* 0019655329601 *

Cambridge Assessment International Education

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CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

* 6333996119 *

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 π, 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.

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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^3.

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.

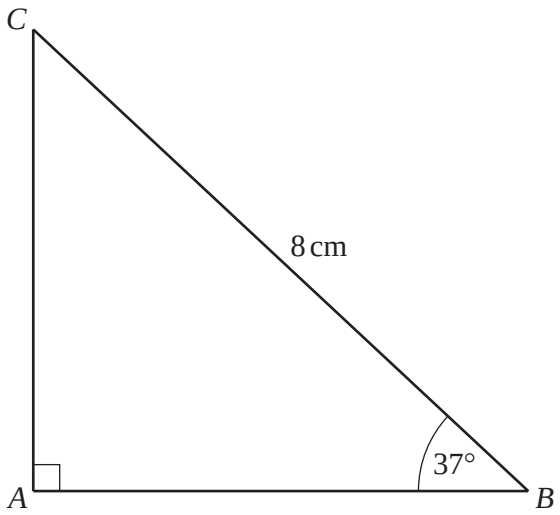
..... km [2]

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



NOT TO SCALE

The diagram shows a right-angled triangle.

Calculate *AB*.

AB = ... cm [2]

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

..... [2]

11 Solve the simultaneous equations.

$$5t - 2w = 19$$
$$3t + 2w = 5$$

$t =$ .....

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

12 Simplify.

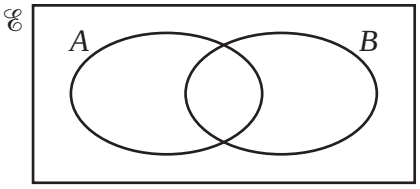
(a) $\dfrac{32g^{16}}{16g^{8}}$

..... [2]

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

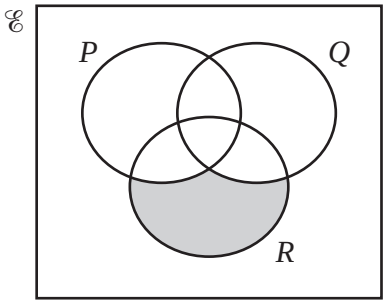
..... [2]

13 (a)



Shade the region $A \cup B'$. [1]

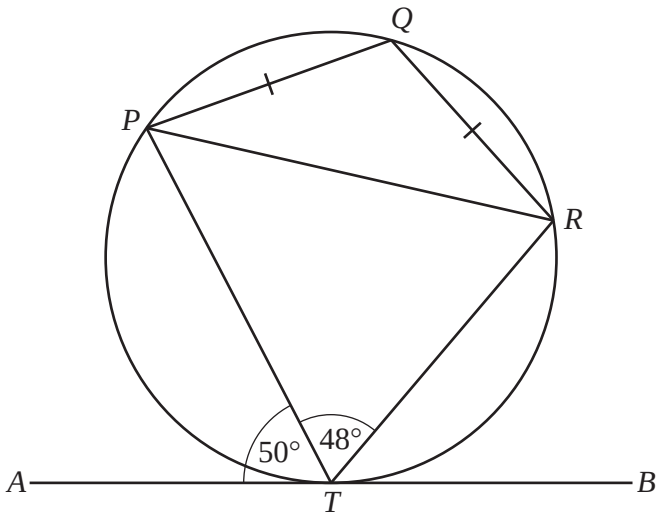
(b)



Use set notation to describe the shaded region.

..... [1]

14



NOT TO SCALE

P, Q, R and T are points on the circle.
AB is a tangent to the circle at T.
Angle $ATP = 50°$, angle $PTR = 48°$ and $PQ = QR$.

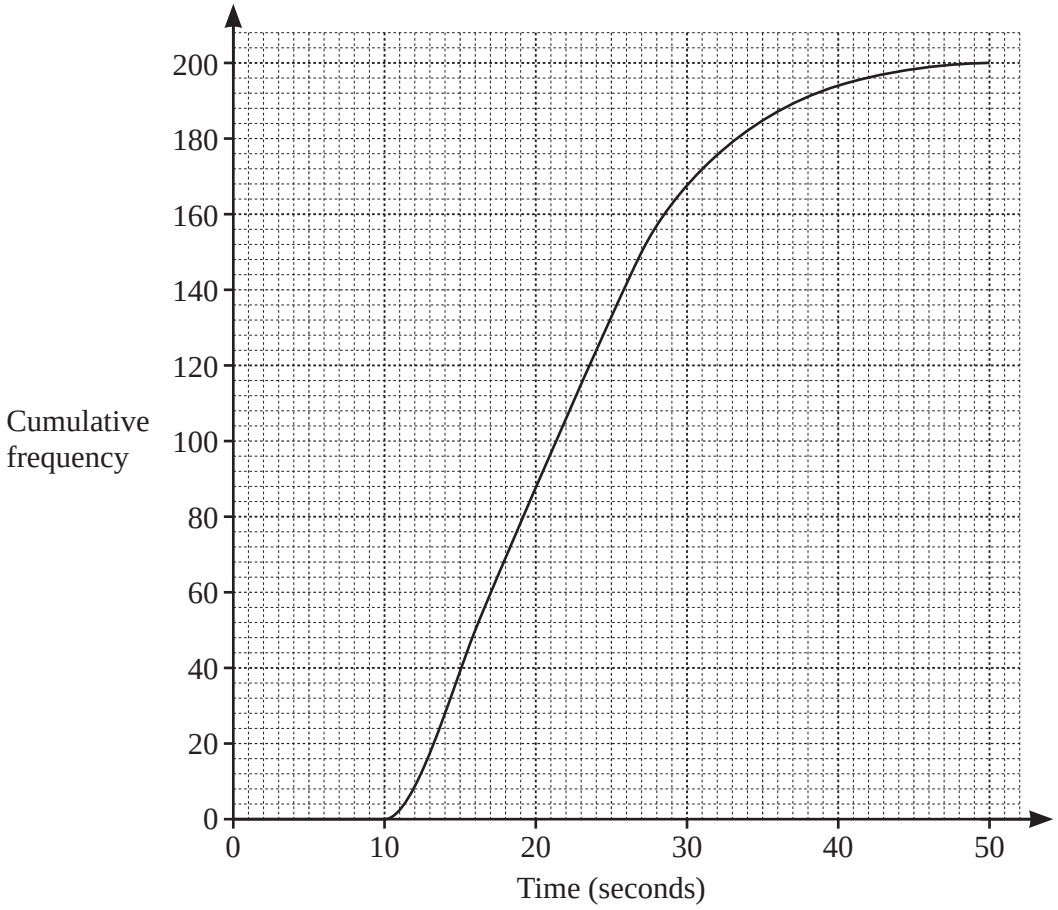
(a) Find angle PRT.

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.

$h =$ ..... [2]

17 Work out, giving each answer in standard form.

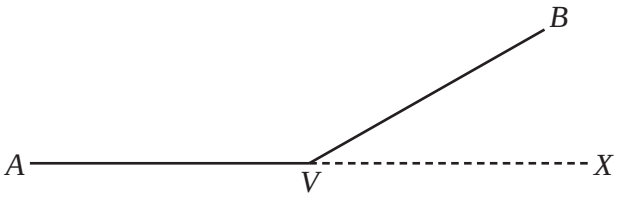
(a) $\left(2.1 \times 10^{101}\right) \times \left(8 \times 10^{101}\right)$

..... [2]

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

..... [2]

18



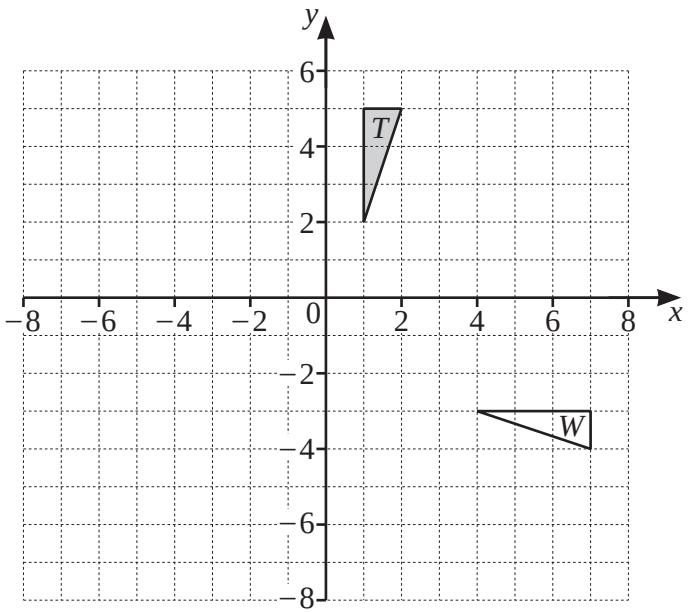
NOT TO SCALE

The diagram shows two sides, *VA* and *VB*, of a regular polygon.
AVX is a straight line.
Angle $BVX = y°$ and angle $AVB = 11.5y°$.

Find the number of sides of this polygon.

..... [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 $f(x) = 3^x + 2$

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

$x =$ ..... [2]

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

$x =$ ..... [2]

21 Write the recurring decimal $0.4\dot{1}$ as a fraction in its simplest form.
You must show all your working.

..... [2]

22 Solve the equation $\tan x + \sqrt{3} = 0$ for $0° \leqslant x \leqslant 360°$.

..... [3]

[Turn over

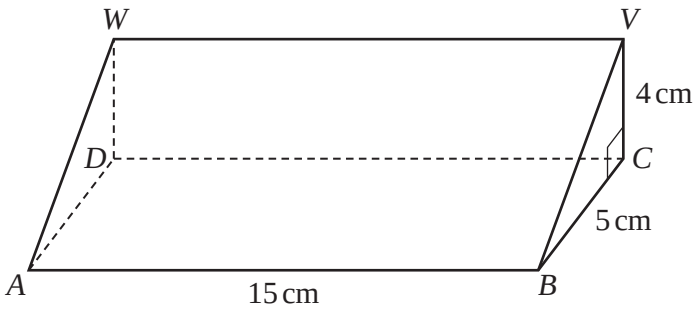
23 Simplify.

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

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.
Angle $BCV = 90°$, $BC = 5\text{cm}$, $CV = 4\text{cm}$ and $AB = 15\text{cm}$.

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

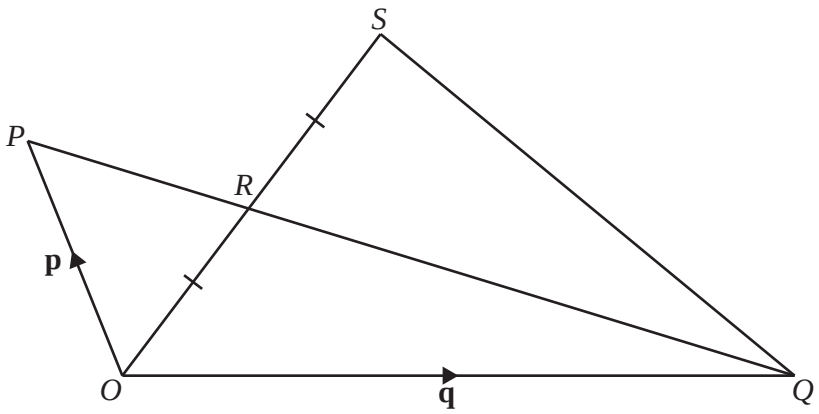
..... [4]

25 Simplify.

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

..... [4]

26



NOT TO SCALE

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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