



# Cambridge IGCSE™

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## 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.



- 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]



**5** Work out.

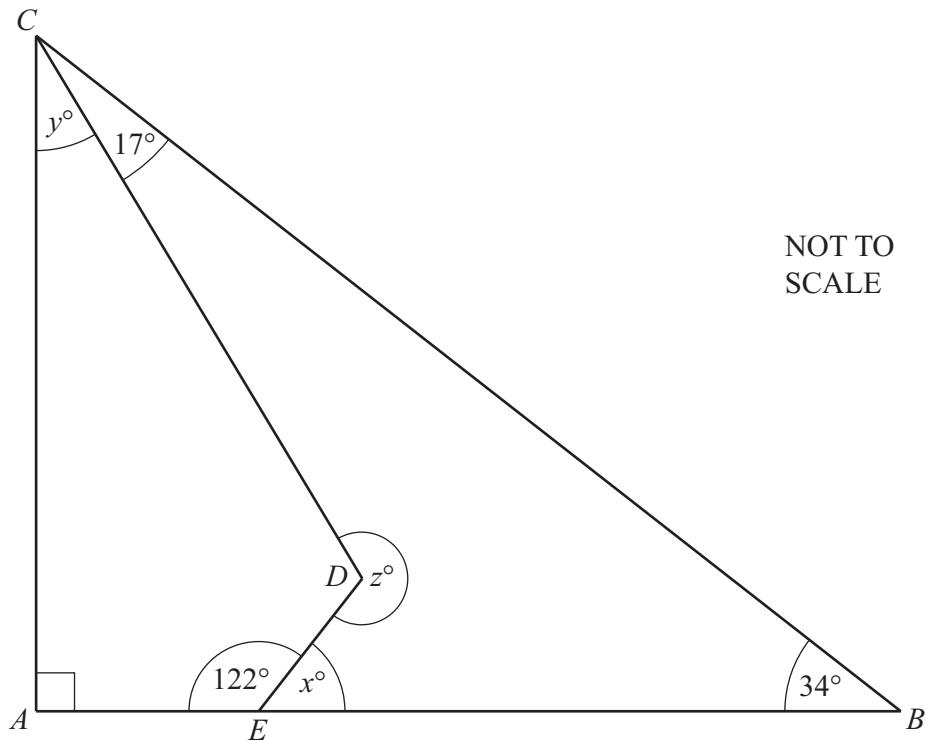
(a)  $3 \begin{pmatrix} 6 \\ -4 \end{pmatrix}$

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

(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  $AEDC$ .



Find the value of

(a)  $x$

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

(b)  $y$

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

(c)  $z$ .

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





7 Factorise.

$$28x - 35$$

..... [1]

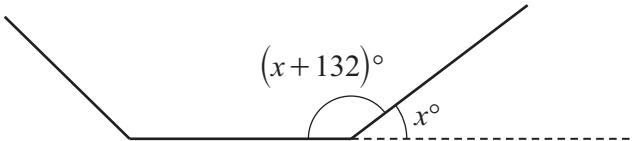
8 Edith invests \$3000 in a savings account.

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  
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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]





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- 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]





- 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]



- 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  $8 \text{ g/cm}^3$ .

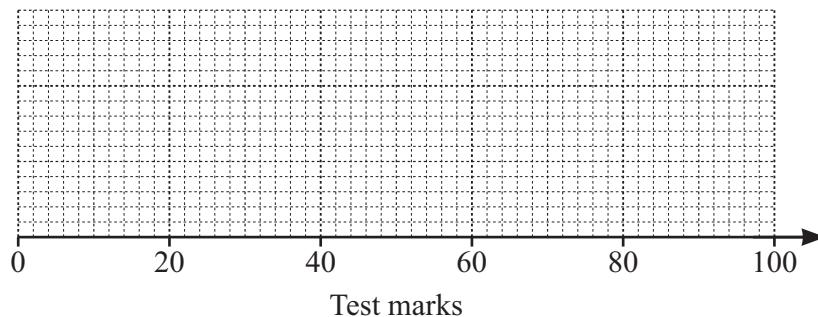
Calculate the volume of the smaller statue.  
 [Density = mass  $\div$  volume.]

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

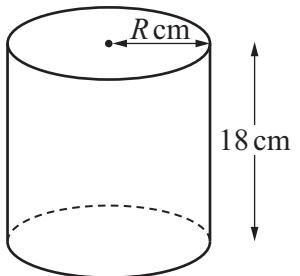
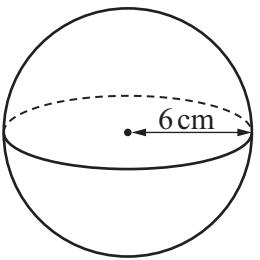
Make two comments comparing the distribution of marks for class  $P$  with that of class  $Q$ .

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

[2]

**[Turn over]**




**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.

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



**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  $n(P \cap (Q \cup R)')$ .

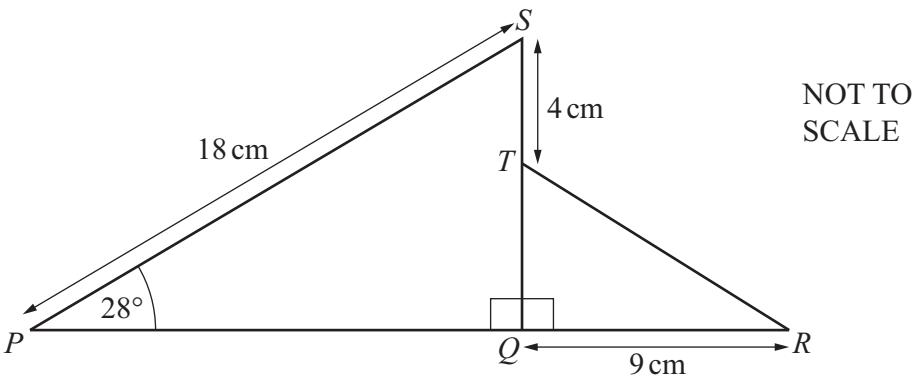
..... [1]





10

20



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

Calculate angle  $QTR$ .

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

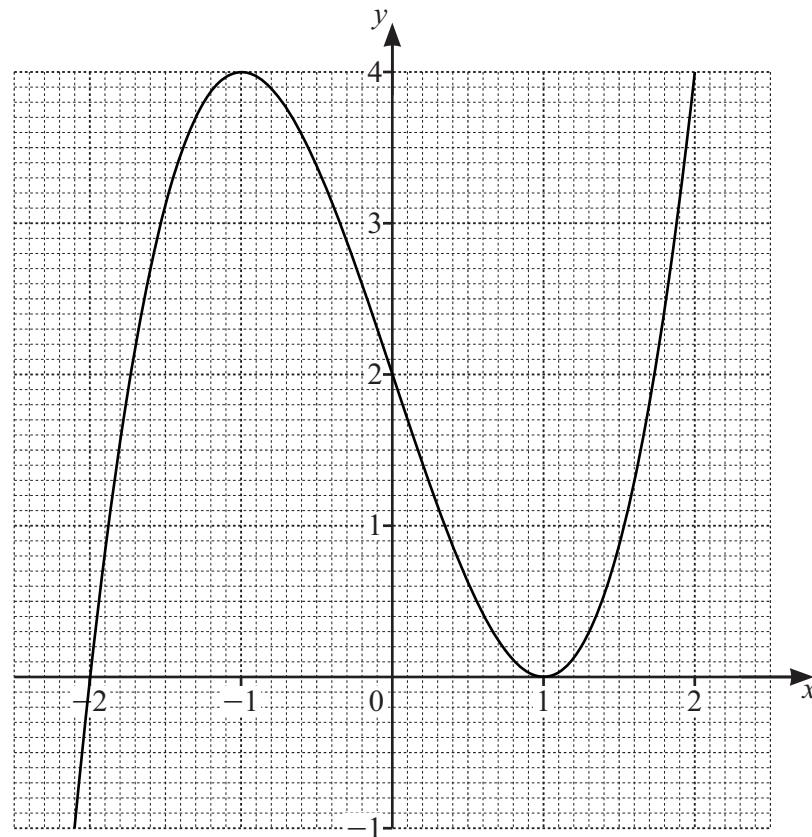
- 21 Solve the equation  $3 \tan x + 5 = 1$  for  $0^\circ \leq x \leq 360^\circ$ .

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





- 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.





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

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

$p = \dots$

$k = \dots$

[2]

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