



Surname \_\_\_\_\_

Other Names \_\_\_\_\_

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

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

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

I declare this is my own work.

**GCSE  
MATHEMATICS**

**H**

Higher Tier      Paper 2 Calculator

**8300/2H**

Thursday 4 June 2020      Morning

Time allowed: 1 hour 30 minutes

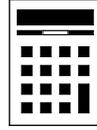
At the top of the page, write your surname and other names, your centre number, your candidate number and add your signature.

[Turn over]



**For this paper you must have:**

- a calculator
- mathematical instruments.



## **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.

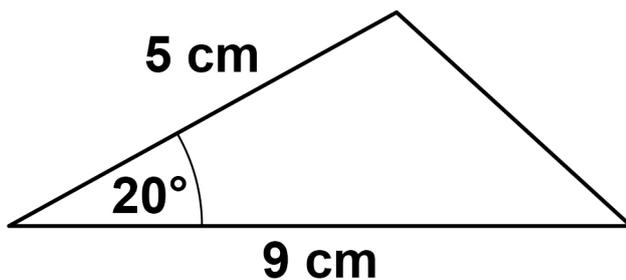
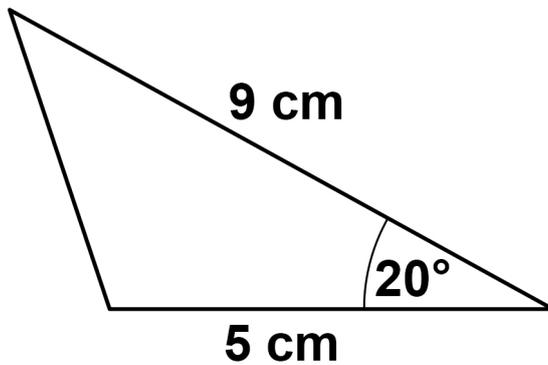
1 Which of these is a correct identity?

Circle your answer. [1 mark]

$$x + 4x \equiv 5x \qquad 6x \equiv 18$$

$$2x + 1 \equiv 7 \qquad 7x + 9 \equiv x$$

2



The diagrams are not drawn accurately.

Circle the reason why these triangles are congruent. [1 mark]

RHS

ASA

SSS

SAS



- 3 Circle the number that is written in standard form. [1 mark]

$0.9 \times 10^{-3}$

$6 \times 10^{0.5}$

$5.2 \times 10^{-4}$

$12 \times 10^7$

- 4 Circle the expression that has the LARGEST value when  $a < -1$  [1 mark]

$\frac{1}{2}a$

$a$

$a^2$

$a^3$

[Turn over]

4



- 5 The time students spent watching TV was recorded.

The table shows the average daily time per student each year from 2012 to 2019

Year	2012	2013	2014	2015	2016	2017	2018	2019
Time (minutes)	157	148	138	124	113	100	90	82

A time series graph, on the opposite page, is drawn to represent the data.

The first four points have been plotted.

- 5 (a) Complete the graph, on the opposite page.  
[2 marks]
- 5 (b) Use the graph to estimate the average daily time per student in 2020 [1 mark]

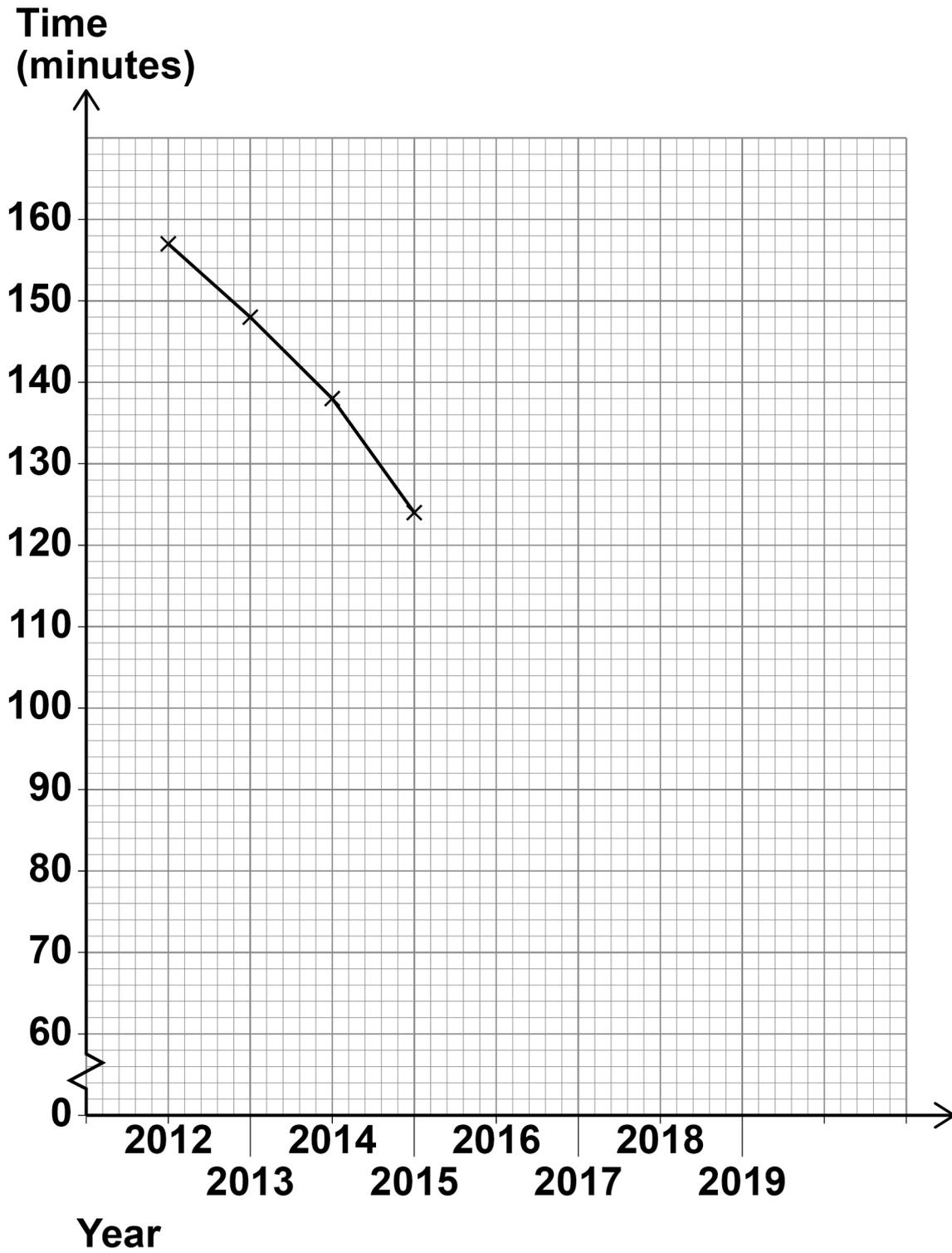
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Answer \_\_\_\_\_ minutes





[Turn over]



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- 6 Work out the highest common factor (HCF) of 75 and 105 [2 marks]

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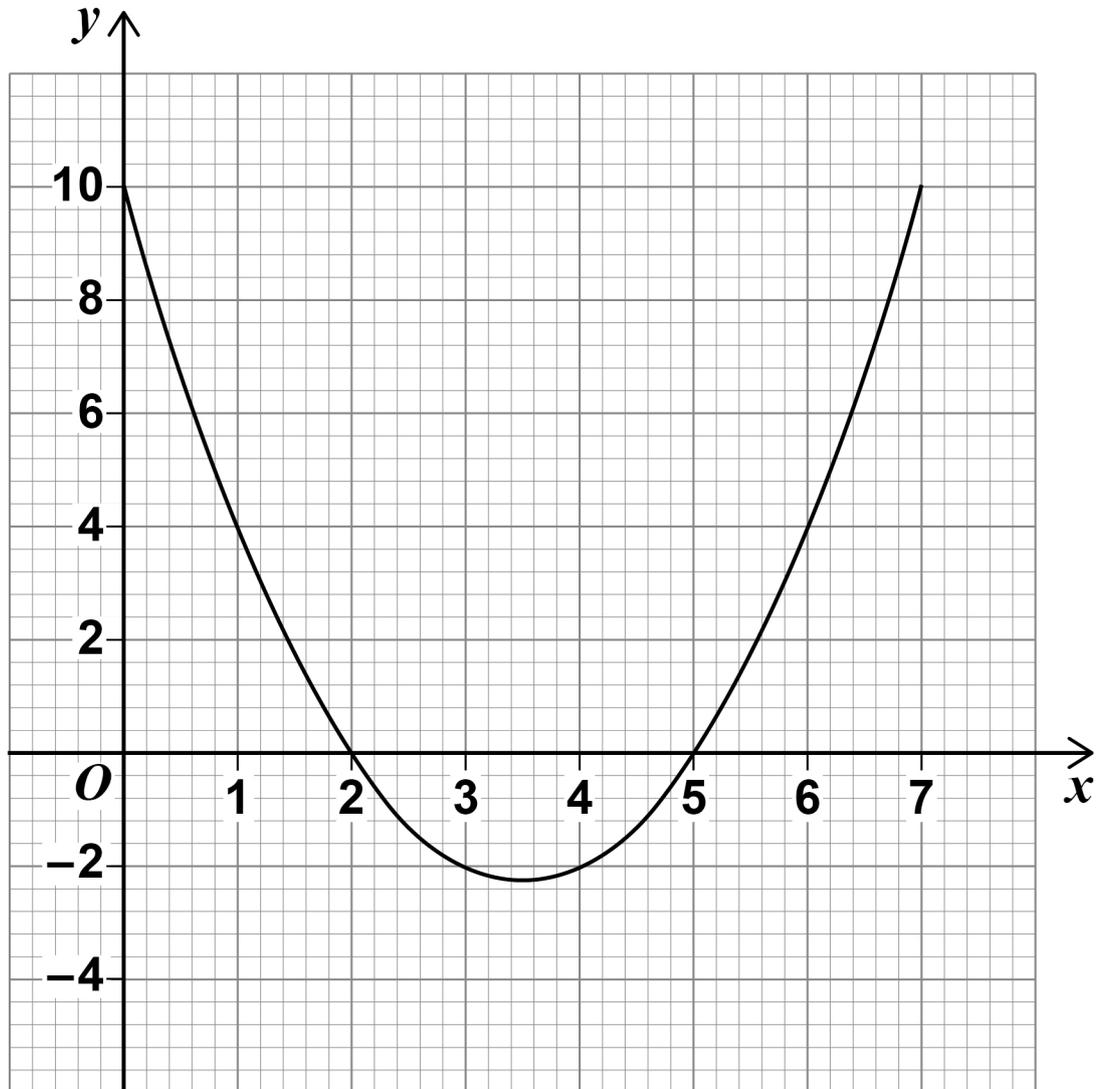
Answer \_\_\_\_\_

[Turn over]

5



- 7 Here is the graph of  $y = x^2 - 7x + 10$  for values of  $x$  from 0 to 7



- 7 (a) Write down the roots of  $x^2 - 7x + 10 = 0$   
[2 marks]

Answer \_\_\_\_\_



- 7 (b) Write down the  $x$ -coordinate of the turning point of the curve. [1 mark]

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Answer 

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[Turn over]



8 At a party there are 90 people.

48 are women and 42 are men.

Some women leave.

Some men arrive.

The ratio of women to men is now 10 : 11

Are there now more than 90 people at the party?

Tick ONE box.

Yes

No

Cannot tell

Show working to support your answer.  
[2 marks]

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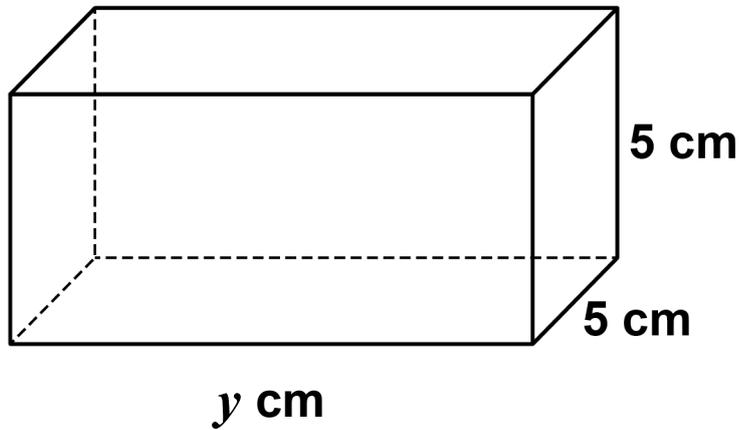
[Turn over]

5



9 Here is a cuboid.

The diagram is not drawn accurately.



9 (a) Assume that the total surface area of the cuboid is  $200 \text{ cm}^2$

Work out the volume of the cuboid. [3 marks]

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Answer \_\_\_\_\_  $\text{cm}^3$

- 9 (b) In fact, the total surface area of the cuboid is smaller than  $200 \text{ cm}^2$

What does this mean about the volume of the cuboid?

Tick ONE box. [1 mark]

It is smaller than the answer to part (a)

It is bigger than the answer to part (a)

It is the same as the answer to part (a)

It could be any of the above

[Turn over]

4



**10 Alex and Bev sat six tests, each with 50 marks.**

**The table shows their mean percentages after five tests.**

<b>Alex</b>	<b>60%</b>
<b>Bev</b>	<b>52%</b>

**After all six tests, their mean percentages were equal.**

**In the sixth test, Alex scored 24 out of 50**

**Work out Bev's score, out of 50, in the sixth test.  
[4 marks]**

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Answer \_\_\_\_\_ out of 50

[Turn over]



- 11 A solid piece of silver has  
mass 2.625 kilograms  
volume 250 cm<sup>3</sup>

Work out the density of the piece of silver.

Give your answer in grams per cubic centimetre.  
[2 marks]

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Answer \_\_\_\_\_ g/cm<sup>3</sup>



- 12 Work out the gradient of the straight line through  $(-2, 3)$  and  $(1, 9)$  [2 marks]

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Answer \_\_\_\_\_

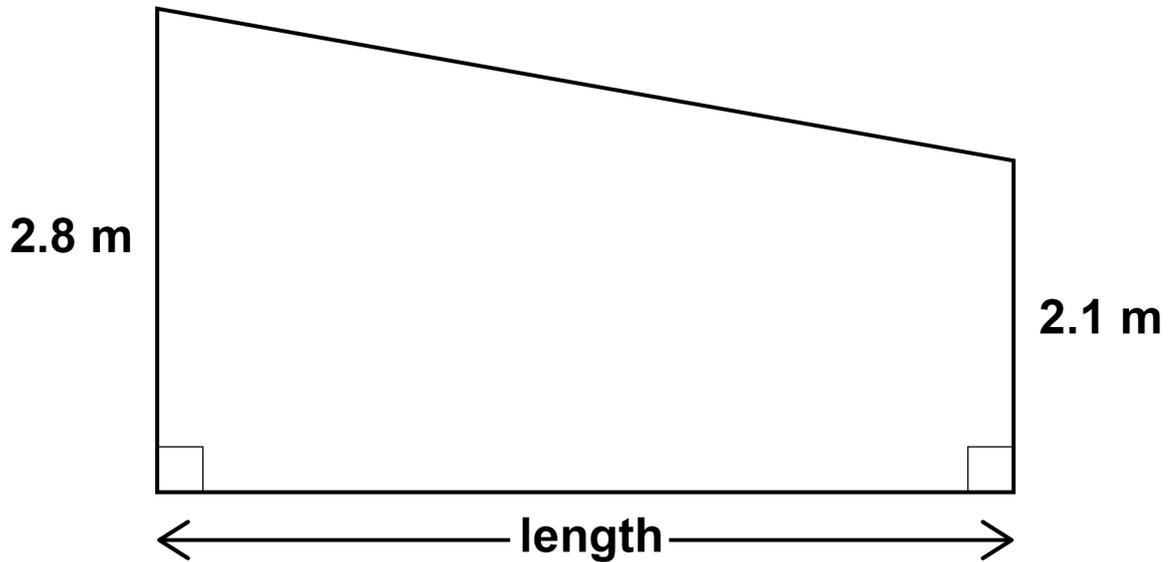
[Turn over]

8



13 The diagram shows a wall.

The diagram is not drawn accurately.



The area of the wall is  $39.2 \text{ m}^2$

Work out the length of the wall. [3 marks]

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Answer \_\_\_\_\_ m

[Turn over]



14 A marathon takes place each year.

In 2020 there were 6500 runners.

**PREDICTION**

**For each of the next 3 years the number of runners will increase by 5%**

**Does this predict that in 2023 there will be more than 7500 runners?**

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

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[Turn over]

6



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16 On a restaurant menu there are  
22 main dishes, of which  $\frac{4}{11}$  are gluten-free  
7 rice dishes, which are all gluten-free  
5 naan breads, of which 40% are gluten-free.  
This Meal Deal is on the menu.

Choose one main dish, one rice dish and  
one naan bread

How many of the possible Meal Deals are totally  
gluten-free? [3 marks]

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Answer \_\_\_\_\_

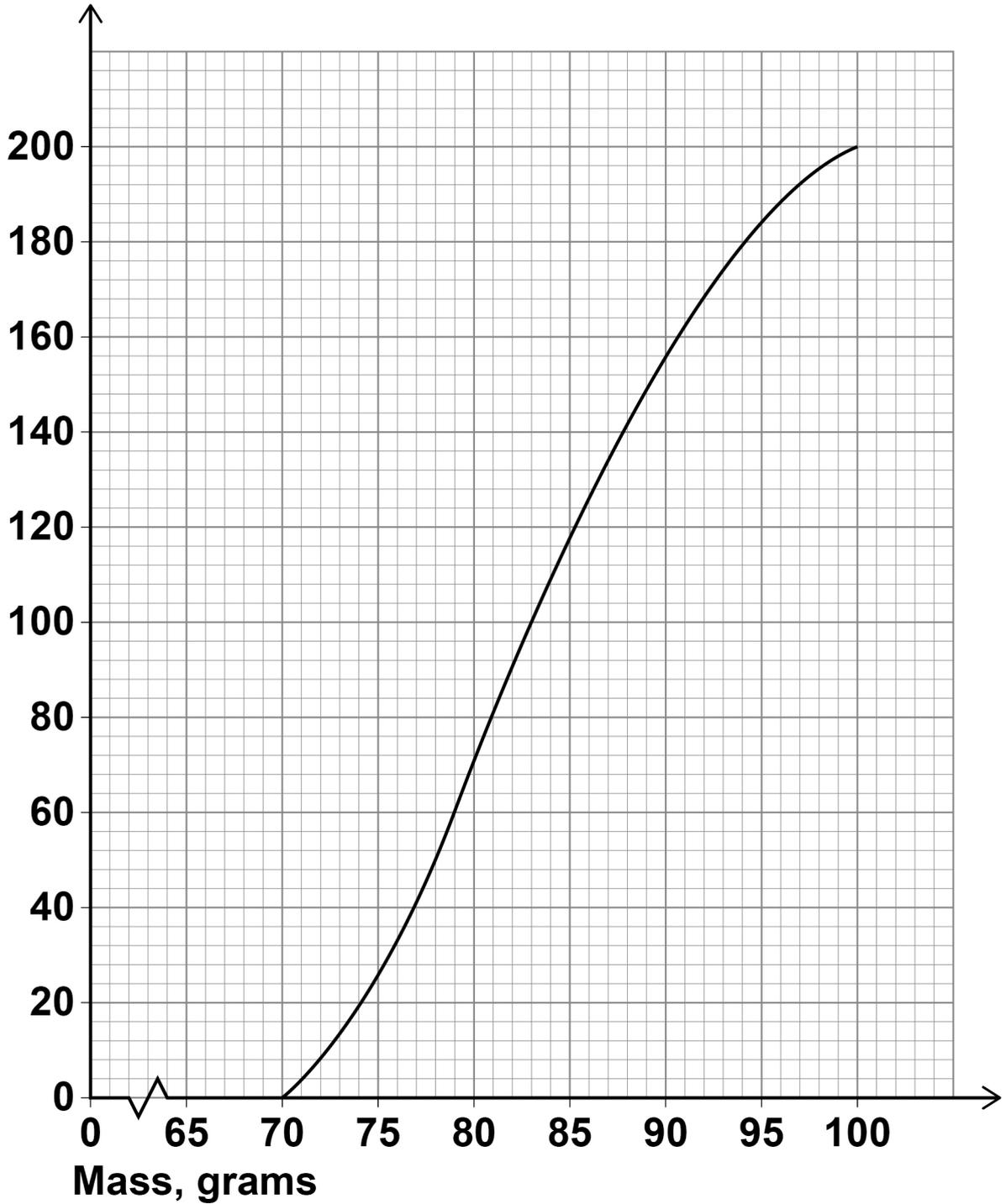
[Turn over]

6



- 17 The cumulative frequency graph shows information about the masses of 200 apples.

Cumulative  
frequency



17 (a) Estimate the median mass. [1 mark]

Answer \_\_\_\_\_ grams

17 (b) Apples with mass 90 grams or less cost 32p each.

Apples with mass more than 90 grams cost 39p each.

Estimate the TOTAL cost of the 200 apples. [3 marks]

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Answer £ \_\_\_\_\_

[Turn over]

4





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

[Turn over]



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19  $a$  and  $b$  are positive values.

Show that  $\frac{7a + 2b - 3a}{8a + 6b + 2a - b}$  always simplifies to the same value. [3 marks]

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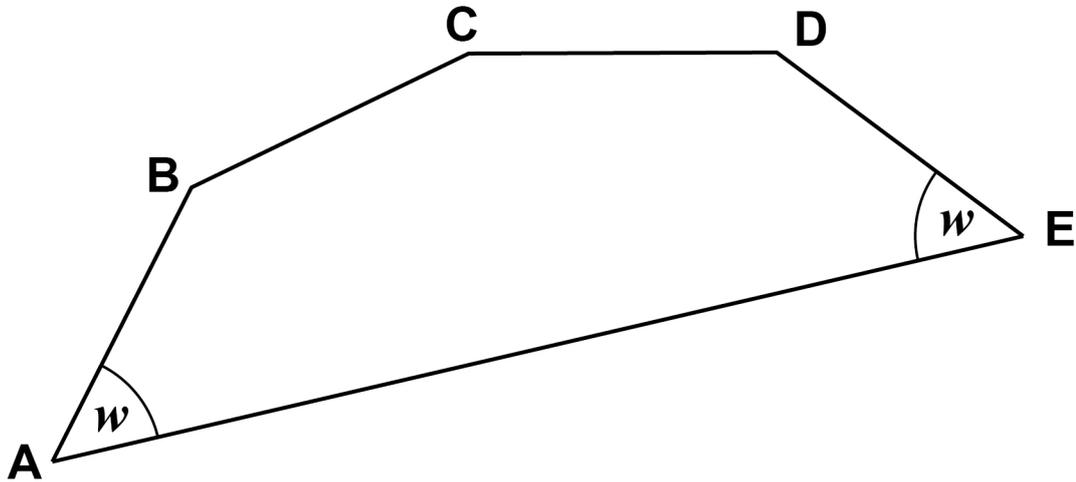
[Turn over]

7



- 20  $AB$ ,  $BC$ ,  $CD$  and  $DE$  are four of the sides of a regular decagon.

The diagram is not drawn accurately.



Work out the size of angle  $w$ . [3 marks]

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

[Turn over]



21 (a) Circle the point that is on the graph of  $y = \frac{1}{x}$   
[1 mark]

(-1, 1)                      (0.3, 3)

(0.8, 0.2)                  (2.5, 0.4)

21 (b) Leo wants to draw the graph of  $y = 2^x$  for  
values of  $x$  from 0 to 4

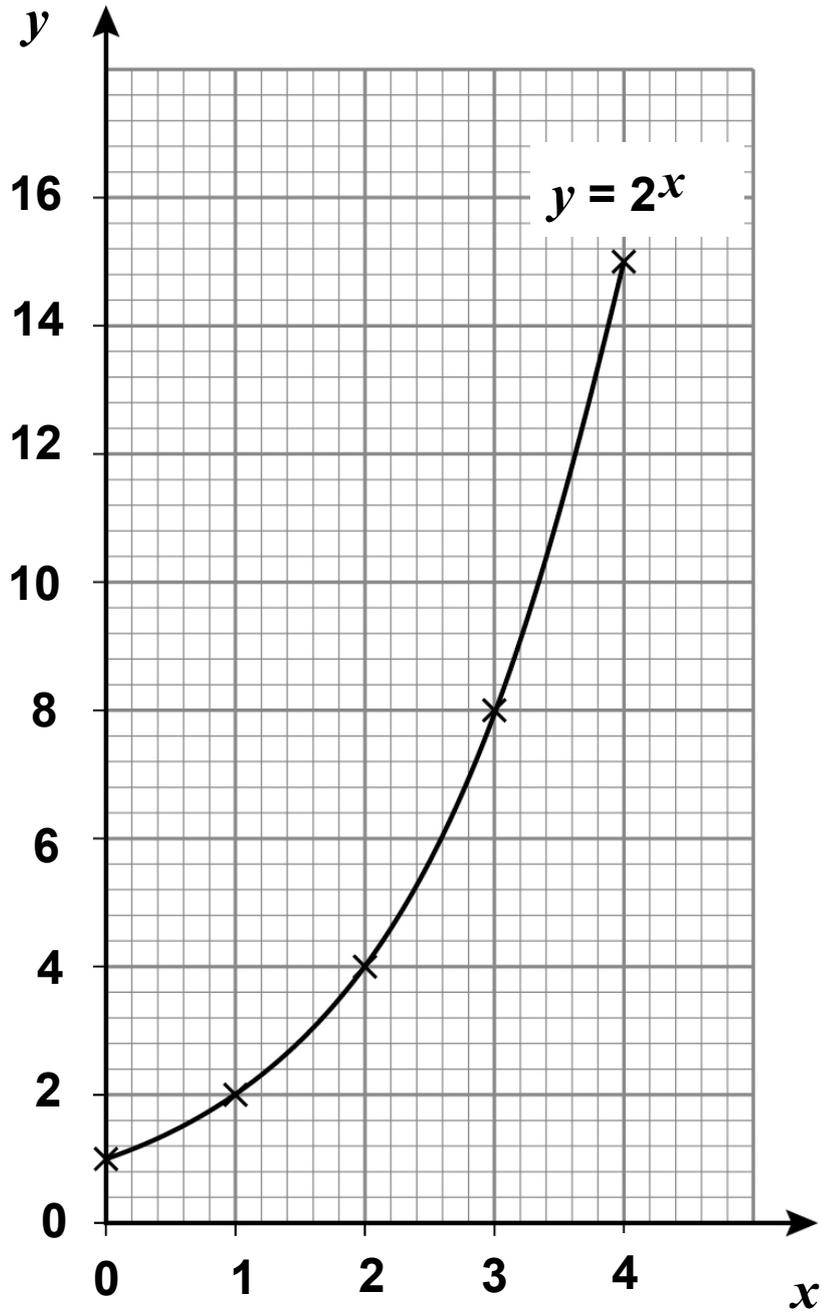
Here is his graph, on the opposite page.

Make one criticism of his graph. [1 mark]

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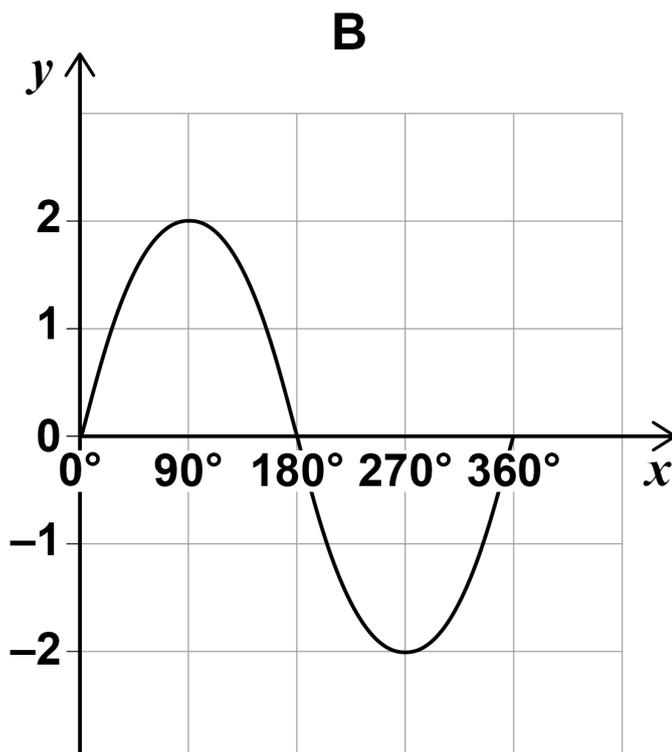
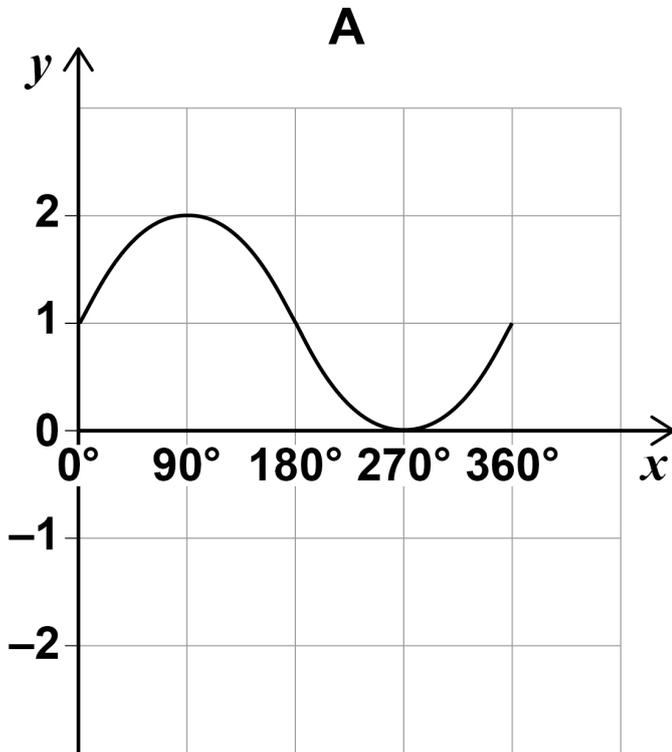
[Turn over]

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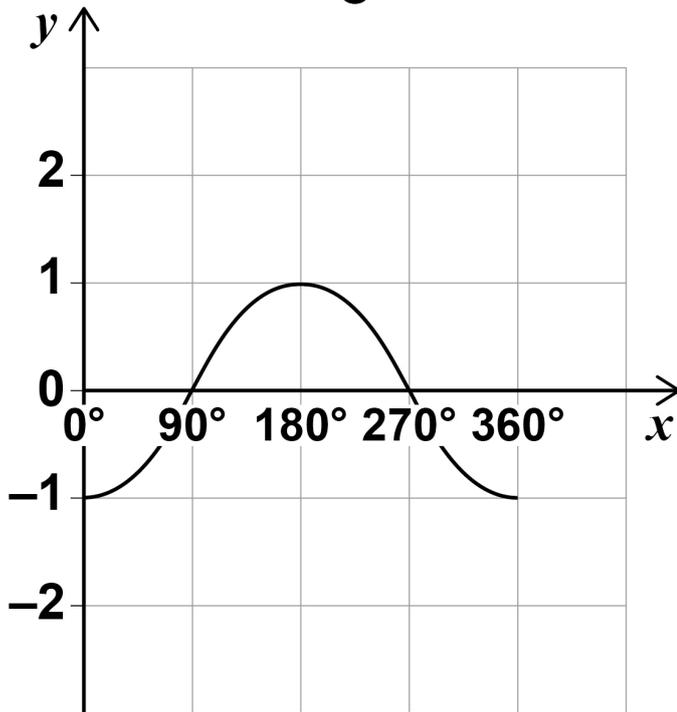


- 22 One of these is the graph of  $y = 1 + \sin x$  for  $0^\circ \leq x \leq 360^\circ$

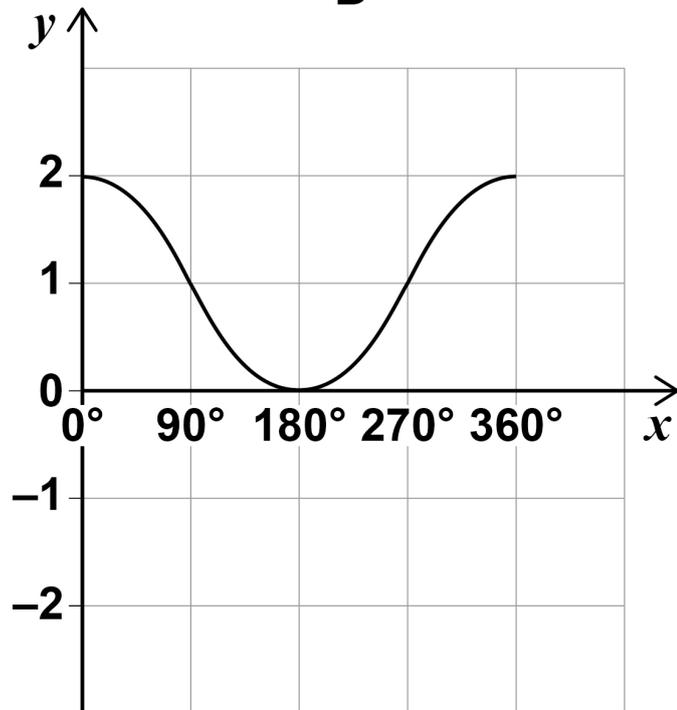
Circle the letter above the correct graph. [1 mark]



C



D



[Turn over]



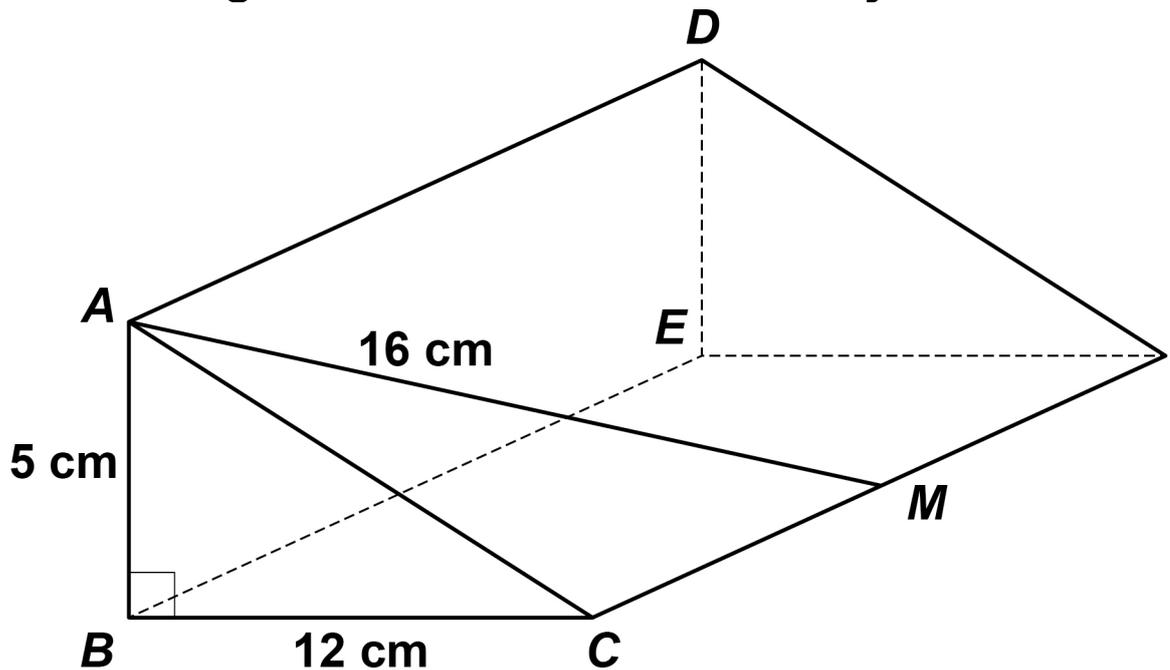
- 23 Right-angled triangle  $ABC$  is the cross section of a prism.

$$AB = 5 \text{ cm} \quad BC = 12 \text{ cm}$$

$M$  is the midpoint of  $CF$ .

$$AM = 16 \text{ cm}$$

The diagram is not drawn accurately.



Work out the volume of the prism. [4 marks]

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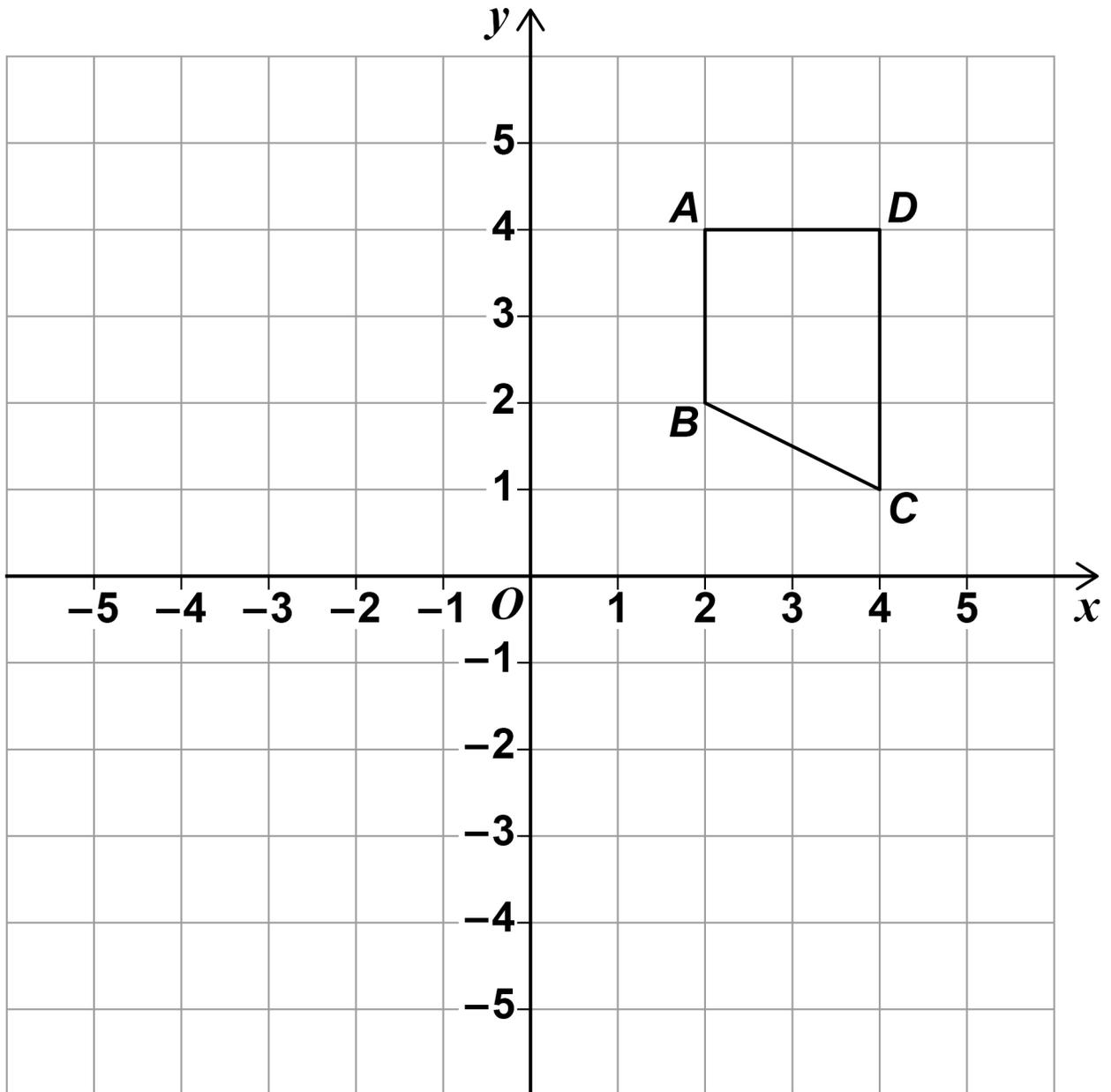


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24 Quadrilateral  $ABCD$  is shown.



24 (a) Work out the coordinates of  $C$  when  $ABCD$  is rotated  $90^\circ$  clockwise about  $O$

then

translated by  $\begin{pmatrix} -6 \\ 2 \end{pmatrix}$

[2 marks]

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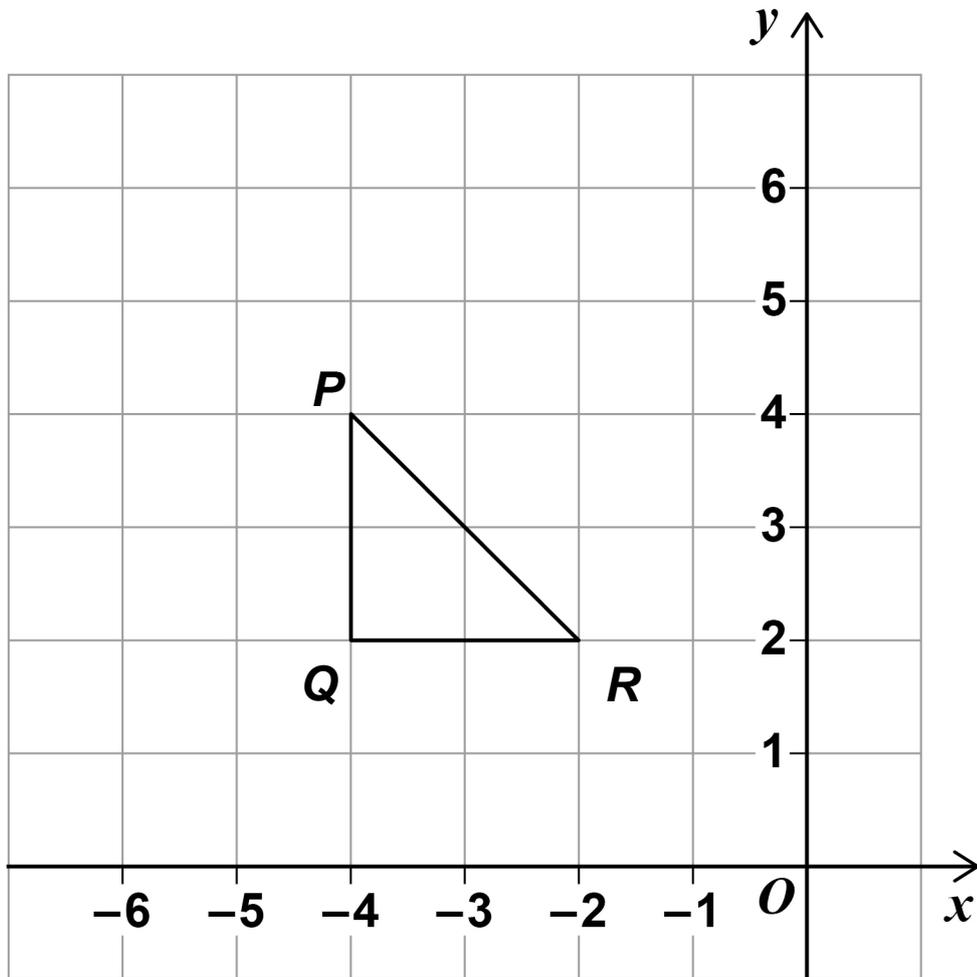
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Answer ( \_\_\_\_\_ , \_\_\_\_\_ )

[Turn over]



24 (b) Triangle  $PQR$  is shown.



When  $PQR$  is reflected in a line,  $P$  AND  $R$  are invariant points.

Circle the equation of the line. [1 mark]

$$y = x + 6$$

$$y = -x$$

$$y = 2$$

$$x = -4$$



25 Factorise  $3x^2 + 11x - 20$  [2 marks]

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Answer \_\_\_\_\_

[Turn over]

5



**26 Edith’s van can safely carry a maximum load of 920 kilograms.**

**She wants to use her van to carry**

**30 sacks of potatoes, each of mass 25 kilograms to the nearest kilogram**

**and**

**20 sacks of carrots, each of mass 7.5 kilograms to 1 decimal place.**

**Can she definitely use her van safely in one journey?**

**You MUST show your working. [4 marks]**

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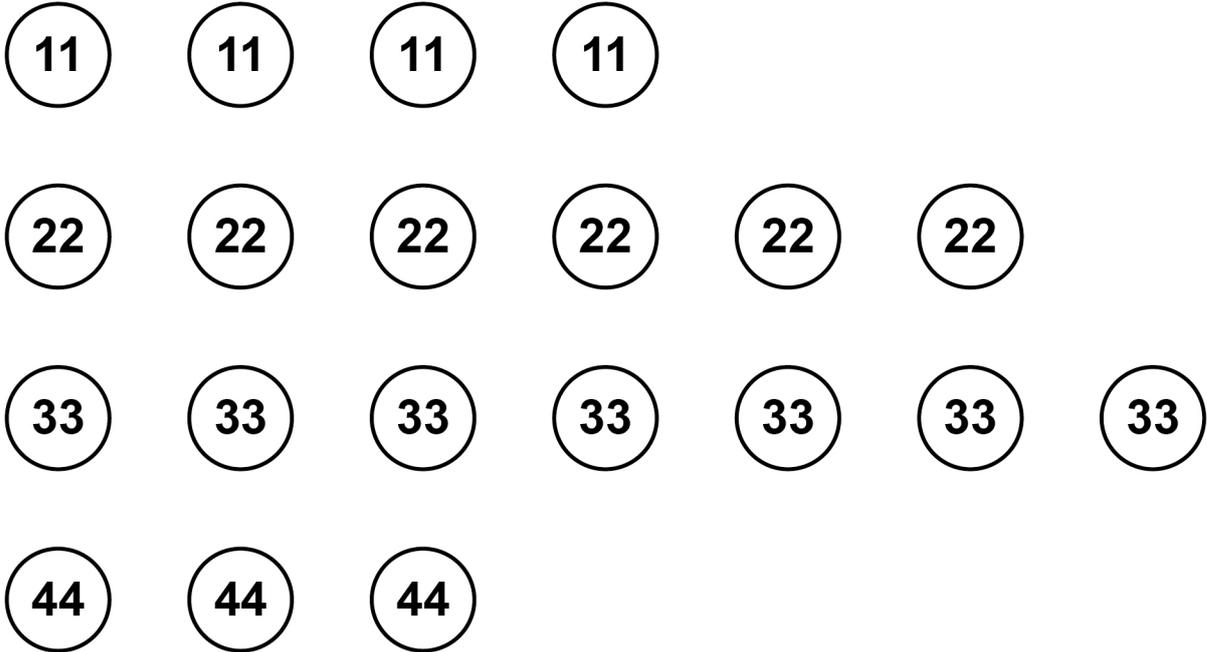
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**[Turn over]**



27 These 20 discs are in a bag.



Two of the discs are taken at random from the bag.

Work out the probability that the first disc has a **SMALLER** number than the second disc.

[4 marks]

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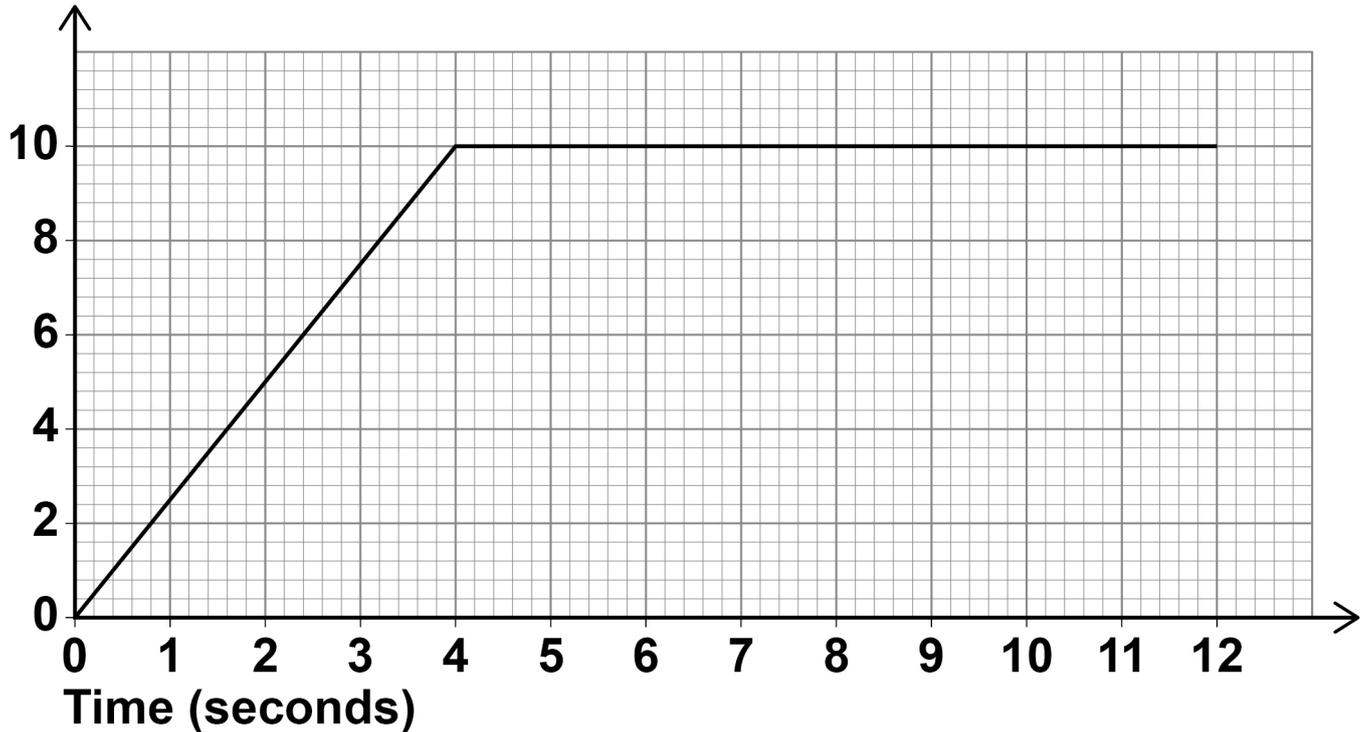




28 A horse runs in a field.

The speed-time graph represents the first 12 seconds of the run.

Speed (metres per second)



After how many seconds had the horse run a distance of 75 metres? [3 marks]

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

**[Turn over]**











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For Examiner's Use	
Pages	Mark
4–5	
6–9	
10–13	
14–15	
16–19	
20–23	
25–27	
28–29	
30–33	
34–37	
38–41	
42–45	
46–49	
50–53	
<b>TOTAL</b>	

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