GCSE

3300U30-1

TUESDAY, 24 MAY 2022 – MORNING

MATHEMATICS

UNIT 1: NON – CALCULATOR

INTERMEDIATE TIER

1 hour 35 minutes plus your additional time allowance

THE USE OF A CALCULATOR IS NOT PERMITTED IN THIS EXAMINATION

Surname: _____

First name(s): _____

Centre Number: _____

Candidate Number: 0 _____

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	4	
2.	3	
3.	4	
4.	3	
5.	4	
6.	3	
7.	5	
8.	6	
9.	3	
10.	4	
11.	5	
12.	6	
13.	2	
14.	6	
15.	4	
16.	4	
17.	2	
18.	2	
Total	70	

ADDITIONAL MATERIALS

A ruler, a protractor and a pair of compasses may be required.

ITEMS INCLUDED WITH QUESTION PAPER

A separate Formula List.

A separate Diagram Booklet.

The Diagram Booklet MUST be handed in to the invigilators and sent for marking.

INSTRUCTIONS TO CANDIDATES

Use black ink, black ball – point pen, black felt tip or your usual method.

Write your name, centre number and candidate number in the spaces on the front cover.

Answer ALL questions.

Write your answers in the spaces provided.

If you run out of space, use the additional page(s) at the back of the booklet.
Question numbers must be given for the work written on the additional page(s).

Take π as $3 \cdot 14$

INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

The number of marks is given in brackets at the end of each question or part – question.

In question 8, the assessment will take into account the quality of your linguistic and mathematical organisation, communication and accuracy in writing.

1. Calculate each of the following.

(a) $3^2 \times 2^3$

[2 marks]

(b) $-124 \div 4$

[1 mark]

continued on the next page . . .

Question 1 continued

1. (c) 15% of 280

[1 mark]

2. Write $0{\cdot}3$, $\frac{8}{25}$ and 31% in ascending order.

You must show all your working.

Smallest value _____ _____ _____ Greatest value

[3 marks]

3. **Look at the diagram for Question 3 in the separate Diagram Booklet.**

The diagram is NOT drawn to scale.

The diagram shows triangle ABC and triangle CBD.

In the diagram:

$CB = CD$

Angle ACB is a right angle.

An angle of 220° is shown on the diagram.

Angle $CDB = x$.

Calculate the size of angle x.

You must show all your working.

_____

_____

_____

x = _____°

[4 marks]

4. **Imran is 9 years older than Glyn.**

Glyn is twice as old as Sheila.

The sum of the three ages is 49 years.

How old are Imran, Glyn and Sheila?

Imran = _____ years old.

Glyn = _____ years old.

Sheila = _____ years old.

[3 marks]

5. (a) Find a whole number value of n,

so that $7n - 9$ is a multiple of 4

You must show all your working.

When $n =$ _____, $7n - 9$ is a multiple of 4

[2 marks]

continued on the next page . . .

Question 5 continued

5. (b) Find a whole number value of n, so that $3n - 5$ is a prime number.

You must show all your working.

When n = _____, $3n - 5$ is a prime number.

[2 marks]

6. (a) A bag contains red balls, green balls and yellow balls.
The number of green balls is equal to the number of yellow balls.

Mali picks one ball from the bag at random.
The probability that she will pick a red ball is $0{\cdot}3$

Find the probability that Mali will pick a yellow ball.

[2 marks]

continued on the next page . . .

Question 6 continued

6. (b) A different bag contains 10 balls.

Some of the balls in the bag are blue.

All the other balls are white.

Morgan picks a ball from the bag at random.

He says,

> **The probability that I will pick a blue ball from the bag is 0•25**

Explain why Morgan cannot be correct.

[1 mark]

7. Solve each of the following equations.

(a) $4y - 3 = 15$

[2 marks]

(b) $8x - 38 = 17 - 3x$

[3 marks]

8. IN THIS QUESTION, YOU WILL BE ASSESSED ON THE QUALITY OF YOUR ORGANISATION, COMMUNICATION AND ACCURACY IN WRITING.

Look at the diagrams for Question 8 in the separate Diagram Booklet.
The diagrams are NOT drawn to scale.

The diagrams show a rectangle and a trapezium.

The area of the rectangle = 48 m^2

The width of the rectangle is represented by *x*.
The height of the trapezium is twice the width of the rectangle.

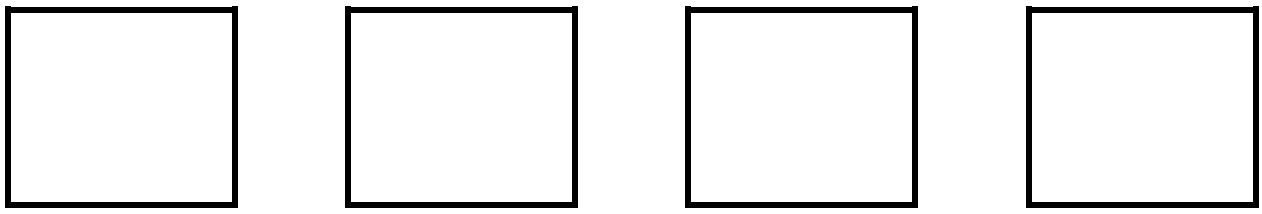
Calculate the area of the trapezium.
You must show all your working.

[4 marks + 2 marks OCW]

9. Write down four whole numbers so that:

- **they are all between 1 and 15 inclusive**
- **they have a mode of 7**
- **they have a median value of 8•5**
- **their mean is 9**

Write your numbers in the boxes on the next page.



[3 marks]

10. The diagram below shows a straight line, *ABC*. The diagram is NOT drawn to scale.

***ABC* is a straight road, where the ratio**

$AB : BC = 3 : 4$

$AC = 56$ **km.**

Calculate the length of *BC*.

Give your answer in MILES.

You must show all your working.

Length of BC = _____ MILES

[4 marks]

11. The table below shows some of the values of $y = x^2 + x - 4$ for values of x from -3 to 3

x	$y = x^2 + x - 4$
-3	2
-2	-2
-1	
0	-4
1	
2	2
3	8

(a) Complete the table above by finding the values of y for $x = -1$ and for $x = 1$

_____

_____

_____

[2 marks]

continued on the next page . . .

Question 11 continued

11. (b) On the graph paper provided for Question 11 (b) in the separate Diagram Booklet, draw the graph of $y = x^2 + x - 4$ for values of x from -3 to 3

[2 marks]

continued on the next page . . .

Question 11 continued

11. (c) Use your graph to solve the equation

$$x^2 + x - 4 = 0$$

Give your answers correct to 1 decimal place.

_____

_____

_____

_____

_____

$x =$ _____ **or** $x =$ _____

[1 mark]

12. **Look at Diagram 1 and Diagram 2 for Question 12 in the separate Diagram Booklet.**

Diagram 1 is a pie chart and Diagram 2 is a bar chart.

The children in year 5 and year 6 in a primary school took part in a survey.
The children were asked,
"How many pets do you have?"

The results for year 5 are shown in the pie chart. The results for year 6 are shown in the bar chart.

No child in either year had more than 5 pets.

There are 36 children in year 5

One child is chosen at random from all the children in year 5 and year 6
What is the probability that this child has no more than 1 pet?

_____

_____

[6 marks]

13. Write down an expression for the *n*th term of the following sequence.

15, 9, 3, –3, ……..

[2 marks]

14. Look at the diagram for Question 14 in the separate Diagram Booklet.

The diagram is an incomplete tree diagram.

A and B are independent events.

The probability of event A occurring is 0•6

The probability of event A AND event B occurring is 0•48

(a) Complete the tree diagram.

[4 marks]

continued on the next page . . .

Question 14 continued

14. (b) Calculate the probability of neither event A nor event B occurring.

[2 marks]

15. Look at the diagram for Question 15 in the separate Diagram Booklet.

The diagram is NOT drawn to scale.

In the diagram:

- ***AB*** **and** ***ED*** **are parallel**
- **triangles** ***ABC*** **and** ***DEC*** **are similar**
- ***BC*** **= 8 cm**
- ***CA*** **= 10 cm**
- ***CD*** **= 15 cm**
- ***DE*** **= 10•5 cm**

(a) Calculate the length of ***CE*****.**

[2 marks]

15. (b) Calculate the length of AB.

[2 marks]

16. Solve the following simultaneous equations using an algebraic (not graphical) method. You must show all your working.

$$2x + 3y = 29$$
$$5x - 4y = -8$$

[4 marks]

17. Circle the correct answer for each of the following statements.

(a) $7{\cdot}2\ m^3$ is equal to

$720\ cm^3$
$72\,000\ cm^3$
$7{\cdot}2 \times 10^5\ cm^3$
$7{\cdot}2 \times 10^3\ cm^3$
$7{\cdot}2 \times 10^6\ cm^3$

[1 mark]

continued on the next page . . .

Question 17 continued

17. (b) $36^{\frac{1}{2}}$ **is equal to**

18	**6**	$\frac{1}{18}$	$\frac{1}{6}$	$\frac{1}{36}$

_____

_____

[1 mark]

18. Find the value of $\dfrac{30\,000}{1{\cdot}5 \times 10^5}$

Write your answer as a decimal.

[2 marks]

END OF PAPER

TOTAL 70 MARKS

Question number	Additional pages, if required. Write the question number(s) in the left - hand margin.

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MATHEMATICS

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INTERMEDIATE TIER

The Diagram Booklet MUST be handed in to the invigilators and sent for marking.

Diagram Booklet

Surname: _____

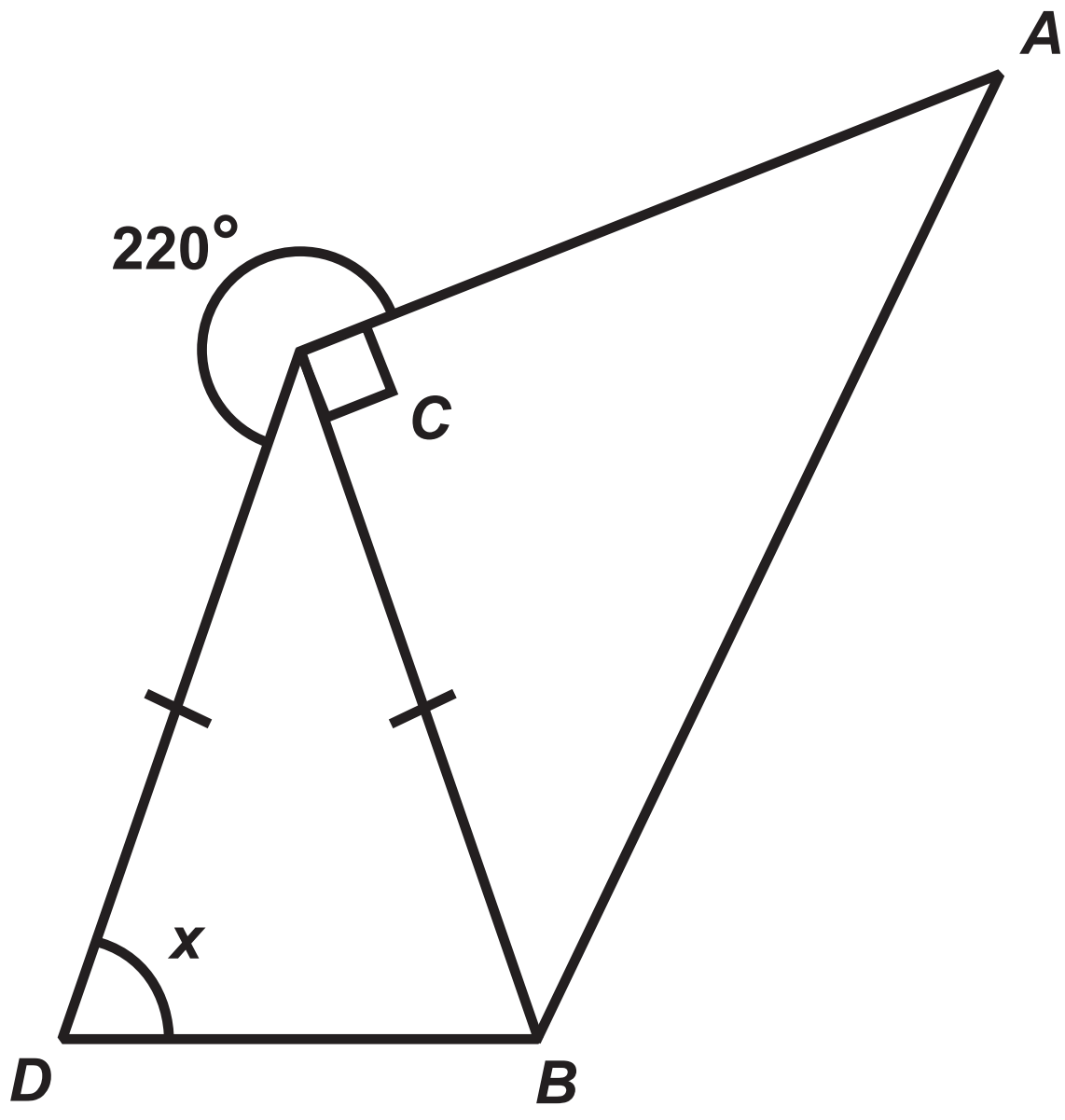
First name(s): _____

Centre Number: _____

Candidate Number: 0 _____

Question 3

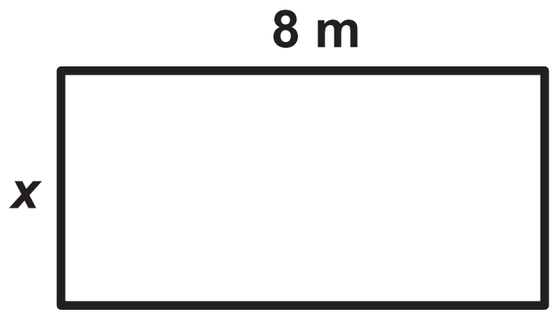
Diagram NOT drawn to scale



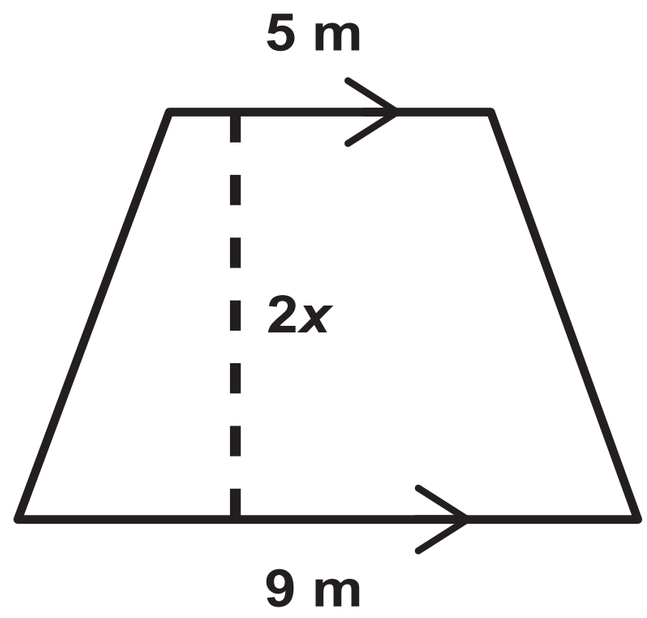
Question 8

Diagrams NOT drawn to scale

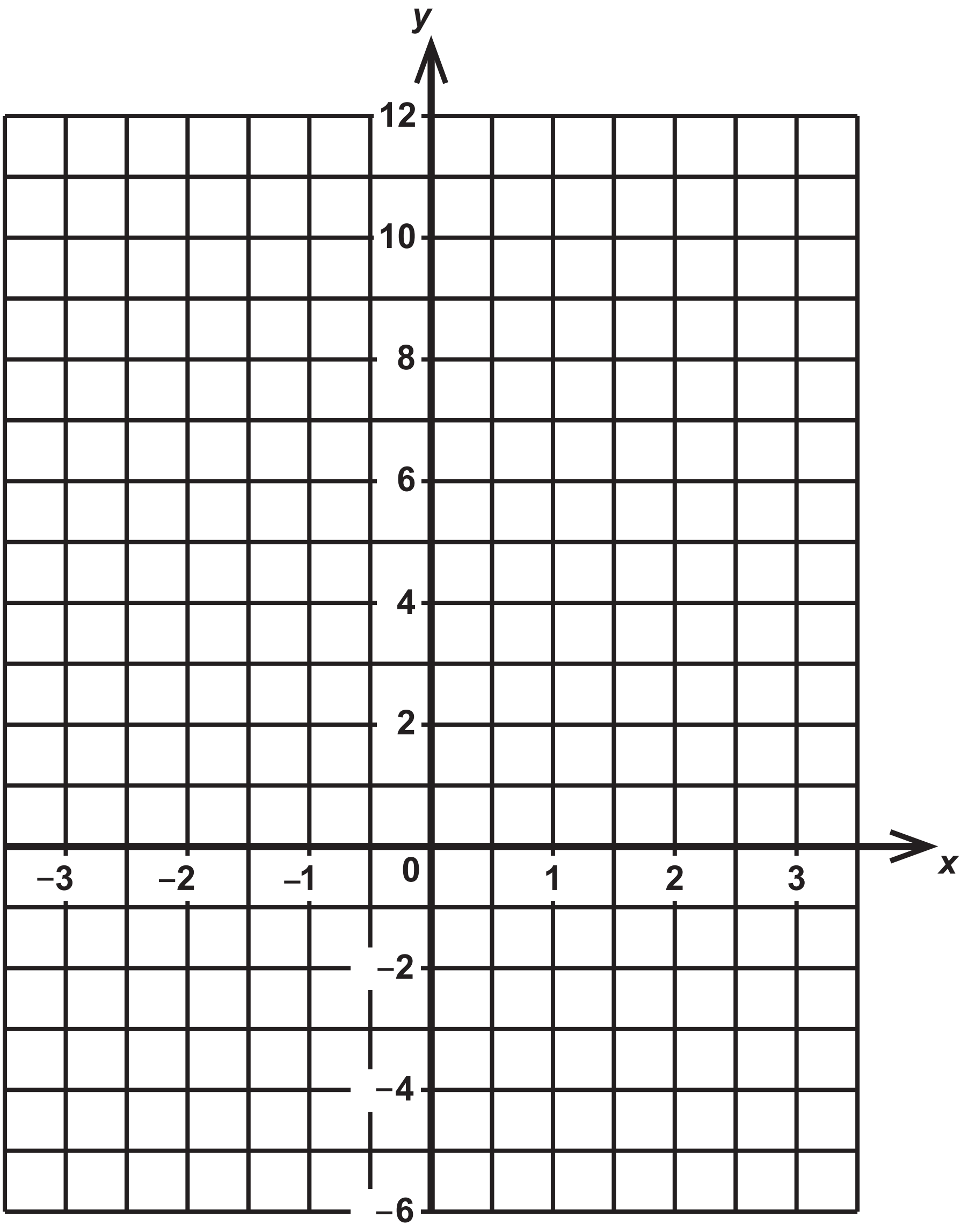
Rectangle



Trapezium



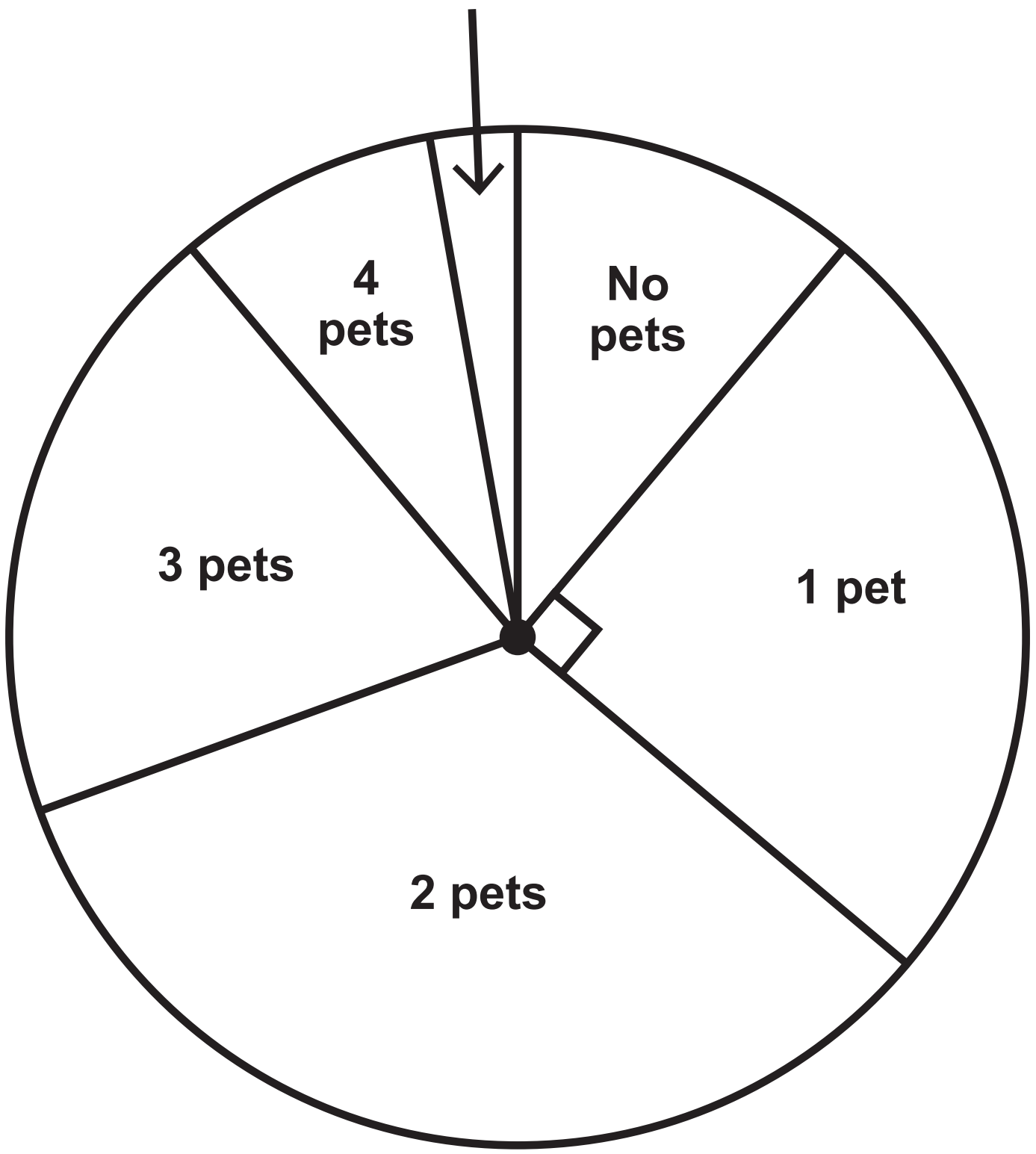
Question 11 (b)



Question 12

Diagram 1

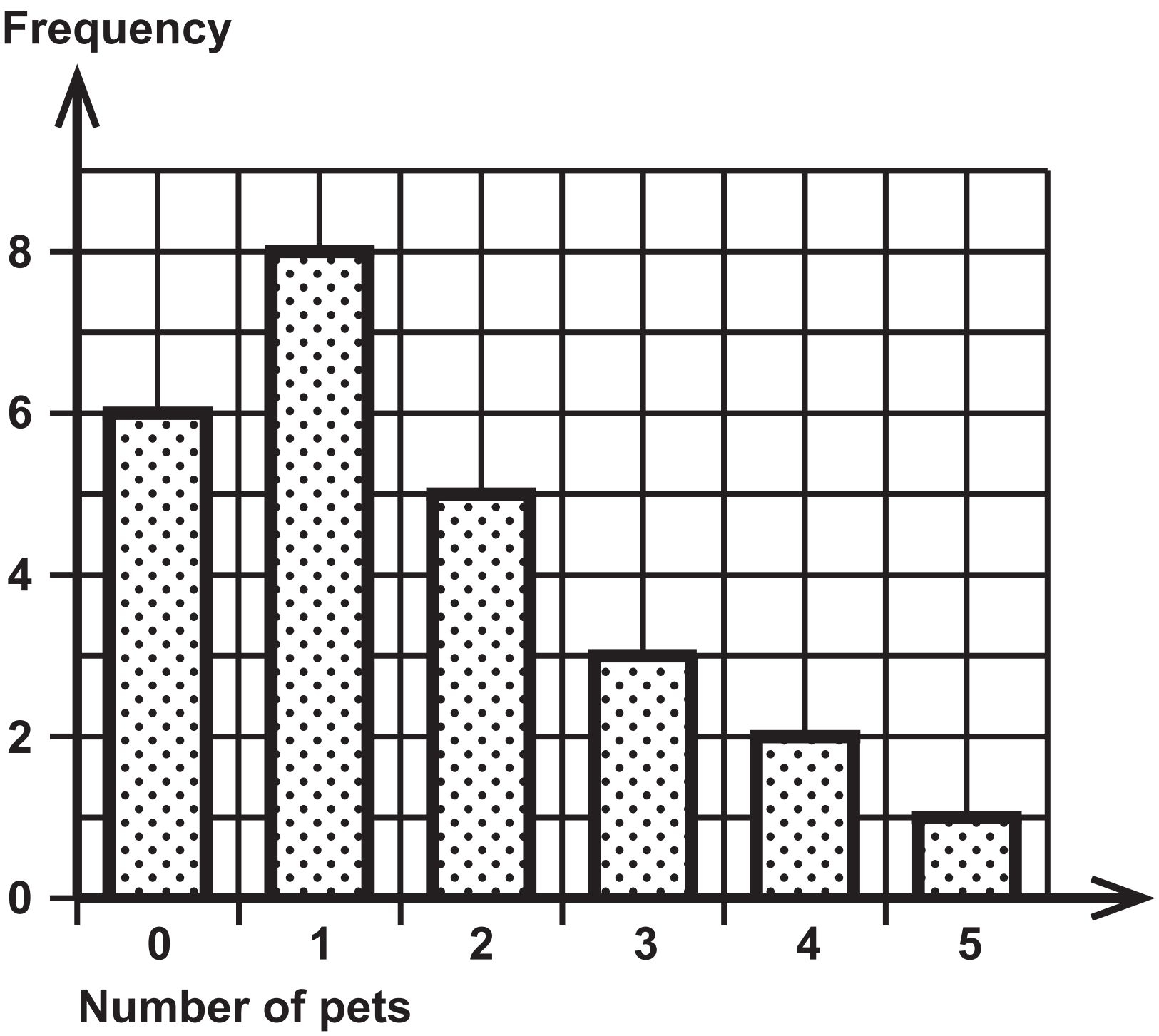
YEAR 5



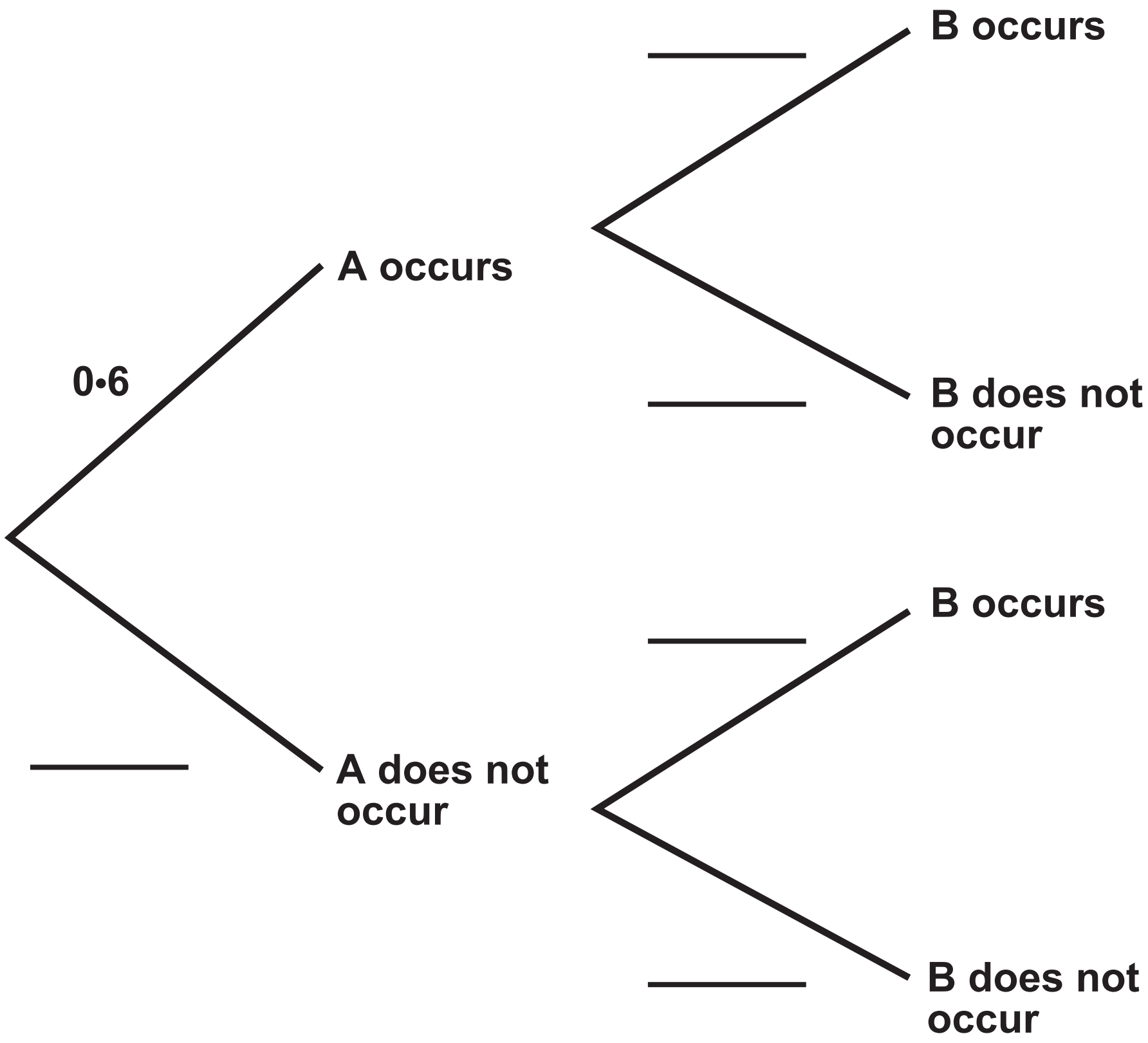
Question 12

Diagram 2

YEAR 6

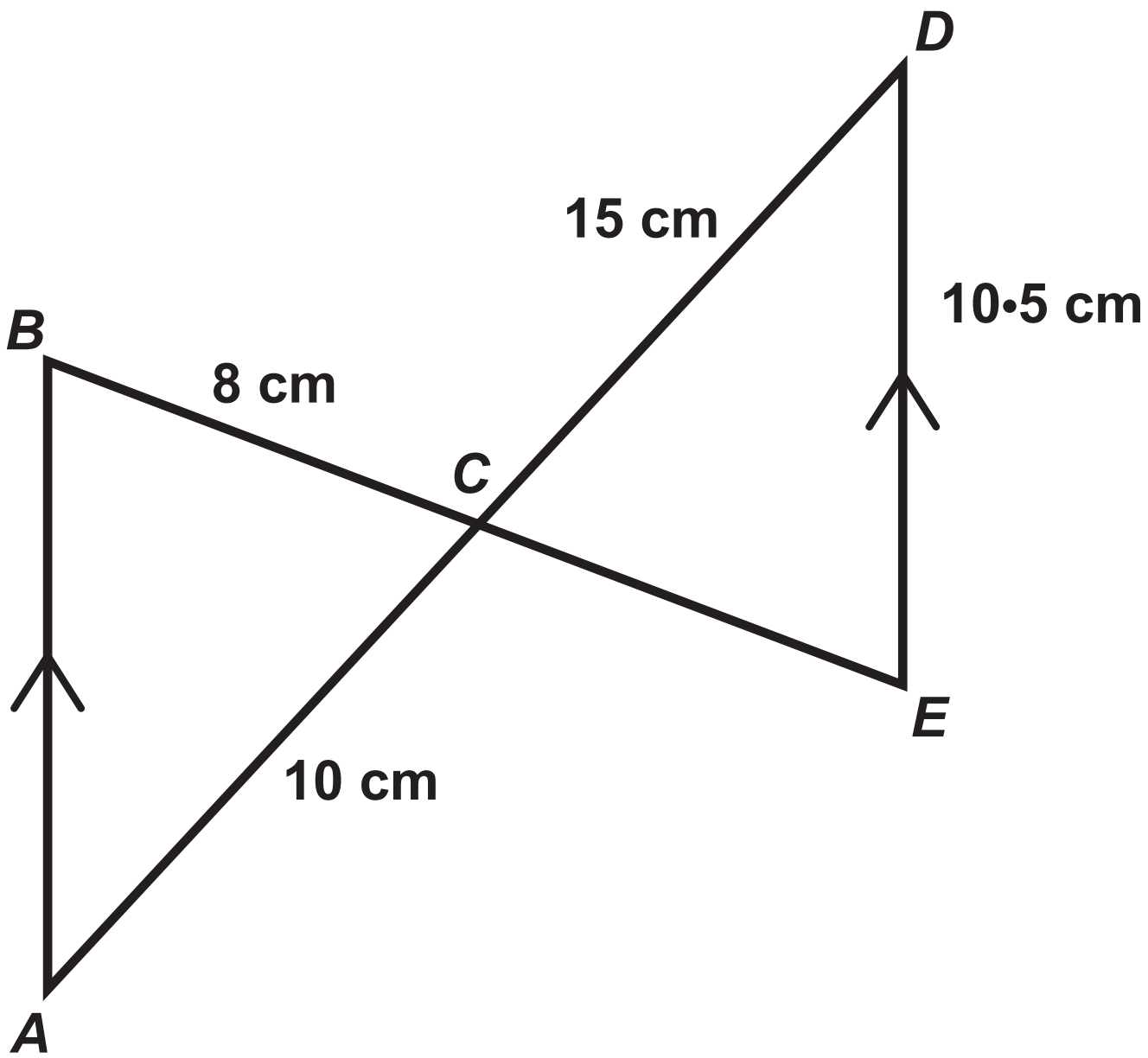


Question 14


A occurs
0·6
B occurs
B does not occur
A does not occur
B occurs
B does not occur

Question 15

Diagram NOT drawn to scale



GCSE
MATHEMATICS
and
NUMERACY

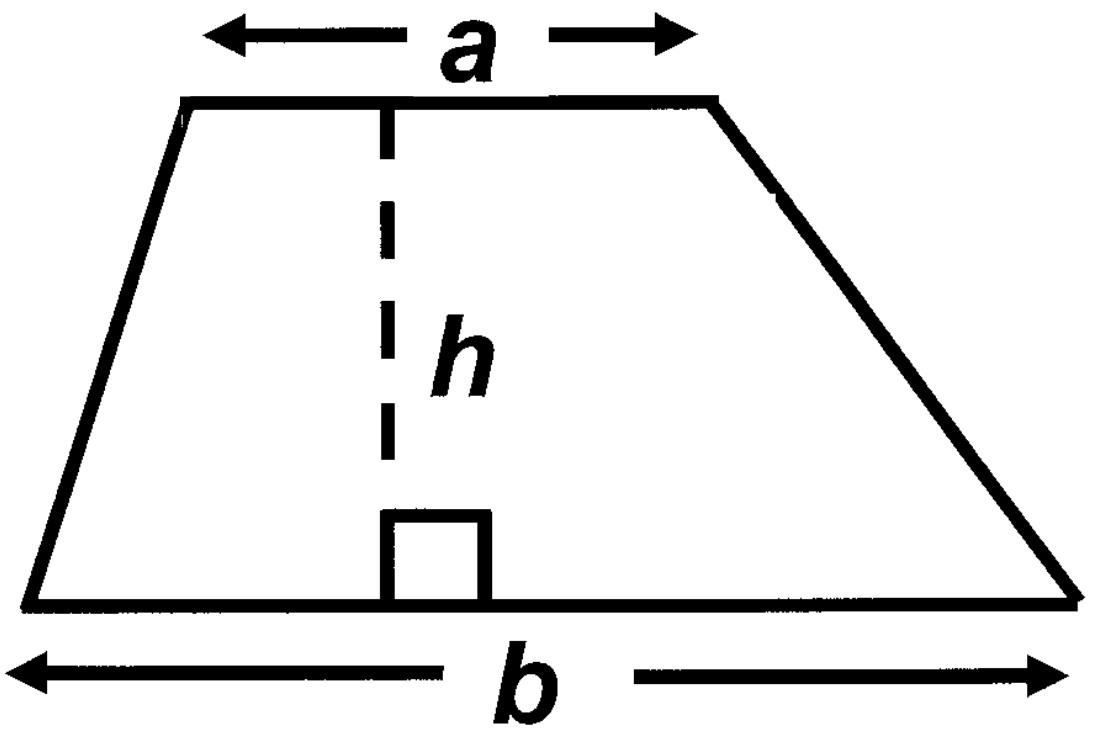
FORMULA LIST
INTERMEDIATE TIER
GCSE

You must not write on these formula pages.

Anything you write on these formula pages will gain NO credit.

Formula List – Intermediate Tier

Area of trapezium $= \frac{1}{2}(a + b)h$



Volume of prism =

area of cross – section × length