



Cambridge IGCSE™

CANDIDATE
NAMECENTRE
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 .

$$V = \frac{1}{3}\pi r^2 h$$

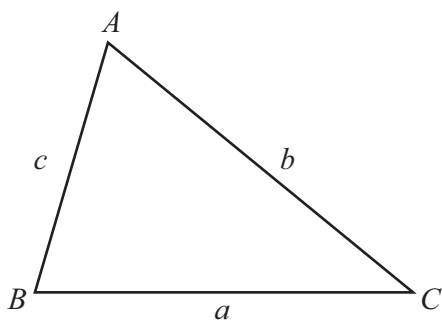
Volume, V , of sphere of radius r .

$$V = \frac{4}{3}\pi r^3$$

For the equation $ax^2 + bx + c = 0$, where $a \neq 0$,

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

For the triangle shown,



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

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

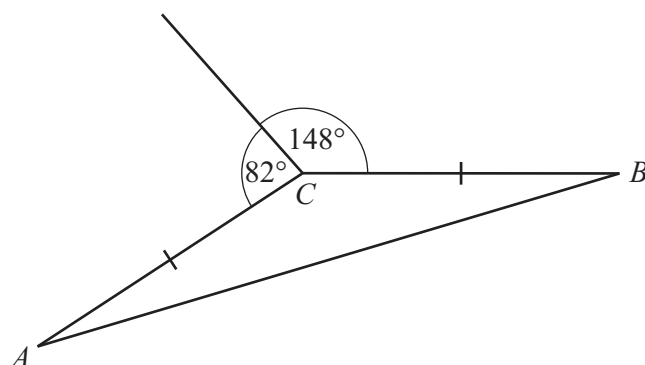
$$\text{Area} = \frac{1}{2}ab \sin C$$

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

- 1 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]

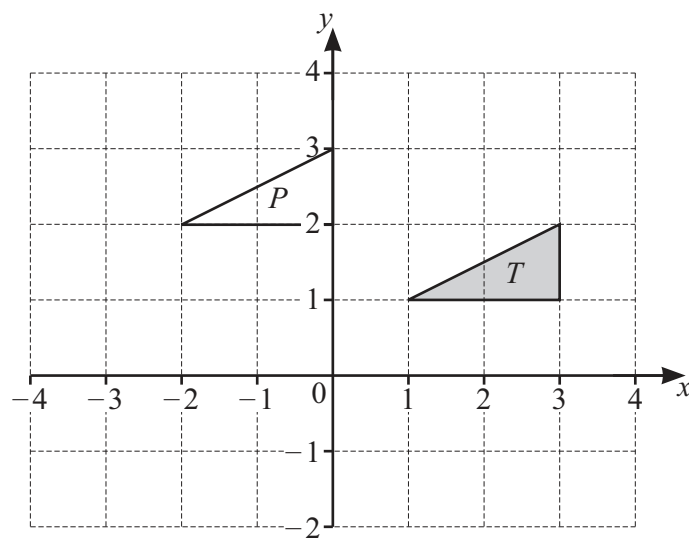


- 4 The area of a triangle is 12 cm^2 .
The length of the base of the triangle is 8 cm.

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) $\frac{p}{t} \div \frac{2}{t}$

..... [2]

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

..... [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 $\mathcal{C} = \{n: n \text{ is an integer and } 1 \leq n \leq 8\}$
 $A = \{\text{factors of } 12\}$
 $B = \{\text{odd numbers}\}$

Find

(a) $A \cap B$

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

(b) $n(A' \cup B)$.

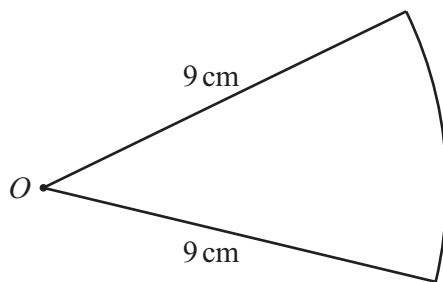
..... [1]

- 11 Write $0.\dot{2}\dot{4}$ as a fraction in its simplest form.

..... [2]



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



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

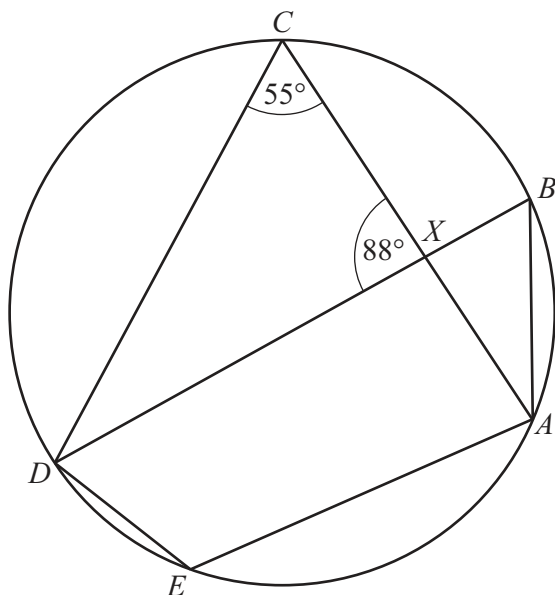
The mean of these scores is 8.

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 $ACD = 55^\circ$ and angle $CXD = 88^\circ$.

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

Angle $CDB = \dots\dots\dots$ because $\dots\dots\dots$

$\dots\dots\dots$

Angle $ABD = \dots\dots\dots$ because $\dots\dots\dots$

$\dots\dots\dots$

Angle $AED = \dots\dots\dots$ because $\dots\dots\dots$

$\dots\dots\dots$

[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 .

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

(ii) Complete the statement.

Area of triangle CXD : area of triangle $BXA = \dots\dots\dots : \dots\dots\dots$ [1]

- 15 (a) Write 66 000 in standard form.

$\dots\dots\dots$ [1]

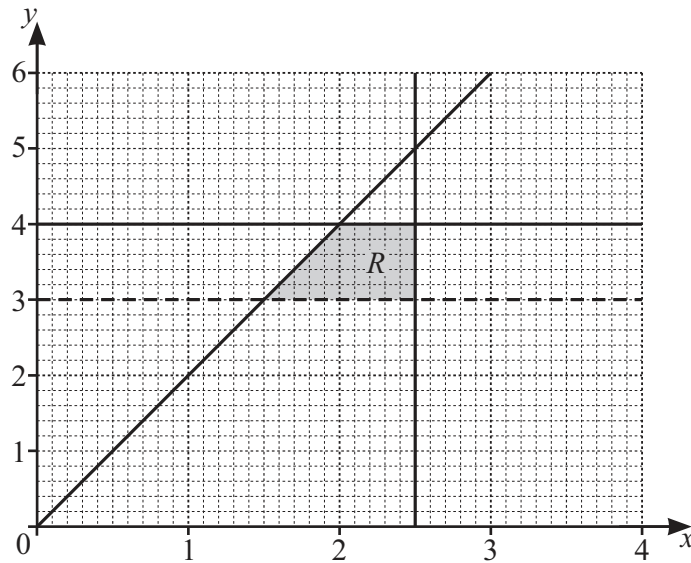
- (b) Work out $(3.7 \times 10^8) + (3.7 \times 10^7)$.

Give your answer in standard form.

$\dots\dots\dots$ [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 .

$$a = \dots\dots\dots$$

$$b = \dots\dots\dots$$

$$c = \dots\dots\dots$$

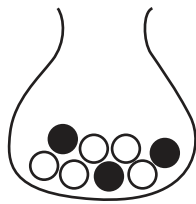
[4]

19 Solve.

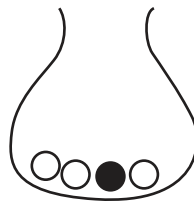
$$\left(\frac{1}{3}\right)^x = 9^{x+4}$$

$$x = \dots\dots\dots$$
 [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.

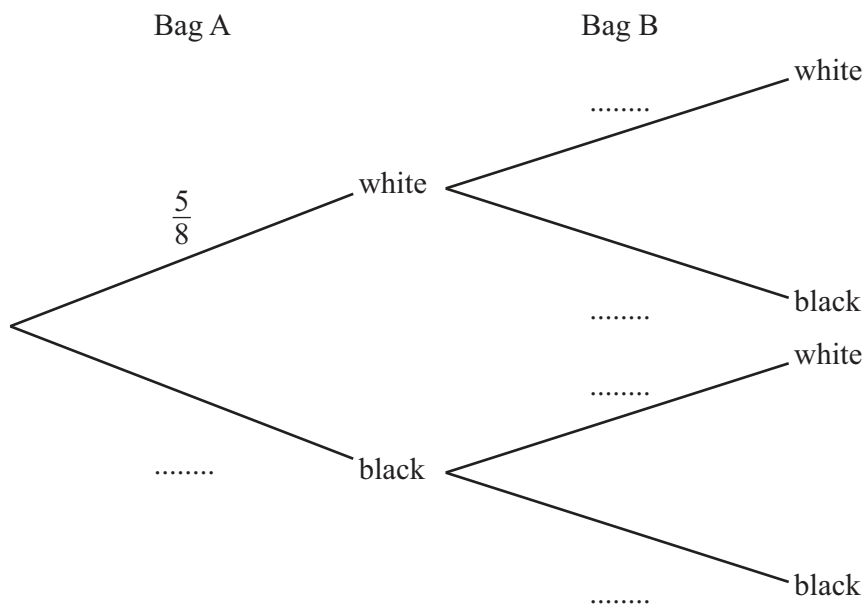
- (a) Two balls are picked at random from bag B without replacement.

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 .

$$a = \dots\dots\dots$$

$$b = \dots\dots\dots$$

[2]

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

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

$$\dots\dots\dots [2]$$

22 Solve.

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

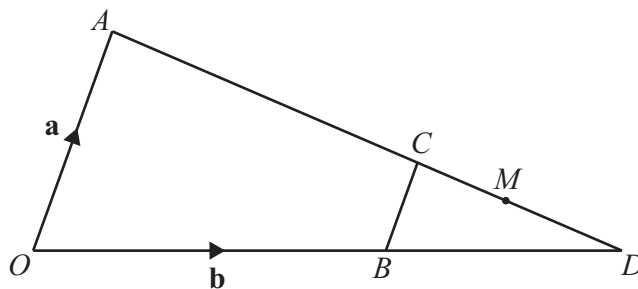
$$x = \dots\dots\dots \text{ or } x = \dots\dots\dots [5]$$



- 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 $\mathbf{a}$ and the position vector of B is $\mathbf{b}$.

$$\overrightarrow{BC} = \frac{1}{3} \overrightarrow{OA}$$

M is the midpoint of CD .

Find the position vector of M .

Give your answer in terms of $\mathbf{a}$ and $\mathbf{b}$, 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 $\tan x = -\frac{1}{\sqrt{3}}$ for $0^\circ \leq x \leq 360^\circ$.

$x = \dots\dots\dots, x = \dots\dots\dots$ [3]

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 (UCLES) 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.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge Assessment International Education Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cambridgeinternational.org after the live examination series.

Cambridge Assessment International Education is part of Cambridge Assessment. Cambridge Assessment is the brand name of the University of Cambridge Local Examinations Syndicate (UCLES), which is a department of the University of Cambridge.

