Y

AQA

Surname _____

Other Names _____

Centre Number _____

Candidate Number _____

Candidate Signature _____

I declare this is my own work

GCSE MATHEMATICS

H

Higher Tier Paper 3 Calculator

8300/3H

Monday 8 June 2020 Morning

Time allowed: 1 hour 30 minutes

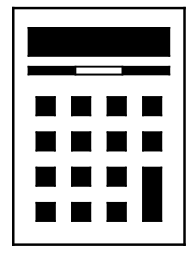
At the top of the page, write your surname and other names, your centre number, your candidate number and add your signature.

[Turn over]

JUN208300 3H 01

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 What does A U B represent in P(A U B) ?

Circle your answer. [1 mark]

A or B or both **A but not B**

not A and not B **A and B**

2 Circle the equation of the line that is parallel to $y = \frac{1}{2}x + 3$ [1 mark]

$y = -2x$ $y = 2x$ $y = \frac{1}{2}x$ $y = -\frac{1}{2}x$

3 Work out 320 as a percentage of 80

Circle your answer. [1 mark]

25% 75% 300% 400%

4 A fair coin is spun four times.

Circle the probability of getting four Heads. [1 mark]

$\frac{1}{2}$ 2 $\frac{1}{8}$ $\frac{1}{16}$

5 To the nearest 1000, there are 18 000 people at a festival.

5 (a) Write down the minimum possible number of people at the festival. [1 mark]

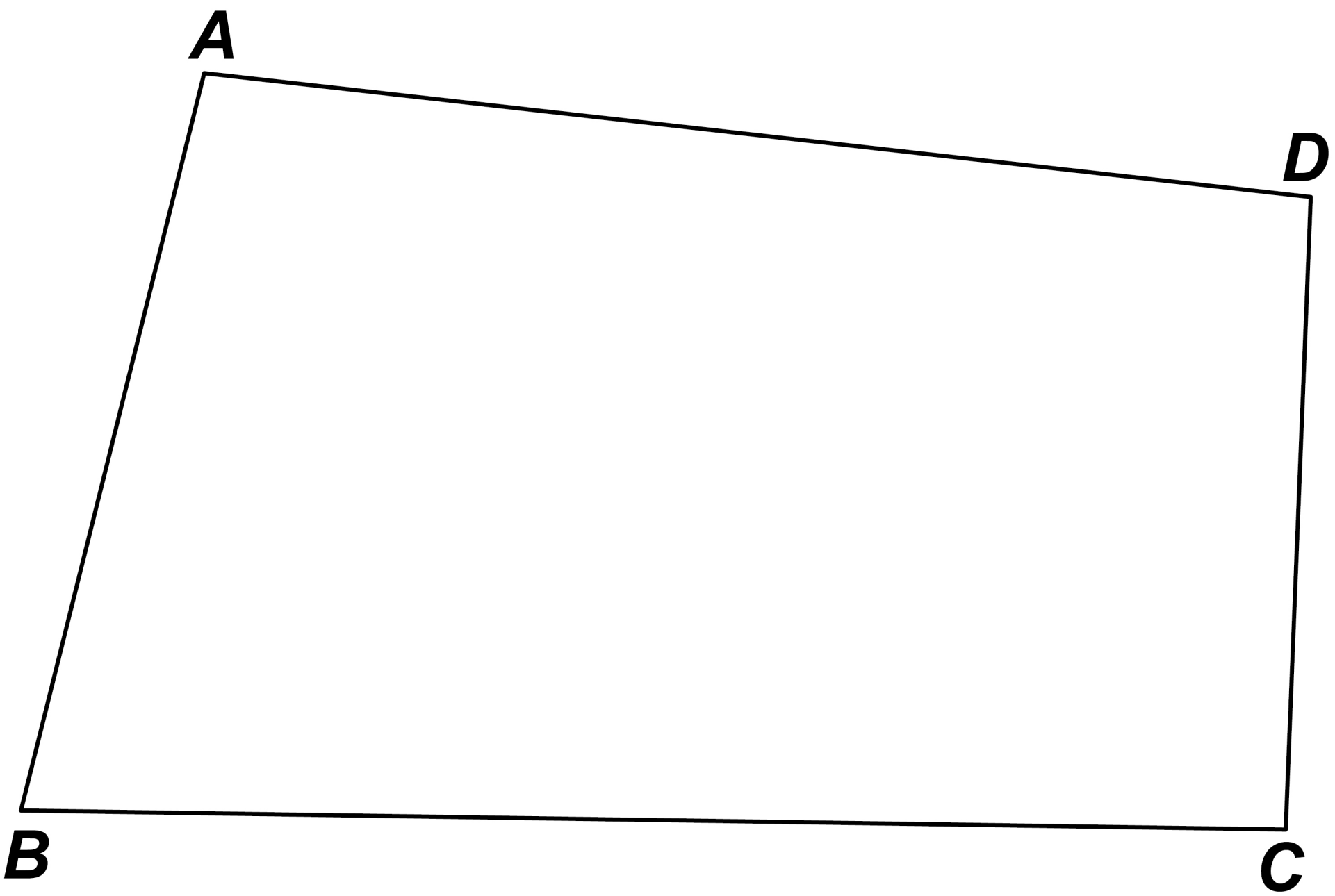
Answer _____

5 (b) Write down the maximum possible number of people at the festival. [1 mark]

Answer _____

6

6 *ABCD* represents the plan of a field.



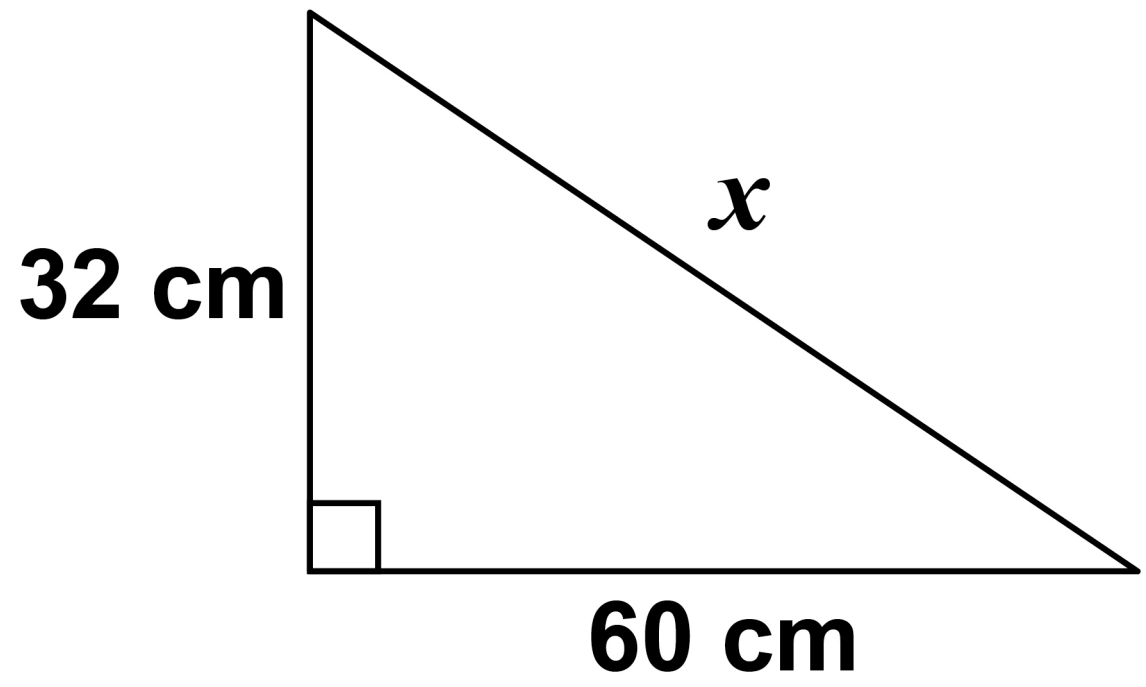
There is a path across the field that starts at *B*

is the same distance from *BA* and *BC*.

Using ruler and compasses, show the position of the path. [2 marks]

7 **Use Pythagoras' theorem to work out the value of x.**

The diagram is not drawn accurately.



[3 marks]

Answer _____ **cm**

5

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[Turn over]

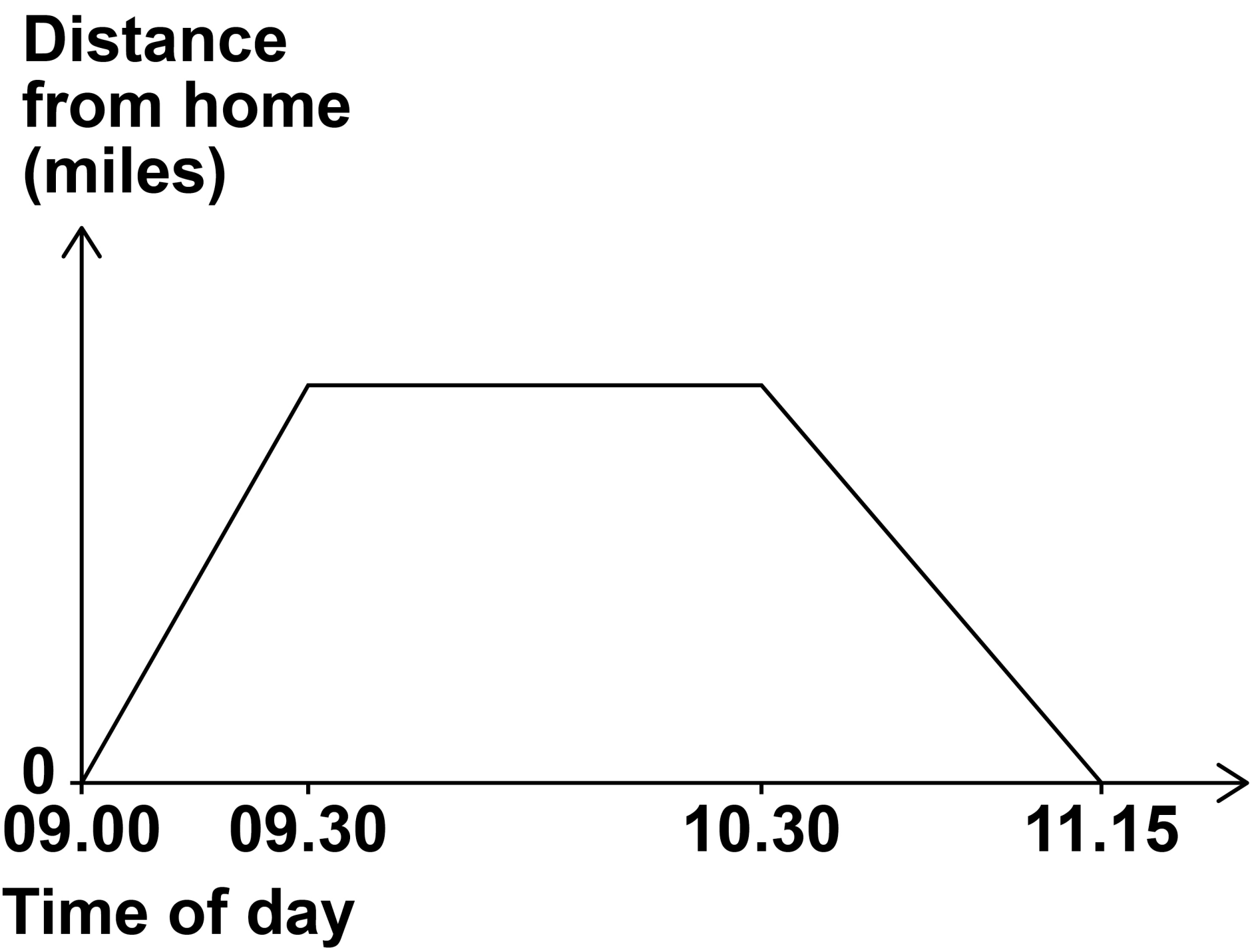
8 Chris visits a library.

He cycles to the library in half an hour at a speed of 12 miles per hour.

He stays at the library for one hour.

He then cycles home.

The sketch graph represents his visit.

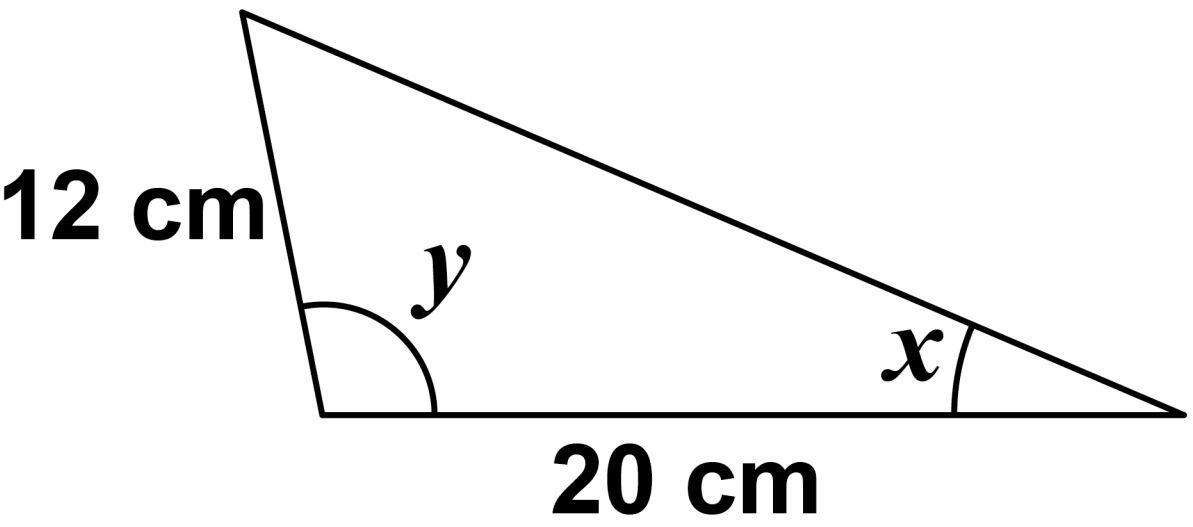


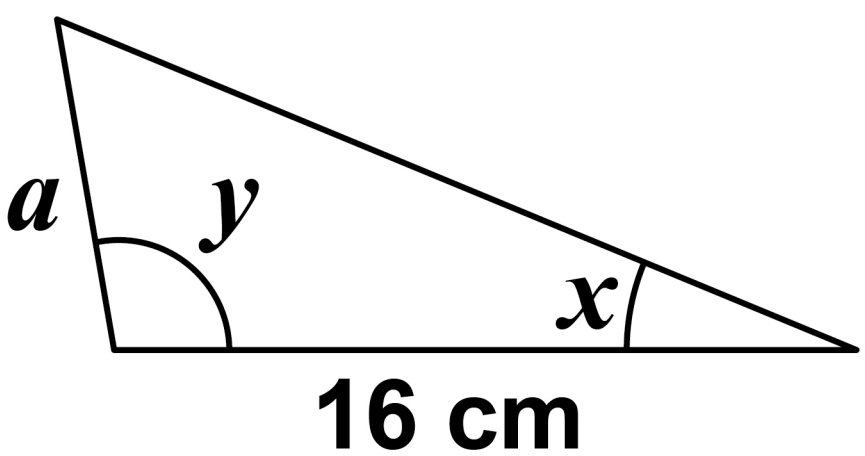
Work out the speed, in miles per hour, at which Chris cycles home. [3 marks]

Answer _____ mph

9 These two triangles are similar.

The diagrams are not drawn accurately.





Work out the value of a. [2 marks]

Answer _____ **cm**

10 Expand and simplify fully

$4(2c + 3) – (5c – 1)$ [2 marks]

Answer

[Turn over]

7

11 A spinner can land on red, blue or green.

After 350 spins

relative frequency of red = 0.18

relative frequency of blue = 0.62

Work out the number of times the spinner landed on green. [3 marks]

Answer

BLANK PAGE

[Turn over]

12 Here is some information about 26 houses.

a, b and c are all DIFFERENT numbers.

Number of bedrooms	Number of houses
1	7
2	a
3	b
4	c
5	8

The median number of bedrooms is 3.5

Work out a possible set of values for a, b and c. [3 marks]

a = _____

b = _____

c = _____

6

13 (a) Simplify $\frac{25a}{8} \times \frac{2a}{5}$

Give your answer as a single fraction in its simplest form.
[2 marks]

Answer _____

13 (b) Sofia is trying to simplify $\frac{6c + 10}{2}$

Her method is

divide $6c$ by 2

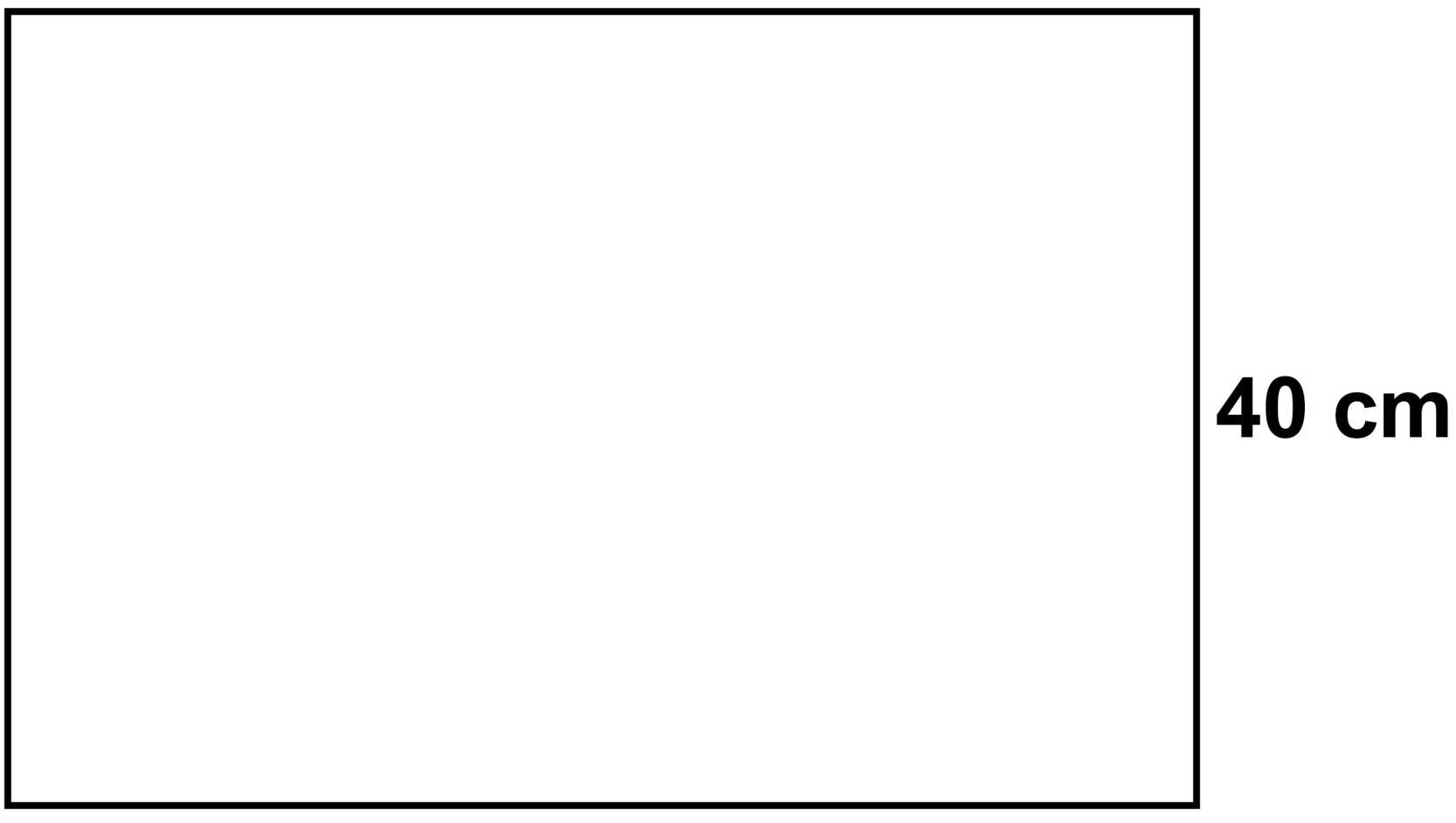
then

add 10

Evaluate her method. [1 mark]

14 A rectangle has length 60 cm and width 40 cm

The diagram is not drawn accurately.



The length decreases by 15%

The width decreases by 10%

Sue says,

“The perimeter decreases by 25% because 15% + 10% is 25%”

Is she correct?

You MUST show calculations to support your answer. [4 marks]

15 Solve $4 > 11 - \frac{x}{3}$ [2 marks]

Answer

BLANK PAGE

[Turn over]

16 The number of goals scored by 20 players in a season is shown.

Number of goals	Frequency	Midpoint	
0 to 4	6		
5 to 9	11		
10 to 14	3		
	Total = 20		

Work out an estimate of the mean number of goals per player.

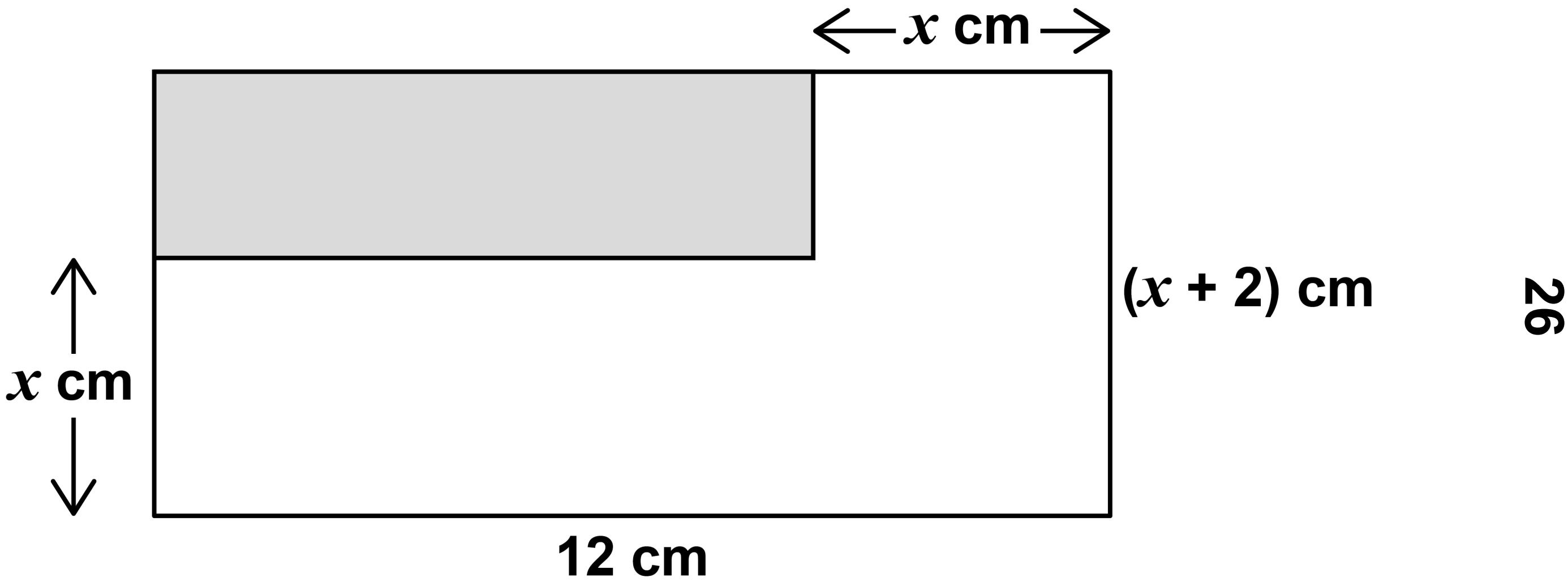
Give your answer as a decimal. [3 marks]

Answer _____

[Turn over]

17 Here are two rectangles.

The diagram is not drawn accurately.



The area of the shaded rectangle is $\frac{1}{4}$ the area of the large rectangle.

Work out the value of x. [4 marks]

Answer _____

18 The pressure in a tyre is 30 pounds per square inch.

Convert the pressure into kilograms per square centimetre.

Use

1 pound = 0.45 kilograms

and

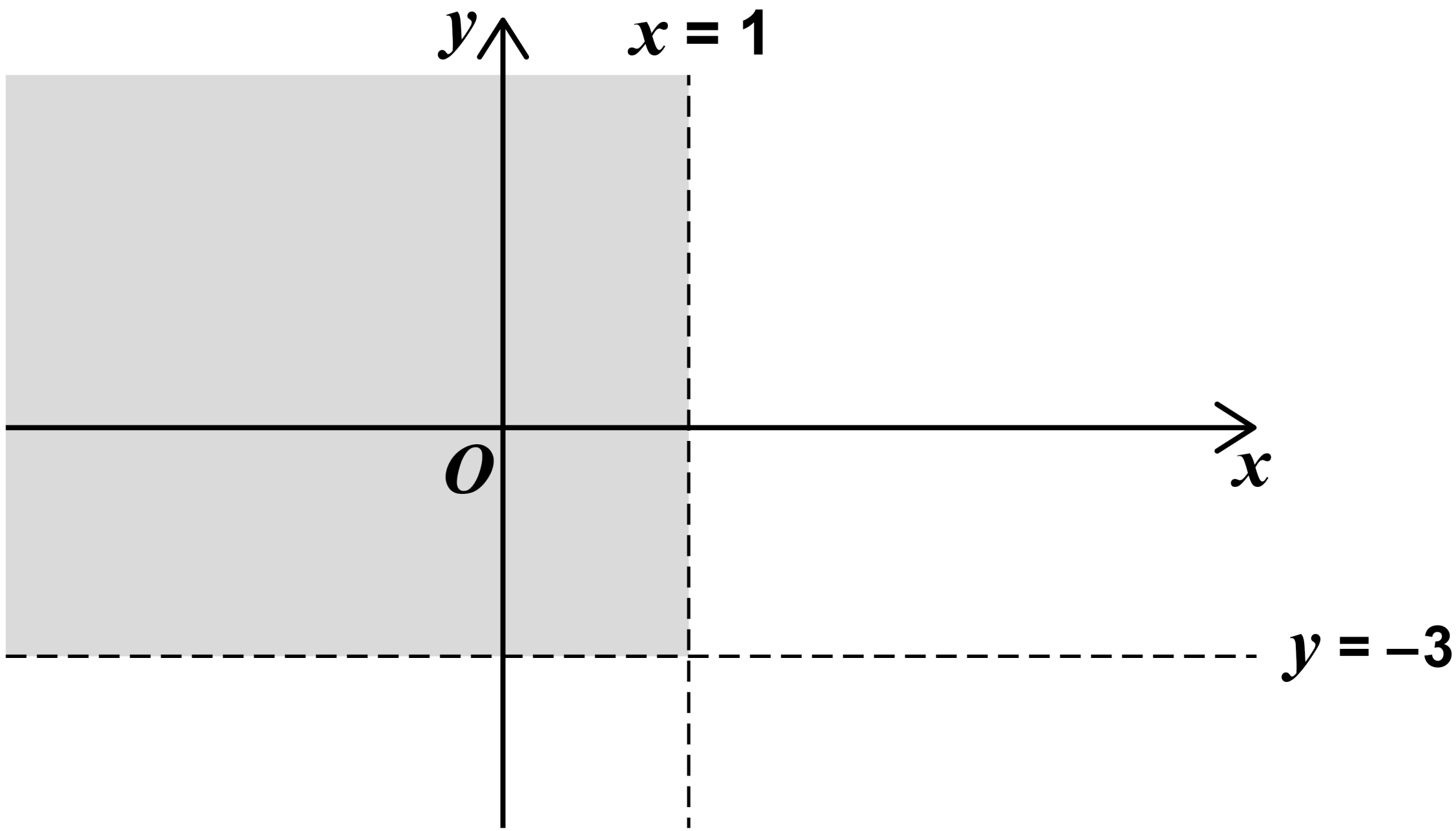
1 inch = 2.54 centimetres

[3 marks]

Answer _____ kg/cm^2

[Turn over]

19 The sketch shows the lines $x = 1$ and $y = -3$



Which pair of inequalities describes the shaded region?

Tick ONE box. [1 mark]

☐ $x < 1$ and $y < -3$

☐ $x < 1$ and $y > -3$

☐ $x > 1$ and $y > -3$

☐ $x > 1$ and $y < -3$

4

20 Amari and Ben each play a game.

20 (a) Here is some information about Amari's scores.

Lowest 12

Highest 20

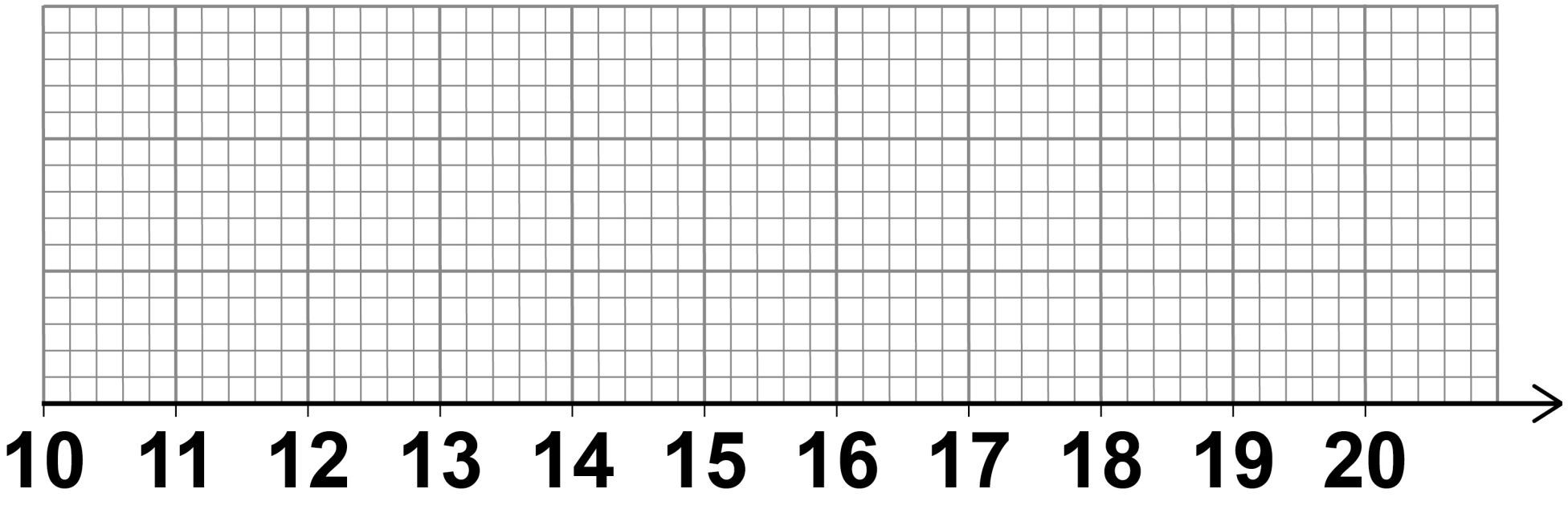
Lower quartile 13

Upper quartile 19

Median 17

On the opposite page, draw a box plot to represent his scores.
[2 marks]

AMARI

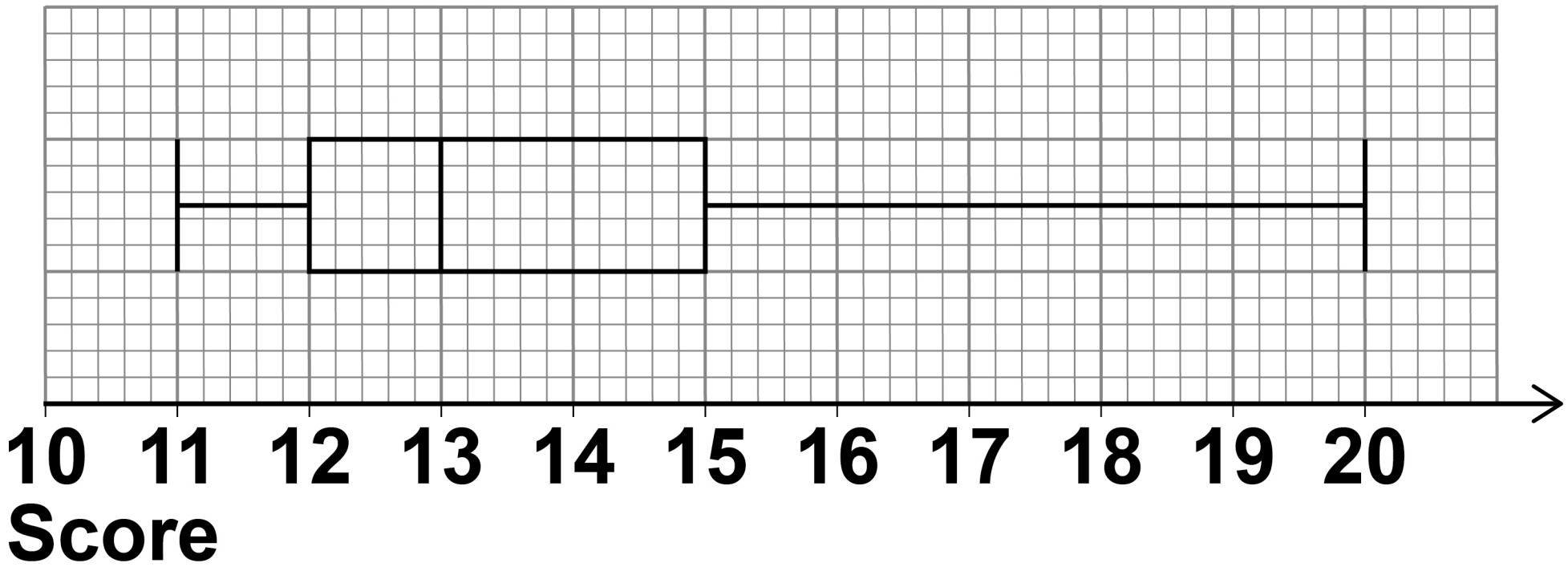


Score

[Turn over]

20 (b) The box plot represents Ben's scores.

BEN



Who had more consistent scores, Amari or Ben?

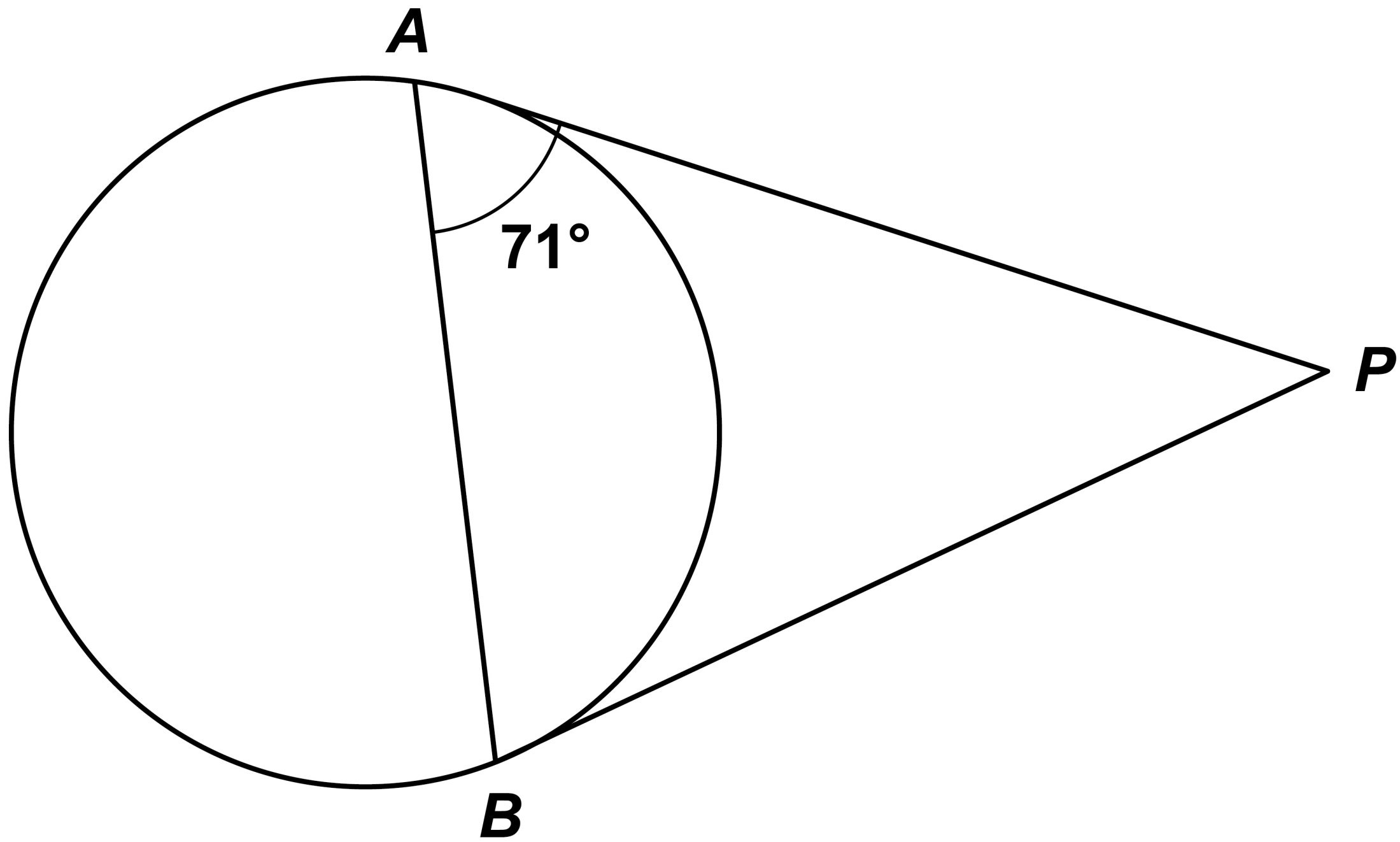
Work out the interquartile ranges to support your answer. [2 marks]

[Turn over]

21 (a) ***A*** **and** ***B*** **are points on a circle.**

PA **and** ***PB*** **are tangents.**

The diagram is not drawn accurately.



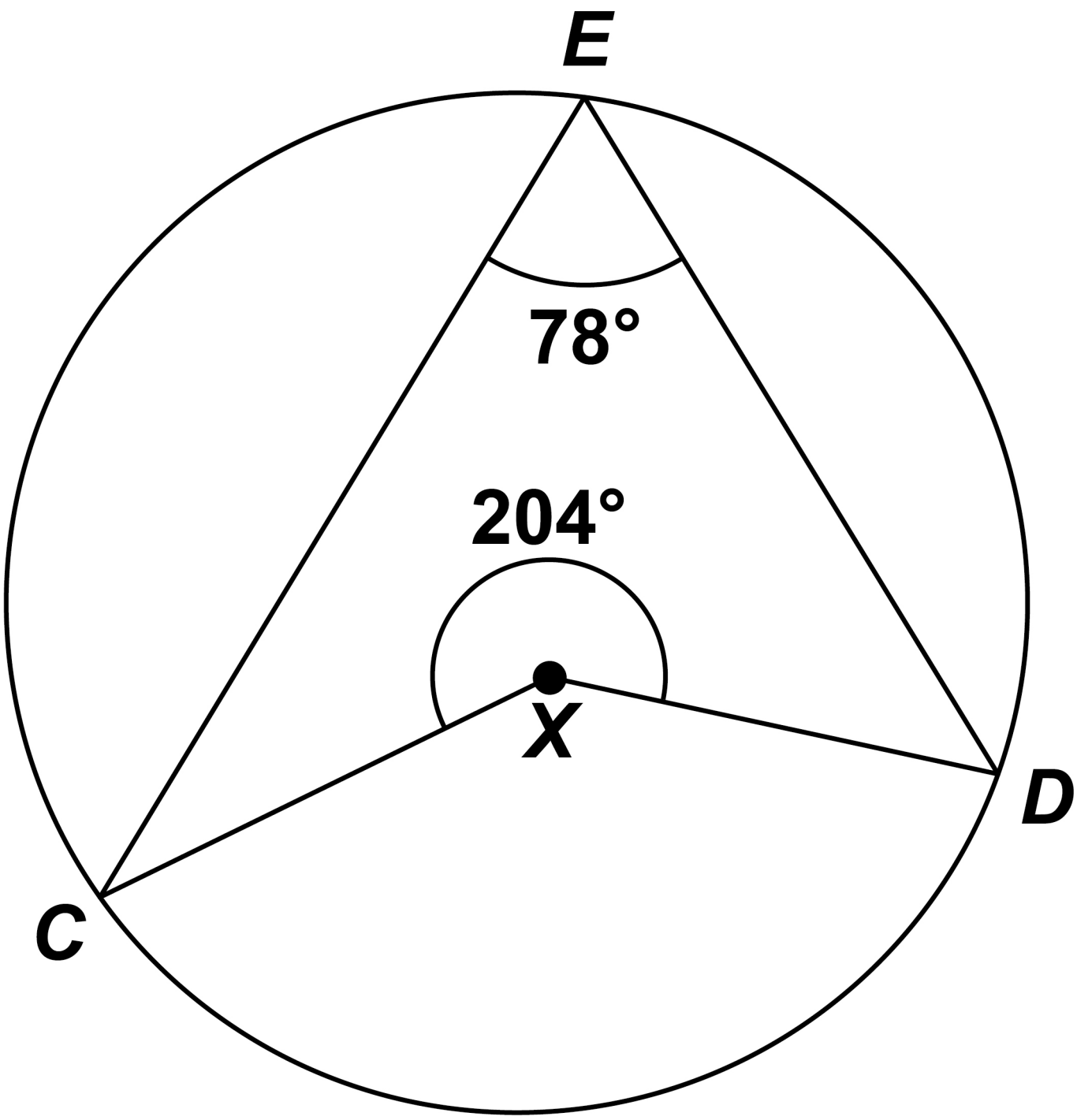
Work out the size of angle *APB*. [2 marks]

Answer _____ degrees

[Turn over]

21 (b) ***C*, *D* and *E* are points on a different circle.**

The diagram is not drawn accurately.



Is *X* the centre of the circle?

Tick a box.

☐ **Yes**

☐ **No**

Show working to support your answer. [2 marks]

22 Visitors to a museum buy a child ticket or an adult ticket.

Here is some information about two groups of visitors.

Group X	250 visitors, including 120 children
Group Y	number of children : number of adults = 17 : 15

One visitor from each group is picked at random.

Is this statement correct?

Probability of picking two children > probability of picking two adults

You MUST show your working.
[4 marks]

[Turn over]

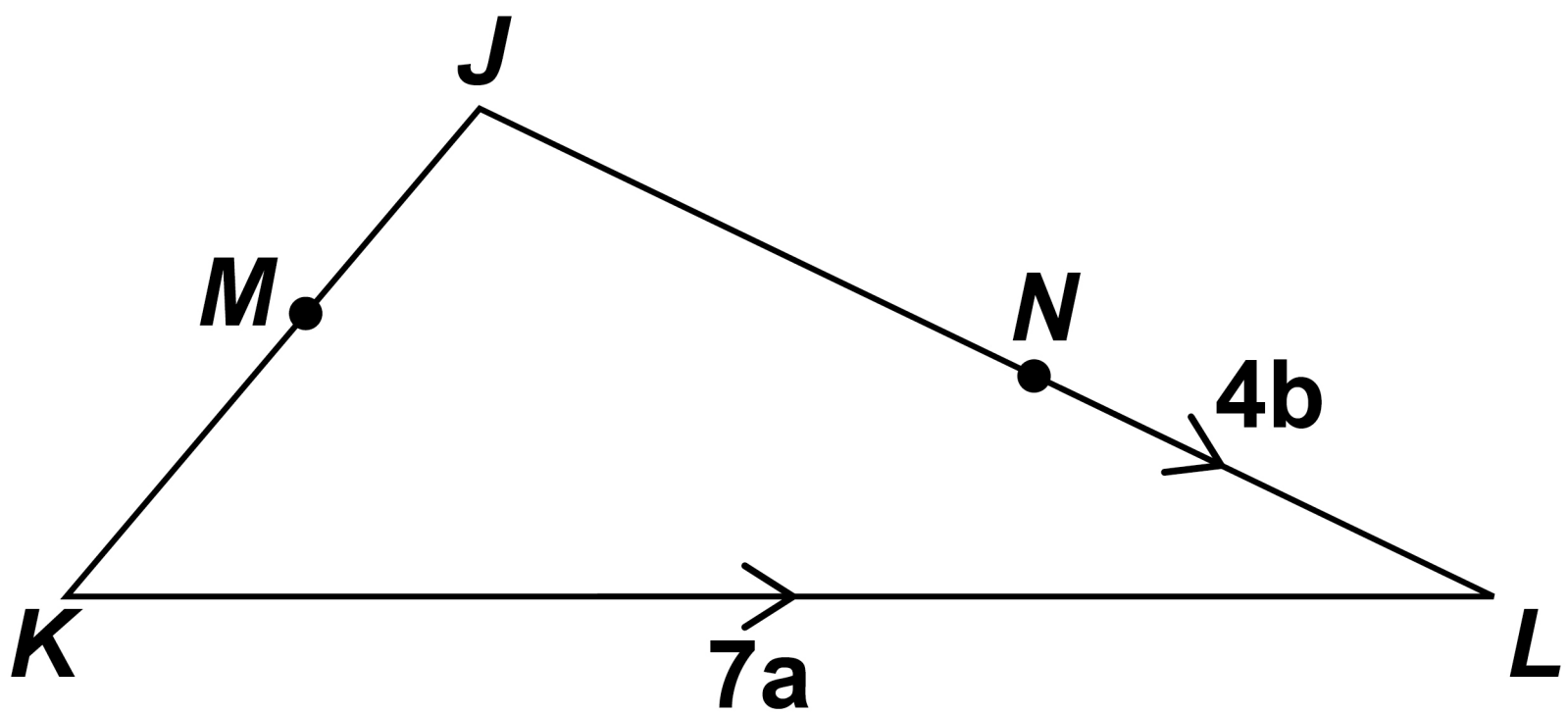
23 In triangle JKL

M is the midpoint of JK

$JN : NL = 3 : 2$

$\overrightarrow{KL} = 7\mathbf{a}$ $\overrightarrow{NL} = 4\mathbf{b}$

The diagram is not drawn accurately.



Work out $\overrightarrow{JM}$ in terms of a and b.

Give your answer in its simplest form.
[3 marks]

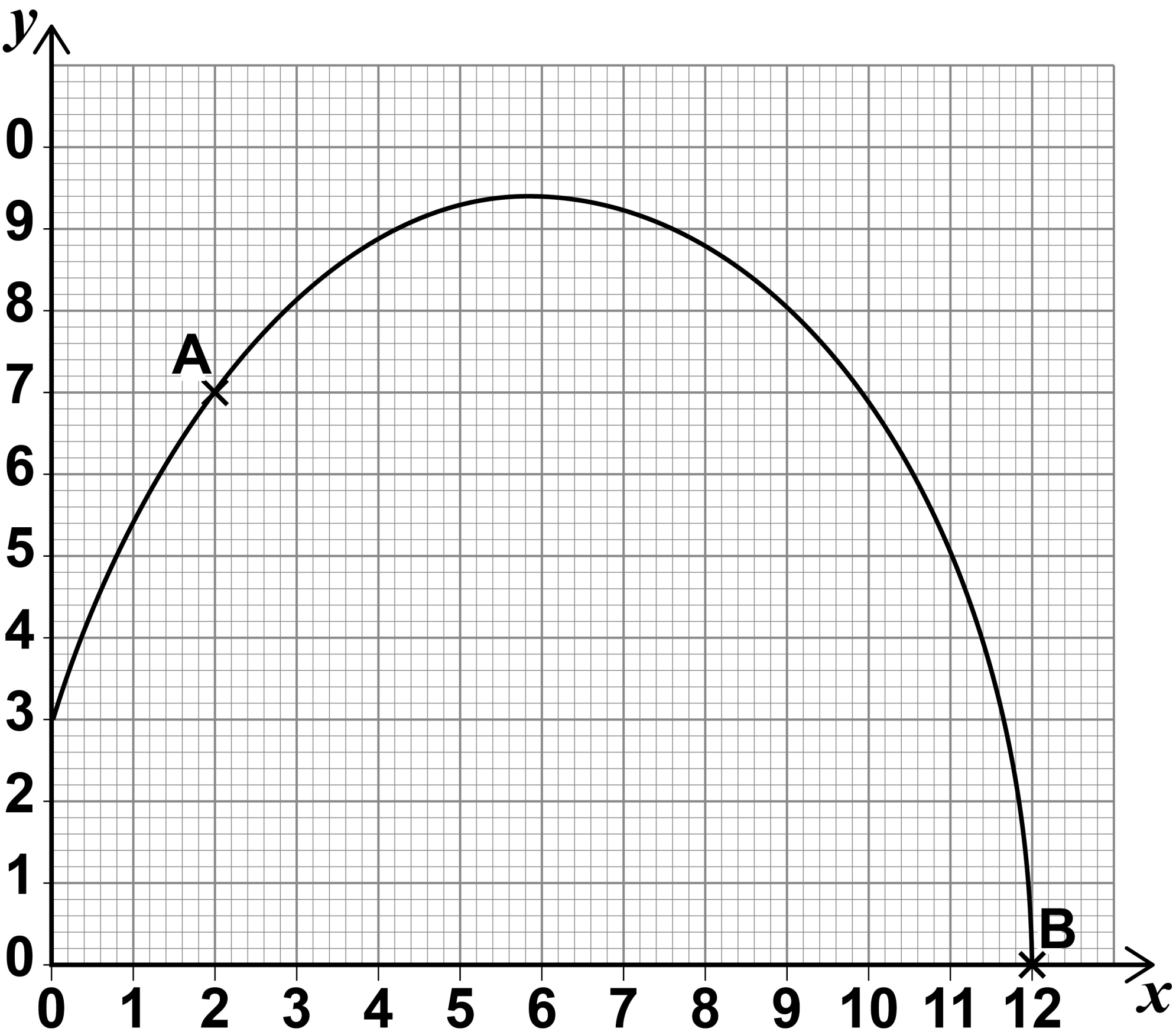
Answer

[Turn over]

7

24 ***A*** **and** ***B*** **are points on a curve.**

A **is (2, 7)**
B **is (12, 0)**



24 (a) Work out the instantaneous rate of change of y with respect to x at point *A*. [2 marks]

Answer _____

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24 (b) **The average rate of change of y with respect to x between points *A* and *B* is worked out.**

Which statement is correct?

Tick ONE box. [1 mark]

☐ **It is positive.**

☐ **It is zero.**

☐ **It is negative.**

☐ **You cannot tell if it is positive or negative.**

[Turn over]

25 The equation of a circle is $x^2 + y^2 = 9$

Work out the length of the DIAMETER.

Circle your answer. [1 mark]

3 6 9 18

4

BLANK PAGE

[Turn over]

26 **Prove algebraically that** $3.4\dot{7} = \frac{313}{90}$

[3 marks]

[Turn over]

27 The equation of a curve is

$y = (x - 1)^2 - 6$

Circle the coordinates of the turning point. [1 mark]

(–1, –6) (1, 6) (–1, 6) (1, –6)

28 Line A has equation $y = 4x - 1$

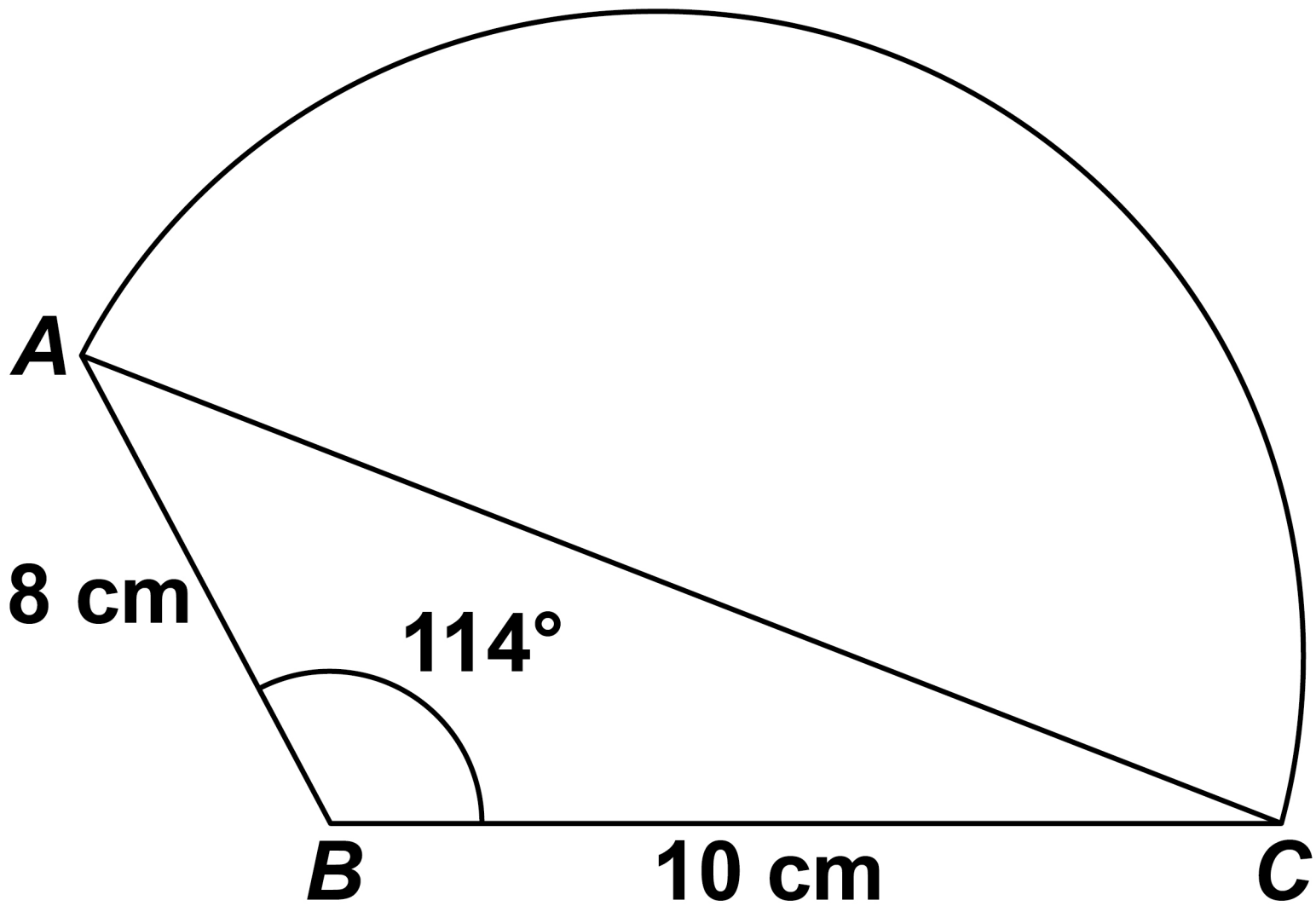
Line B is
perpendicular to line A
and
passes through the point (8, 5)

Work out the coordinates of the point where line B intersects the x-axis.
[4 marks]

Answer (_____, _____)

29 A shape is made by joining triangle *ABC* to a semicircle with diameter *AC*.

The diagram is not drawn accurately.



Work out the TOTAL area of the shape.

[5 marks]

Answer _____ **cm^2**

30 $f(x) = \frac{1}{2}x$ $g(x) = x - x^2$

Solve $f^{-1}(x) = gf(x)$ **[4 marks]**

Answer

END OF QUESTIONS

9

Additional page, if required.

Write the question numbers in the left-hand margin.

Additional page, if required.

Write the question numbers in the left-hand margin.

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For Examiner's Use	
Pages	Mark
4–6	
7–8	
10–13	
14–17	
18–21	
22–27	
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32–35	
36–39	
40–43	
44–48	
50–53	
54–57	
TOTAL	