



**Surname** \_\_\_\_\_

**Forename(s)** \_\_\_\_\_

**Centre Number** \_\_\_\_\_

**Candidate Number** \_\_\_\_\_

**Candidate Signature** \_\_\_\_\_

**I declare this is my own work.**

**GCSE**

**MATHEMATICS**

**H**

**Higher Tier Paper 1 Non-Calculator**

**8300/1H**

**Tuesday 1 November 2022 Morning**

**Time allowed: 1 hour 30 minutes**

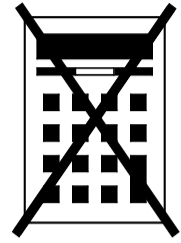
**At the top of the page, write your surname and forename(s), your centre number, your candidate number and add your signature.**

**[Turn over]**



## MATERIALS

For this paper you must have:



- mathematical instruments
- the Formulae Sheet (enclosed).

**You must NOT use a calculator.**

## INSTRUCTIONS

- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Answer ALL questions.
- You must answer the questions in the spaces provided. Do not write on blank pages.
- If you need extra space for your answer(s), use the lined pages at the end of this book. Write the question number against your answer(s).



- **Do all rough work in this book. Cross through any work you do not want to be marked.**

## **INFORMATION**

- **The marks for questions are shown in brackets.**
- **The maximum mark for this paper is 80.**
- **You may ask for more answer paper, graph paper and tracing paper. These must be tagged securely to this answer book.**

## **ADVICE**

**In all calculations, show clearly how you work out your answer.**

**DO NOT TURN OVER UNTIL TOLD TO DO SO**



**Answer ALL questions in the spaces provided.**

**1 Work out  $-4 \times -\frac{7}{9}$**

**Circle your answer. [1 mark]**

$$-\frac{28}{36}$$

$$-\frac{28}{9}$$

$$\frac{28}{36}$$

$$\frac{28}{9}$$

**2 Circle the value of  $(-\sqrt{6})^4$  [1 mark]**

$$12$$

$$36$$

$$10$$

$$\sqrt{24}$$



3  $0.203 = \frac{1}{5} + x$

Circle the value of  $x$ . [1 mark]

$$\frac{1}{300}$$

$$\frac{1}{3000}$$

$$\frac{3}{100}$$

$$\frac{3}{1000}$$

4 Circle the correct statement.  
[1 mark]

$$3x \equiv x + 2x$$

$$3x \equiv 2$$

$$3x + x \equiv 2 - x$$

$$3x + x - 2 \equiv 0$$

[Turn over]

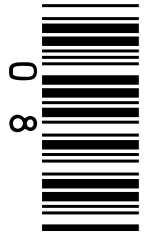




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**[Turn over]**





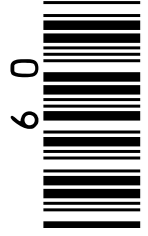
**6** Here is some information about the time spent on social media by 40 women and 40 men last week.

<b>Time spent, <math>t</math> (hours)</b>	<b>Number of women</b>	<b>Number of men</b>
<b><math>2 &lt; t \leq 5</math></b>	<b>12</b>	<b>10</b>
<b><math>5 &lt; t \leq 8</math></b>	<b>11</b>	<b>17</b>
<b><math>8 &lt; t \leq 11</math></b>	<b>14</b>	<b>9</b>
<b><math>11 &lt; t \leq 14</math></b>	<b>2</b>	<b>4</b>
<b><math>14 &lt; t \leq 17</math></b>	<b>1</b>	<b>0</b>

8

**Tick ONE box, on the opposite page, for each statement. [3 marks]**





**Definitely  
true**

**Might be  
true**

**Cannot  
be true**

**Three of the WOMEN  
spent more than  
11 hours on social  
media.**

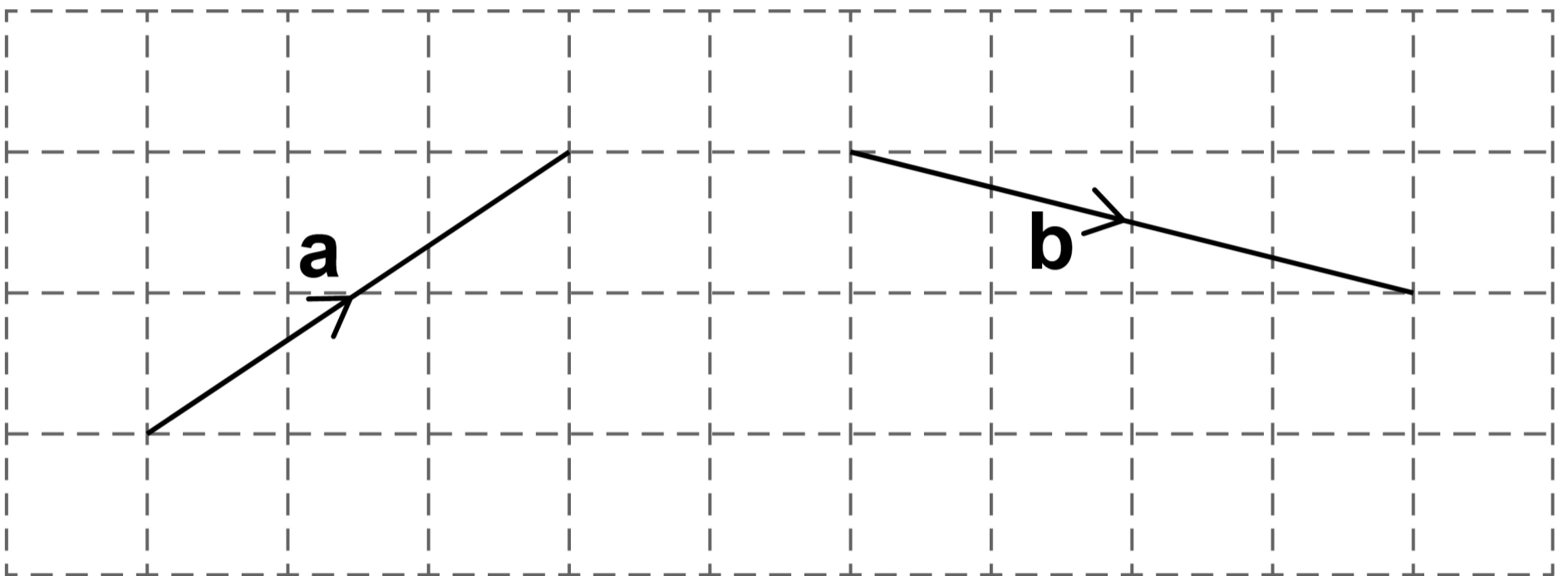
**The range for the MEN  
is 15 hours.**

**The women have a  
higher median than the  
men.**

**[Turn over]**

- 7 The diagram shows the vectors  $a$  and  $b$ .

As a column vector  $a = \begin{pmatrix} 3 \\ 2 \end{pmatrix}$



- 7 (a) What is  $b$  as a column vector?  
[2 marks]

Answer  $\left( \quad \right)$



7 (b) Work out  $4a$  as a column vector.  
[1 mark]

Answer  $\begin{pmatrix} \phantom{0} \\ \phantom{0} \end{pmatrix}$

7 (c)  $a + c = \begin{pmatrix} 3 \\ 0 \end{pmatrix}$

Work out  $c$  as a column vector.

Circle your answer. [1 mark]

$$\begin{pmatrix} 2 \\ 0 \end{pmatrix}$$

$$\begin{pmatrix} 0 \\ 2 \end{pmatrix}$$

$$\begin{pmatrix} -2 \\ 0 \end{pmatrix}$$

$$\begin{pmatrix} 0 \\ -2 \end{pmatrix}$$

[Turn over]

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**Answer** \_\_\_\_\_

**[Turn over]**



- 9 Work out all the INTEGER values of  $x$  for which  $12 \leq 4x < 25$   
[2 marks]

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**Answer** \_\_\_\_\_



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**[Turn over]**



**10 Here is some information about 120 people who visit a shop.**

**$\frac{3}{4}$  of the people buy neither a coat nor a dress.**

**19 people buy a coat.**

**14 people buy a dress.**

**Complete this Venn diagram, on the opposite page, to represent the information. [3 marks]**

**$\xi$  = 120 people who visit the shop**

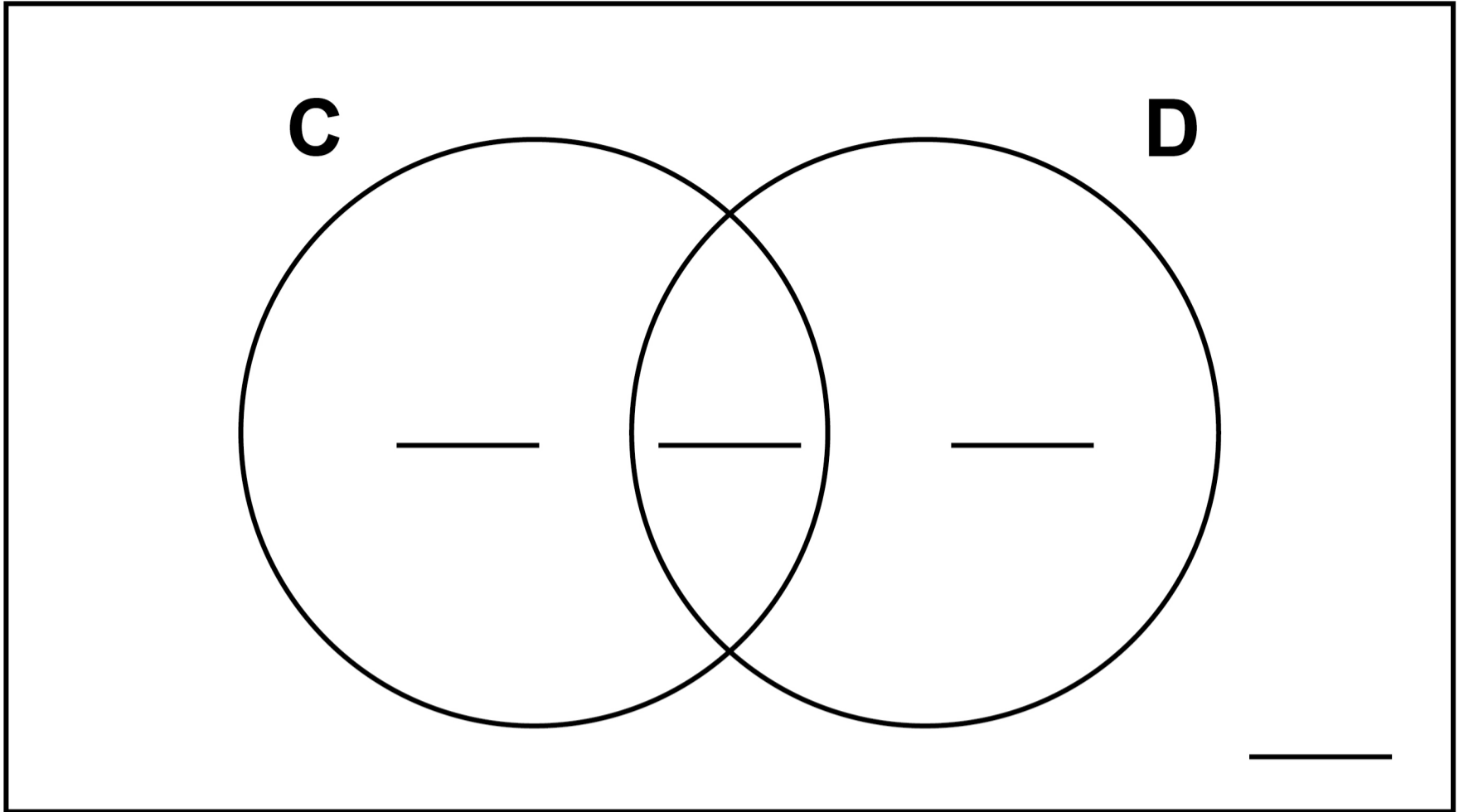
**C = people who buy a coat**

**D = people who buy a dress**





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**[Turn over]**



1 7

- 11 Write  $(3^6 \times 3^5) : 3^7$  in the form  $n : 1$  where  $n$  is an integer.  
[3 marks]

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Answer \_\_\_\_\_ : 1



12  $a$  is 10% more than  $b$ .

Circle the ratio  $a : b$  [1 mark]

10 : 11

10 : 1

11 : 10

1 : 10

13 Work out  $0.4\dot{7} + 0.312$

Circle your answer. [1 mark]

0.782

0.789

$0.789\dot{7}$

$0.7\ddot{8}\ddot{9}$

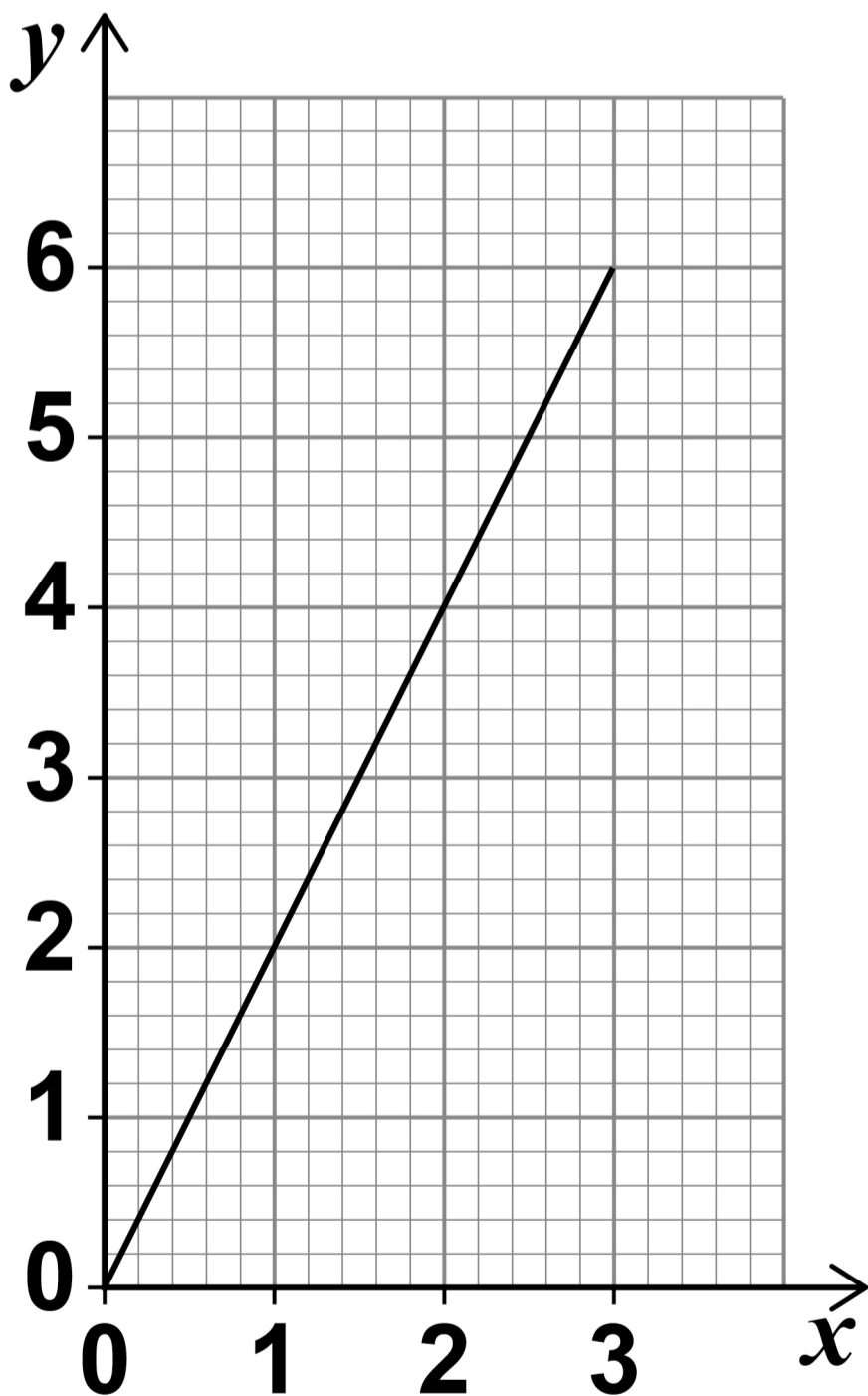
[Turn over]



**14** Craig wants to draw a graph, for values of  $x$  from  $-3$  to  $3$ ,

where the  $x$ -coordinate and  $y$ -coordinate are always in the ratio  $2 : 1$

Here is his graph.



**Make two criticisms of Craig's graph. [2 marks]**

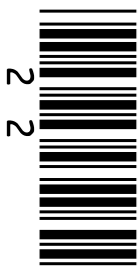
**Criticism 1** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Criticism 2** \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**[Turn over]**

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**15 Show that**

$$(3x + 4)(2x - 5) - 11x(x - 2) + 5(x^2 - 3x - 1)$$

**simplifies to an integer. [4 marks]**

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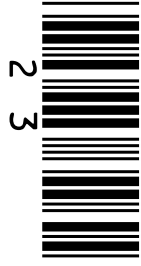
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**[Turn over]**

**16** A graph has the equation  
 $y = x^2 + px + r$  where  $p$  and  $r$  are constants.

The graph passes through the points  $(0, 4)$ ,  $(1, 3)$  and  $(8, w)$

**Work out the value of  $w$ . [4 marks]**

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$w =$  \_\_\_\_\_

**[Turn over]**

8



- 17 The table shows information about the heights of 60 athletes.

Height, $h$ (cm)	Frequency
$150 < h \leq 160$	4
$160 < h \leq 170$	12
$170 < h \leq 180$	35
$180 < h \leq 190$	7
$190 < h \leq 200$	2



**17 (a) Complete the cumulative frequency table. [1 mark]**

<b>Height, <math>h</math> (cm)</b>	<b>Cumulative frequency</b>
<b><math>h \leq 150</math></b>	<b>0</b>
<b><math>h \leq 160</math></b>	<b>4</b>
<b><math>h \leq 170</math></b>	<b>16</b>
<b><math>h \leq 180</math></b>	
<b><math>h \leq 190</math></b>	
<b><math>h \leq 200</math></b>	

**17 (b) Circle the class interval that contains the lower quartile. [1 mark]**

$$150 < h \leq 160$$

$$160 < h \leq 170$$

$$170 < h \leq 180$$

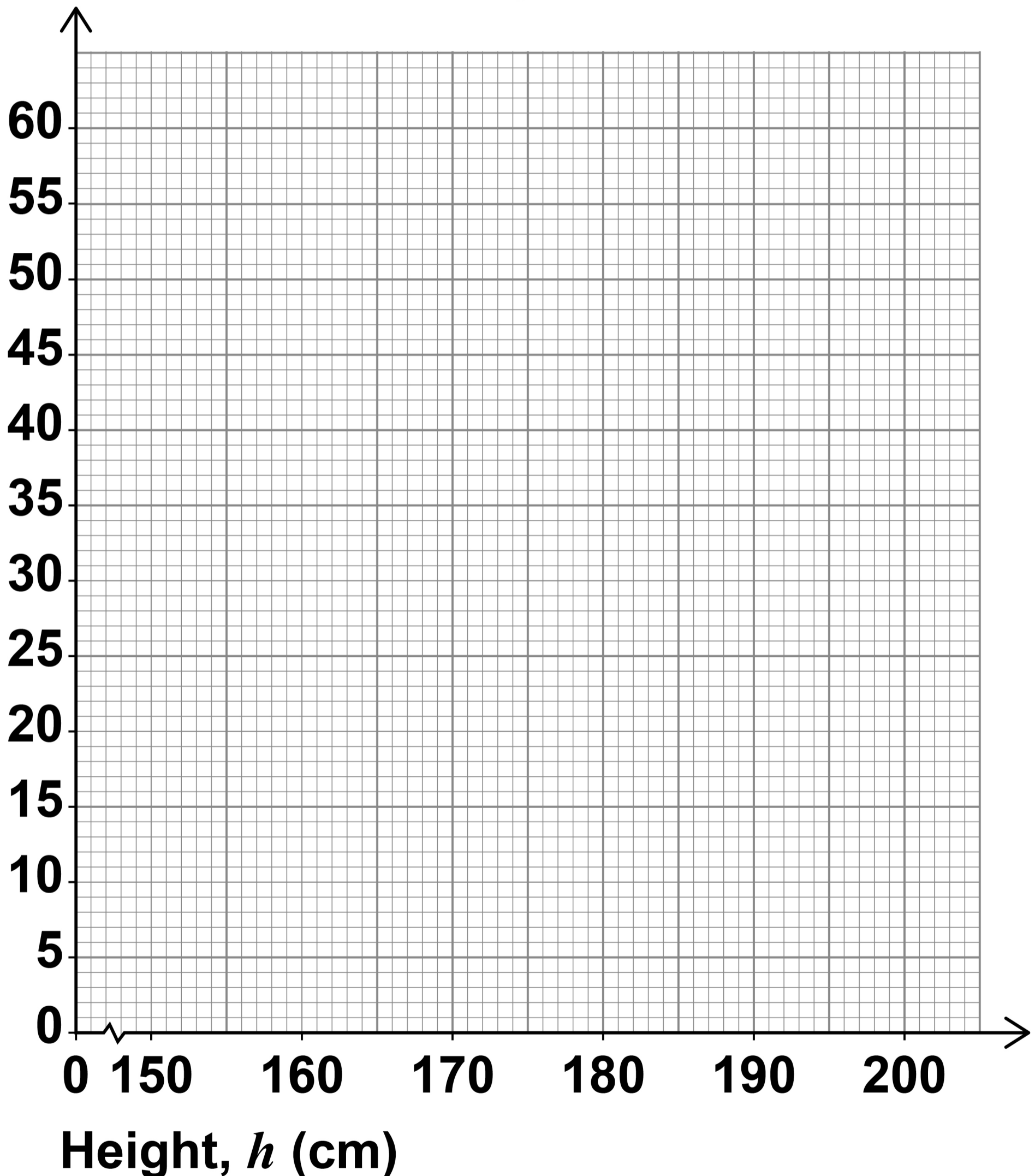
$$180 < h \leq 190$$

**[Turn over]**



**17 (c) Draw a cumulative frequency diagram to represent the data shown on page 26. [2 marks]**

**Cumulative frequency**



**17 (d) Estimate the number of the athletes whose height is MORE than 176 cm [2 marks]**

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**Answer** \_\_\_\_\_

**[Turn over]**

6

**18** A road has three sections, D, E and F.

**The lengths of D, E and F are in the ratios**

**D : E = 3 : 5**

**E : F = 7 : 4**

**What fraction of the length of the road is section D? [3 marks]**

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**Answer** \_\_\_\_\_

**[Turn over]**



19 (a) Work out the value of  $\left(\frac{5}{4}\right)^{-2}$

[2 marks]

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**Answer** \_\_\_\_\_





19(b) Work out the value of  $\left(\frac{9}{100}\right)^{\frac{3}{2}}$

[2 marks]

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Answer \_\_\_\_\_

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[Turn over]





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**[Turn over]**



**21** Convert  $0.\dot{6}\dot{1}$  to a fraction.  
**[3 marks]**

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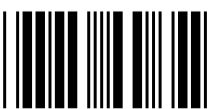
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**Answer** \_\_\_\_\_

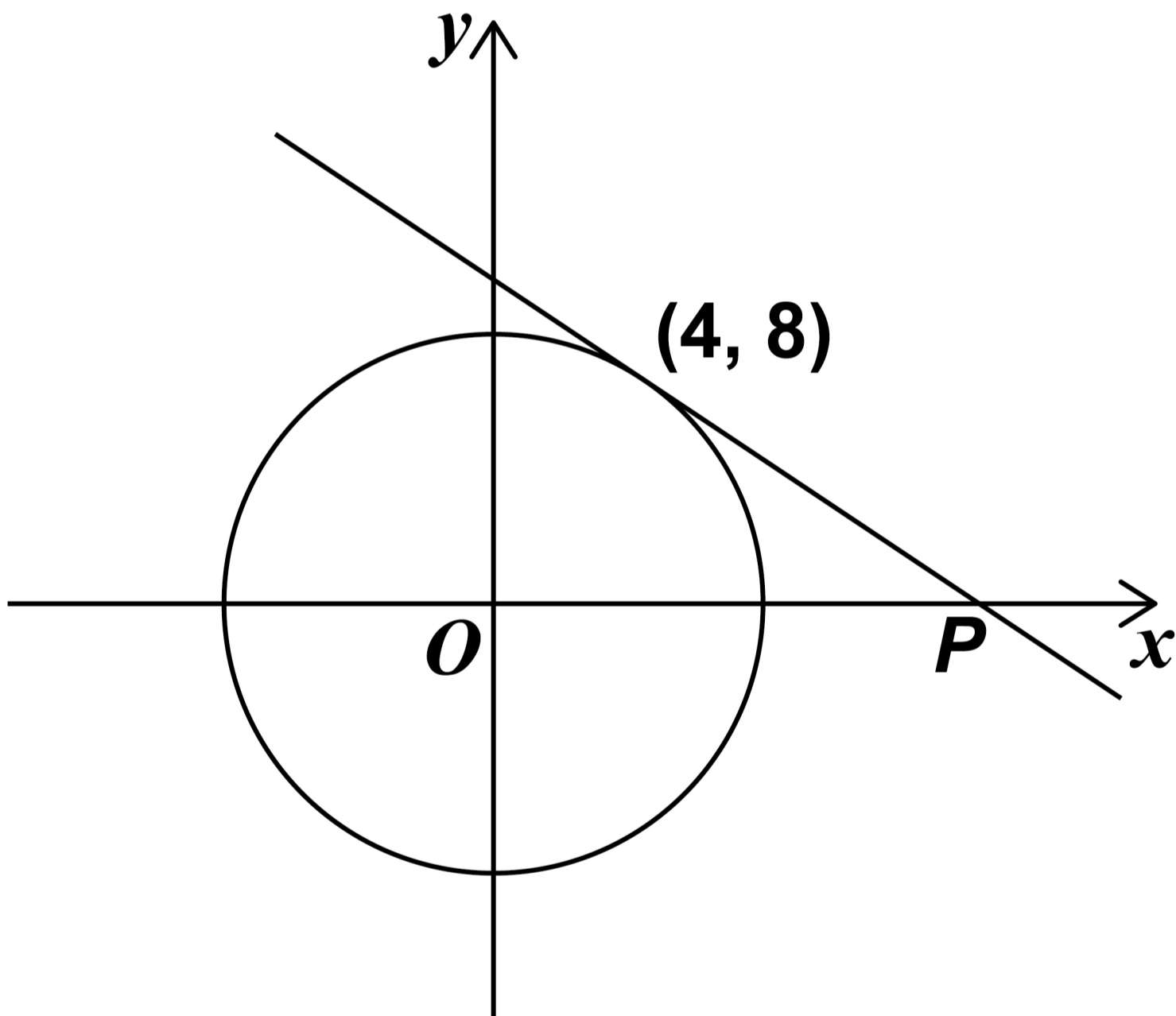
**[Turn over]**



22  $(4, 8)$  is a point on a circle, centre  $O$ .

The tangent at  $(4, 8)$  intersects the  $x$ -axis at  $P$ .

The diagram is not drawn accurately.



Work out the  $x$ -coordinate of  $P$ .  
[5 marks]

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**Answer** \_\_\_\_\_

**[Turn over]**



3 9





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**Answer** \_\_\_\_\_ **degrees**

**[Turn over]**



**24** Triangle  $ABC$  is drawn on a grid on the opposite page.

$ABC$  is transformed to  $A'B'C'$  by a reflection in the line  $x = 1$

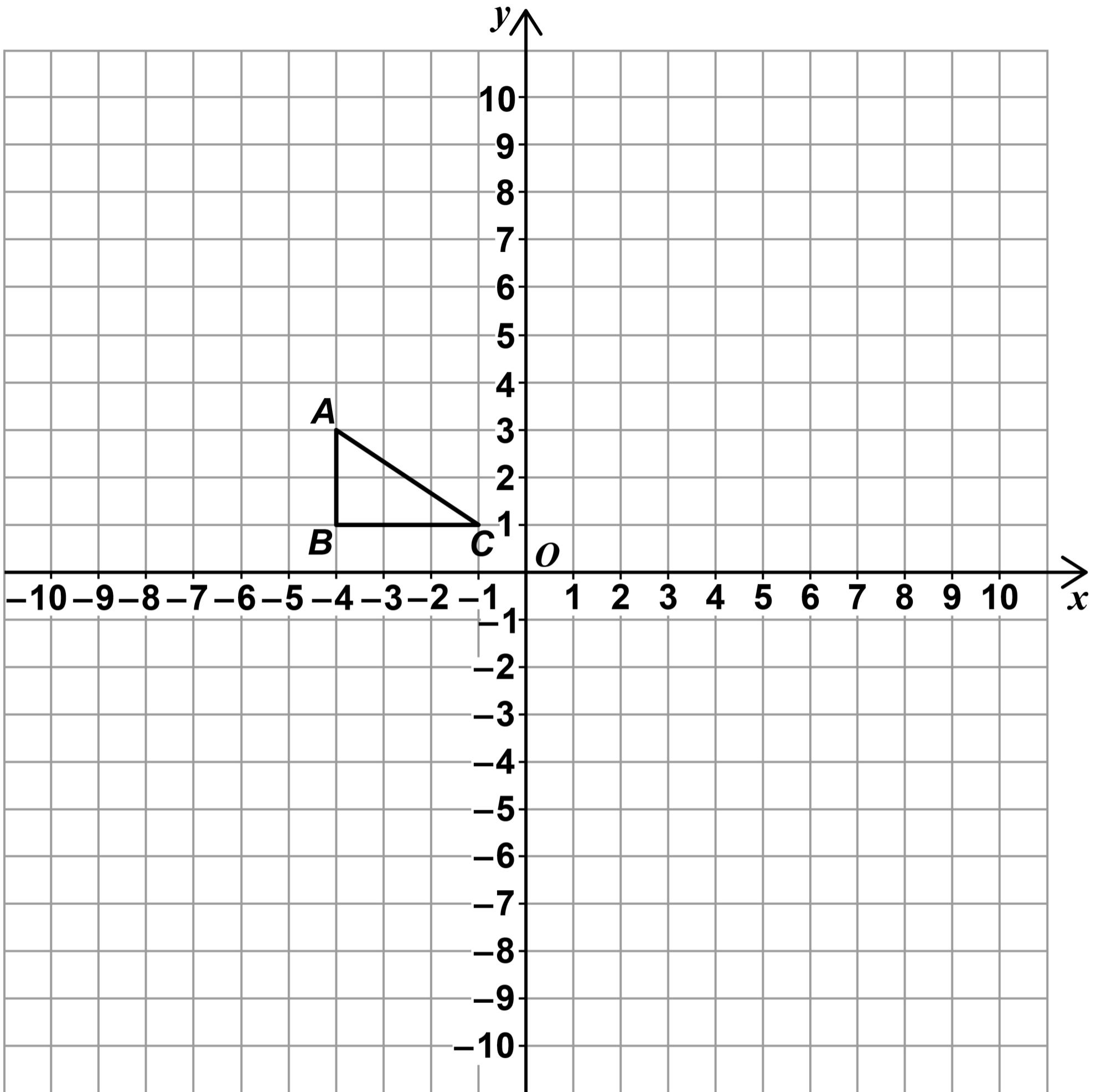
$A'B'C'$  is transformed to  $A''B''C''$  by a rotation  $90^\circ$  anticlockwise about  $(1, -4)$

**Which ONE point on  $ABC$  is invariant under the combined transformation?**

**You MUST show the result of each transformation on the grid on the opposite page. [4 marks]**

**Answer** \_\_\_\_\_

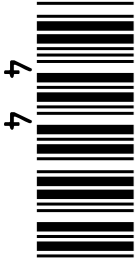




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**25 (a) Solve  $x^2 - 5x - 6 < 0$  [2 marks]**

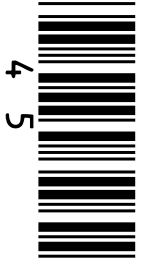
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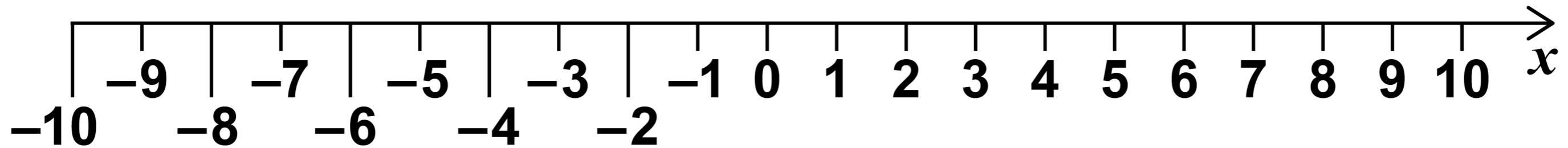
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**Answer** \_\_\_\_\_



**25 (b) Show the solution to  $x^2 - 5x - 6 < 0$  on the number line. [1 mark]**



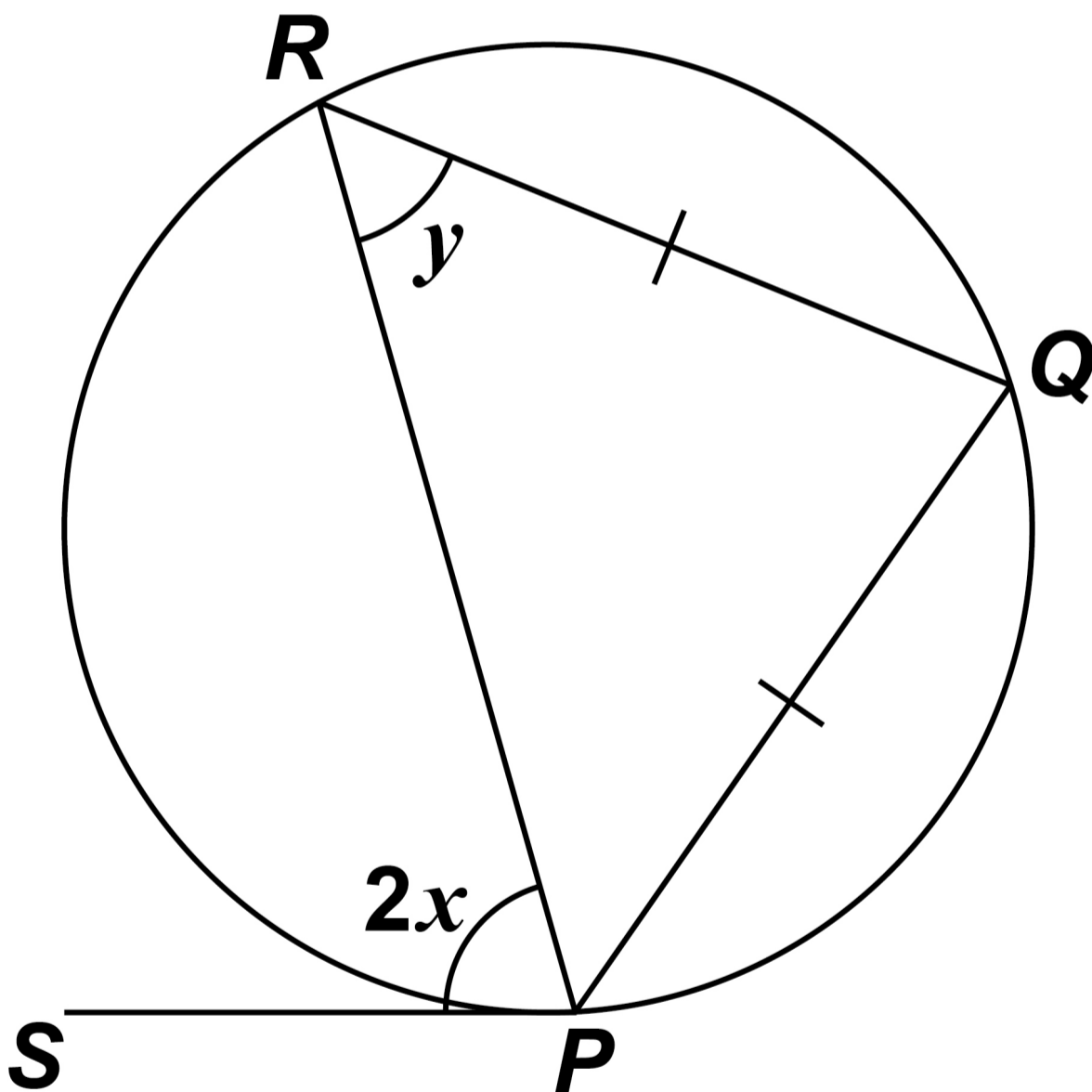
**[Turn over]**

26  $P$ ,  $Q$  and  $R$  are points on a circle.

$SP$  is a tangent to the circle.

$$RQ = PQ$$

The diagram is not drawn accurately.





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**[Turn over]**





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**Answer** \_\_\_\_\_

**END OF QUESTIONS**

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For Examiner's Use	
Pages	Mark
4–6	
8–11	
12–17	
18–21	
22–25	
26–29	
30–33	
34–39	
40–43	
44–48	
50–51	
<b>TOTAL</b>	

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