



CANDIDATE  
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CENTRE  
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4024/12

## Paper 1

October/November 2023

**2 hours**

You must answer on the question paper.

You will need: Geometrical instruments

- 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.
- Calculators must **not** be used in this paper.
- You may use tracing paper.
- You must show all necessary working clearly.

- The total mark for this paper is 80.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **16** pages.

**ELECTRONIC CALCULATORS MUST NOT BE USED IN THIS PAPER****1** Work out.

**(a)**  $0.05 \times 0.3$

..... [1]

**(b)**  $600 \div 0.2$

..... [1]

**(c)**  $20 - 12 \div (8 - 6)$

..... [1]

**2**

This rectangle is split into squares of two different sizes.

Find the fraction of the rectangle that is shaded grey.

..... [1]

- 3 (a) Find the decimal which is exactly halfway between  $\frac{3}{5}$  and 68% .

..... [1]

- (b) Write 4.073 82 correct to 3 decimal places.

..... [1]

- (c) Evaluate  $\sqrt[3]{64}$  .

..... [1]

- 4 Sonu records the temperature, in °C, at midnight every day for 12 days.  
Here are the results in order, starting with the coldest.

−6    −5    −3    −2    −1    −1     $T$     5    5    6    6    7

- (a) Find the range of the temperatures.

..... °C [1]

- (b) The median temperature is 1 °C.

Find the value of  $T$ .

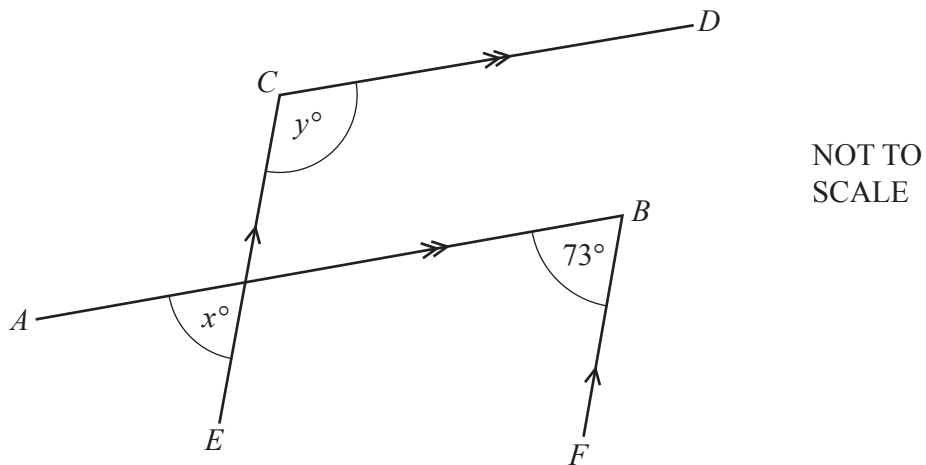
$T =$  ..... [1]

- 5 Anna and Ria share some money in the ratio 5 : 9.  
Ria receives \$8 more than Anna.

Work out the total amount of money that is shared.

\$ ..... [2]

6



$AB$  and  $CD$  are parallel lines.  
 $EC$  and  $FB$  are parallel lines.  
Angle  $ABF = 73^\circ$ .

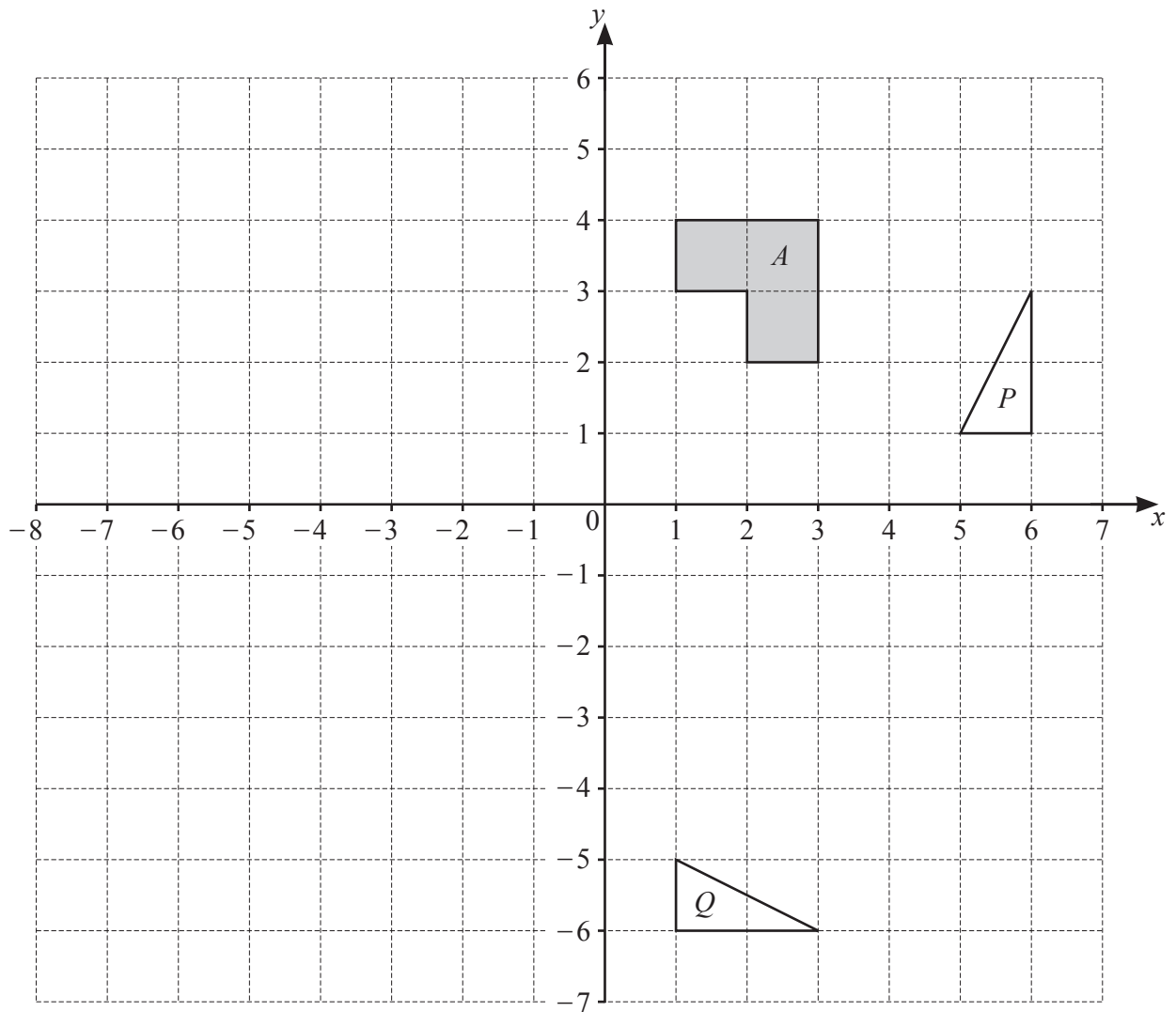
- (a) Find the value of  $x$ .

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

- (b) Find the value of  $y$ .

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

- 7 Shape  $A$  and triangles  $P$  and  $Q$  are drawn on a centimetre square grid.



- (a) Describe fully the **single** transformation that maps triangle  $P$  onto triangle  $Q$ .

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

- (b) Shape  $B$  is an enlargement of shape  $A$ .  
 The centre of enlargement is  $(5, 5)$ .  
 The area of shape  $B$  is  $27 \text{ cm}^2$ .

Draw shape  $B$  on the grid.

[3]

- 8 (a) Write the number 0.004 93 in standard form.

..... [1]

- (b) Evaluate  $(4 \times 10^9) \times (2 \times 10^{-2})$ .  
Give your answer in standard form.

..... [1]

- 9 (a) Write 180 as the product of its prime factors.

..... [2]

- (b) Expressed as the product of their prime factors,

$$36 = 2^2 \times 3^2 \quad \text{and} \quad N = 2^2 \times 3 \times k, \text{ where } k > 3.$$

180 is the lowest common multiple (LCM) of 36 and  $N$ .

Find the value of  $k$ .

$k =$  ..... [1]

- 10 By writing each number correct to 1 significant figure, estimate the value of

$$\sqrt{\frac{1240 \times 3.8}{11.2}}.$$

..... [2]

- 11 Solve  $7m - 13 \leq 8$ .

..... [2]

- 12 Solve the simultaneous equations.  
Show all your working.

$$\begin{aligned} 5x + 4y &= 14 \\ 3x - 2y &= 15 \end{aligned}$$

$$x = \dots\dots\dots$$

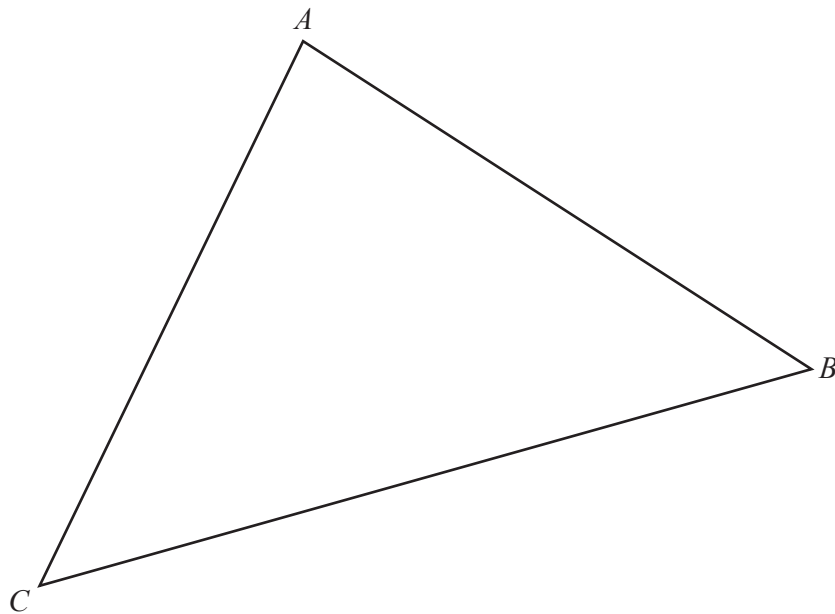
$$y = \dots\dots\dots [3]$$

- 13 A list of eight numbers has a mean of 12.  
The first five numbers have a mean of 9.

Find the sum of the three remaining numbers.

..... [2]

14



- (a) Measure angle  $ABC$ .

Angle  $ABC =$  ..... [1]

- (b) **Using compasses and a straight edge only**, construct the perpendicular bisector of  $AC$ . [2]

- (c) On the diagram, shade the region inside triangle  $ABC$  that is

- nearer to  $A$  than to  $C$
- and
- more than 6 cm from  $B$ .

[2]

- 15 (a)** The second term of a linear sequence is 28.  
The fifth term of the sequence is 16.

Find the first term, the third term and the fourth term of this sequence.

First term = .....

Third term = .....

Fourth term = ..... [2]

- (b)** These are the first five terms of a different sequence.

3      9      19      33      51

Find an expression for the  $n$ th term of this sequence.

..... [2]

**16**       $T = \sqrt{P-4}$

- (a)** Work out the value of  $T$  when  $P = 40$ .

$T =$  ..... [1]

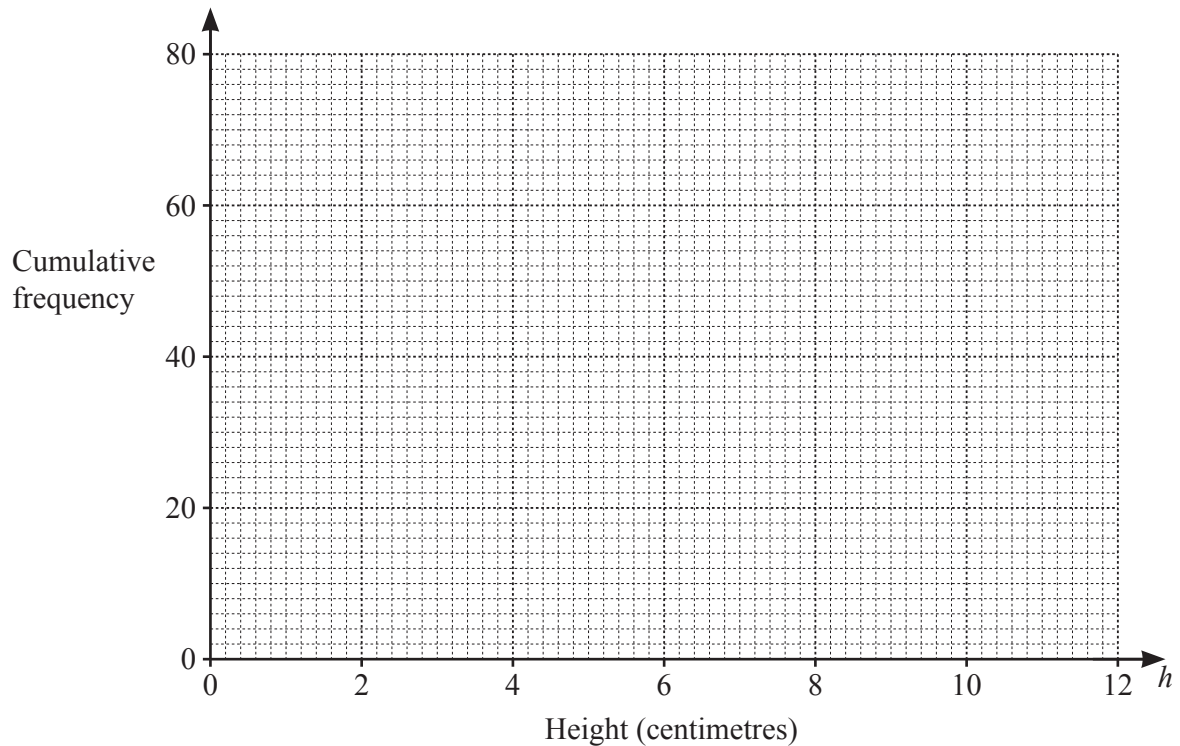
- (b)** Rearrange the formula to make  $P$  the subject.

$P =$  ..... [2]

- 17 The heights of 80 plants are measured.  
The table shows the results.

|                              |            |            |            |            |             |             |
|------------------------------|------------|------------|------------|------------|-------------|-------------|
| Height<br>( $h$ centimetres) | $h \leq 2$ | $h \leq 4$ | $h \leq 6$ | $h \leq 8$ | $h \leq 10$ | $h \leq 12$ |
| Cumulative<br>frequency      | 4          | 18         | 42         | 60         | 72          | 80          |

- (a) Draw a cumulative frequency diagram to show this information.



[2]

- (b) Use your diagram to find an estimate for the interquartile range.

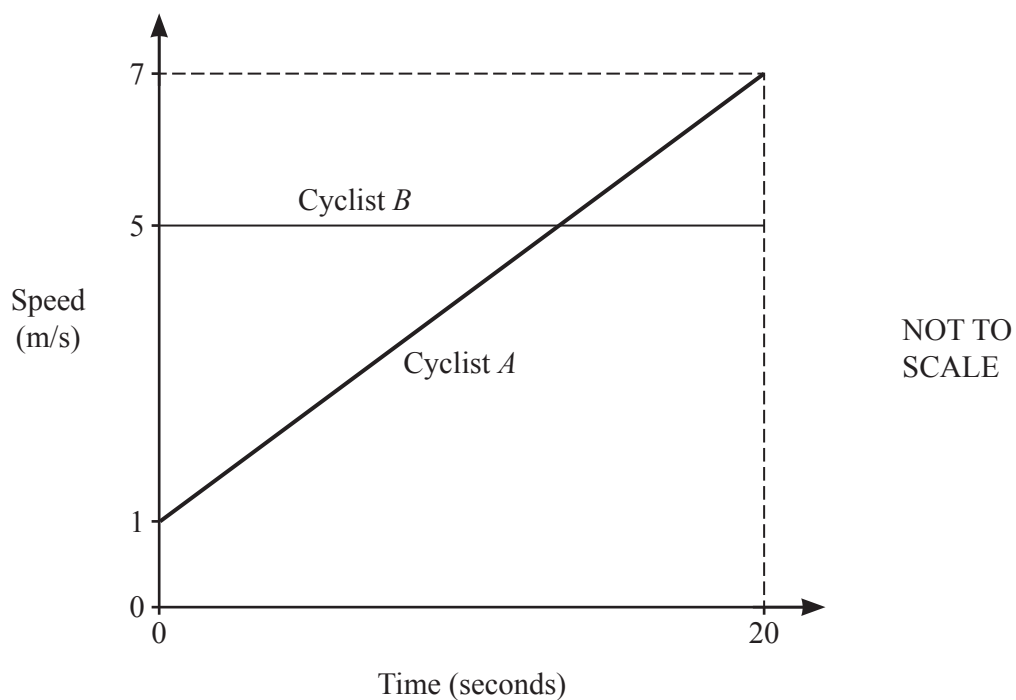
..... cm [2]

- (c) Plants are sold when they are taller than  $H$  centimetres.  
28 of these plants are sold.

Find the value of  $H$ .

$H =$  ..... [2]

- 18 The diagram shows the speed–time graph of part of a journey for two cyclists, *A* and *B*.



- (a) Find the acceleration of cyclist *A* during the first 20 seconds.

.....  $\text{m/s}^2$  [1]

- (b) Find which cyclist travelled further in the first 20 seconds and by how many metres.

Cyclist ..... travelled further by ..... metres [3]

19 Express as a single fraction in its simplest form.

$$\frac{x+1}{8} + \frac{3x}{4} - \frac{5x}{16}$$

..... [2]

20 Factorise.

(a)  $2cd + ce - 6d - 3e$

..... [2]

(b)  $3v^2 - 27t^2$

..... [2]

21

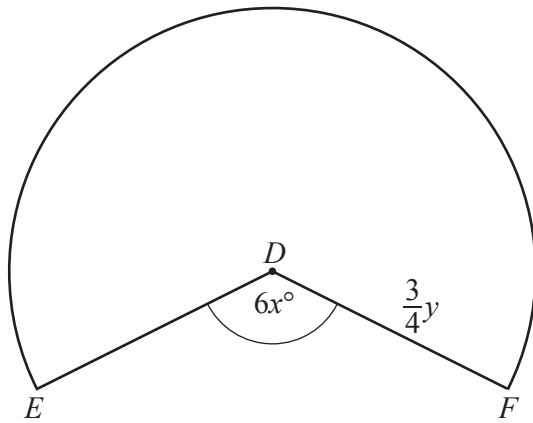


Diagram A

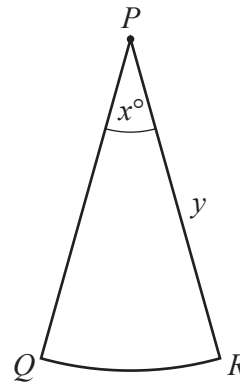


Diagram B

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Diagram A shows a sector of a circle, centre  $D$  and radius  $\frac{3}{4}y$  cm.  
The obtuse angle  $EDF = 6x^\circ$ .

Diagram B shows a sector of a circle, centre  $P$  and radius  $y$  cm.  
The sector angle is  $x^\circ$ .

- (a) The length of the major arc  $EF$  is 9 times the length of the arc  $QR$ .

Show that  $x = 20$ .

[3]

- (b) Find the value of  $y$  when the area of sector  $QPR$  is equal to  $2\pi \text{ cm}^2$ .

$y = \dots\dots\dots$  [2]

22

$$\begin{pmatrix} x & 3 \\ 2 & x+1 \end{pmatrix} \begin{pmatrix} x-1 \\ 2 \end{pmatrix} = \begin{pmatrix} 2x+6 \\ y \end{pmatrix}$$

(a) Show that  $x^2 - 3x = 0$  .

[2]

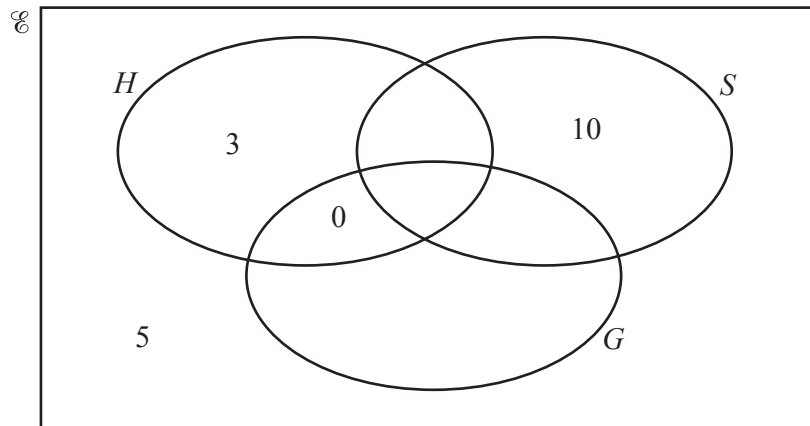
(b) (i) Solve  $x^2 - 3x = 0$  .

$x = \dots\dots\dots$  or  $x = \dots\dots\dots$  [2]

(ii) Find the value of  $y$  when  $x > 0$  .

$y = \dots\dots\dots$  [2]

- 23 A shop sells hats ( $H$ ), scarves ( $S$ ) and gloves ( $G$ ).  
A group of 40 people are asked which items they buy in the shop.  
Some of the results are shown in the Venn diagram.



- (a) 2 people buy all three items.  
Those people that buy both a hat and a scarf also buy gloves.  
4 people buy exactly two items.

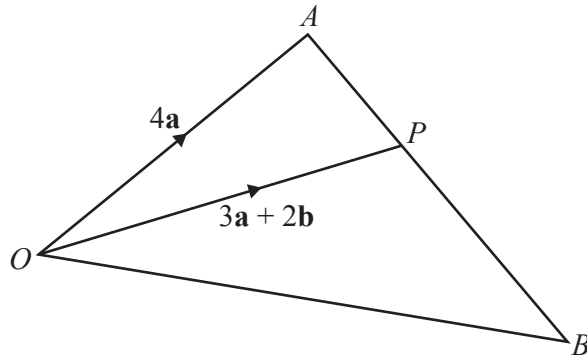
Use this information to complete the Venn diagram.

[2]

- (b) Work out  $n(S \cap (H \cup G)')$ .

..... [1]

**Question 24 is printed on the next page.**



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$OAB$  is a triangle.

$P$  lies on  $AB$  and  $AP : PB = 2 : 3$ .

$\overrightarrow{OA} = 4\mathbf{a}$  and  $\overrightarrow{OP} = 3\mathbf{a} + 2\mathbf{b}$ .

(a) Find, in terms of  $\mathbf{a}$  and  $\mathbf{b}$ , giving your answer in its simplest form

(i)  $\overrightarrow{AP}$

$\overrightarrow{AP} = \dots\dots\dots$  [1]

(ii)  $\overrightarrow{OB}$ .

$\overrightarrow{OB} = \dots\dots\dots$  [3]

(b)  $Q$  is a point on  $OA$  such that  $\overrightarrow{QP}$  is parallel to  $\overrightarrow{OB}$ .

Find  $\overrightarrow{QP}$ .

$\overrightarrow{QP} = \dots\dots\dots$  [1]

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