



# Cambridge IGCSE™

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**MATHEMATICS****0580/23**

Paper 2 (Extended)

**May/June 2023****1 hour 30 minutes**

You must answer on the question paper.

You will need: Geometrical instruments

**INSTRUCTIONS**

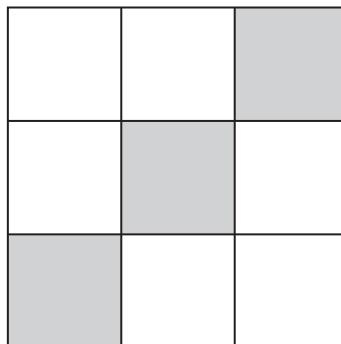
- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction 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 [ ].

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This document has **12** pages. Any blank pages are indicated.

**1**


- (a)** Complete the statement.

The diagram has rotational symmetry of order ..... .

[1]

- (b)** On the diagram, draw all the lines of symmetry.

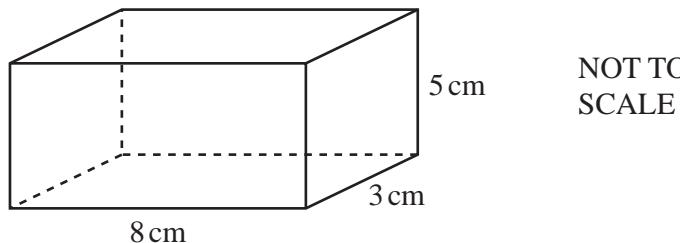
[2]

- 2** A film lasts for 2 hours 50 minutes.

The film ends at 23 05.

Find the time the film starts.

..... [1]

**3**


Find the total surface area of the cuboid.

.....  $\text{cm}^2$  [3]

4                    $v = u - 9.8t$

Find the value of  $v$  when  $u = 4$  and  $t = -7$ .

$v = \dots \dots \dots$  [2]

5 Simplify  $d^8 \div d^2$ .

$\dots \dots \dots$  [1]

- 6 At the end of the day, a shopkeeper has 12 tins of cat food left.  
This is  $\frac{3}{13}$  of the number he had at the beginning of the day.

Calculate the number of tins he had at the beginning of the day.

$\dots \dots \dots$  [2]

- 7 A spinner has five sides.  
 Each side is painted red, blue, green, yellow or orange.  
 The table shows some of the probabilities of the spinner landing on each colour.

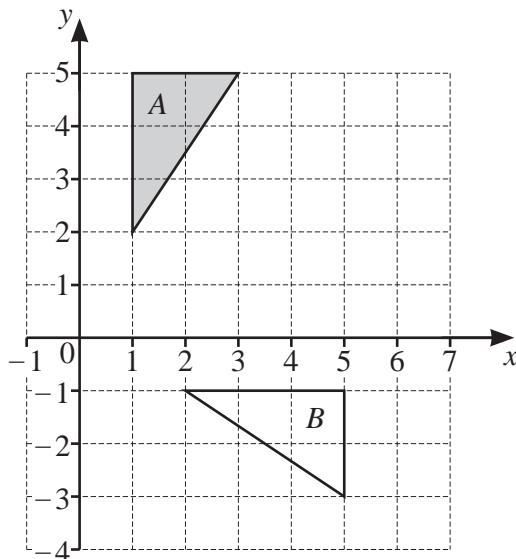
| Colour      | Red | Blue | Green | Yellow | Orange |
|-------------|-----|------|-------|--------|--------|
| Probability | 0.3 | 0.16 | 0.18  | 0.25   |        |

- (a) Complete the table. [2]
- (b) Dan spins the spinner once.

Find the probability that the spinner lands on red or blue.

..... [2]

8

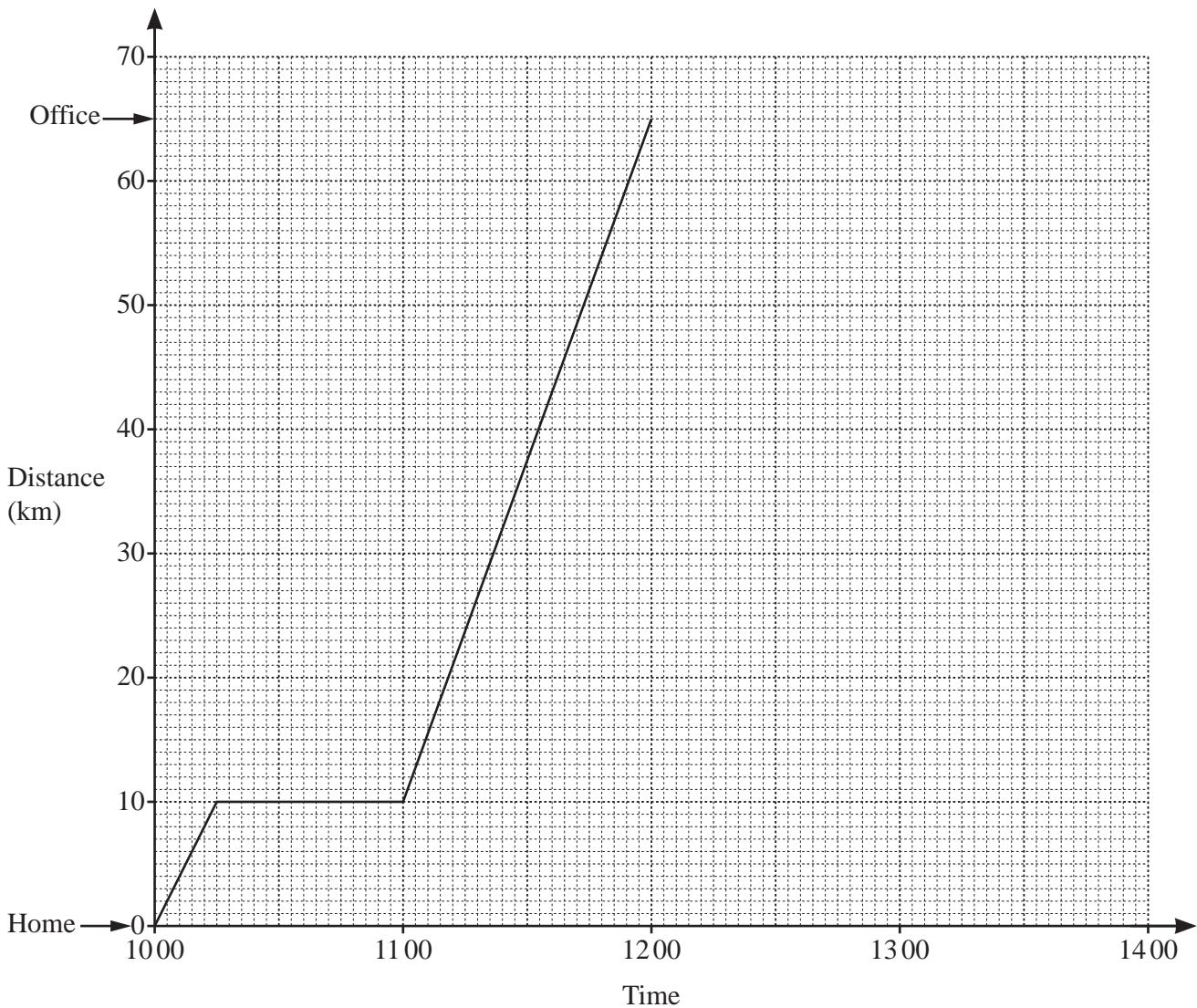


Describe fully the **single** transformation that maps triangle A onto triangle B.

.....

[3]

- 9 The distance–time graph shows information about Kai’s journey from home to the office.



- (a) Calculate the average speed, in km/h, for Kai’s journey from home to the office.

..... km/h [2]

- (b) When Kai arrives at the office, he finds his meeting is cancelled. He immediately returns home at a constant speed of 50 km/h.

Complete the distance–time graph to show his journey home.

[1]

- 10** Without using a calculator, work out  $5\frac{11}{12} + 2\frac{1}{4}$ .

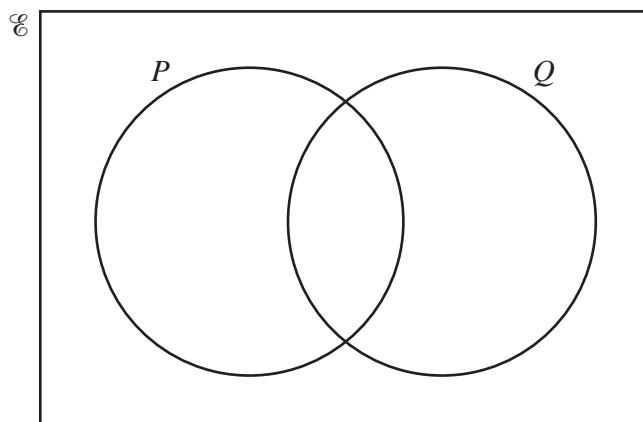
You must show all your working and give your answer as a mixed number in its simplest form.

..... [3]

**11 (a)**  $\mathcal{E} = \{ a, b, e, g, l, m, o, r, t, y \}$

$$P = \{ a, b, e, g, l, r \}$$

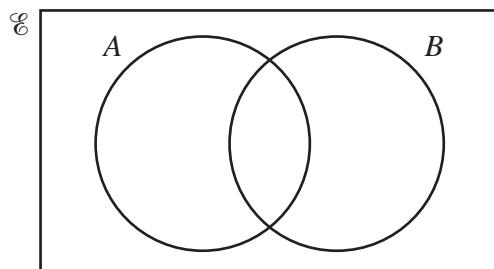
$$Q = \{ e, g, m, o, r, t, y \}$$



Complete the Venn diagram.

[2]

**(b)**



Shade the region  $A' \cap B$ .

[1]

- 12 The position vector of  $A$  is  $\begin{pmatrix} 5 \\ 3 \end{pmatrix}$  and  $\overrightarrow{BA} = \begin{pmatrix} 4 \\ 8 \end{pmatrix}$ .

Show that  $|\overrightarrow{OB}| = 5.1$ , correct to 1 decimal place.

[3]

- 13 Calculate  $\sqrt{42} + 3^{0.4}$ .

..... [1]

- 14 Write  $0.\dot{5}\dot{8}\dot{1}$  as a fraction.

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

..... [3]

- 15 The number of trees in a forest is decreasing exponentially at a rate of 1.75% per year. Eleven years ago there were 980 trees.

Calculate the number of trees in the forest now.  
Give your answer correct to the nearest integer.

..... [2]

- 16 The volume of a cylinder is  $1970 \text{ cm}^3$ .  
The height of the cylinder is 12.8 cm.

Calculate the radius of the cylinder.

..... cm [3]

- 17 Rearrange the formula to make  $m$  the subject.

$$R = \frac{2(m-k)}{m}$$

$m =$  ..... [4]

- 18  $y$  is inversely proportional to the cube root of  $(x + 5)$ .  
When  $x = 3$ ,  $y = 12$ .

Find  $y$  when  $x = 22$ .

$y =$  ..... [3]

- 19 Solve the equation  $x^2 + 5x - 7 = 0$ .

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

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

20  $f(x) = 6x - 7$        $g(x) = x^{-3}$

- (a) Find  $f(x+2)$ .

Give your answer in its simplest form.

$\dots$  [2]

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

$f^{-1}(x) = \dots$  [2]

- (c) Find  $x$  when  $g(x) = f(22)$ .

$x = \dots$  [2]

21 Simplify.

$$\frac{2x^2 + 5x - 12}{4x^2 - 9}$$

..... [4]

22 These are the first four terms of a sequence.

$$2.75 \qquad \qquad 6 \qquad \qquad 11.25 \qquad \qquad 20$$

The  $n$ th term of this sequence is  $\frac{1}{4}n^3 + an^2 + bn$ .

Calculate the value of  $a$  and the value of  $b$ .

$$a = \dots$$

$$b = \dots [5]$$

- 23 A train travels between two stations.

The distance between the stations is 220 km, correct to the nearest kilometre.

The speed of the train is 125 km/h, correct to the nearest 5 km/h.

Calculate the upper bound for the time the journey takes.

Give your answer in hours and minutes.

..... h ..... min [4]

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