



# Cambridge IGCSE™

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## MATHEMATICS

0580/23

Paper 2 (Extended)

May/June 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. Any blank pages are indicated.



1 Write the number two million two thousand and two in figures.

..... [1]

2 Put one pair of brackets into this calculation to make it correct.

$$5 - 4 \times 3 - 9 - 2 = 0$$

[1]

3 Simplify.

$$7x - 8y - x - y$$

..... [2]

4 The base of a cuboid measures 10 cm by 7 cm.  
The volume of the cuboid is 280 cm<sup>3</sup>.

Calculate the height of the cuboid.

..... cm [2]

5 In a city, the probability that it will rain today is 0.15 .

Find the probability that it will not rain today in this city.

..... [1]

6 Factorise completely.

$$4x^2y - 5xy^2$$

..... [2]





7 The scale of a map is  $1:40\,000$ .  
On the map the distance between two villages is 37 cm.

Calculate the actual distance between the two villages.  
Give your answer in kilometres.

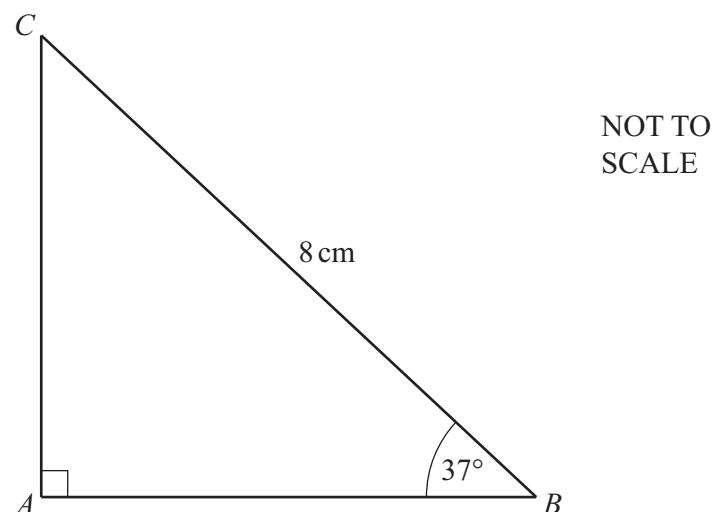
..... km [2]

8 **Without using a calculator**, work out  $\frac{3}{7} - \frac{1}{14}$ .

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

..... [2]

9

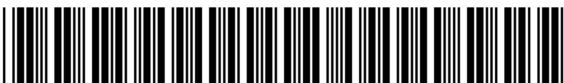


The diagram shows a right-angled triangle.

Calculate  $AB$ .

$AB = \dots$  cm [2]





10 Find the gradient of the line joining the points  $(-2, 7)$  and  $(3, 1)$ .

..... [2]

11 Solve the simultaneous equations.

$$\begin{aligned}5t - 2w &= 19 \\3t + 2w &= 5\end{aligned}$$

$t =$  .....

$w =$  ..... [2]

12 Simplify.

(a)  $\frac{32g^{16}}{16g^8}$

..... [2]

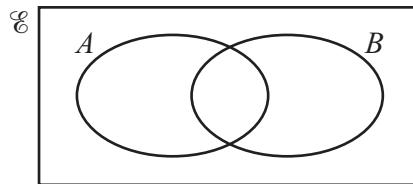
(b)  $(625k^8)^{\frac{3}{4}}$

..... [2]



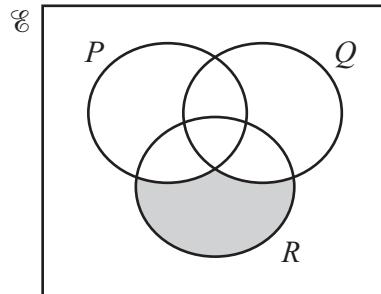


13 (a)

Shade the region  $A \cup B'$ .

[1]

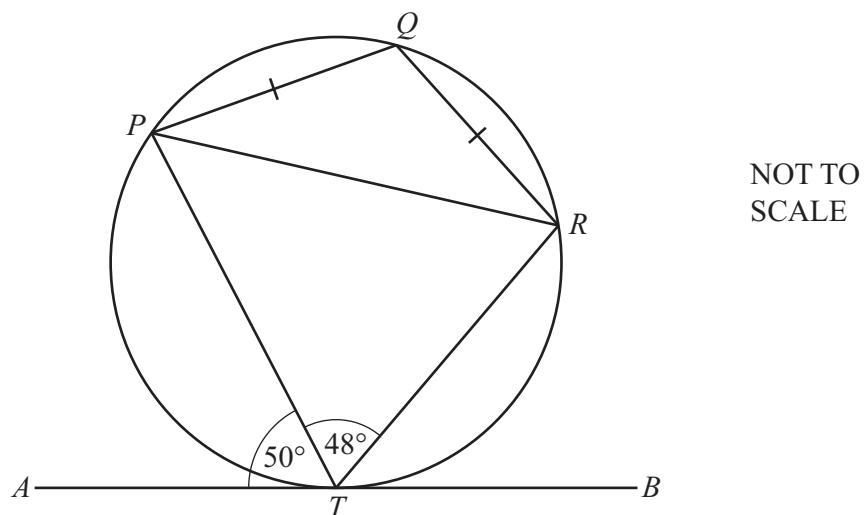
(b)



Use set notation to describe the shaded region.

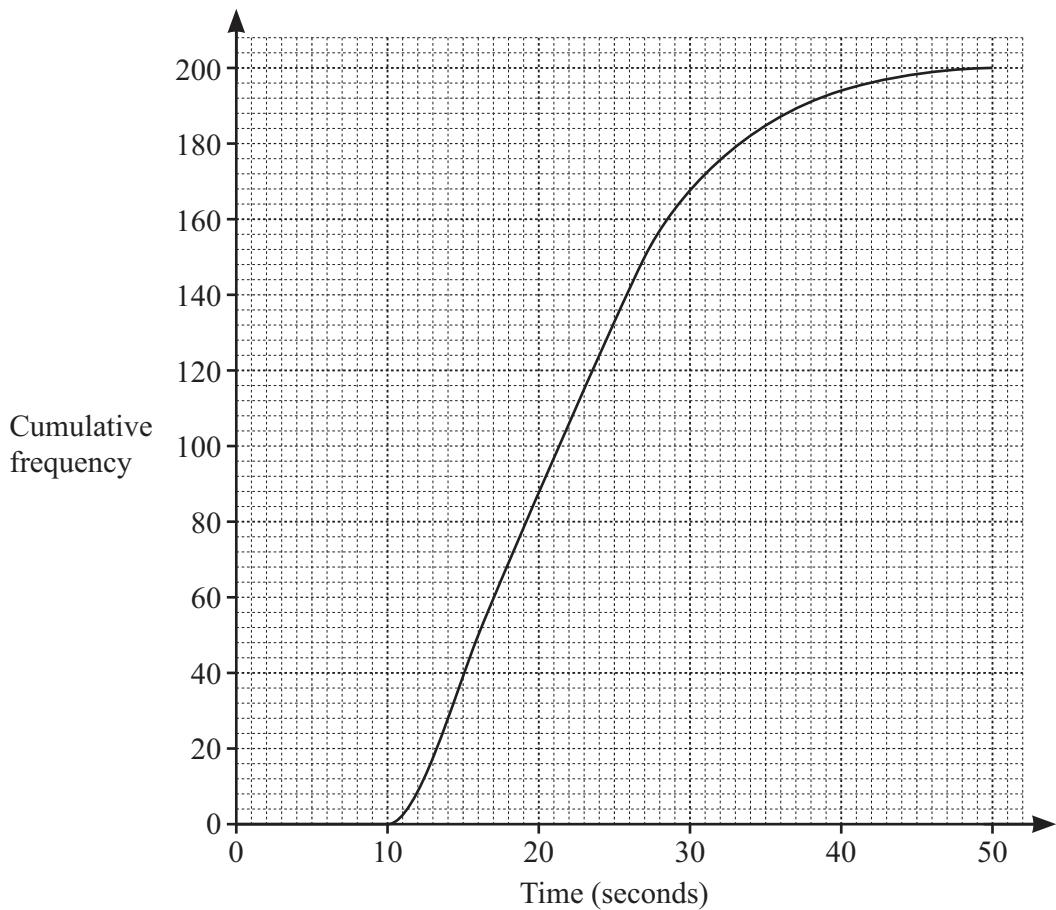
..... [1]

14

 $P, Q, R$  and  $T$  are points on the circle. $AB$  is a tangent to the circle at  $T$ .Angle  $ATP = 50^\circ$ , angle  $PTR = 48^\circ$  and  $PQ = QR$ .(a) Find angle  $PRT$ .Angle  $PRT =$  ..... [1](b) Find angle  $QPR$ .Angle  $QPR =$  ..... [2]



15



The time taken for each of 200 students to complete a calculation is measured.  
The cumulative frequency diagram shows the results.

Use the diagram to find an estimate for

(a) the interquartile range

..... s [2]

(b) the number of students taking more than 40 seconds to complete the calculation.

..... [2]





16

$$A = \pi r^2 + \pi dh$$

Rearrange the formula to make  $h$  the subject.

$$h = \dots \quad [2]$$

17 Work out, giving each answer in standard form.

(a)  $(2.1 \times 10^{101}) \times (8 \times 10^{101})$

$$\dots \quad [2]$$

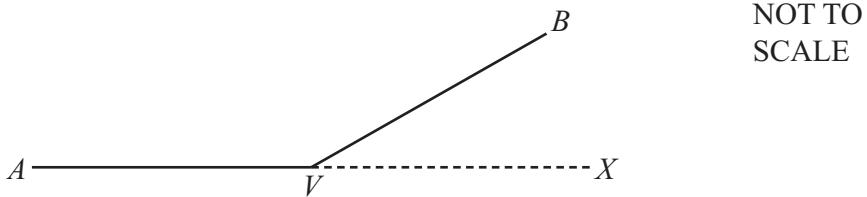
(b)  $(2.1 \times 10^{101}) + (2.1 \times 10^{100})$

$$\dots \quad [2]$$





18



The diagram shows two sides,  $VA$  and  $VB$ , of a regular polygon.  
 $AVX$  is a straight line.

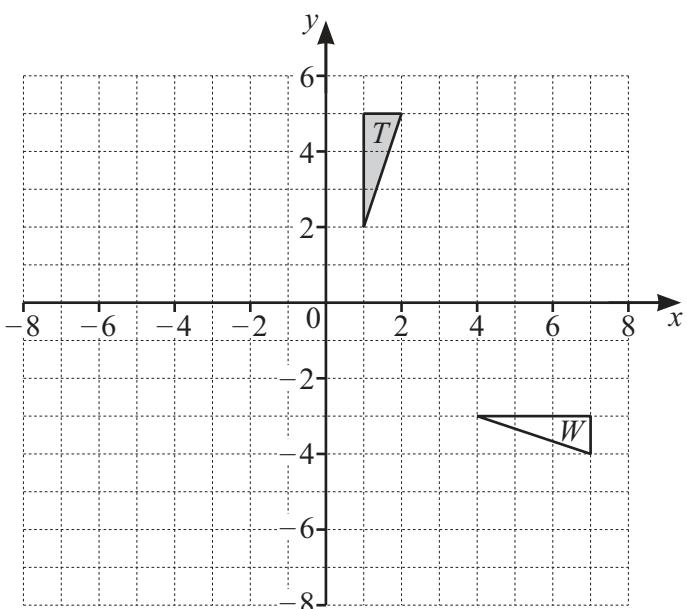
Angle  $BVX = y^\circ$  and angle  $AVB = 11.5y^\circ$ .

Find the number of sides of this polygon.

.....  
 NOT TO  
 SCALE

[3]

19



(a) Describe fully the **single** transformation that maps triangle  $T$  onto triangle  $W$ .

.....  
 .....  
 ..... [3]

(b) Draw the enlargement of triangle  $T$  with scale factor  $-2$  and centre of enlargement  $(-1, 1)$ . [2]





$$20 \quad f(x) = 3^x + 2$$

(a) Find  $x$  when  $f(x) = 245$ .

$$x = \dots [2]$$

(b) Find  $x$  when  $f^{-1}(x) = 7$ .

$$x = \dots [2]$$

21 Write the recurring decimal  $0.\dot{4}\dot{1}$  as a fraction in its simplest form.  
You must show all your working.

..... [2]

22 Solve the equation  $\tan x + \sqrt{3} = 0$  for  $0^\circ \leq x \leq 360^\circ$ .

[3]





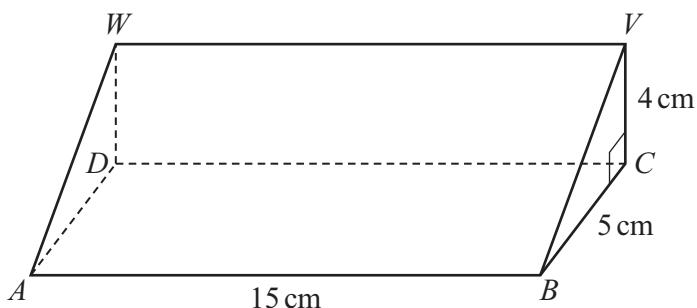
23 Simplify.

$$\frac{2}{y+1} - \frac{3}{y}$$

Give your answer as a single fraction in its simplest form.

..... [3]

24



NOT TO  
SCALE

The diagram shows a triangular prism with cross-section triangle  $BCV$ .  
 $\text{Angle } BCV = 90^\circ$ ,  $BC = 5\text{cm}$ ,  $CV = 4\text{cm}$  and  $AB = 15\text{cm}$ .

Calculate the angle between  $AV$  and the base  $ABCD$ .

..... [4]



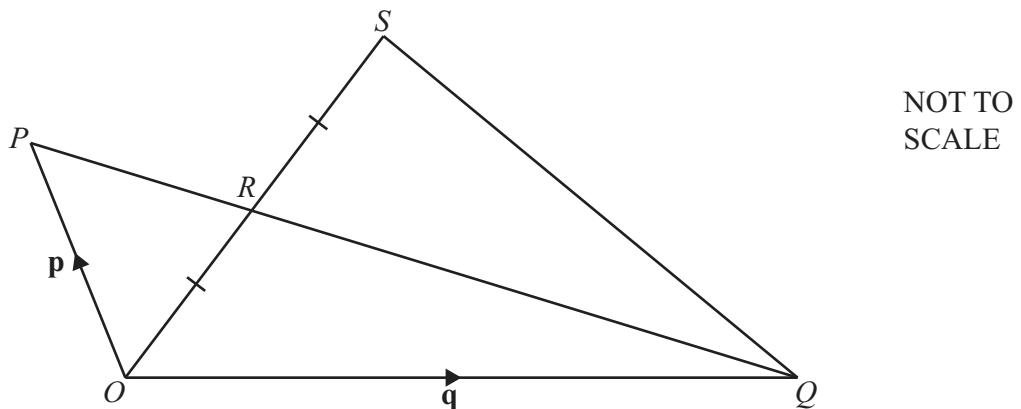


25 Simplify.

$$\frac{pt-p-t+1}{1-t^2}$$

..... [4]

26



In the diagram,  $O$  is the origin.

$\overrightarrow{OP} = \mathbf{p}$  and  $\overrightarrow{OQ} = \mathbf{q}$ .

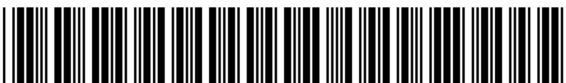
$R$  is the point of intersection of  $PQ$  and  $OS$ , with  $PR : RQ = 1 : 2$  and  $OR = RS$ .

Find the position vector of  $S$  in terms of  $\mathbf{p}$  and  $\mathbf{q}$ .

Give your answer in its simplest form.

..... [4]





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