



Cambridge IGCSE™

CANDIDATE
NAME

--

CENTRE
NUMBER

--	--	--	--	--

CANDIDATE
NUMBER

--	--	--	--



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

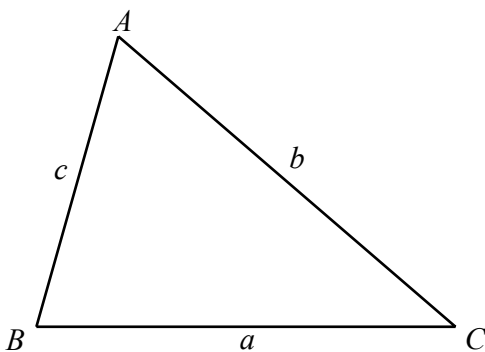
Volume, V , of cylinder of radius r , height h . $V = \pi r^2 h$

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.

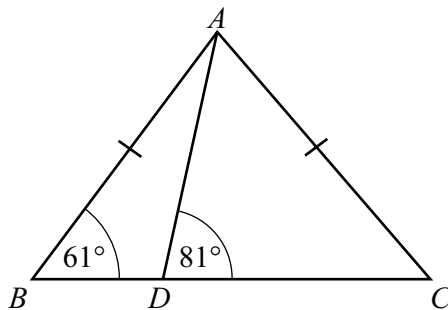
..... [1]

- 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 m^2 into cm^2 .

..... cm^2 [1]

6 The mass of a solid metal cuboid is 4 kg. The volume of the cuboid is 600 cm^3 .

Calculate the density of the metal, giving your answer in g/cm^3 .

[Density = mass \div volume]

..... g/cm^3 [2]

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

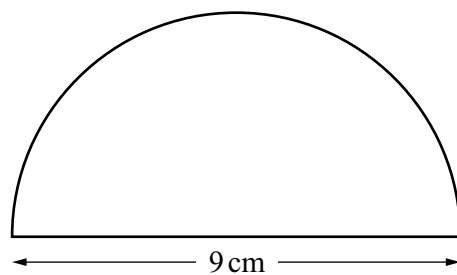
(a) Find $\mathbf{u} - 2\mathbf{v}$.

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

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

..... [2]

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° .

..... [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



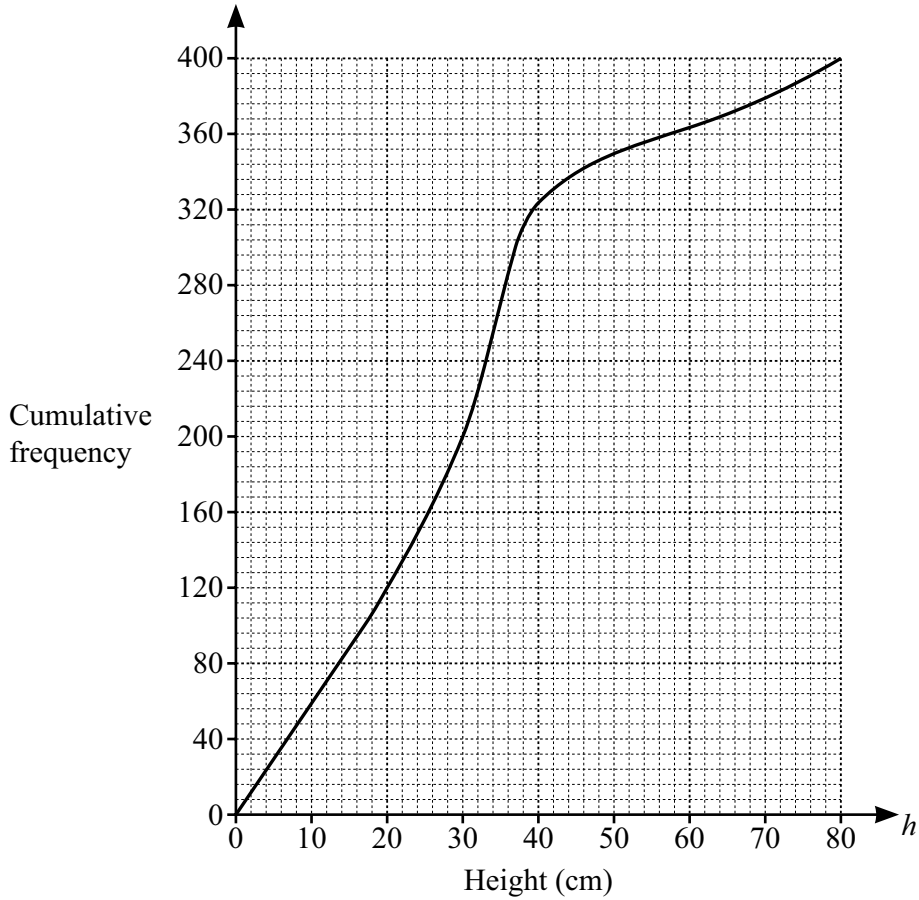
Describe fully the **single** transformation that maps triangle T onto triangle A .

.....

..... [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]

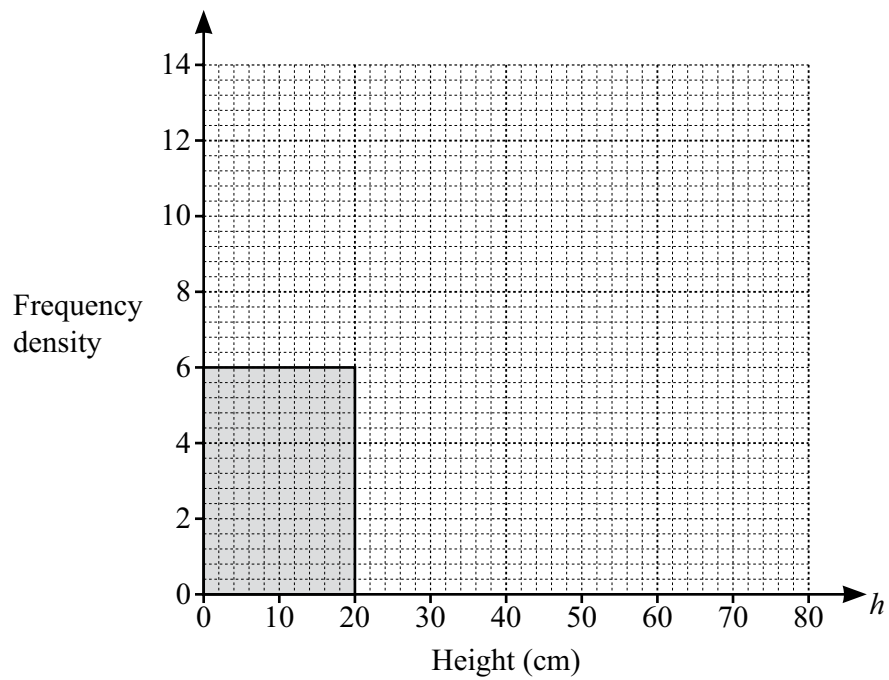
(iv) the number of plants with a height greater than 60 cm.

..... [2]

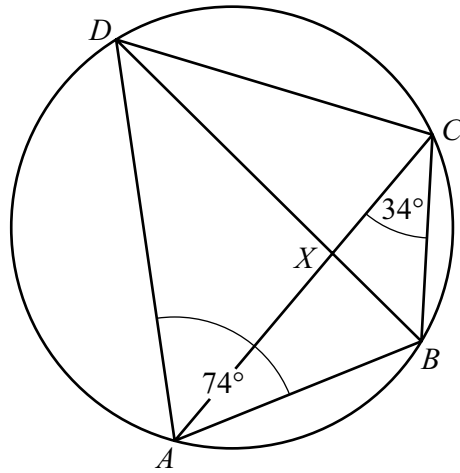
(b) The heights are also shown in the frequency table.

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.

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

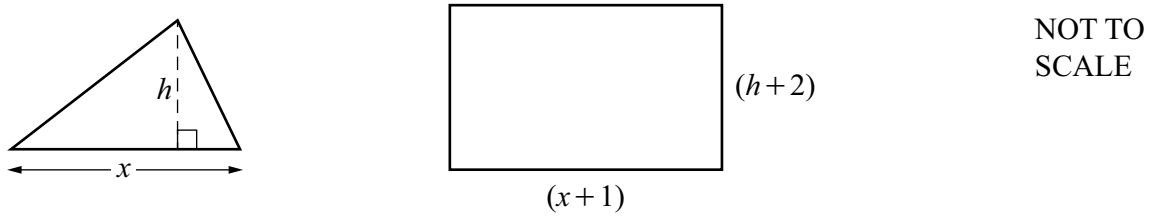
..... [2]

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.



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 cm^2 and the area of the rectangle is 39 cm^2 .

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

..... [1]

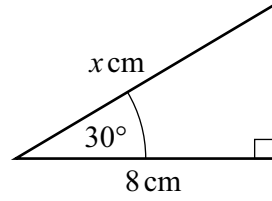
(b) Show that $2x^2 - 15x + 22 = 0$.

[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]

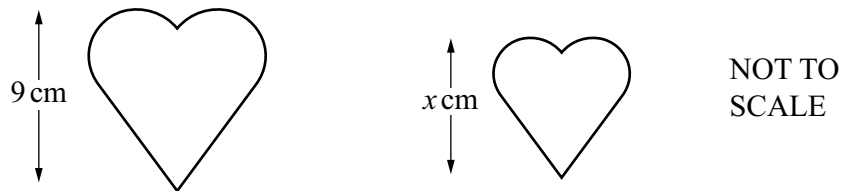
24 (a) Write $x^2 - 4x + 7$ in the form $(x - a)^2 + b$.

..... [2]

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

(..... ,) [1]

25



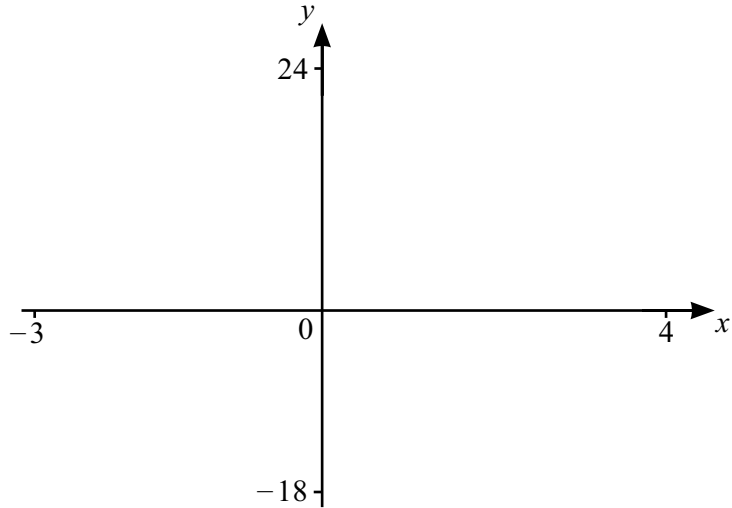
The two shapes are mathematically similar.

The area of the larger shape is 36 cm^2 and the area of the smaller shape is 25 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]



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

- (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]

BLANK PAGE

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (Cambridge University Press & Assessment) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

Cambridge Assessment International Education is part of Cambridge University Press & Assessment. Cambridge University Press & Assessment is a department of the University of Cambridge.