



Cambridge IGCSE™ (9–1)

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MATHEMATICS

0980/02

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

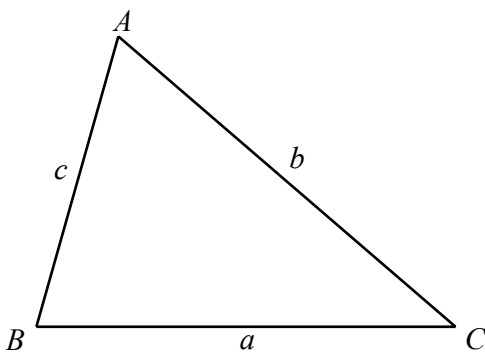
Volume, V , of cylinder of radius r , height h . $V = \pi r^2 h$

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.

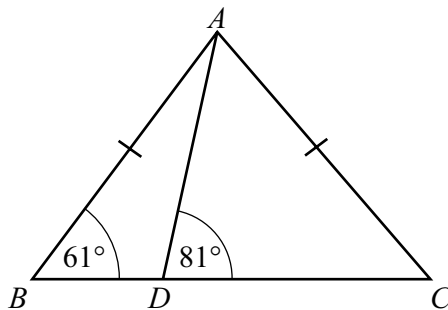
..... [1]

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

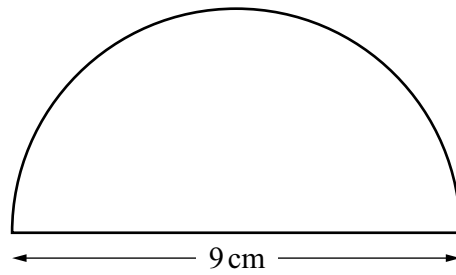
(a) Find $\mathbf{u} - 2\mathbf{v}$.

$\begin{pmatrix} \\ \end{pmatrix}$ [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° .

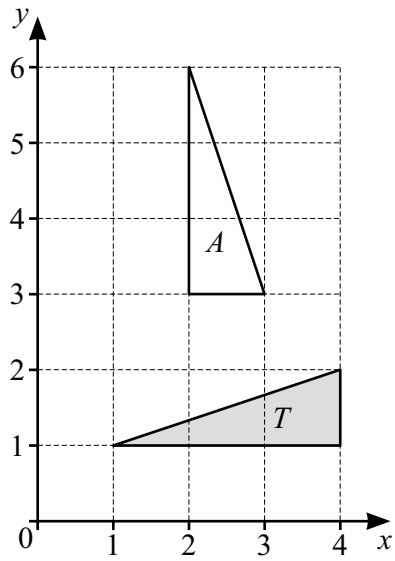
..... [2]

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



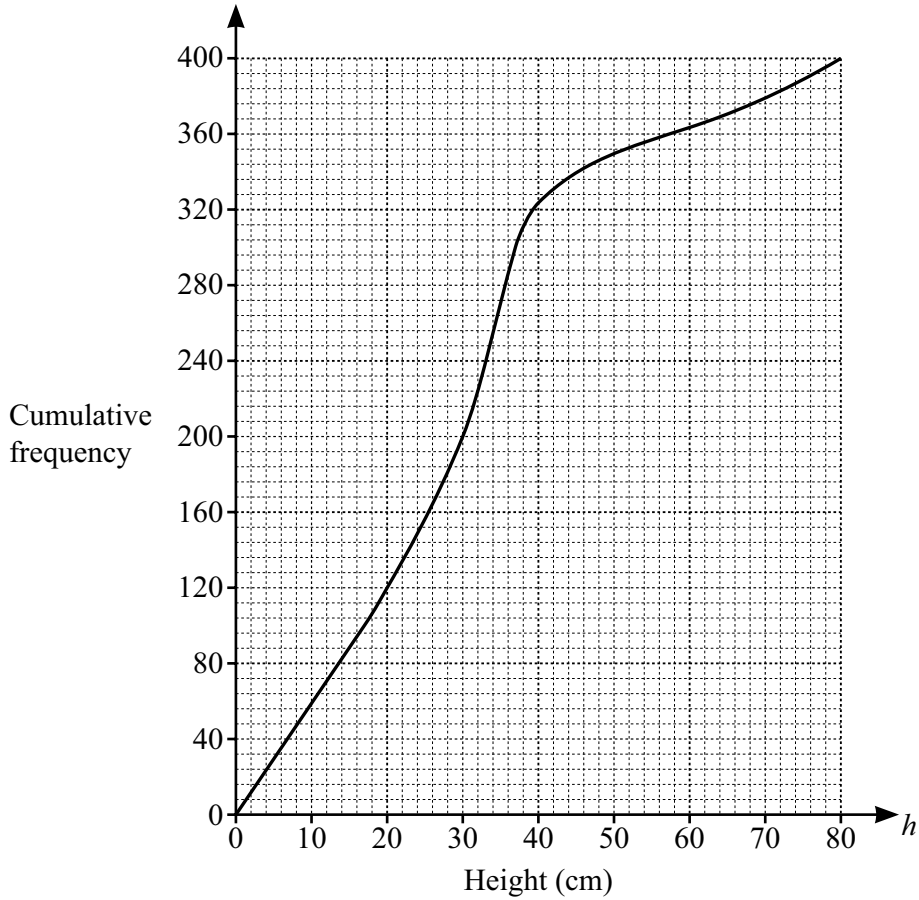
Describe fully the **single** transformation that maps triangle T onto triangle A .

.....

..... [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]

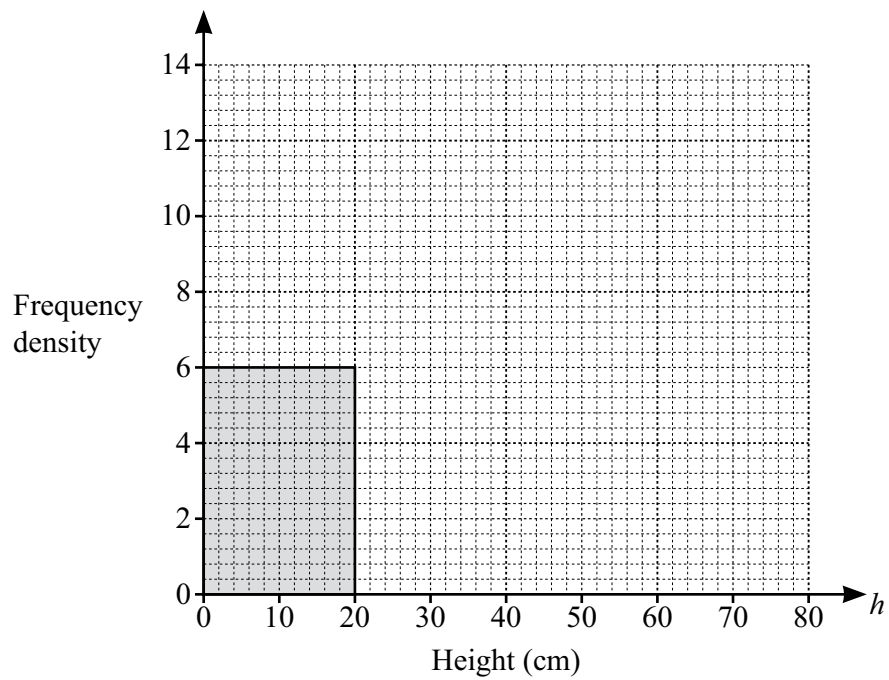
(iv) the number of plants with a height greater than 60 cm.

..... [2]

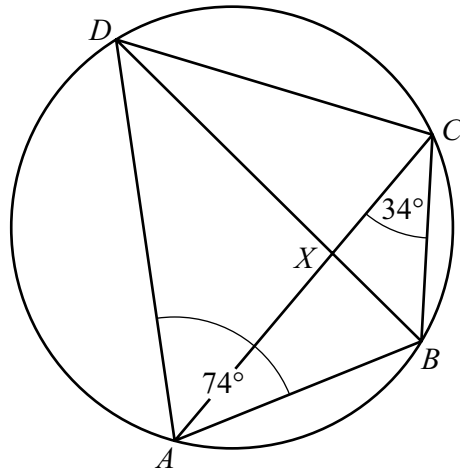
(b) The heights are also shown in the frequency table.

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.

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

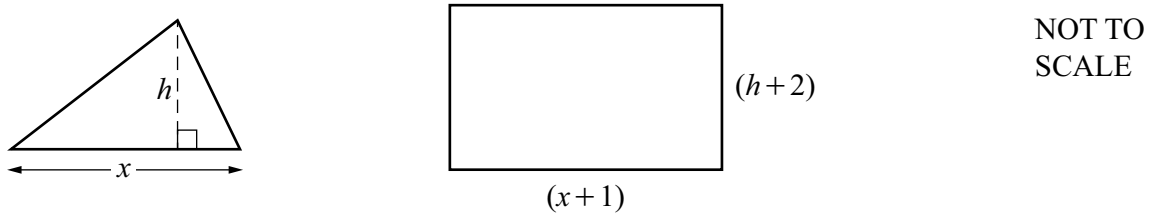
..... [2]

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]

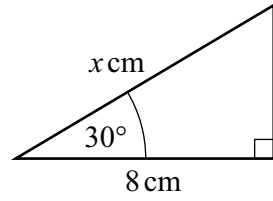
(b) Show that $2x^2 - 15x + 22 = 0$.

[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]

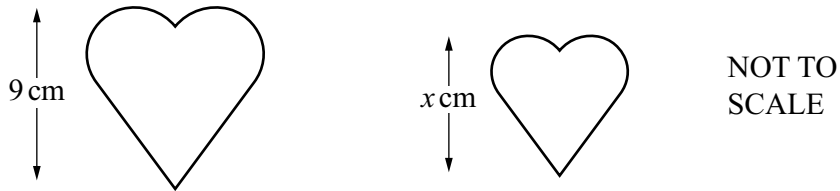
24 (a) Write $x^2 - 4x + 7$ in the form $(x - a)^2 + b$.

..... [2]

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

(..... ,) [1]

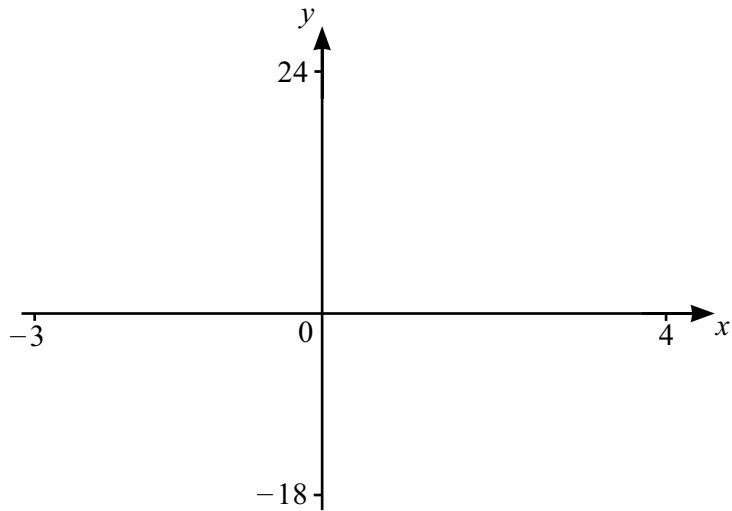
25



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]

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