Cambridge Assessment
International Education

Cambridge IGCSE™

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

MATHEMATICS **0580/21**

Paper 2 Non-calculator (Extended) **October/November 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.
- 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 **16** pages.

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 $\quad\quad ax^2 + bx + c = 0$, where $a \neq 0$, $\quad\quad x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

For the triangle shown,
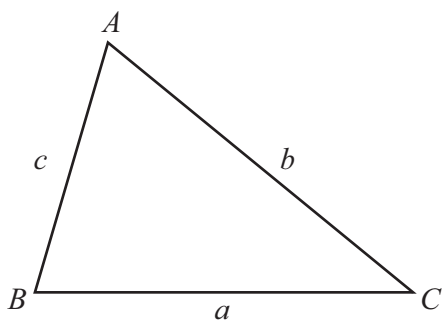
$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$
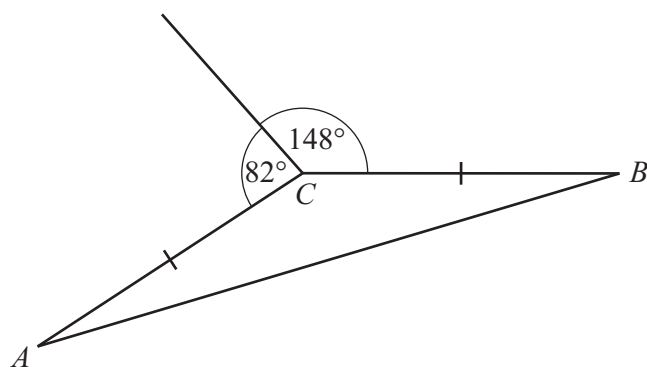
$$a^2 = b^2 + c^2 - 2bc \cos A$$

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

DO NOT WRITE IN THIS MARGIN

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

1   Divide $90 in the ratio 2 : 3.

$ .... , $ .... [2]

2

NOT TO SCALE

In the diagram, $AC = BC$.

Work out angle CAB.

Angle $CAB =$ .... [3]

3   Find the interior angle of a regular 20-sided polygon.

.... [2]

4 The area of a triangle is $12\,\text{cm}^2$.
The length of the base of the triangle is $8\,\text{cm}$.

Work out the height of the triangle.

.... cm   [2]

5
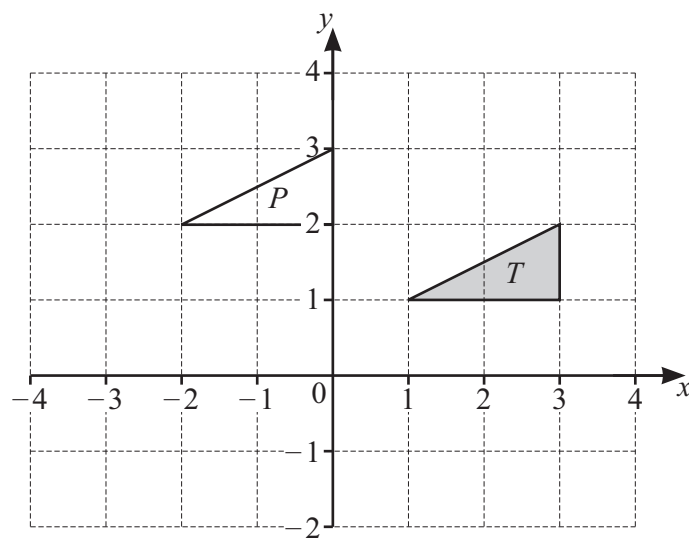
(a) Describe fully the **single** transformation that maps triangle *T* onto triangle *P*.

....

.... [2]

(b) Draw the image of triangle *T* after an enlargement of scale factor 2, centre (3, 3).   [2]

6 Find the value of

(a) $5^{-5} \times 5^{5}$

.... [1]

(b) $125^{\frac{2}{3}}$.

.... [2]

7 Simplify.

(a) $\dfrac{p}{t} \div \dfrac{2}{t}$

.... [2]

(b) $\dfrac{3x}{4} - \dfrac{x-1}{2}$

.... [2]

8 The cost of one orange is t cents.
The cost of one apple is w cents.

The total cost of 3 oranges and 1 apple is 51 cents.
The total cost of 6 oranges and 5 apples is 129 cents.

Use simultaneous equations to find the value of t and the value of w.
You must show all your working.

$t = $ ....

$w = $ ....

[5]

9 Nina walks at an average speed of 5 km/h, correct to the nearest km/h.
She walks for exactly 2 hours.

Work out the lower bound for the distance Nina walks.

.... km [2]

10 $\mathscr{E} = \{n: n$ is an integer and $1 \leqslant n \leqslant 8\}$
$A = \{$factors of 12$\}$
$B = \{$odd numbers$\}$

Find

(a) $A \cap B$

$A \cap B = \{$..............................$\}$ [1]

(b) $\text{n}(A' \cup B)$.

.... [1]

11 Write $0.2\dot{4}$ as a fraction in its simplest form.

.... [2]

12 The diagram shows a sector of a circle with centre O and radius 9 cm.

9 cm

O

9 cm
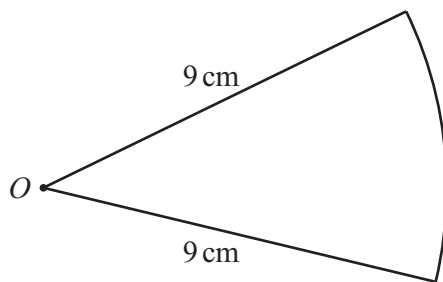
NOT TO
SCALE

The perimeter of the sector is $(18 + 2\pi)$ cm.

Find the area of the sector.
Give your answer in terms of π.

.... cm^2 [4]

13 These are Rahul's 10 test scores.

9 8 9 10 7 x 9 9 x 7

The mean of these scores is 8.

Find the interquartile range.
You must show all your working.

.... [4]
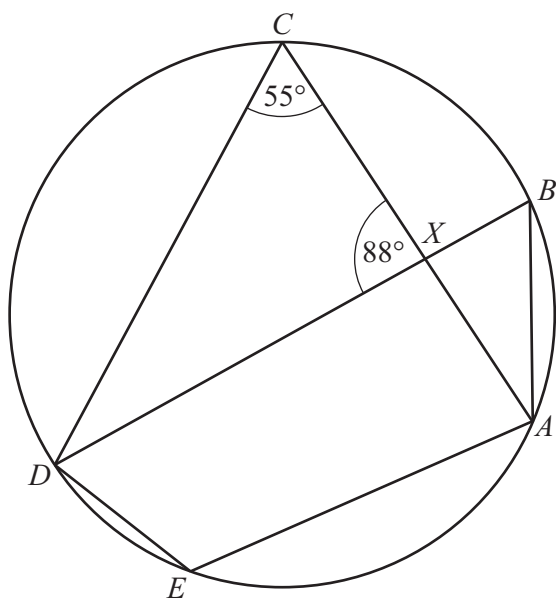
NOT TO
SCALE

A, *B*, *C*, *D* and *E* lie on the circle.
AC and *BD* intersect at *X*.
Angle *ACD* = 55° and angle *CXD* = 88°.

(a) Complete the statements, giving a geometrical reason in each part.

Angle *CDB* = ... because ....

....

Angle *ABD* = ... because ....

....

Angle *AED* = ... because ....

....

[6]

(b) Triangle *CXD* is mathematically similar to triangle *BXA*.
$DX = 8.0$ cm, $BX = 2.7$ cm and $AX = 4.0$ cm.

(i) Work out the length of *CX*.

$CX =$ .... cm [2]

(ii) Complete the statement.

Area of triangle *CXD* : area of triangle *BXA* = ... : .... [1]

15 (a) Write 66 000 in standard form.

.... [1]

(b) Work out $(3.7 \times 10^8) + (3.7 \times 10^7)$.

Give your answer in standard form.

.... [2]

16
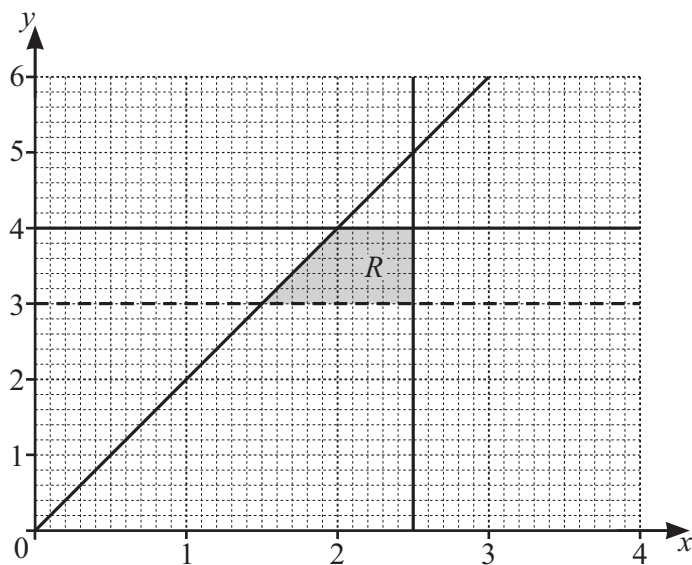
Write down all the inequalities that define the region R.

....

....

....

....

          [4]

17 $I = M(k^2 + c^2)$

(a) Find the value of I when $M = 7$, $k = 3$ and $c = 2$.

$I =$ .... [2]

(b) Rearrange the formula to write k in terms of I, M and c.

$k =$ .... [3]

18 $f(x) = 2x + 5$

$f(x)f(x) - ff(x) = ax^2 + bc + c$

Find the value of a, the value of b and the value of c.

$a = $ ....

$b = $ ....

$c = $ ....
[4]

19   Solve.

$$\left(\frac{1}{3}\right)^x = 9^{x+4}$$

$x = $ .... [3]
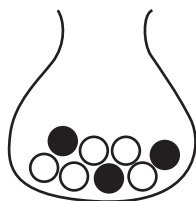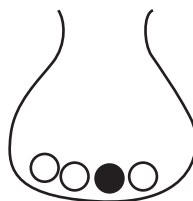
Bag A　　　　　　Bag B

Bag A contains 5 white balls and 3 black balls.
Bag B contains 3 white balls and 1 black ball.

(a) Two balls are picked at random from bag B without replacement.

Find the probability that both balls are black.

.... [1]

(b) The balls are replaced into bag B.
Kyle picks a ball at random from each bag.

(i) Complete the tree diagram.
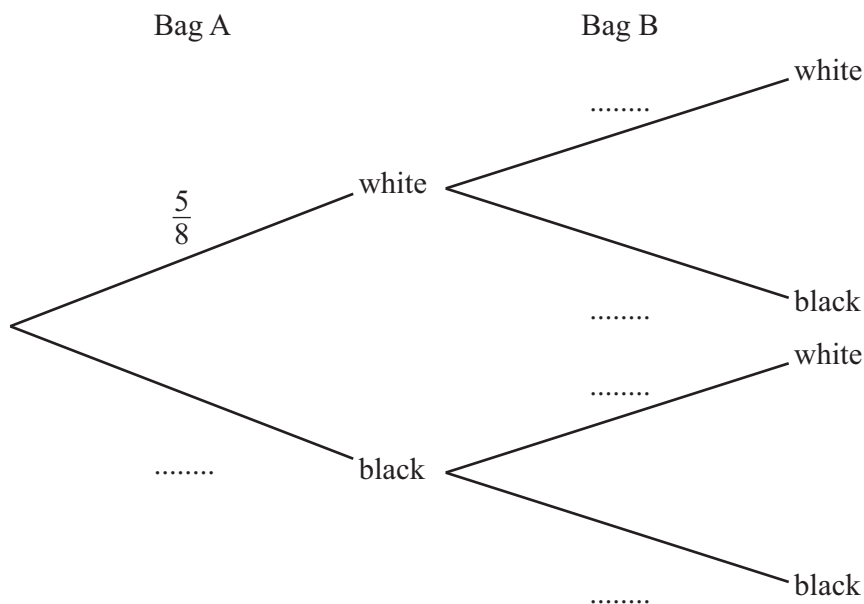
[2]

(ii) Find the probability that the two balls are the same colour.

.... [3]

(c) The balls are replaced into their bags.
Jo picks a ball at random from bag A and places it into bag B.
She then picks a ball at random from bag B.

Find the probability that she picks a black ball from bag B.

.... [3]

21 (a) $(3 - \sqrt{5})(2 + 3\sqrt{5}) = a + b\sqrt{5}$

Find the value of a and the value of b.

$a = $ ....

$b = $ ....

[2]

(b) Rationalise the denominator.
Write your answer in its simplest form.

$$\frac{6}{\sqrt{2}}$$

.... [2]

22 Solve.

$$\frac{2}{x-1} = \frac{x}{x+2}$$

$x = $ .... or $x = $ .... [5]

23 Find the coordinates of the turning point on the graph of $y = 7 - 2x - x^2$.

(..................... , ...) [4]

24
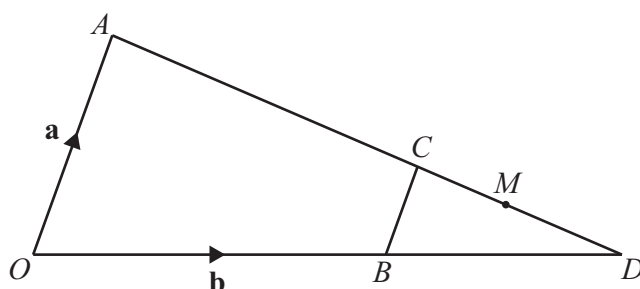
NOT TO
SCALE

In the diagram, OBD and ACD are straight lines.
O is the origin, the position vector of A is **a** and the position vector of B is **b**.
$\overrightarrow{BC} = \frac{1}{3}\overrightarrow{OA}$
M is the midpoint of CD.

Find the position vector of M.
Give your answer in terms of **a** and **b**, in its simplest form.

.... [4]

Questions 25 and 26 are printed on the next page.

25 Simplify.

$$\frac{10ax + 6bx - 25a - 15b}{4x^2 - 25}$$

.... [4]

26 Solve $\tan x = -\dfrac{1}{\sqrt{3}}$ for $0° \leqslant x \leqslant 360°$.

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