A

AQA

Surname _____

Other Names _____

Centre Number _____

Candidate Number _____

Candidate Signature _____

GCSE MATHEMATICS

H

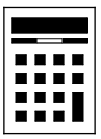
Higher Tier Paper 2 Calculator

8300/2H

Monday 6 November 2017 Morning

Time allowed: 1 hour 30 minutes

For this paper you must have:
- **a calculator**
- **mathematical instruments.**



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

[Turn over]

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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.
- 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 Circle the fraction that is equivalent to 3.875 [1 mark]

$\frac{15}{4}$ $\frac{29}{8}$ $\frac{31}{8}$ $\frac{15}{8}$

2 What is 50 as a percentage of 20?

Circle your answer. [1 mark]

10% 40% 150% 250%

3 Circle the point that does NOT lie on the curve $y = x^3$ [1 mark]

$\left(-\frac{1}{2}, -\frac{1}{8}\right)$ (5, 125)

$\left(\frac{1}{3}, \frac{1}{9}\right)$ (–1, –1)

4 Which ONE of these is a unit of density?

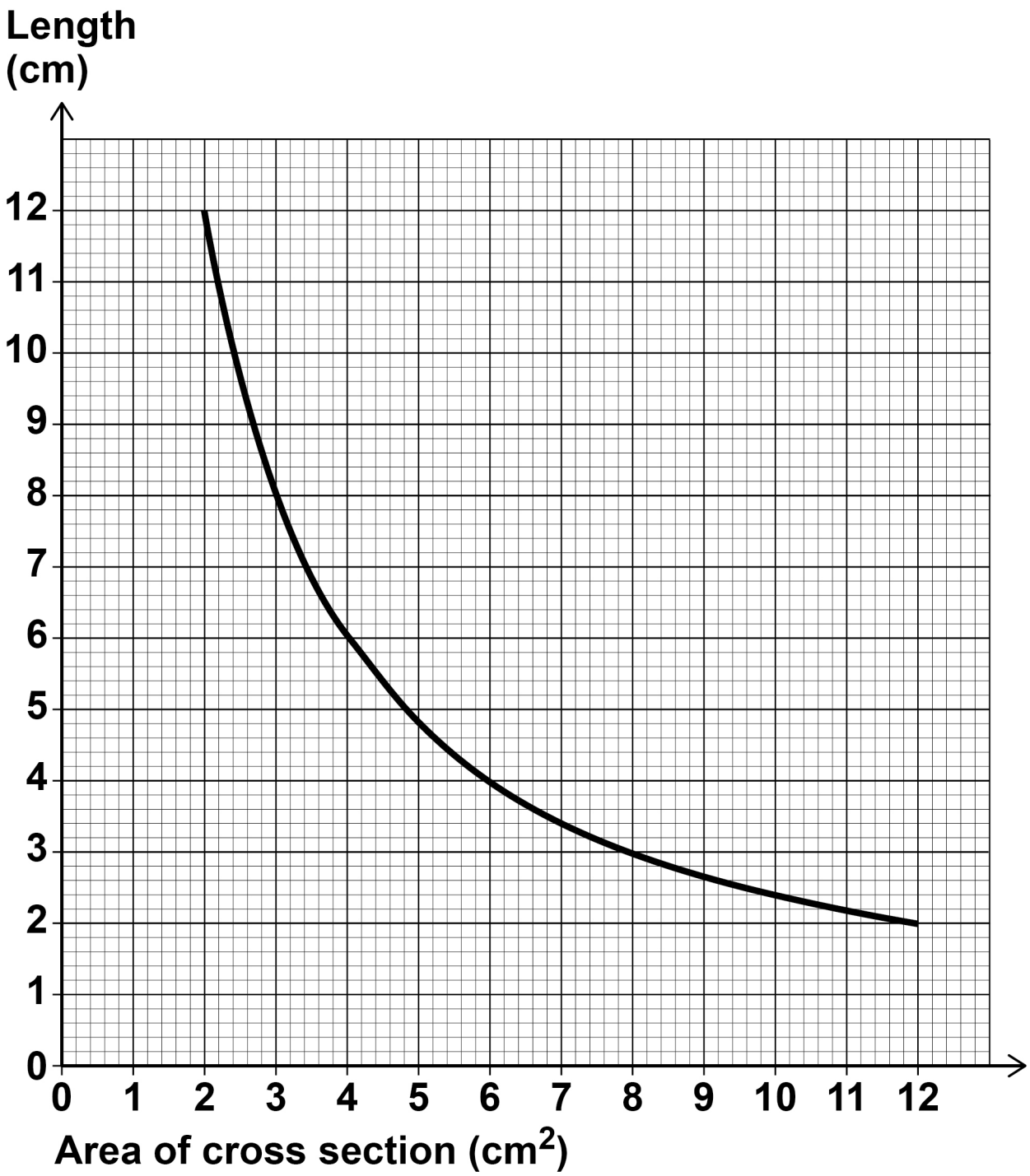
Circle your answer. [1 mark]

kg/m^2 m^2/kg kg/m^3 m^3/kg

5 Solve $4(3x - 2) = 2x - 5$ [3 marks]

$x =$ _____ 7

6 The graph shows information about prisms with the same volume.



6 (a) Give ONE example to show the volume is 24 cm^3
[1 mark]

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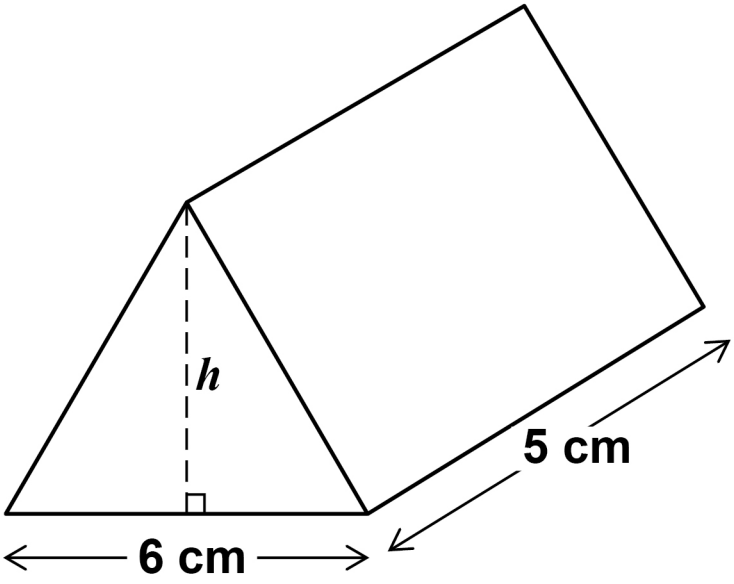
6 (b) The diagram shows a prism with volume 24 cm^3

The height of the triangular cross section is h.



Work out the height, h. [3 marks]

Answer _____ cm

4

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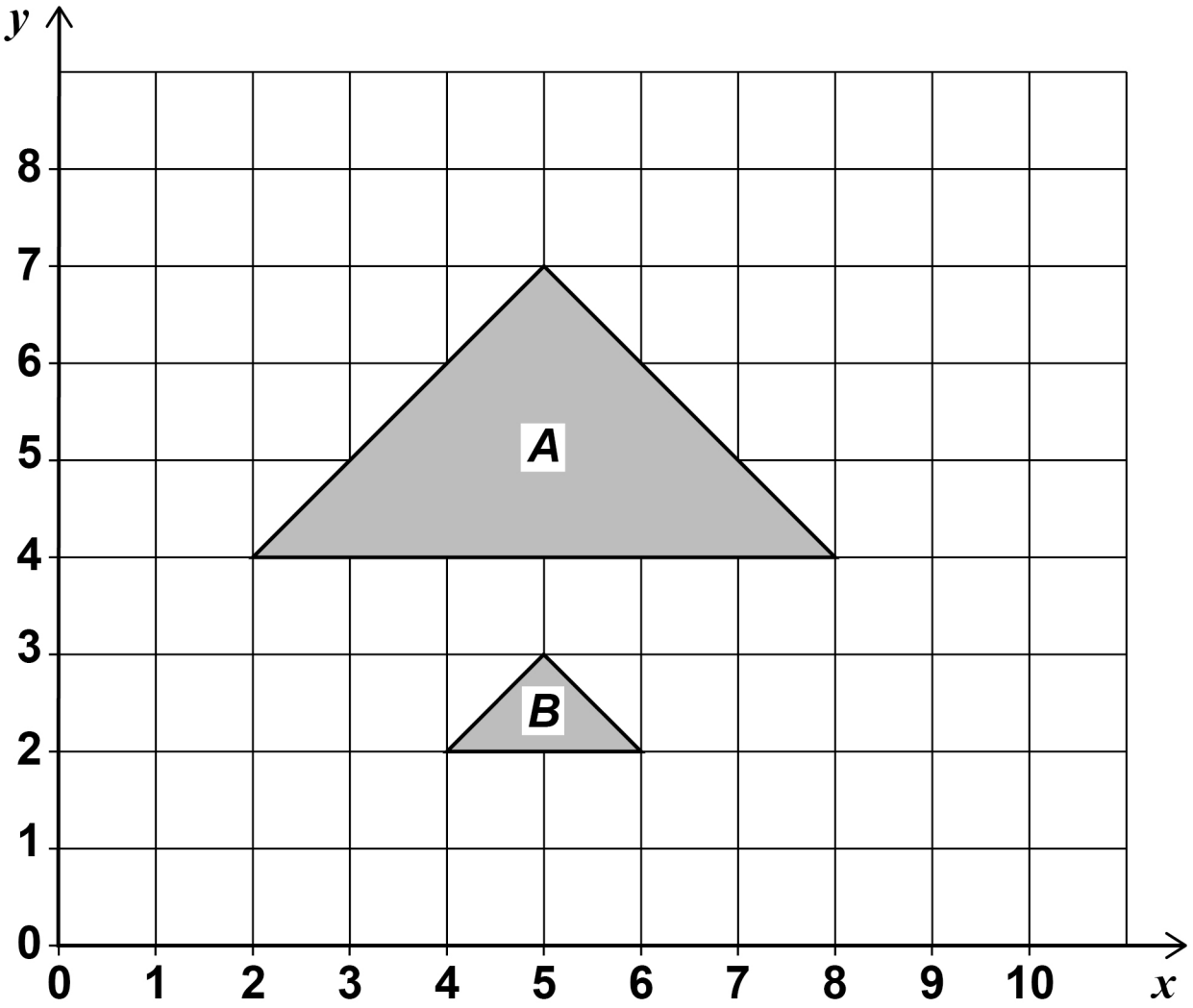
7 **Describe fully the SINGLE transformation that maps triangle *A* to triangle *B*. [3 marks]**



8 **The table shows information about the distances walked by 120 students on their way to school one week.**

Distance, x (miles)	Frequency		
$0 < x \leqslant 5$	20		
$5 < x \leqslant 10$	48		
$10 < x \leqslant 15$	30		
$15 < x \leqslant 20$	22		
	Total = 120		

Work out an estimate for the mean distance. [3 marks]

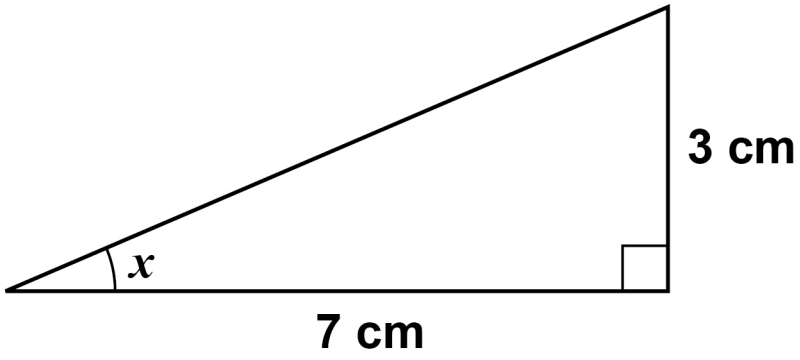
Answer _____ **miles**

6

[Turn over]

9 Work out the size of angle x. [2 marks]

The diagram is not drawn accurately.



Answer _____ degrees

10 Work out the next term of this quadratic sequence.
[2 marks]

5 8 14 23 _____

Answer _____

11 Circle the expression that is equivalent to

$\frac{3x^2}{6x^2+3}$ [1 mark]

$\frac{x^2}{2x^2+3}$ $\frac{x^2}{6x^2+1}$

$\frac{x^2}{2x^2+1}$ $\frac{1}{2}+x^2$

5

12 The table shows information about the UK and Germany.

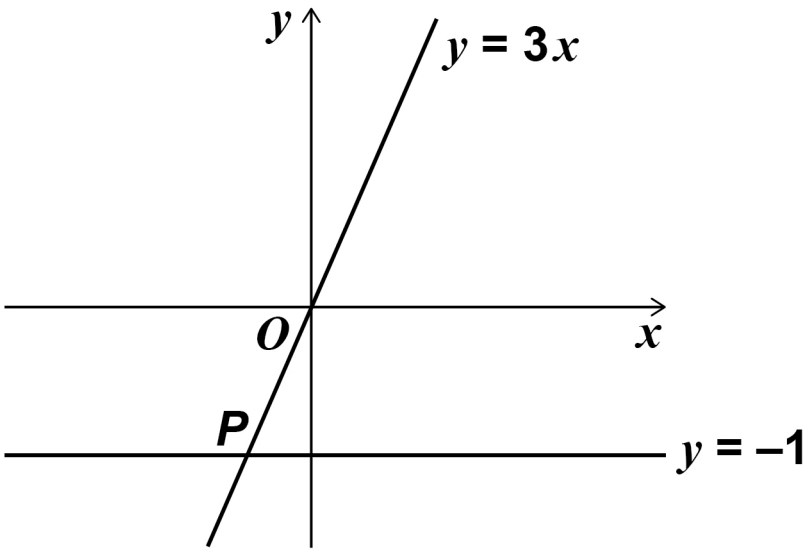
	Population	Area (square miles)
UK	64 000 000	95 000
Germany	82 000 000	140 000

$$\text{Population density} = \frac{\text{population}}{\text{area}}$$

Compare the population densities of the UK and Germany. [3 marks]

13 Two straight lines intersect at point *P*.

The diagram is not drawn accurately.



Circle the coordinates of *P*. [1 mark]

(–3, –1)

$\left(-1, -\frac{1}{3}\right)$

(–1, –3)

$\left(-\frac{1}{3}, -1\right)$

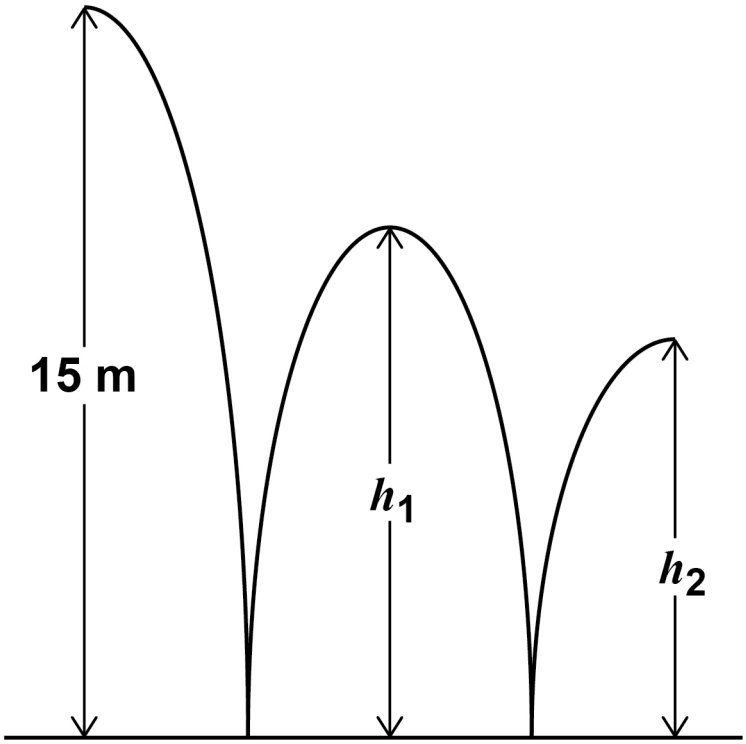
4

[Turn over]

14 A ball is thrown from a height of 15 metres.

It bounces to height h_1, then to height h_2 as shown.

The diagram is not drawn accurately.



h_1 is three quarters of the original height.

14 (a) Jack expects h_2 to be three quarters of h_1

Work out the value of h_2 that he expects.
[2 marks]

Answer _____ metres

[Turn over]

BLANK PAGE

14 (b) In fact, h_2 is two thirds of h_1

How does this affect the answer to part (a)?

Tick a box.

☐ The ball bounced higher than he expected

☐ The ball bounced lower than he expected

Show working to support your answer. [2 marks]

4

15 Mirek invests £6000 at a compound interest rate of 1.5% per year.

He wants to earn more than £1000 interest.

Work out the LEAST time, in whole years, that this will take. [3 marks]

Answer _____ years

[Turn over]

16 (a) Factorise fully $9y^3 - 6y$ [2 marks]

Answer _____

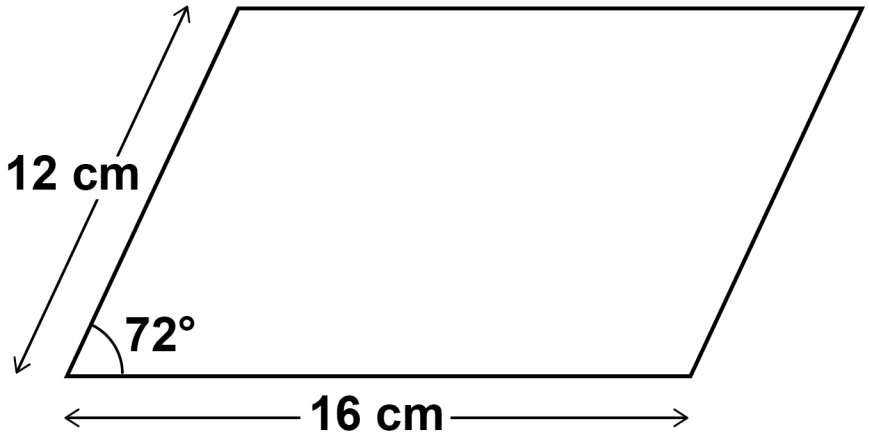
16 (b) Factorise $3x^2 - 22x + 7$ [2 marks]

Answer _____

7

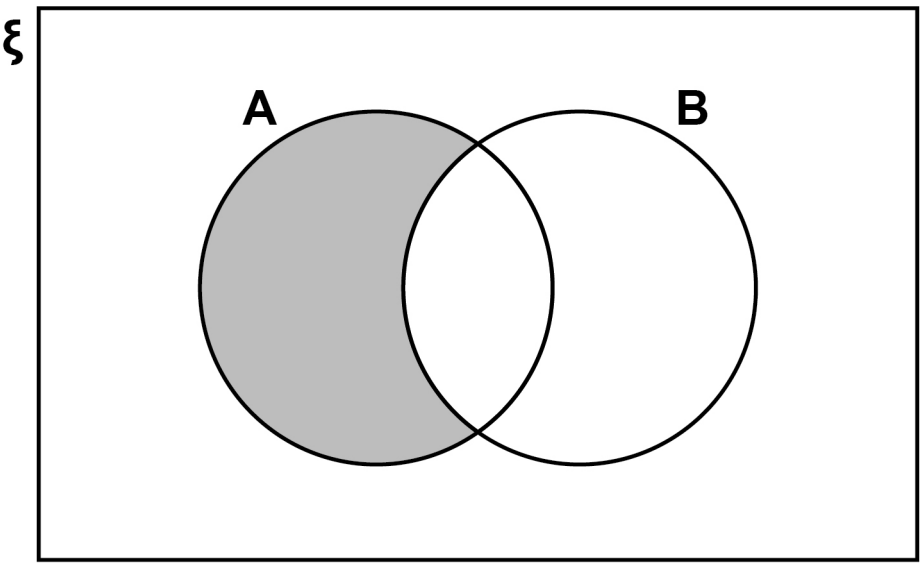
17 **Work out the area of the parallelogram. [3 marks]**

It is not drawn accurately.



Answer _____ **cm²**

18 (a)

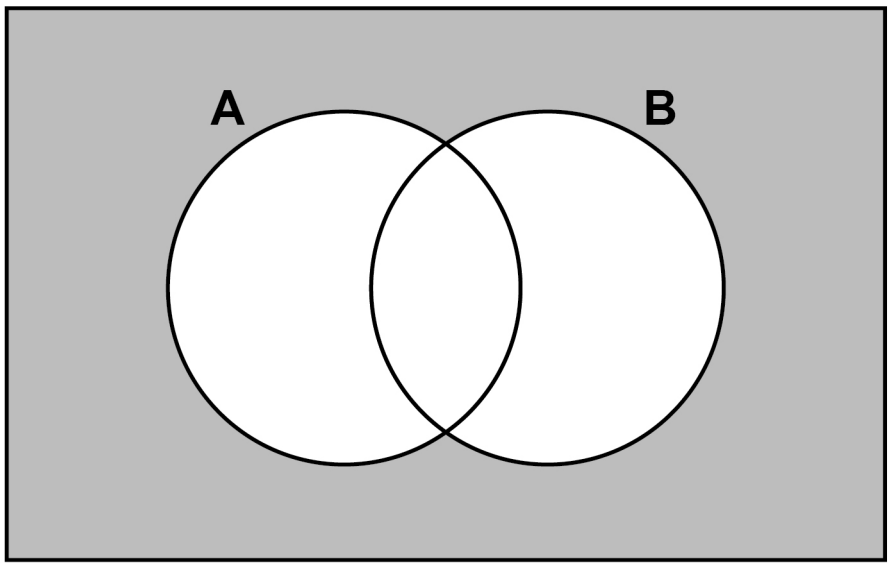


Which of these represents the shaded region?

Circle your answer. [1 mark]

A **B'** **$A \cap B'$** **$A \cup B'$**

18 (b)



Which of these represents the shaded region?

Circle your answer. [1 mark]

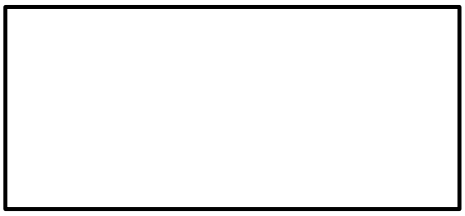
$(A \cup B)'$ $(A \cap B)'$ $A' \cap B$ $A' \cup B'$

5

19 The length of a rectangle is five times the width.

The area of the rectangle is 1620 cm^2

It is not drawn accurately.



Work out the width of the rectangle. [3 marks]

Answer _____ cm

20 A stone is thrown upwards with a speed of v metres per second.

The stone reaches a maximum height of h metres.

h is directly proportional to v^2

When $v = 10$, $h = 5$

Work out the maximum height reached when $v = 24$ [4 marks]

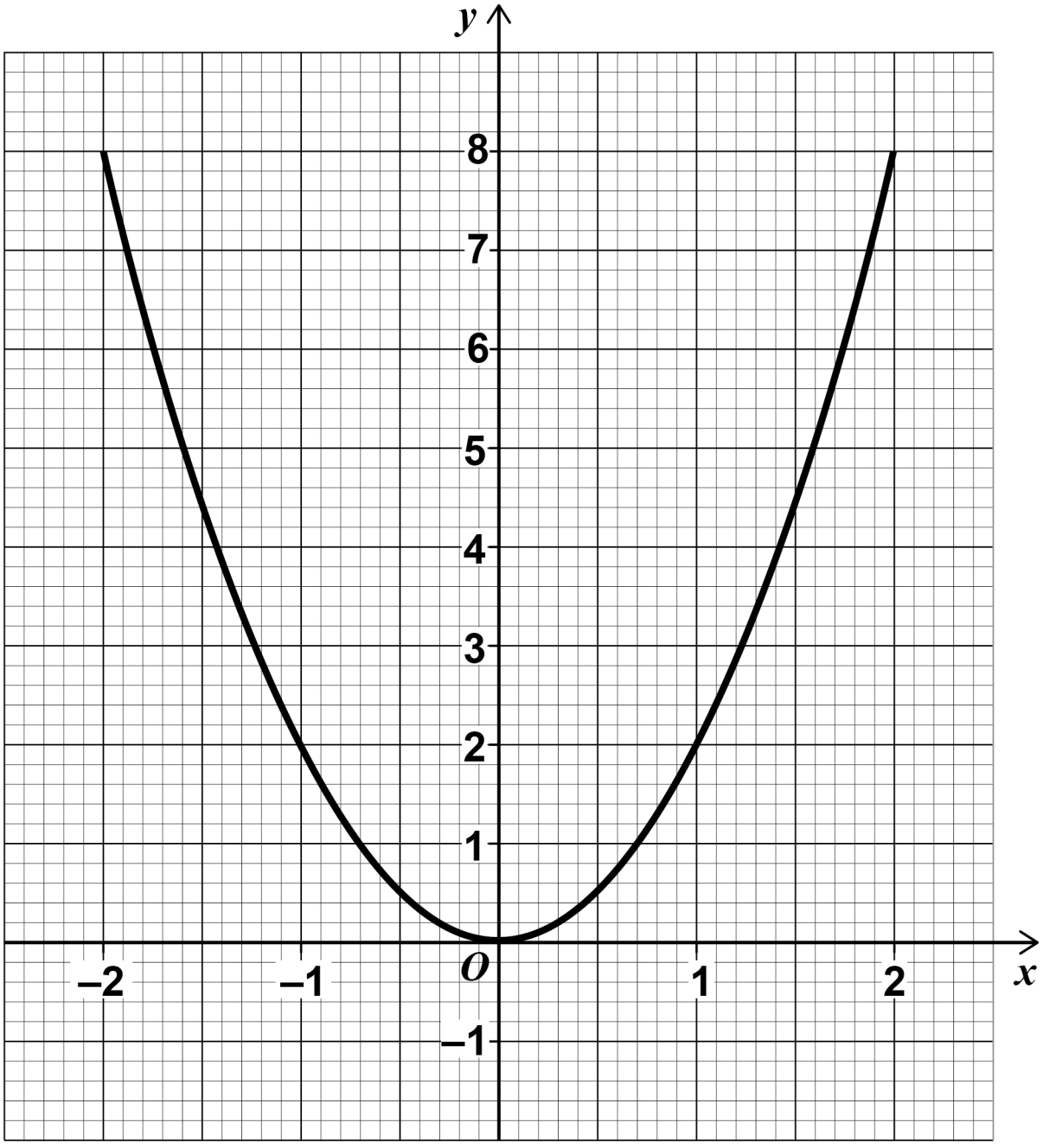
Answer _____ m

7

21 (a) Meera is using a GRAPHICAL method to solve $2x^2 - 3x = 0$

She draws the graph of $y = 2x^2$ and a straight line graph on the same grid.

Here is the graph of $y = 2x^2$



Complete her method to solve $2x^2 - 3x = 0$
[2 marks]

Answer _____

[Turn over]

BLANK PAGE

21 (b) Levi is solving $2x^2 + 5x = 0$

He uses this method.

$2x^2 + 5x = 0$ subtract $5x$ from both sides

$2x^2 = -5x$ divide both sides by x

$2x = -5$ divide both sides by 2

$x = -2.5$

Evaluate his method and his answer. [2 marks]

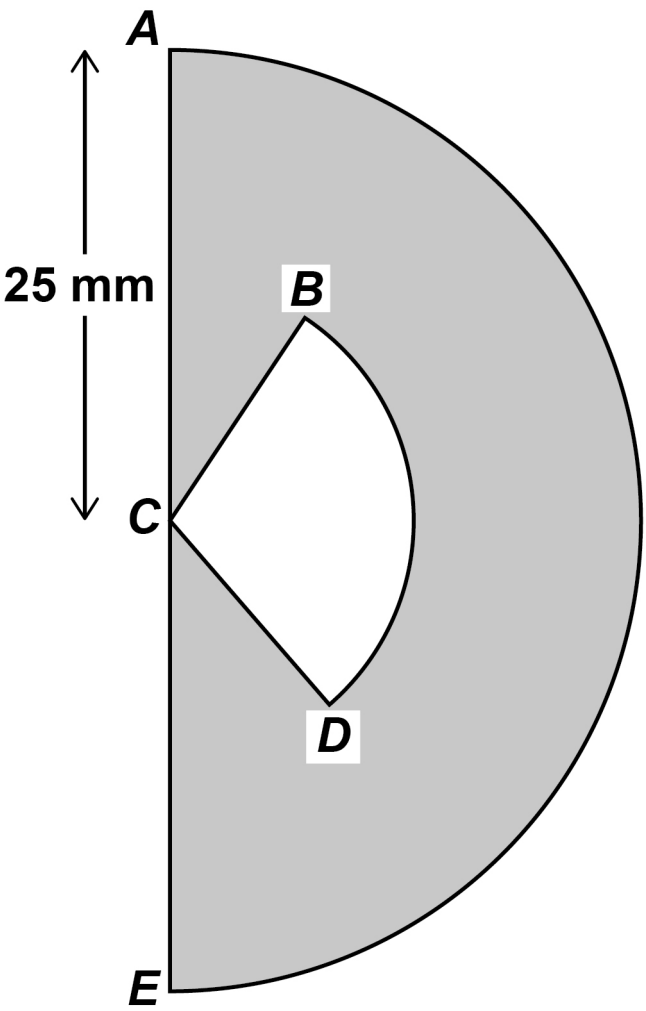
4

22 **The cross section of an earring is a semicircle, centre *C*, radius 25 mm**

The earring is black and white.

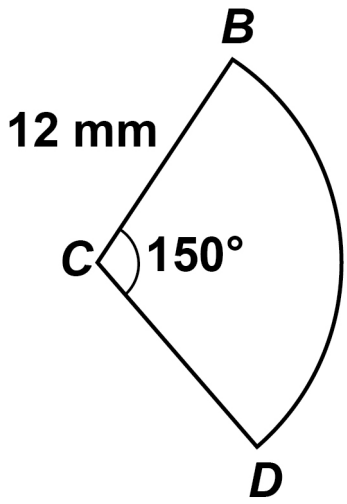
The shaded area is black.

It is not drawn accurately.



Sector *BCD* is white and has radius 12 mm

It is not drawn accurately.



[Turn over]

Is more than 20% of the semicircle white?

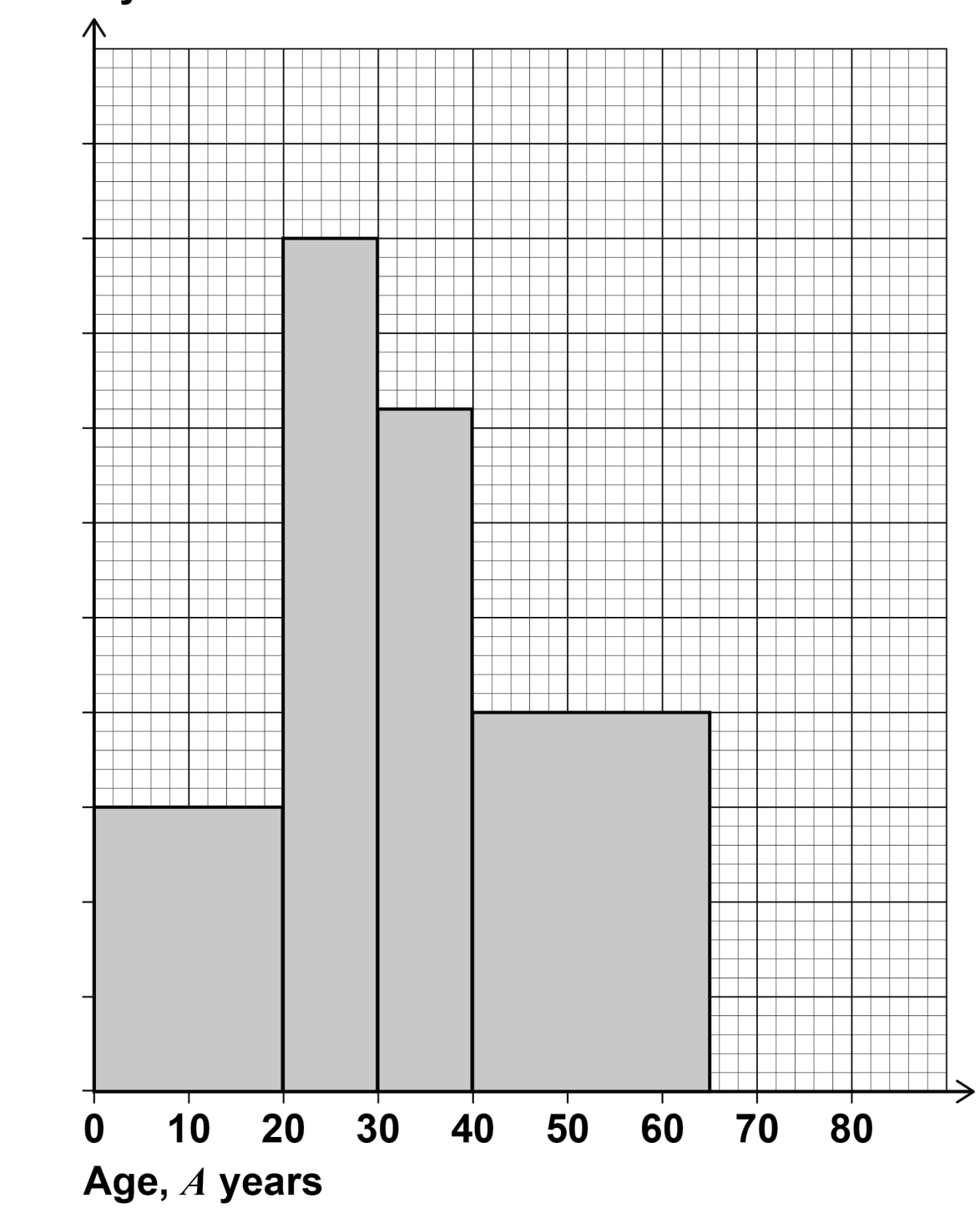
You MUST show your working. [5 marks]

Answer _____ [5]

[Turn over]

23 Here is some information about a tennis club.

Members of a tennis club



There are 30 members with $A < 20$

There are 12 members with $65 \leqslant A < 80$

There are no members with $A \geqslant 80$

23 (a) Complete the histogram. [3 marks]

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23 (b) **Work out the total number of members of the club. [2 marks]**

Answer _____

5

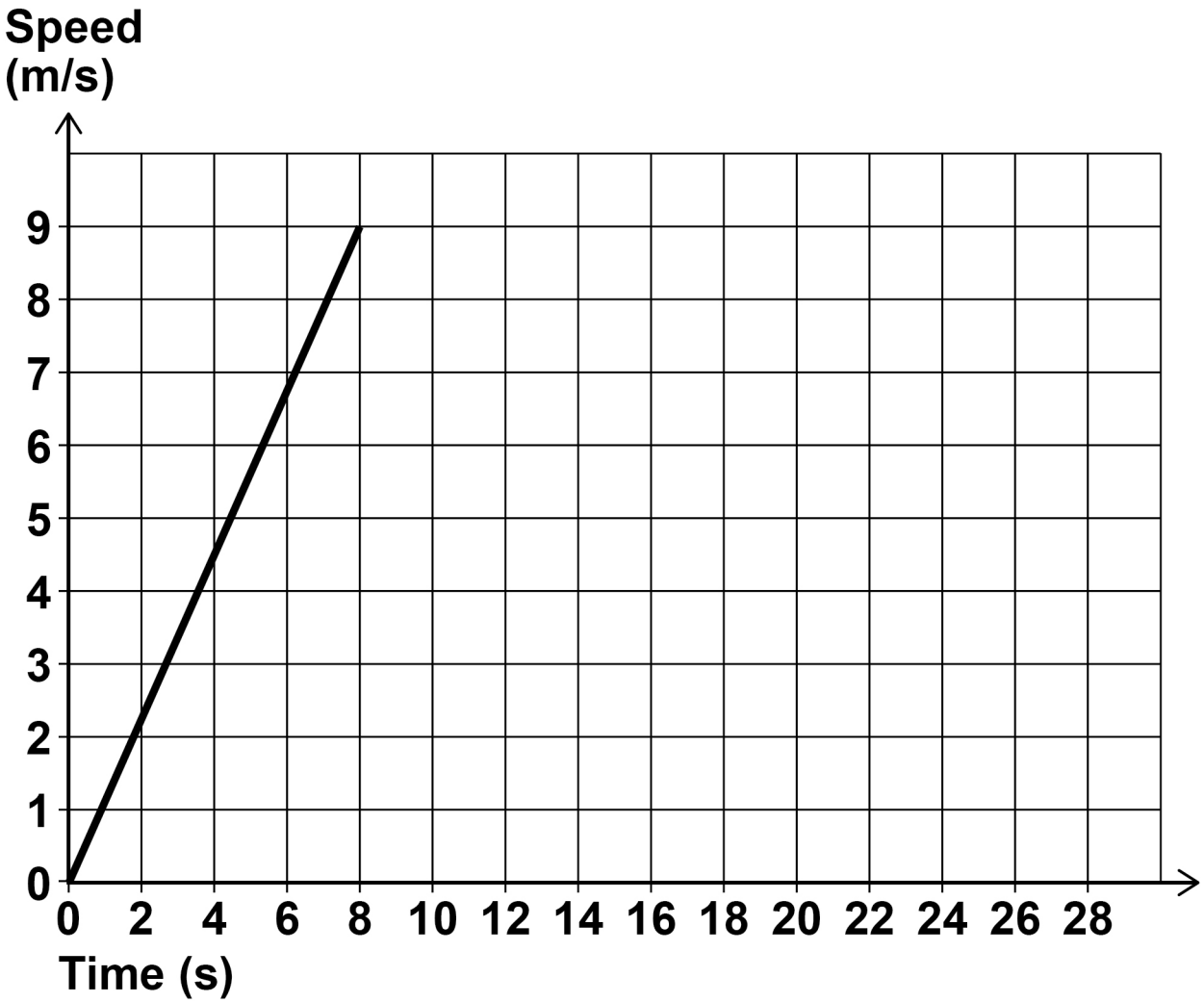
[Turn over]

24 **Beth ran a 200 metre race.**

Here is a graph of the first 8 seconds of her race.

She completed the race at a constant speed of 9 m/s

Speed-time graph for Beth



Amy completed the race in 27 seconds.

Did Beth finish before Amy?

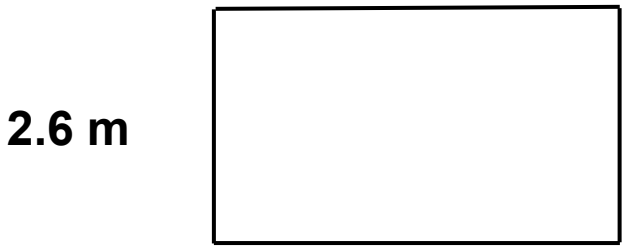
You MUST show your working. [3 marks]

Answer _____

[Turn over]

25 The dimensions of a rectangular floor are to the nearest 0.1 metres.

It is not drawn accurately.



A force of 345 Newtons is applied to the floor.

The force is to the nearest 5 Newtons.

$$\text{pressure} = \frac{\text{force}}{\text{area}}$$

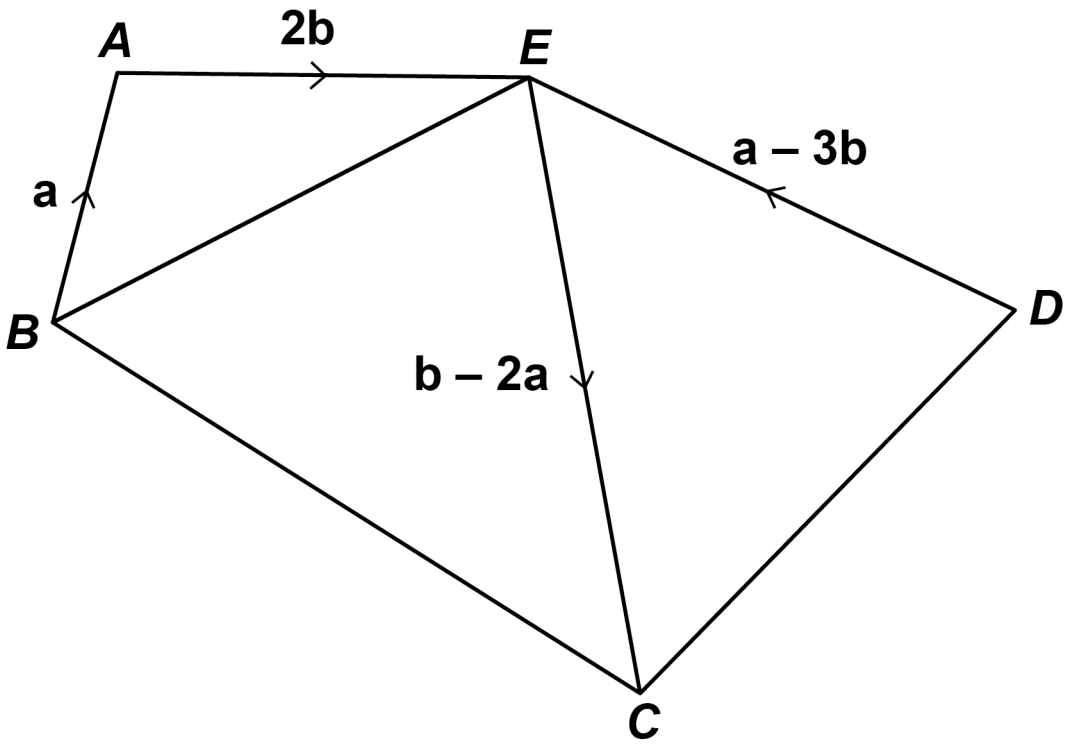
Work out the upper bound of the pressure.
Give your answer to 4 significant figures.
You MUST show your working. [5 marks]

Answer _____ N/m^2 [8]

[Turn over]

26 ***ABCDE*** **is a pentagon.**

It is not drawn accurately.



Show that *BCDE* is a parallelogram. [3 marks]

[Turn over]

27 Solve $\frac{x}{4} - \frac{2x}{x+2} = 1$

Give your solutions to 2 decimal places.

You MUST show your working. [6 marks]

Answer _____ [9]

END OF QUESTIONS

There are no questions printed on this page

For Examiner's Use	
Pages	Mark
4-5	
6-9	
11-13	
14-15	
16-17	
18-21	
22-24	
25-27	
28-29	
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38-41	
42-45	
46-49	
TOTAL	