

Please write clearly in block capitals.

Centre number

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Candidate number

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Surname

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Forename(s)

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Candidate signature

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I declare this is my own work.

# GCSE MATHEMATICS

# H

Higher Tier

Paper 1 Non-Calculator

Tuesday 1 November 2022

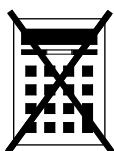
Morning

Time allowed: 1 hour 30 minutes

## 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.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or 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.

For Examiner's Use	
Pages	Mark
2–3	
4–5	
6–7	
8–9	
10–11	
12–13	
14–15	
16–17	
18–19	
20–21	
22	
<b>TOTAL</b>	



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]

$3x \equiv x + 2x$

$3x \equiv 2$

$3x + x \equiv 2 - x$

$3x + x - 2 \equiv 0$

5 Divide 62 in the ratio 3 : 7

[3 marks]

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Answer \_\_\_\_\_ and \_\_\_\_\_

Turn over for the next question

7

Turn over ►



6

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

Time spent, $t$ (hours)	Number of women	Number of men
$2 < t \leq 5$	12	10
$5 < t \leq 8$	11	17
$8 < t \leq 11$	14	9
$11 < t \leq 14$	2	4
$14 < t \leq 17$	1	0

Tick **one** box for each statement.

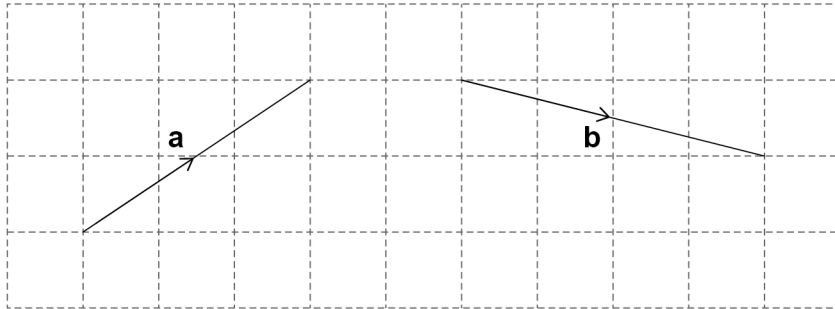
[3 marks]

	Definitely true	Might be true	Cannot be true
Three of the <b>women</b> spent more than 11 hours on social media.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The range for the <b>men</b> is 15 hours.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The women have a higher median than the men.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



7 The diagram shows the vectors **a** and **b**.

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



7 (a) What is **b** as a column vector?

[2 marks]

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

7 (b) Work out  $4\mathbf{a}$  as a column vector.

[1 mark]

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

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

Work out **c** as a column vector.

Circle your answer.

[1 mark]

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

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

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

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





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.

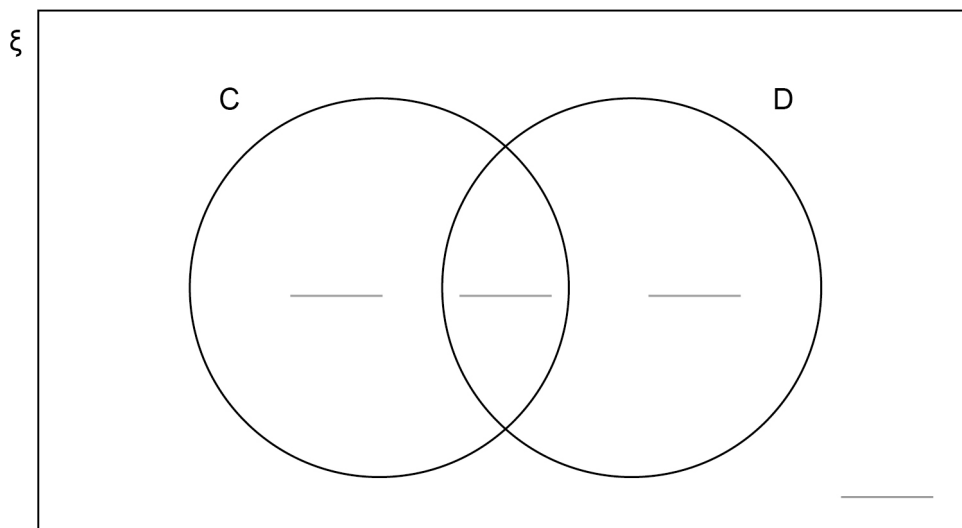
Complete this Venn diagram to represent the information.

[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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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

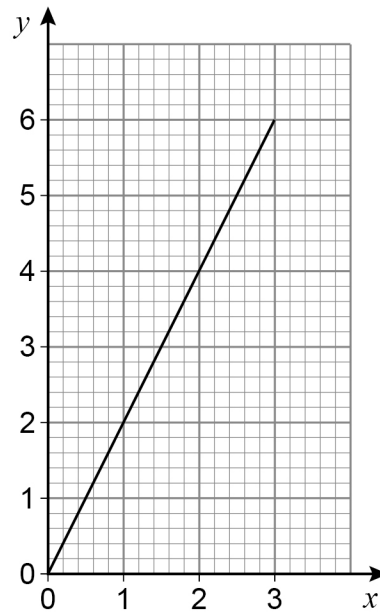
$0.789\dot{7}$

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





- 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 \_\_\_\_\_

\_\_\_\_\_







- 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]

Height, $h$ (cm)	Cumulative frequency
$h \leq 150$	0
$h \leq 160$	4
$h \leq 170$	16
$h \leq 180$	
$h \leq 190$	
$h \leq 200$	

- 17 (b)** Circle the class interval that contains the lower quartile.

[1 mark]

$150 < h \leq 160$

$160 < h \leq 170$

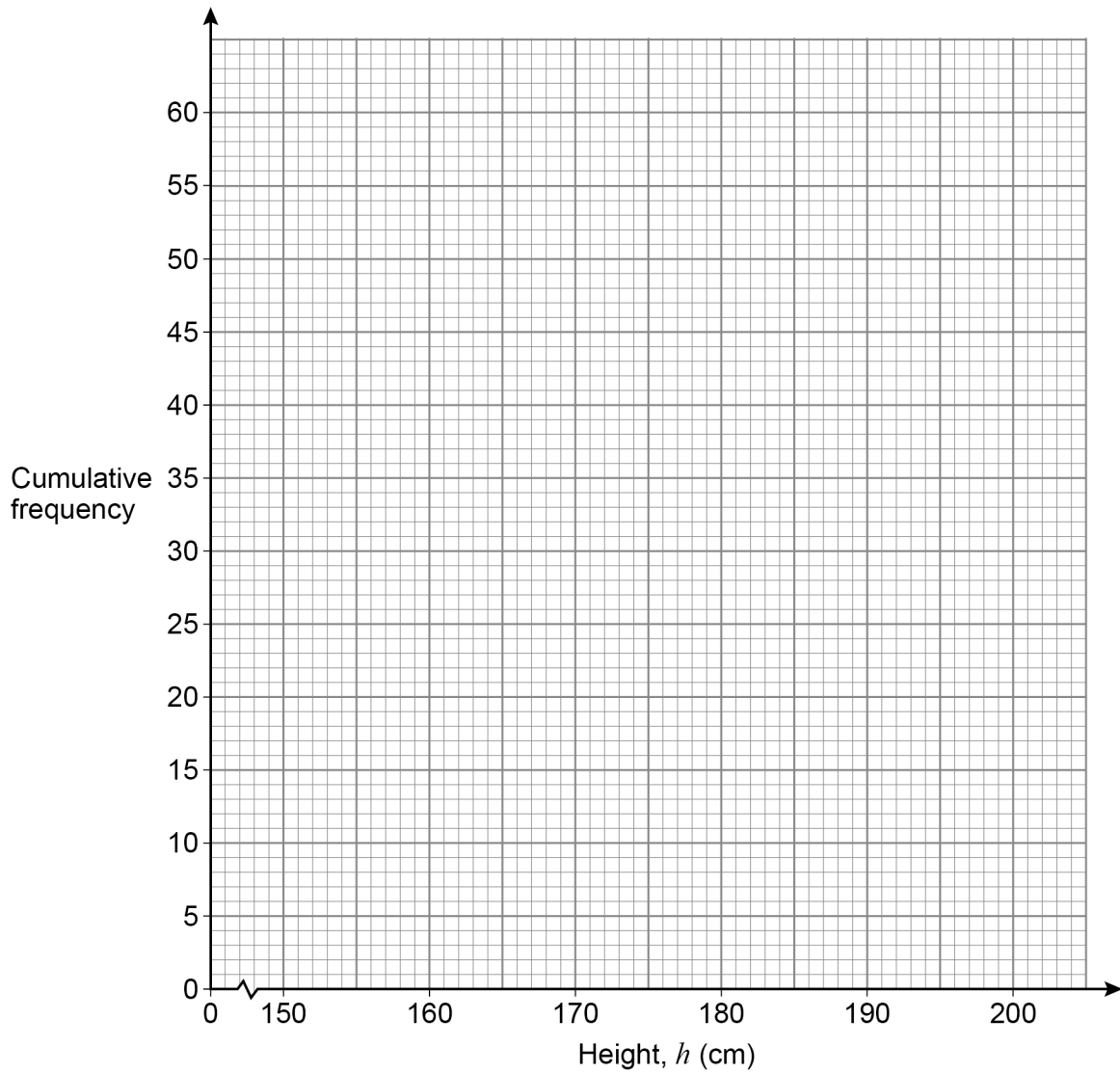
$170 < h \leq 180$

$180 < h \leq 190$



17 (c) Draw a cumulative frequency diagram to represent the data.

[2 marks]



17 (d) Estimate the number of the athletes whose height is **more** than 176 cm

[2 marks]

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Answer \_\_\_\_\_

6
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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 \_\_\_\_\_

Turn over for the next question

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Turn over ►



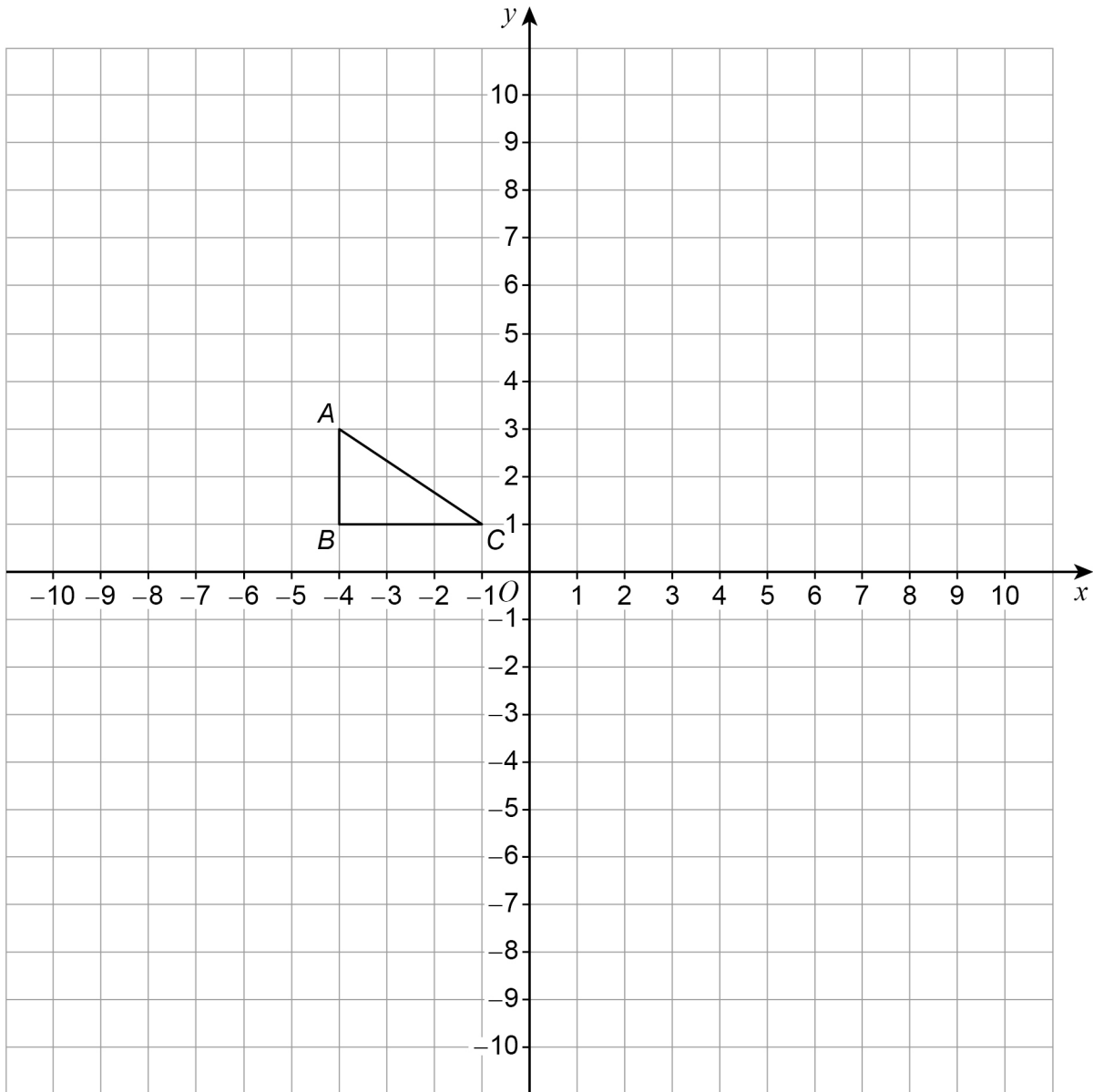








24 Triangle  $ABC$  is drawn on a grid.



$ABC$  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.

[4 marks]

Answer \_\_\_\_\_



25 (a) Solve  $x^2 - 5x - 6 < 0$

[2 marks]

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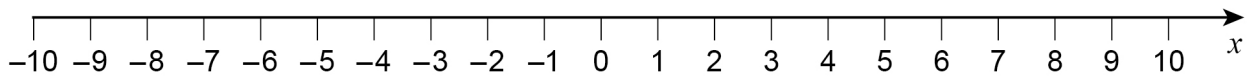
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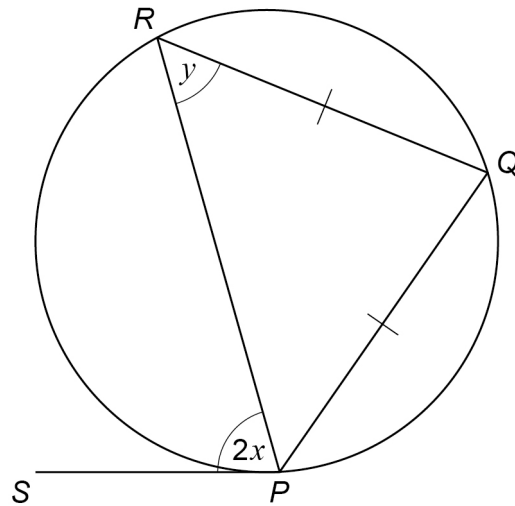
Answer \_\_\_\_\_

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

[1 mark]



26

 $P$ ,  $Q$  and  $R$  are points on a circle. $SP$  is a tangent to the circle. $RQ = PQ$ Not drawn  
accuratelyProve that  $y = 90^\circ - x$ **[4 marks]**


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2 8



2 2 B G 8 3 0 0 / 1 H

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