



**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**

**Wednesday 8 November 2023 Morning**

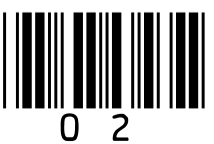
**Time allowed: 1 hour 30 minutes**

**[Turn over]**



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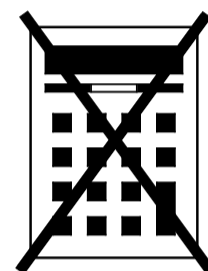


**On the front of this book, write your surname and forename(s), your centre number, your candidate number and add your signature.**

## **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.**

**[Turn over]**



- **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 the lowest common multiple (LCM) of 20 and 25  
[1 mark]**

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

**2 Work out the size of an EXTERIOR angle of a regular hexagon.  
[1 mark]**

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**Answer** \_\_\_\_\_ °



3 ***A* is (2, 0) and *B* is (0, -4)**

**Work out the midpoint of *AB*.**  
**[1 mark]**

**Answer** ( \_\_\_\_\_ , \_\_\_\_\_ )

4 **Simplify  $a + 3a \div a$  [1 mark]**

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

**[Turn over]**





**6 A music company releases 10 albums.**

**The scatter graph, on page 10, shows, for each album, the number of downloads on the first day**

**and**

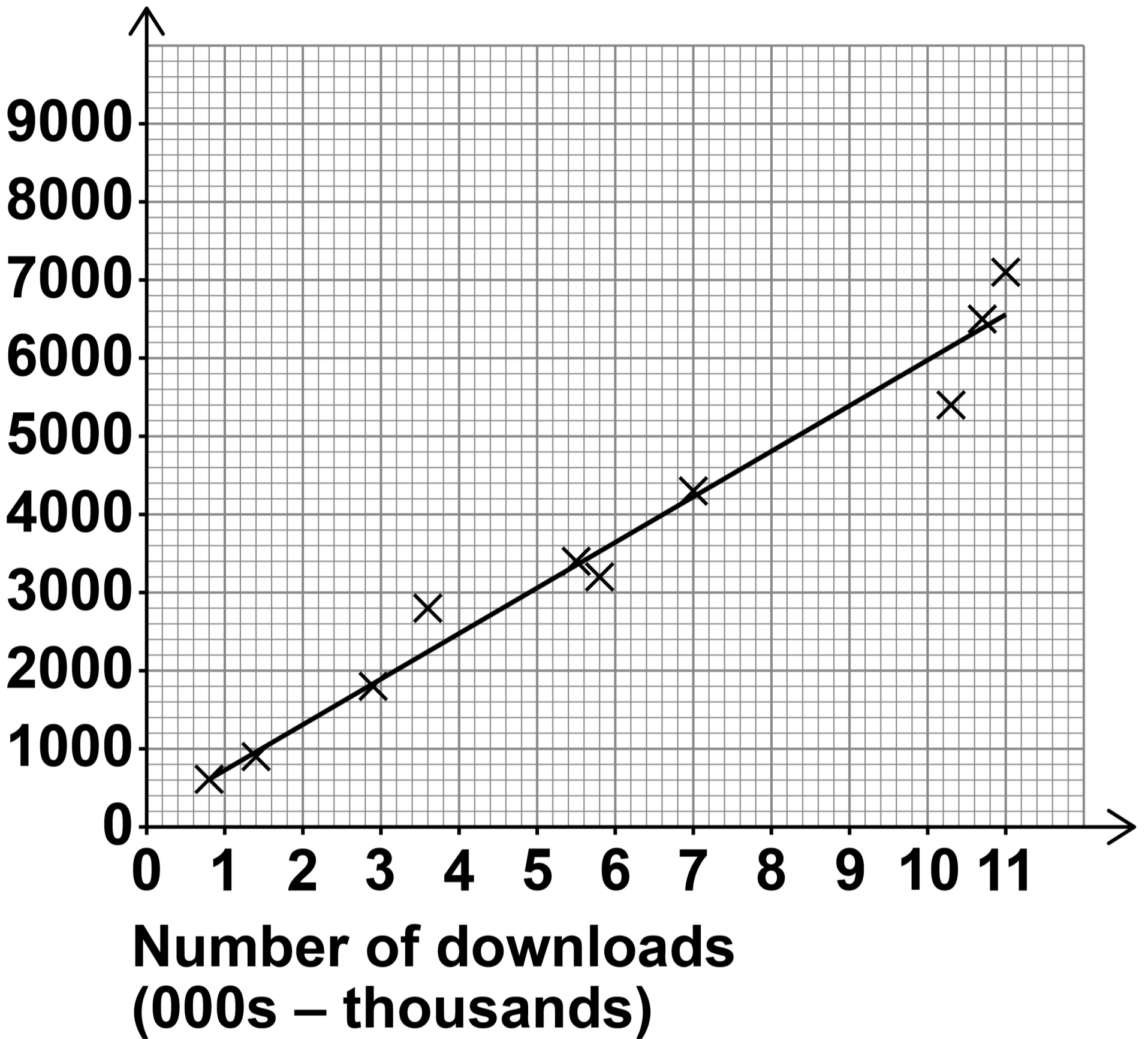
**the number of CDs sold on the first day.**

**A line of best fit has been drawn on the scatter graph.**

**[Turn over]**



**Number of  
CDs sold**



**6 (a) The scatter graph shows positive correlation.**

**Describe the relationship between number of downloads and number of CDs sold. [1 mark]**

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**[Turn over]**



**6 (b) The company earns  
£2.50 for each download  
and  
£3 for each CD sold.**

**The company releases another  
album.**

**On the first day it has 9000  
downloads.**

**Estimate the TOTAL amount the  
company earns from downloads  
and CDs of the album that day.  
[3 marks]**

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**Answer £** \_\_\_\_\_

**[Turn over]**

4





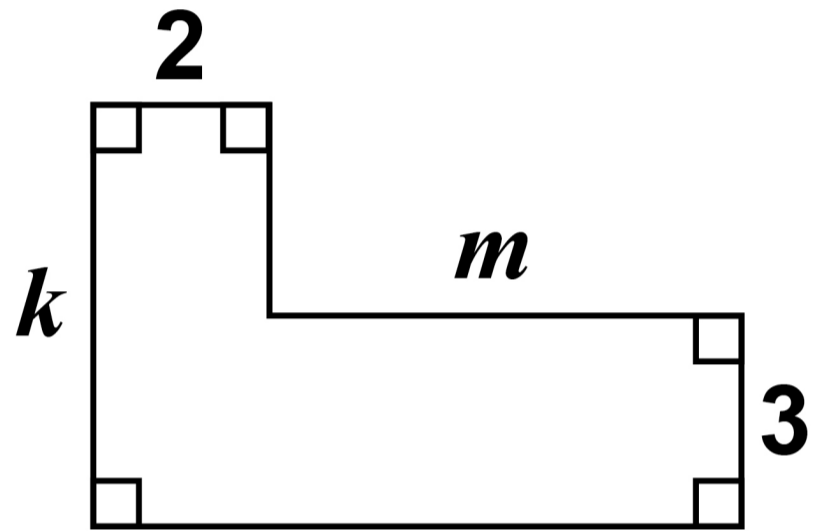
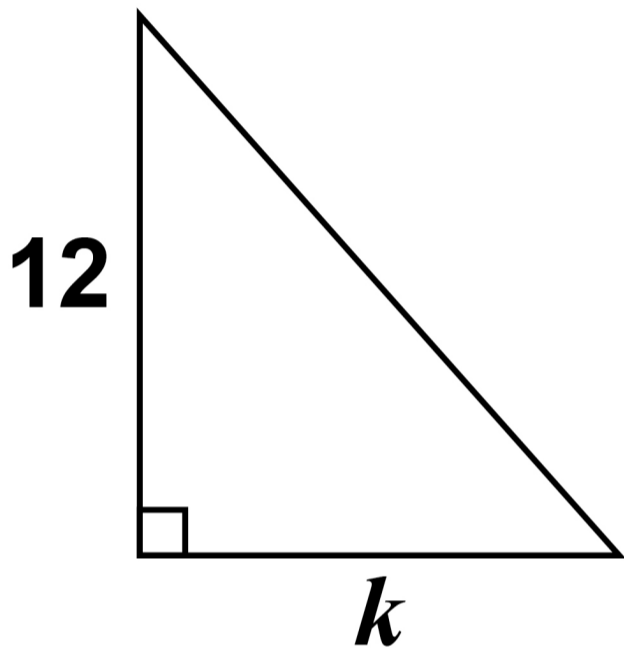
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**[Turn over]**



- 8 In the diagrams, all lengths are in centimetres.

The diagrams are not drawn accurately.



The two shapes have equal areas.

Work out  $k : m$  [3 marks]

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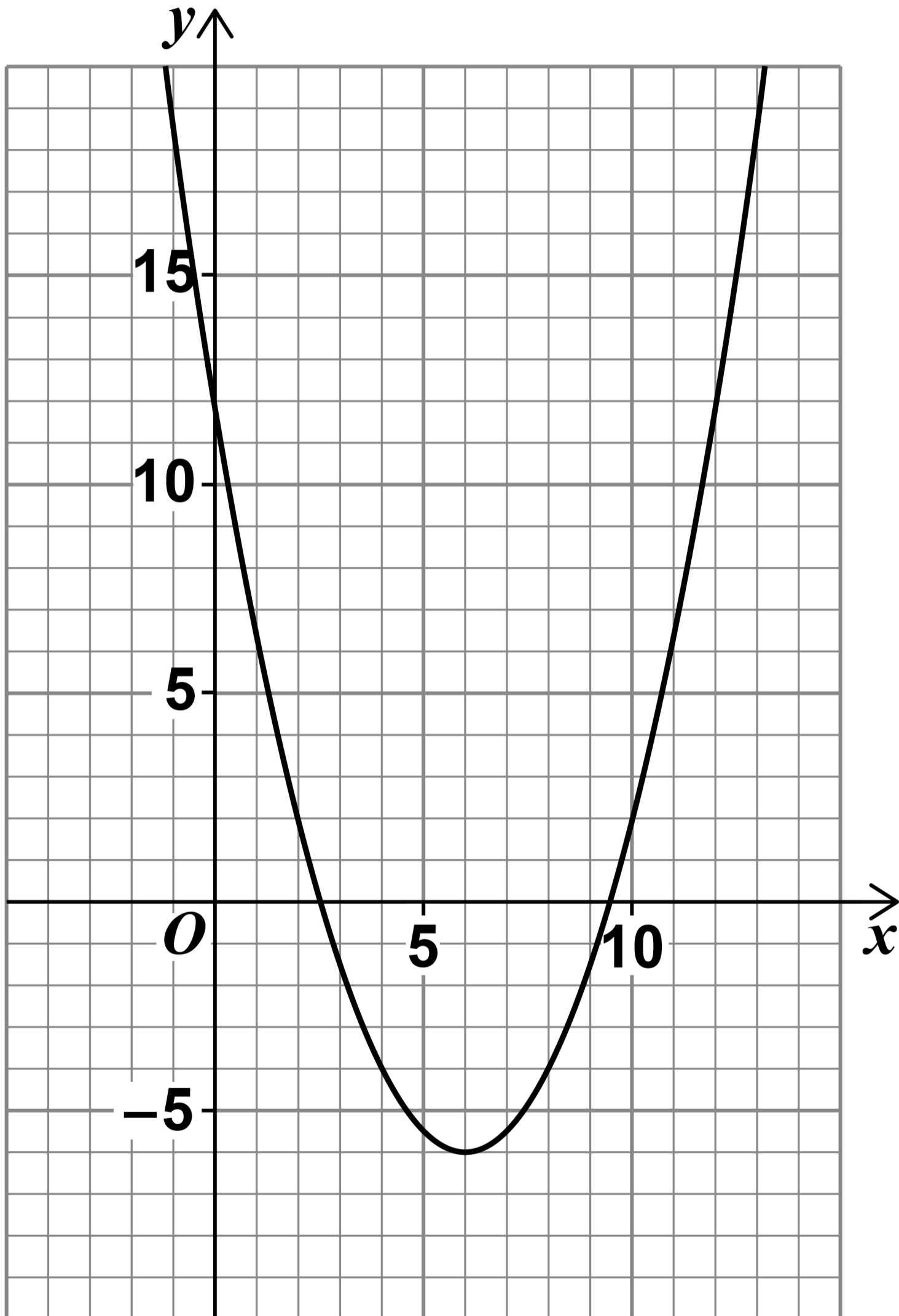
**Answer** \_\_\_\_\_ :

6

**[Turn over]**



9 Here is the graph of  
 $y = 0.5x^2 - 6x + 12$



**USE THE GRAPH to estimate the solutions of  $0.5x^2 - 6x + 12 = 0$  [2 marks]**

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

**[Turn over]**



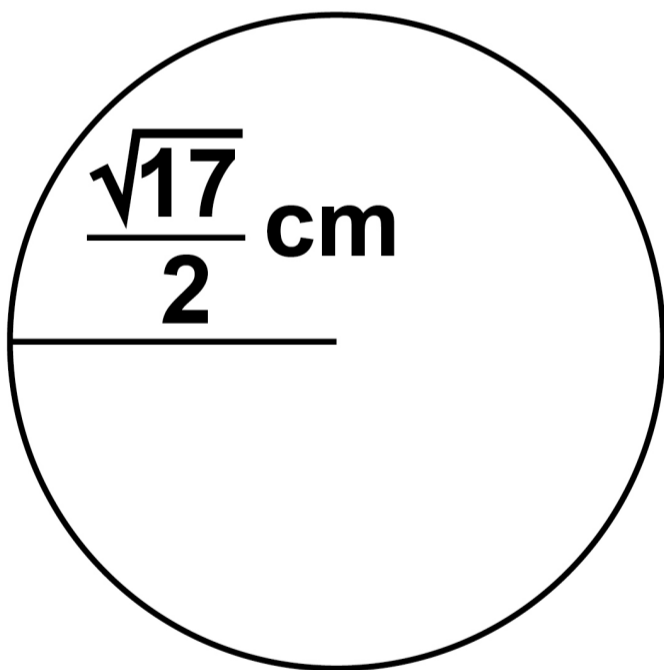
**10 Shape A is a circle with radius**

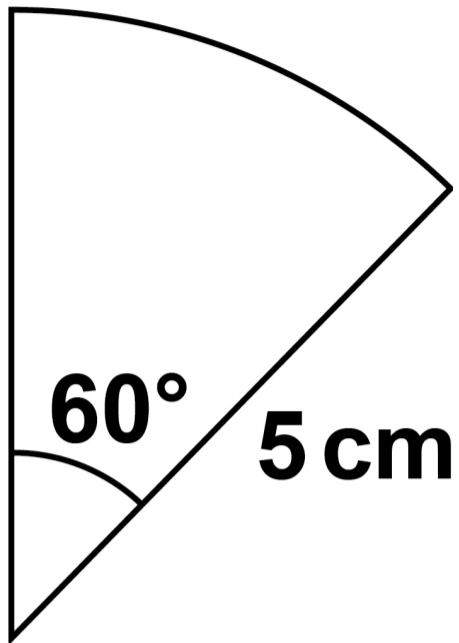
$$\frac{\sqrt{17}}{2} \text{ cm}$$

**Shape B is a sector of a circle with radius 5 cm**

**The diagrams are not drawn accurately.**

**SHAPE A**



**SHAPE B**

**Which shape has the greater area,  
A or B?**

**You MUST show your working.  
[5 marks]**

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**[Turn over]**





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

7

**[Turn over]**



**11 Factorise  $x^2 + 2x - 24$  [2 marks]**

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

**12(a) Write  $2 \times 10^3$  as an ordinary number. [1 mark]**

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



12 (b) Simplify  $(2 \times 10^3) : (5 \times 10^{-1})$

Give your answer in the form  
 $n : 1$  [2 marks]

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

[Turn over]



13 Here is an identity in  $x$ .

$$5(2x + d) \equiv cx + 30$$

Work out the values of  $c$  and  $d$ .

[3 marks]

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$c =$  \_\_\_\_\_  $d =$  \_\_\_\_\_



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**[Turn over]**



**14 Cora is revising for two subjects, History and French.**

**The time she spends revising is in the ratio**

**History : French = 7 : 2**

**The time she spends revising for History is 20 hours MORE than for French.**

**Work out the TOTAL time she spends revising. [3 marks]**

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

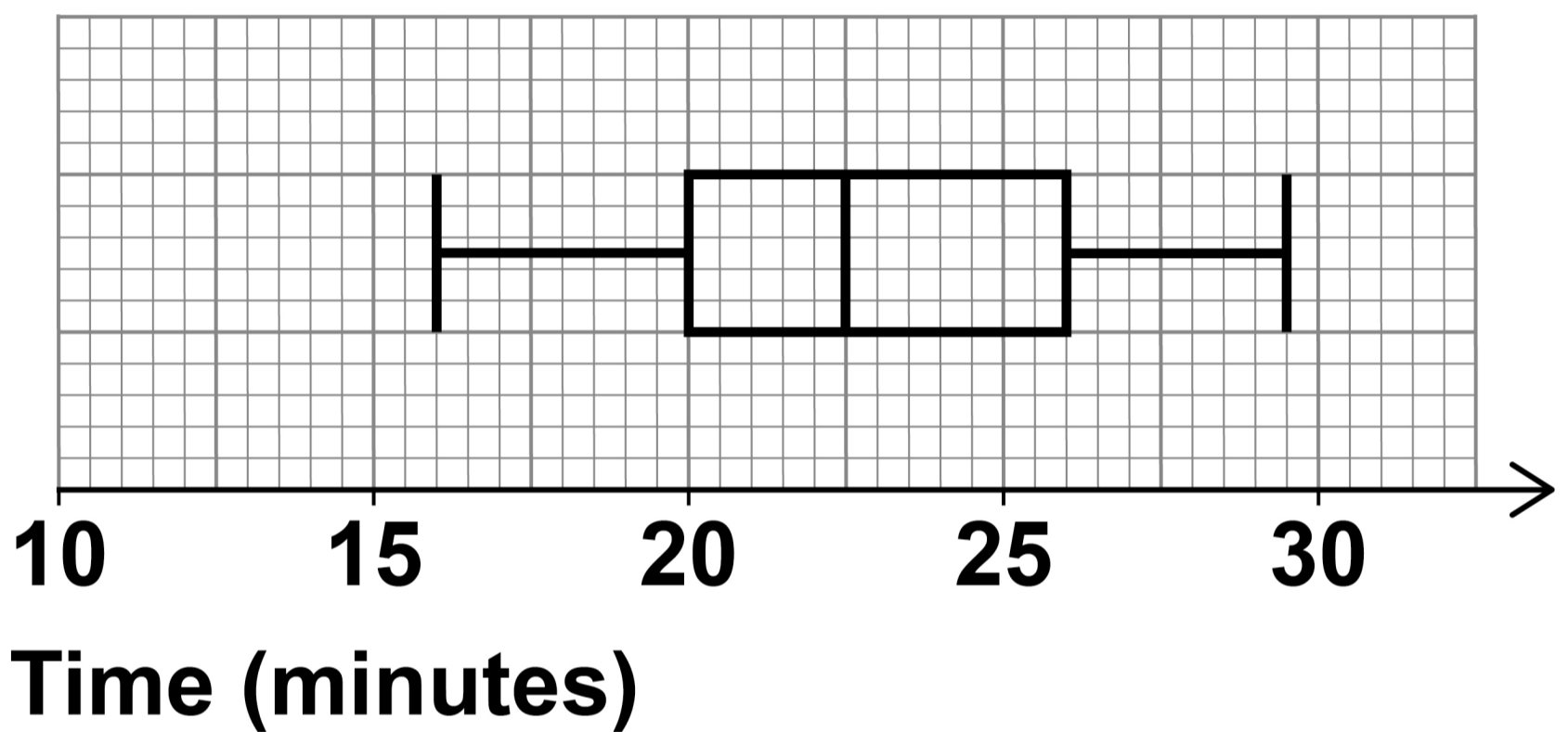
11

**[Turn over]**



**15 A race was run in 2019 and in 2020**

**The box plot shows information about the finishing times in 2019**



**15(a) In 2019, what was the fastest time? [1 mark]**

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

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**[Turn over]**



**15(b) The table shows information about the finishing times in 2020**

<b>LOWER QUARTILE</b>	<b>21 minutes</b>
<b>MEDIAN</b>	<b>24 minutes</b>
<b>UPPER QUARTILE</b>	<b>27 minutes</b>

**Use the data to comment on each of the following statements.  
[4 marks]**

**On average, times were faster in 2019 than in 2020**

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**Times were equally consistent in  
2019 and 2020**

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**[Turn over]**

<hr/>
<b>5</b>

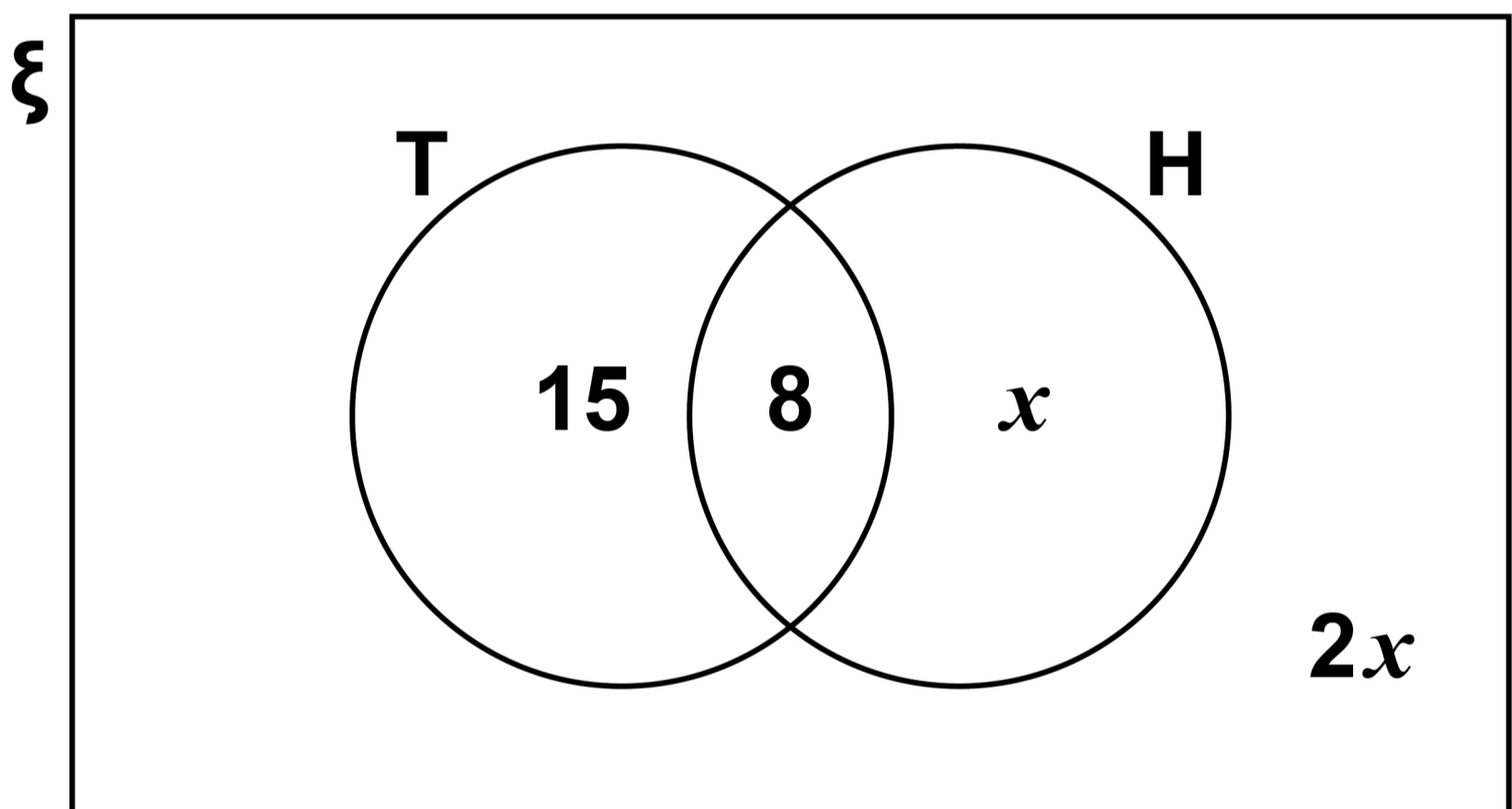


- 16** The Venn diagram shows information about 80 people who visited an online shop.

$\xi = 80$  people

**T** = people who bought trainers

**H** = people who bought a hoodie



**16 (a) One person is chosen at random.**

**Work out the probability that they bought a hoodie. [3 marks]**

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

**[Turn over]**

**16 (b) One person who bought trainers is chosen at random.**

**Work out the probability that they bought a hoodie. [1 mark]**

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

**17  $x$  and  $y$  are integers.**

$$8 \leq 4x \leq 20 \quad \text{and} \quad y - 3x < 12$$

**Work out the LARGEST possible value of  $y$ . [3 marks]**

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

7

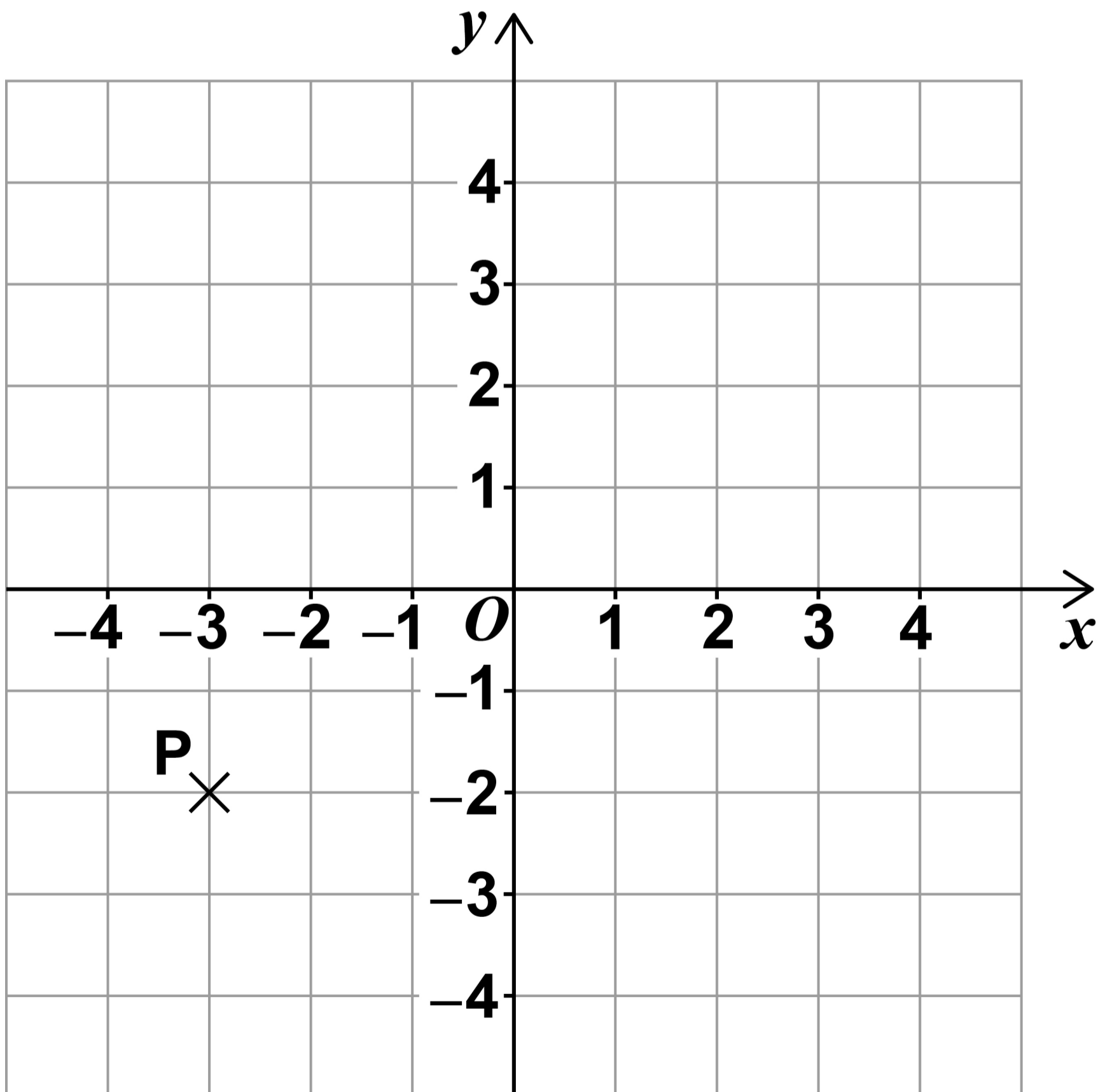
**[Turn over]**



18 (a)  $P$  and  $Q$  are points.

$P(-3, -2)$  is mapped to  $Q$  by a rotation about  $(1, 0)$  through  $90^\circ$  clockwise.

$Q$  is mapped back to  $P$  by a **SINGLE** transformation.



**Complete these two SINGLE transformations that each map  $Q$  back to  $P$ . [2 marks]**

**Rotation about  $(1, 0)$  \_\_\_\_\_**

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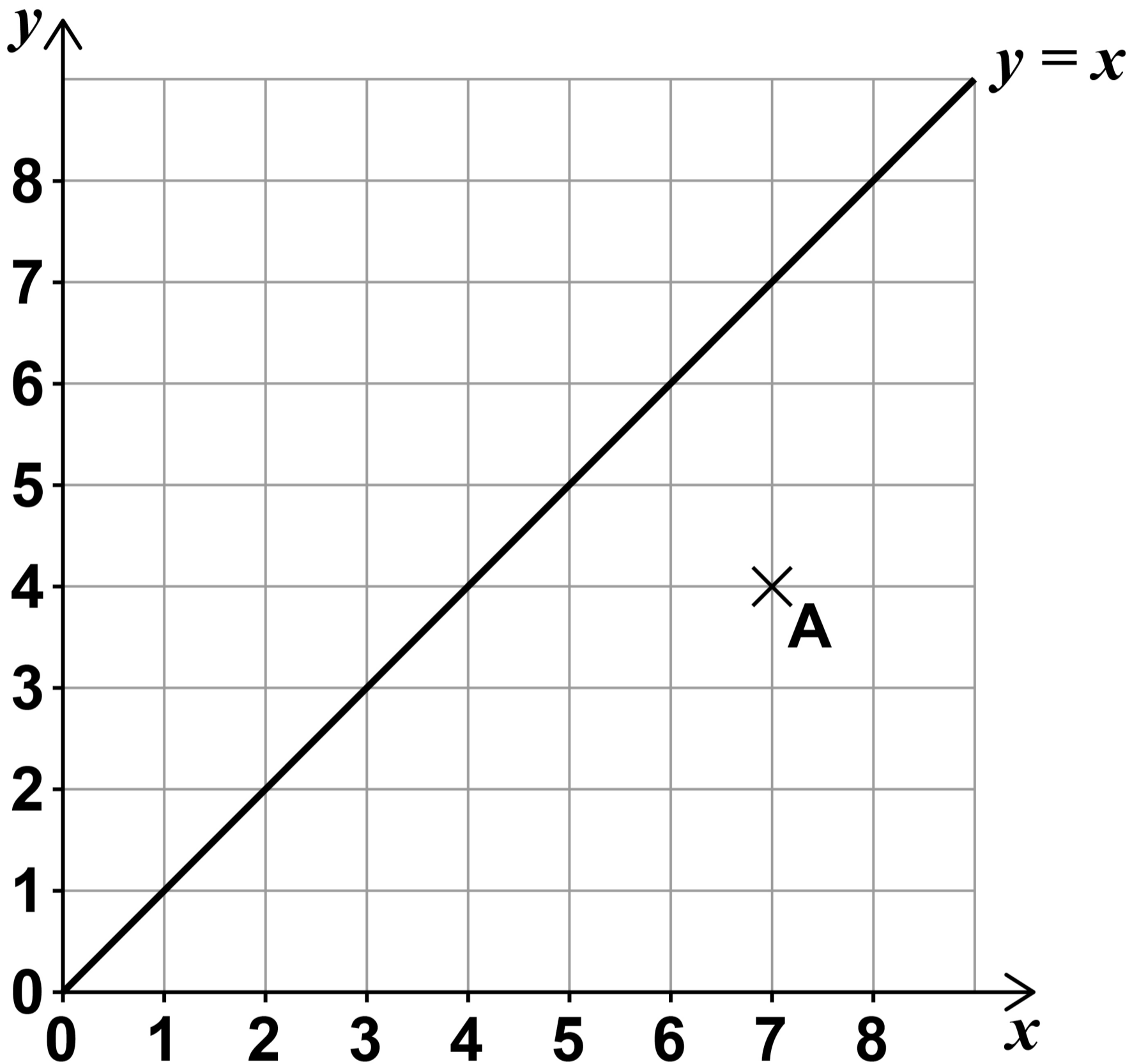
**Translation \_\_\_\_\_**

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**[Turn over]**

**18(b) Point A (7, 4) and the line  $y = x$  are shown on the grid.**



***B* and *C* are points on the grid, each having positive INTEGER coordinates.**

***BAC* is a right-angled triangle.**

**When *BAC* is reflected in the line  $y = x$  side *BC* is invariant.**

**Work out ONE possible set of coordinates for *B* and *C*. [1 mark]**

***B* ( \_\_\_\_\_ , \_\_\_\_\_ )**

***C* ( \_\_\_\_\_ , \_\_\_\_\_ )**

**[Turn over]**

<b>3</b>





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

**[Turn over]**



**20**  $x$  and  $y$  are acute angles.

$$\sin x = \frac{\sqrt{3}}{2} \quad \tan y = 1$$

$$w = 3x - 2y$$

**Work out the value of  $\cos w$**

**You MUST show your working.**  
**[3 marks]**

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

6

**[Turn over]**



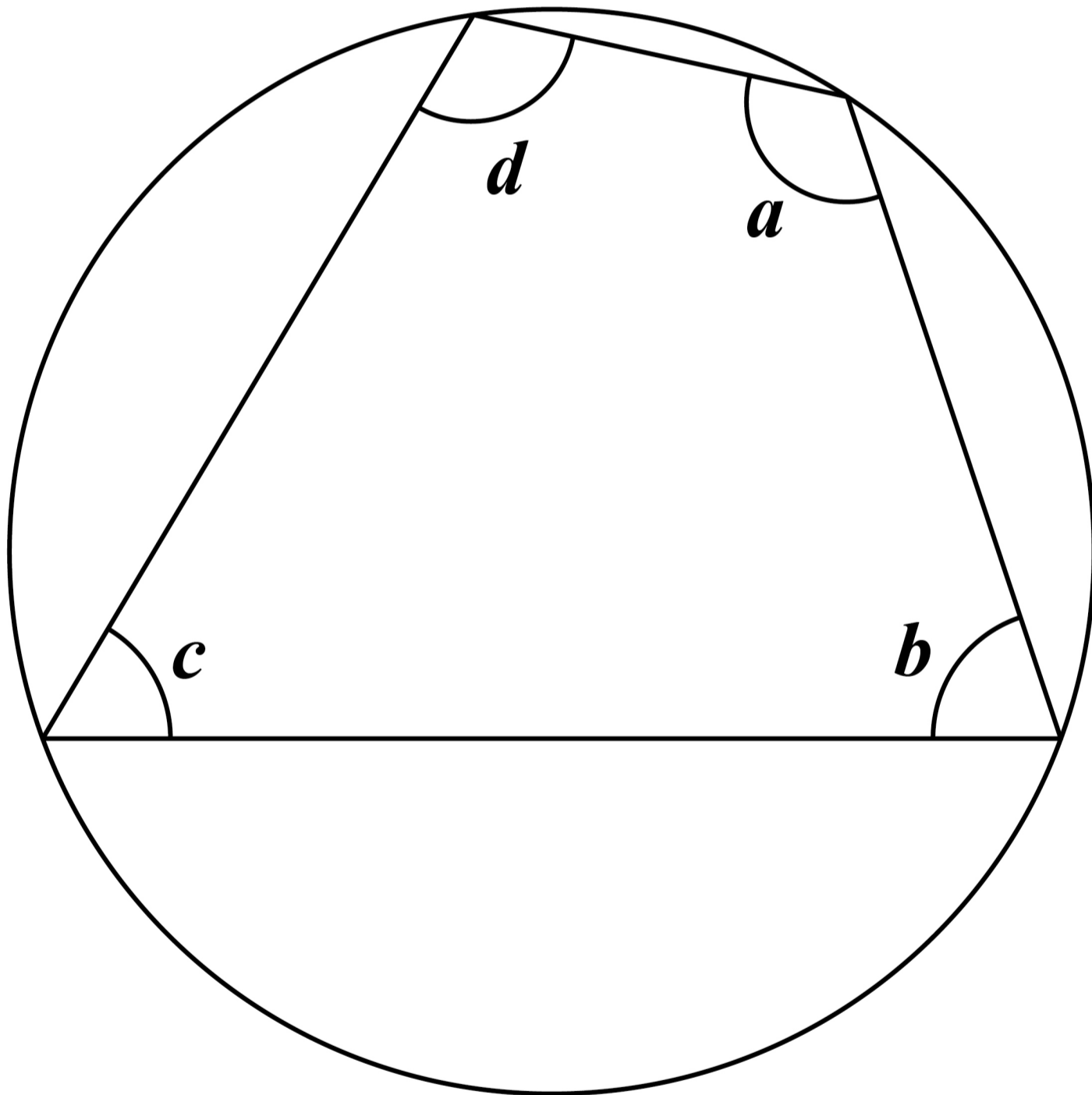




**22** Here is a cyclic quadrilateral.

$$a : b : c = 9 : 5 : 3$$

**The diagram is not drawn accurately.**







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

**[Turn over]**



**24 Line A is perpendicular to line B.**

**The gradient of line A is  $-2$**

**Work out the gradient of line B.**

**[1 mark]**

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

25 The  $n$ th term of a geometric progression is  $r^n$  where  $r > 0$

The second term is  $\frac{8}{9}$

Work out the third term.

Give your answer in the form  $\frac{c\sqrt{2}}{d}$

where  $c$  and  $d$  are integers.

[2 marks]

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Answer \_\_\_\_\_

[Turn over]



**26 (a) Work out the value of  $\left(5\frac{1}{16}\right)^{\frac{1}{4}}$**

**[2 marks]**

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



**26(b) Write  $(49^m)^{2.5}$  as a power of 7 in terms of  $m$ . [2 marks]**

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

**27 Write down the solution of  $x^2 < 16$  [1 mark]**

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

**[Turn over]**



28  $PQRS$  is a quadrilateral.

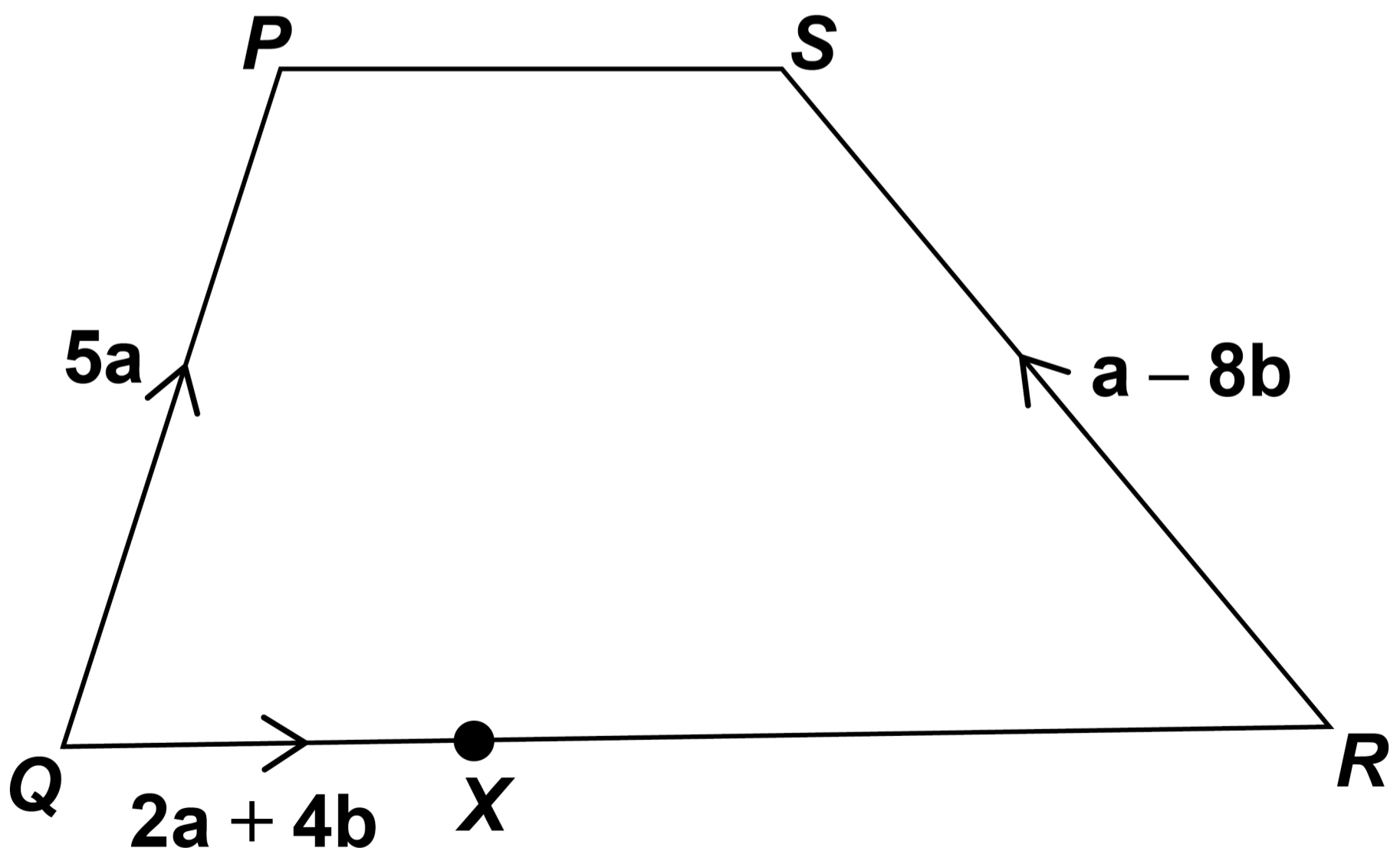
$PQ$  is not parallel to  $SR$ .

$X$  is a point on  $QR$ .

$$QX : XR = 2 : 3$$

$$\vec{QX} = 2a + 4b$$

The diagram is not drawn accurately.





**29** Here are the equations of three graphs.

$$y = \sin x \quad y = \cos x \quad y = \tan x$$

**29 (a)** Which statement is true?

Tick **ONE** box. [1 mark]

$y = \sin x$  passes through  $(180^\circ, -1)$

$y = \cos x$  passes through  $(180^\circ, -1)$

$y = \tan x$  passes through  $(180^\circ, -1)$

None of the graphs pass through  $(180^\circ, -1)$



**29 (b) Which statement is true?**

**Tick ONE box. [1 mark]**

$y = \sin x$  passes through  
 $(270^\circ, 1)$

$y = \cos x$  passes through  
 $(270^\circ, 1)$

$y = \tan x$  passes through  
 $(270^\circ, 1)$

None of the graphs pass  
through  $(270^\circ, 1)$

**END OF QUESTIONS**

2







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For Examiner's Use	
Pages	Mark
6–8	
9–13	
14–17	
18–23	
24–29	
30–33	
34–37	
38–41	
42–45	
46–49	
50–53	
54–57	
58–59	
<b>TOTAL</b>	

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6 2



2 3 B G 8 3 0 0 / 1 H