

\* 0000800000001 \*



**Cambridge Assessment  
International Education**

# Cambridge IGCSE™

CANDIDATE  
NAME



CENTRE  
NUMBER

--	--	--	--	--

CANDIDATE  
NUMBER

--	--	--	--



## MATHEMATICS

**0580/21**

Paper 2 (Extended)

**October/November 2024**

**1 hour 30 minutes**

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.
- You should use a calculator where appropriate.
- You may use tracing paper.
- You must show all necessary working clearly.
- Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place for angles in degrees, unless a different level of accuracy is specified in the question.
- For  $\pi$ , use either your calculator value or 3.142.

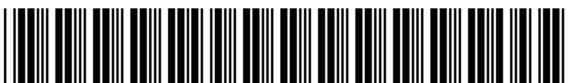
### INFORMATION

- The total mark for this paper is 70.
- The number of marks for each question or part question is shown in brackets [ ].

---

This document has **12** pages.

\* 0000800000002 \*



2

- 1 A concert starts at 1950 and finishes 2 hours 42 minutes later.

Work out the time the concert finishes.

..... [1]

- 2 Find the reciprocal of  $1\frac{1}{4}$ .

..... [1]

- 3 Use one of the symbols  $<$ ,  $>$  or  $=$  to make each statement true.

$$\frac{2}{7} \dots\dots\dots\dots\dots 0.2861$$

$$\frac{99}{900} \dots\dots\dots\dots\dots 11\%$$

$$1^3 \dots\dots\dots\dots\dots 4^0$$

[2]

- 4 Safia has a piece of fabric of length 5.6 m.

She cuts the fabric into two parts, with lengths in the ratio 3 : 4.

Calculate the length of the longer part.

..... m [2]

DO NOT WRITE IN THIS MARGIN





DO NOT WRITE IN THIS MARGIN

5 Work out.

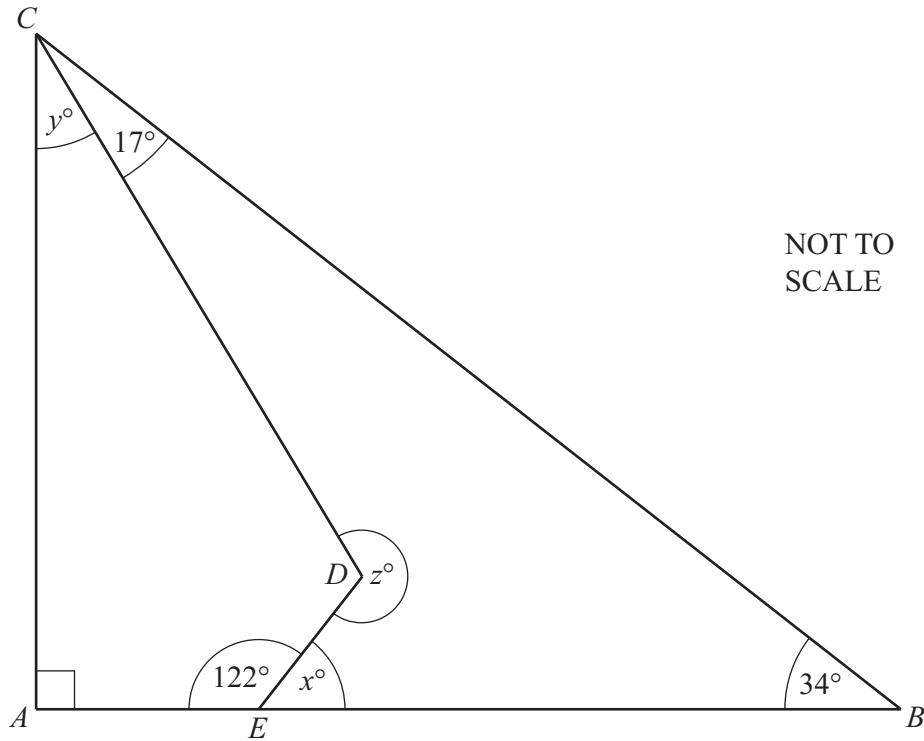
(a)  $3 \begin{pmatrix} 6 \\ -4 \end{pmatrix}$

$$\begin{pmatrix} \quad \\ \quad \end{pmatrix} [1]$$

(b)  $\begin{pmatrix} 4 \\ -1 \end{pmatrix} + \begin{pmatrix} -7 \\ 5 \end{pmatrix}$

$$\begin{pmatrix} \quad \\ \quad \end{pmatrix} [1]$$

6 The diagram shows a right-angled triangle  $ABC$  and a quadrilateral  $AEDC$ .



DO NOT WRITE IN THIS MARGIN

Find the value of

(a)  $x$

$$x = \dots \quad [1]$$

(b)  $y$

$$y = \dots \quad [1]$$

(c)  $z$ .

$$z = \dots \quad [1]$$



\* 0000800000004 \*



4

7 Factorise.

$$28x - 35$$

..... [1]

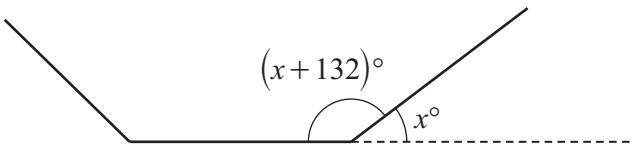
8 Edith invests \$3000 in a savings account.

The account pays simple interest at a rate of 2.6% per year.

Calculate the total interest earned at the end of 3 years.

\$ ..... [2]

9

NOT TO  
SCALE

The diagram shows part of a regular polygon.

The interior angle of the polygon is  $132^\circ$  larger than the exterior angle.

Calculate the number of sides of this polygon.

..... [3]

DO NOT WRITE IN THIS MARGIN

\* 0000800000005 \*



5



- 10 Jacinda plays a game with her friend.  
She can win, lose or draw the game.  
The probability that she wins the game is 0.28 .

- (a) Jacinda is twice as likely to draw the game as to lose the game.

Work out the probability that she loses the game.

..... [2]

- (b) Jacinda plays the game 150 times.

Find the expected number of times that **she wins**.

..... [1]

- 11 **Without using a calculator**, work out  $5\frac{1}{3} - 3\frac{4}{7}$  .

You must show all your working and give your answer as a mixed number in its simplest form.

..... [3]



\* 0000800000006 \*



6

- 12** Solve the simultaneous equations.  
You must show all your working.

$$\begin{aligned}5x + 6y &= 9 \\3x - 2y &= -17\end{aligned}$$

$$x = \dots$$

$$y = \dots$$

[3]

- 13 (a)** A sequence has  $n$ th term  $3n^2 - 1$ .

Find the second term in this sequence.

..... [1]

- (b)** The table shows the first five terms of sequences *A* and *B*.

	1st term	2nd term	3rd term	4th term	5th term	$n$ th term
Sequence <i>A</i>	-6	-2	2	6	10	
Sequence <i>B</i>	3	17	55	129	251	

Complete the table to show the  $n$ th term of each sequence.

[4]



\* 0000800000007 \*



7



- 14** Two solid steel statues are mathematically similar.  
 The smaller statue has height 12 cm and the larger statue has height 15 cm.  
 The larger statue has a mass 2.5 kg.  
 The density of steel is  $8 \text{ g/cm}^3$ .

Calculate the volume of the smaller statue.

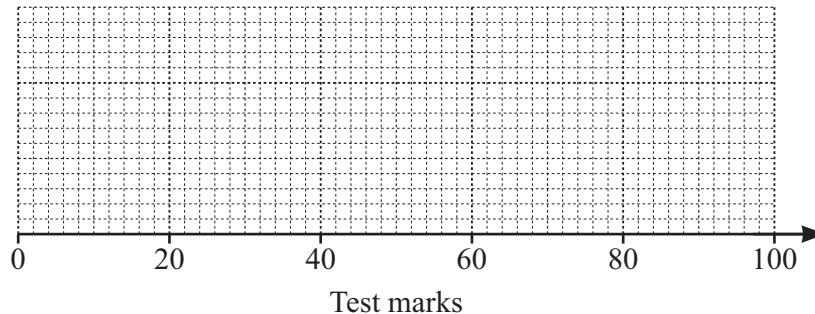
[Density = mass  $\div$  volume.]

.....  $\text{cm}^3$  [4]

- 15** Students in class  $P$  take a test.  
 These statistics show information about their marks.

- lower quartile = 38
- median = 53
- interquartile range = 28
- range = 81
- highest mark = 96

- (a) Draw a box-and-whisker plot to represent this information.



[3]

- (b) Students in class  $Q$  take the same test.  
 For class  $Q$ , the median is 49 and the interquartile range is 35.

Make two comments comparing the distribution of marks for class  $P$  with that of class  $Q$ .

1. ....
- ....
2. ....
- ....

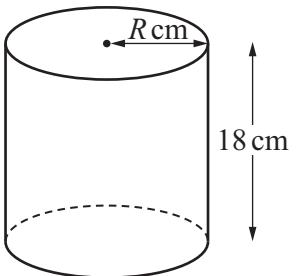
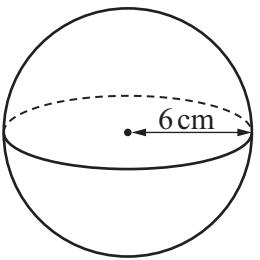
[2]

[Turn over]

\* 0000800000008 \*



8

**16**NOT TO  
SCALE

The diagram shows a sphere of radius 6 cm and a cylinder of height 18 cm and radius  $R$  cm.  
The volume of the sphere is equal to the volume of the cylinder.

Calculate the curved surface area of the cylinder.

Give your answer in terms of  $\pi$ .

[The volume,  $V$ , of a sphere with radius  $r$  is  $V = \frac{4}{3}\pi r^3$ ]

.....  $\text{cm}^2$  [4]

**17** Solve.

$$3x^2 - 7x - 16 = 0$$

You must show all your working and give your answers correct to 2 decimal places.

$$x = \dots \text{ or } x = \dots [4]$$

DO NOT WRITE IN THIS MARGIN

\* 0000800000009 \*



9



**18**       $g(x) = 4^{x+3}$

- (a) Find  $x$  when  $g(x) = 1$ .

..... [1]

(b) Find  $g^{-1}\left(\frac{1}{16}\right)$ .

..... [2]

**19**     $\mathcal{E} = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$

$P = \{\text{odd numbers}\}$

$Q = \{\text{multiples of } 3\}$

$R = \{\text{square numbers}\}$

- (a) Find  $P \cap Q \cap R$ .

{ ..... } [1]

- (b) (i) Find  $Q \cup R$ .

{ ..... } [1]

- (ii) Find  $n(P \cap (Q \cup R)')$ .

..... [1]

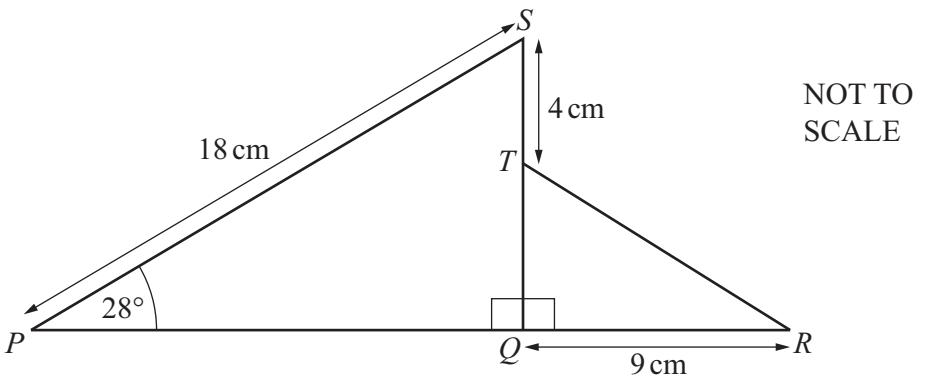


\* 0000800000010 \*



20

10



The diagram shows two right-angled triangles  $PQS$  and  $RQT$ .  
 $PQR$  and  $QTS$  are straight lines.

Calculate angle  $QTR$ .

Angle  $QTR$  = ..... [5]

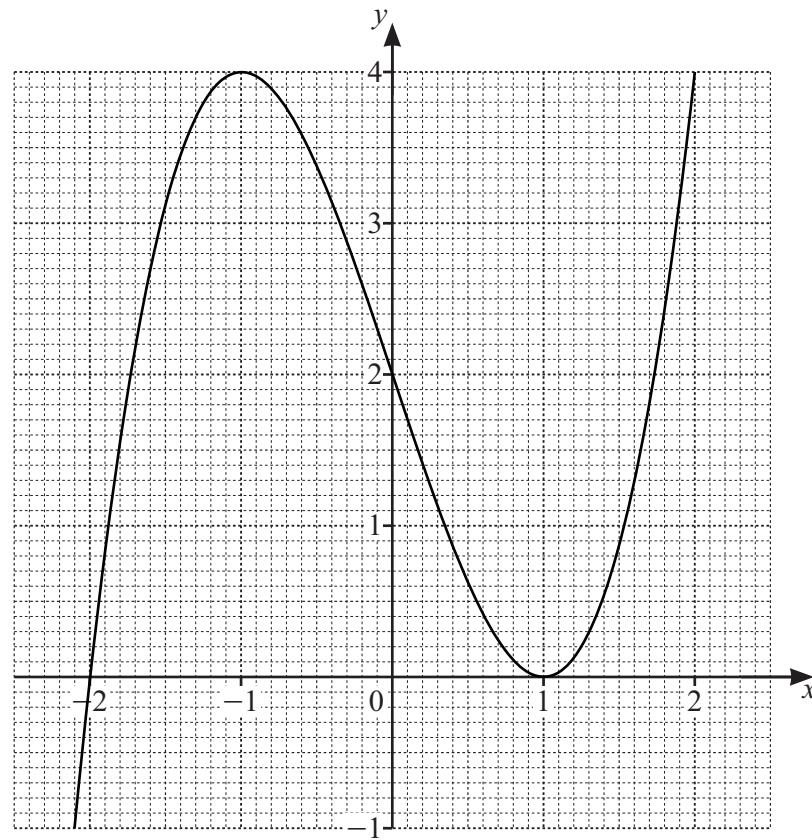
- 21 Solve the equation  $3 \tan x + 5 = 1$  for  $0^\circ \leqslant x \leqslant 360^\circ$ .

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

DO NOT WRITE IN THIS MARGIN



- 22 The graph of  $y = (x+2)(x-1)^2$  is shown on the grid.



- (a) Show that  $y = (x+2)(x-1)^2$  can be written as  $y = x^3 - 3x + 2$ .

[2]

- (b) By drawing a suitable straight line, solve the equation  $2x^3 - 5x = 0$ .

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

Question 23 is printed on the next page.



\* 0000800000012 \*



12

23  $(x-5)^2 + k = x^2 - px - 21$

Find the value of  $p$  and the value of  $k$ .

$p = \dots$

$k = \dots$

[2]

DO NOT WRITE IN THIS MARGIN

---

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](http://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.

