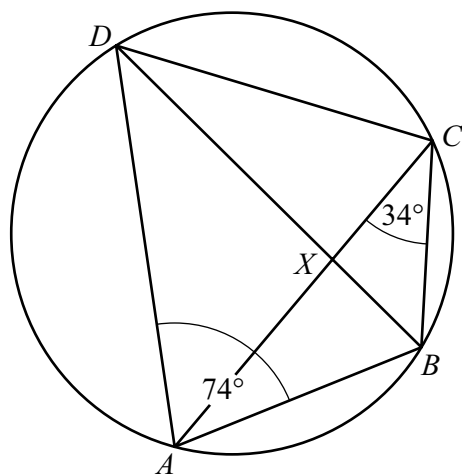
(b) The heights are also shown in the frequency table.

Height ( $h$ cm)	$0 < h \leq 20$	$20 < h \leq 30$	$30 < h \leq 40$	$40 < h \leq 80$
Frequency	120	80	124	76

Complete the histogram to show this information.



[3]



NOT TO  
SCALE

The diagram shows a cyclic quadrilateral  $ABCD$ .  
 $BD$  and  $AC$  intersect at  $X$ .

- (a) Angle  $BAD = 74^\circ$  and angle  $BCA = 34^\circ$ .

Find

- (i) angle  $BDA$

Angle  $BDA = \dots\dots\dots$  [1]

- (ii) angle  $BCD$

Angle  $BCD = \dots\dots\dots$  [1]

- (iii) angle  $ABD$ .

Angle  $ABD = \dots\dots\dots$  [1]

- (b) In the diagram, triangle  $ADX$  is similar to triangle  $BCX$ .  
 $BC = 4.5$  cm,  $AD = 9$  cm and  $CX = 3.3$  cm.

Work out  $XD$ .

$XD = \dots\dots\dots$  cm [2]

18  $f(x) = 3 - 2x$        $g(x) = 2x + 3$        $h(x) = 2^x$

(a) (i) Find  $f(-3)$ .

..... [1]

(ii) Find  $gf(-3)$ .

..... [1]

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

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

(c) Find  $x$  when  $gg(x) = 7$ .

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

(d) Find  $x$  when  $h^{-1}(x) = 5$ .

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

- 19 (a) Simplify.  $\sqrt{32} + \sqrt{98}$

..... [2]

- (b) Rationalise the denominator.

$$\frac{1}{\sqrt{2} + 1}$$

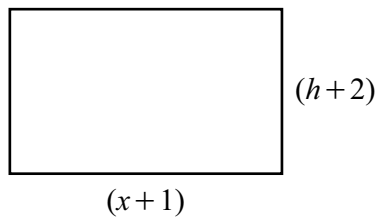
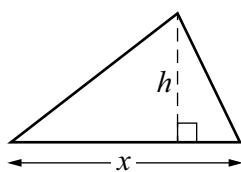
..... [2]

- 20  $y \propto \frac{1}{\sqrt{x}}$   
When  $y = 8, x = 4$ .

Find  $y$  when  $x = 49$ .

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

- 21 In this question, all measurements are in centimetres.



NOT TO  
SCALE

The height of the triangle is  $h$  and the height of the rectangle is  $(h + 2)$ .  
The length of the base of the triangle is  $x$  and the length of the rectangle is  $(x + 1)$ .  
The area of the triangle is  $11 \text{ cm}^2$  and the area of the rectangle is  $39 \text{ cm}^2$ .

- (a) Write down an expression, in terms of  $x$ , for the height of the rectangle.

..... [1]

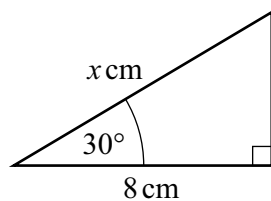
- (b) Show that  $2x^2 - 15x + 22 = 0$ .

[3]

- (c) By factorising and solving  $2x^2 - 15x + 22 = 0$ , find the two possible heights of the triangle.

$h = \dots\dots\dots$  or  $h = \dots\dots\dots$  [5]

22

NOT TO  
SCALEFind the exact value of  $x$ .

$$x = \dots\dots\dots [4]$$

23 Write as a single fraction in its simplest form.

$$\frac{3}{x-4} - \frac{4}{x+3}$$

$$\dots\dots\dots [3]$$

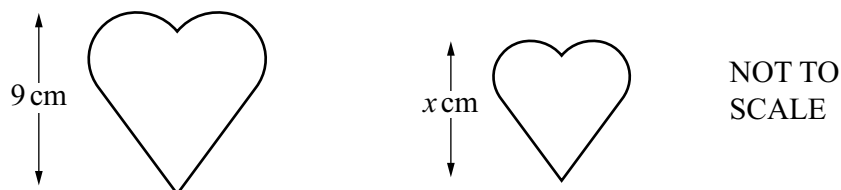
24 (a) Write  $x^2 - 4x + 7$  in the form  $(x - a)^2 + b$ .

..... [2]

(b) Write down the coordinates of the turning point of the graph of  $y = x^2 - 4x + 7$ .

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

25



The two shapes are mathematically similar.

The area of the larger shape is  $36 \text{ cm}^2$  and the area of the smaller shape is  $25 \text{ cm}^2$ .

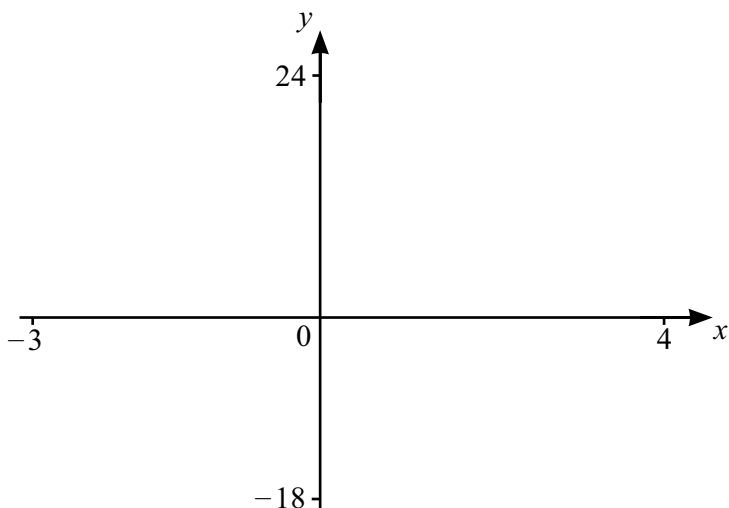
The height of the larger shape is 9 cm and the height of the smaller shape is  $x$  cm.

Find the value of  $x$ .

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



26



$$f(x) = x(x + 2)(x - 3)$$

- (a) On the diagram, sketch the graph of  $y = f(x)$  for  $-3 \leq x \leq 4$ . Show the values of the intersections with the axes. [3]

- (b) Expand and simplify.  
 $x(x + 2)(x - 3)$

..... [3]

- (c)  $A$  is the point  $(1, -6)$ .  
 The tangent to the graph of  $y = f(x)$  at  $A$  meets the  $y$ -axis at  $B$ .  
 Find the coordinates of  $B$ .

( ..... , ..... ) [5]

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