GCSE

3300U30-1

MATHEMATICS

UNIT 1: NON – CALCULATOR

INTERMEDIATE TIER

TUESDAY,

21 MAY 2019 – MORNING

1 hour 45 minutes

(plus your additional

time allowance)

THE USE OF A CALCULATOR IS NOT PERMITTED IN THIS EXAMINATION

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1.	3	
2.	5	
3.	3	
4.	5	
5.	3	
6.	4	
7.	6	
8.	6	
9.	4	
10.	5	
11.	4	
12.	4	
13.	4	
14.	3	
15.	6	
16.	5	
17.	4	
18.	6	
Total	80	

Surname:	
Other Names:	
Centre Number:	
Candidate Number:	0

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.

A spare Diagram Booklet.

Cut out shapes for Question 3 (a), Question 3 (b) and Question 3 (c).

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 continuation pages at the back of the booklet.
Question numbers must be given for all work written on the continuation page(s).

Take π as $3{\cdot}14$

(Turn over)

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.

(Turn over)

1. Look at the table for Question 1 in the separate Diagram Booklet.

   Circle either TRUE or FALSE for each calculation given in the table.

SPACE FOR WORKING:

[3 marks]

2. **Look at the list provided for Question 2 in the separate Diagram Booklet.**

Twenty – five balls have numbers printed on them.

Some of the balls are coloured yellow (Y), the others are coloured blue (B).

The list shows both the colour of each ball and the number printed on it.

(a) Complete the frequency table for Question 2 (a) in the separate Diagram Booklet.

[2 marks]

continued on the next page . . .

Question 2 continued

2. (b) How can you use your table to check that all the balls have been counted?

_____

_____

_____

_____

_____

[1 mark]

continued on the next page . . .

Question 2 continued

2. (c) The 25 balls are placed in a box.

One ball is chosen at random.

What is the probability that it is a yellow ball numbered less than 100?

[2 marks]

3. (a) Look at the diagram for Question 3 (a) in the separate Diagram Booklet.

Shade ONE SQUARE so that the diagram has rotational symmetry of order 2

A cut out square is available for this question.

[1 mark]

(b) Look at the diagram for Question 3 (b) in the separate Diagram Booklet.

Shade TWO SQUARES so that the diagram has rotational symmetry of order 4

Cut out squares are available for this question.

[1 mark]

continued on the next page . . .

Question 3 continued

3. (c) Look at the diagram for Question 3 (c) in the separate Diagram Booklet.

Shade TWO SQUARES so that the diagram has rotational symmetry of order 3

Cut out squares are available for this question.

[1 mark]

4. (a) Write down the next two numbers in the following sequence.

$-19 \quad -15 \quad -11 \quad -7 \quad _____ \quad _____$

[2 marks]

(b) Look at the diagram for Question 4 (b) in the separate Diagram Booklet.

Rods are used to make a sequence of patterns as shown in the diagram.

Pattern 1 uses six rods.

(i) How many rods are required to draw Pattern 4?

[1 mark]

Question 4 continued

4. (b) (ii) Pattern 37 requires 186 rods.

How many rods are required to draw Pattern 38?

_____

_____

[1 mark]

(c) Describe in words the rule used in the following sequence.

243 81 27 9 ……..

_____

_____

_____

[1 mark]

5. **In this question, you must use only the numbers 3 and 7 to make other numbers. You must only add or subtract.**

For example, if we wanted an answer of 11 we could write

$$7 + 7 - 3 = 11$$

Show how you can get each of the following answers.

(a) **2**

_____

_____

_____

_____

_____

Write your solution in the box below.

= 2

[1 mark]

(Turn over)

Question 5 continued

Remember: You must use only the numbers 3 and 7 to make other numbers.

You must only add or subtract.

5. (b) 8

Write your solution in the box below.

= 8

[1 mark]

continued on the next page . . .

Question 5 continued

Remember: You must use only the numbers 3 and 7 to make other numbers.

You must only add or subtract.

5. (c) 19

Write your solution in the box below.

= 19

[1 mark]

6. A Venn diagram is used to show the following information:

- The Universal set, ε, is the set of numbers from 10 to 20 inclusive.
- Set A = {11, 13, 14, 18, 20}
- Set B = {multiples of 3}

On the blank page provided for Question 6 in the separate Diagram Booklet, draw the Venn diagram that shows the above information.

[4 marks]

7. **(a)** **Factorise** $10g - 15$

[1 mark]

(b) **Solve the following equations.**

(i) $\frac{x}{7} = 21$

[1 mark]

continued on the next page . . .

Question 7 continued

7. (b) (ii) $13f + 2 = 6f + 5$

[3 marks]

continued on the next page . . .

Question 7 continued

7. (c) ***n*** **is an integer.**

Tick (✓) the correct statement below.

You must give an explanation for your decision.

	Tick (✓)
$5n - 3$ is always an even number.	
$5n - 3$ is always an odd number.	
$5n - 3$ can be an even number or an odd number.	

Explanation _____

_____

_____

_____

_____

[1 mark]

(Turn over)

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

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

In the diagram, *ABCE* is a square and *CDE* is a right – angled triangle.
The length of *DE* is 4 cm and the area of triangle *CDE* is 14 cm^2

Calculate the area of the WHOLE SHAPE *ABCDE*.
You must show all your working.

[4 marks + 2 marks OCW]

9. **Look at the diagram for Question 9 in the separate Diagram Booklet.**
The diagram is NOT drawn to scale.

ABCD **is a rectangle.**

AB **is parallel to** ***EF*****.**

AC**,** ***CE*** **and** ***DG*** **are straight lines.**

Find the size of each of the angles marked ***w*****,** ***x*** **and** ***y*****.**

(Turn over)

w = _____ °

x = _____ °

y = _____ °

[4 marks]

10. (a) Express 315 as a product of its prime factors in index form.

[3 marks]

Question 10 continued

10. (b) What is the Highest Common Factor (HCF) of 315 and 42?

[2 marks]

(Turn over)

11. Complete the table below.

x	$y = 3x^2 - 27$
-3	0
-2	
-1	-24
0	-27
1	-24
2	-15
3	0
4	21

On the graph paper provided for Question 11 in the separate Diagram Booklet, draw the graph of $y = 3x^2 - 27$ for values of x between -3 and 4

You must choose a suitable scale for the y – axis.

(Turn over)

[4 marks]

12. **Look at the diagram for Question 12 in the separate Diagram Booklet.**
The diagram is NOT drawn to scale.

A REGULAR octagon with centre *O* is shown in the diagram.

CALCULATE the exact size of angle *OAB*.
You may choose to draw additional lines on the diagram to help you.
You must show all your working.

[4 marks]

13. **Look at the diagram for Question 13 in the separate Diagram Booklet.**

The diagram shows the line AB.

The point P is such that:

- **P lies on the perpendicular bisector of the line AB**
- **Angle $BAP = 30°$**

Using only a ruler and a pair of compasses, show one of the possible positions of P.

All construction lines and arcs must be shown.

[4 marks]

14. Estimate the value of

$$\frac{30{\bullet}21 \times 1{\bullet}98^3}{0{\bullet}49}$$

[3 marks]

15. **The Anglesey Show is a two – day event held every August.**

(a) **On the first day, a random sample of 2000 visitors at the show were asked:**

Do you live on Anglesey?

640 of them answered 'Yes'.

What was the relative frequency of those who answered 'Yes'?

Give your answer as a decimal.

_____

_____

_____

_____

_____

[1 mark]

continued on the next page . . .

Question 15 continued

15. (b) On the second day a random sample of **3000** visitors at the show were asked the same question.
The relative frequency of those who answered **'Yes'** on this day was **0•42**

Calculate the relative frequency of those who said they lived on Anglesey when the samples for BOTH days were combined.
Give your answer as a decimal.

[4 marks]

(Turn over)

Question 15 continued

15. (c) Which of the following is most likely to give the best estimate for the relative frequency of visitors to the show living on Anglesey?

Circle your answer.

Your answer to part (a)	0•42	Your answer to part (b)

You MUST give an explanation for your choice.

_____

_____

_____

[1 mark]

16. (a) (i) A mass is written as **430 kg**, correct to the nearest **10 kg**.
Circle the LEAST possible value of this mass.

420 kg	425 kg	429•5 kg	426 kg	424•9 kg

[1 mark]

(ii) A time period is written as **22** seconds, correct to the nearest second.
Circle the LEAST possible value of this time period.

22 seconds	20 seconds	21 seconds
21•5 seconds	21•4 seconds	

[1 mark]

continued on the next page . . .

Question 16 (a) continued

16. (a) (iii) A population is written as 85 people, correct to the nearest five people. Circle the LEAST possible value of this population.

83 people
81 people
84 people
82 people
80 people

[1 mark]

continued on the next page . . .

Question 16 continued

16. (b) Calculate $(3{\bullet}4 \times 10^{-5}) \times 700$

Give your answer in standard form.

[2 marks]

17. **Arthur, Sian and Kezia are all given some £1 coins.**

Arthur receives £n.
Sian is given five times as much money as Arthur.
Kezia receives three times as much money as Arthur, plus an extra £7

Sian was given less money than Kezia.

(a) Write down an inequality in terms of n that illustrates the fact that Sian received less money than Kezia.

_____

_____

_____

_____

_____

[2 marks]

Question 17 continued

17. (b) What was the greatest amount of money that Arthur could have been given?

[2 marks]

18. **Leah is visiting Cardiff.**

The probability that she will go on a tour bus is 0•3

The probability of Leah seeing a show at the Millennium Centre is independent of her going on a tour bus.

The probability that she goes on a tour bus and sees a show at the Millennium Centre is 0•24

(a) **Look at the diagram for Question 18 (a) in the separate Diagram Booklet.**

The diagram is an incomplete tree diagram.

Complete the tree diagram.

[4 marks]

18. (b) Calculate the probability that Leah does not go on a tour bus and does not see a show at the Millennium Centre.

[2 marks]

END OF PAPER

TOTAL 80 MARKS

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

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GCSE

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MATHEMATICS

UNIT 1: NON – CALCULATOR

INTERMEDIATE TIER

TUESDAY, 21 MAY 2019 – MORNING

Diagram Booklet

Surname:	
Other Names:	
Centre Number:	
Candidate Number:	0

Question 1

Table

CALCULATION		
$23 - (4 + 2) \times 3 = 5$	TRUE	FALSE
$\frac{7}{10} + \frac{2}{5} = \frac{9}{15}$	TRUE	FALSE
$\frac{1}{2}$ of $\frac{1}{8} = \frac{1}{4}$	TRUE	FALSE
25% of 0•4 = 0•1	TRUE	FALSE
$28 - 3 \times 2 + 5 = 55$	TRUE	FALSE

Question 2

List

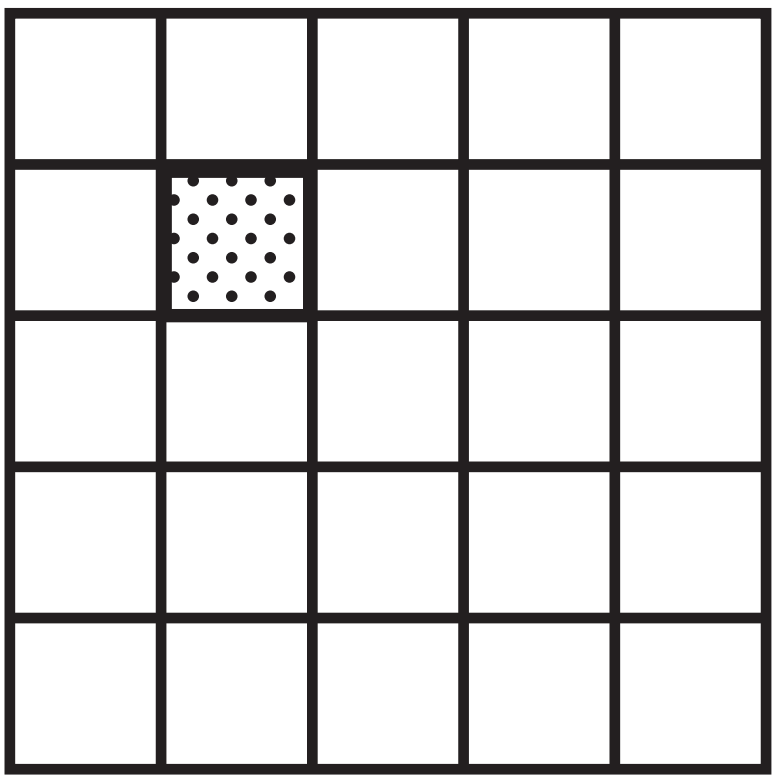
Y 76	Y 217	B 54	B 126	Y 21
Y 438	Y 32	B 561	B 194	Y 69
B 37	B 518	Y 94	Y 157	Y 208
Y 382	B 56	B 234	Y 72	B 84
Y 68	Y 271	Y 53	B 100	Y 321

Question 2 (a)

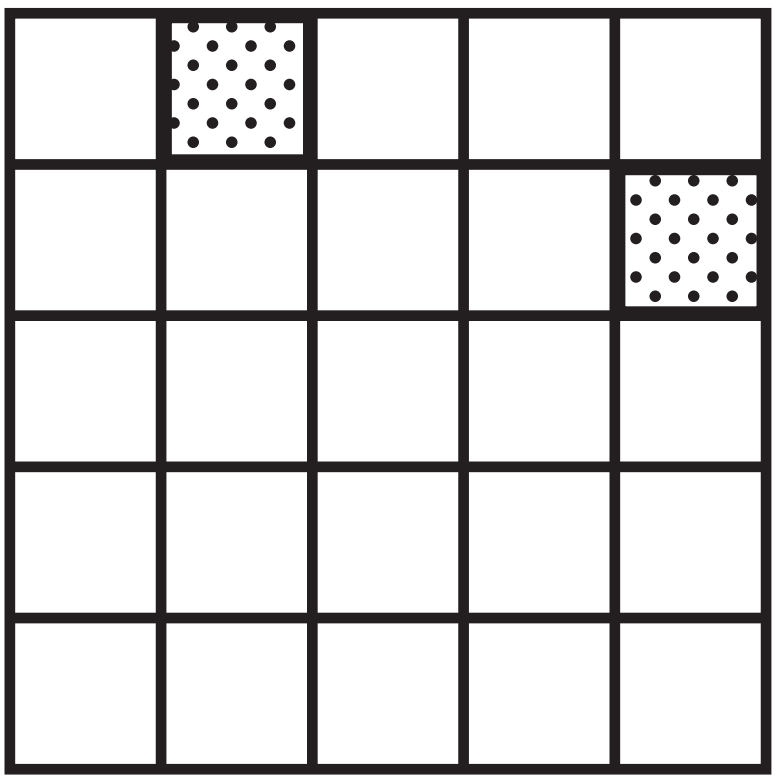
Frequency table

Type of ball	Yellow		Blue	
	Number < 100	Number ≥ 100	Number < 100	Number ≥ 100
Frequency	8			

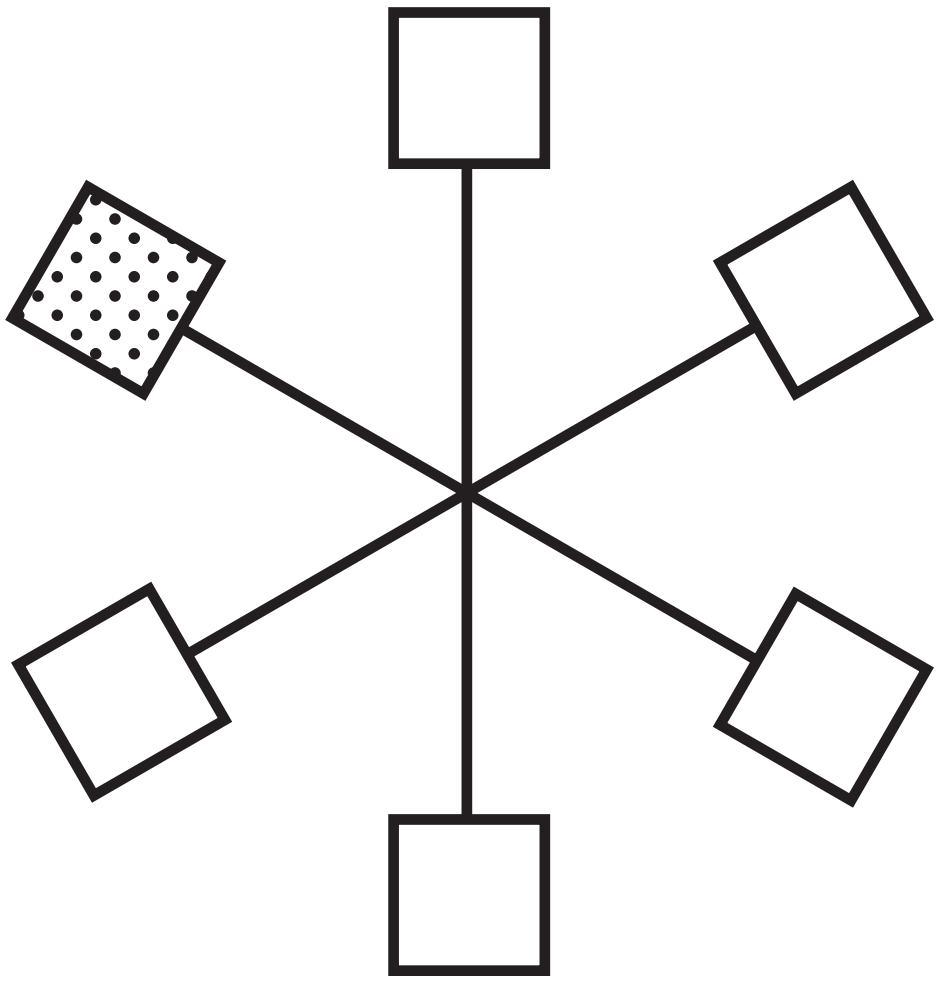
Question 3 (a)



Question 3 (b)



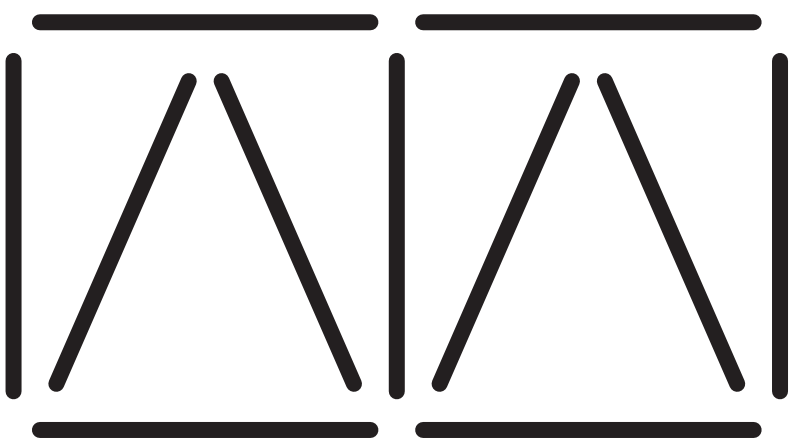
Question 3 (c)



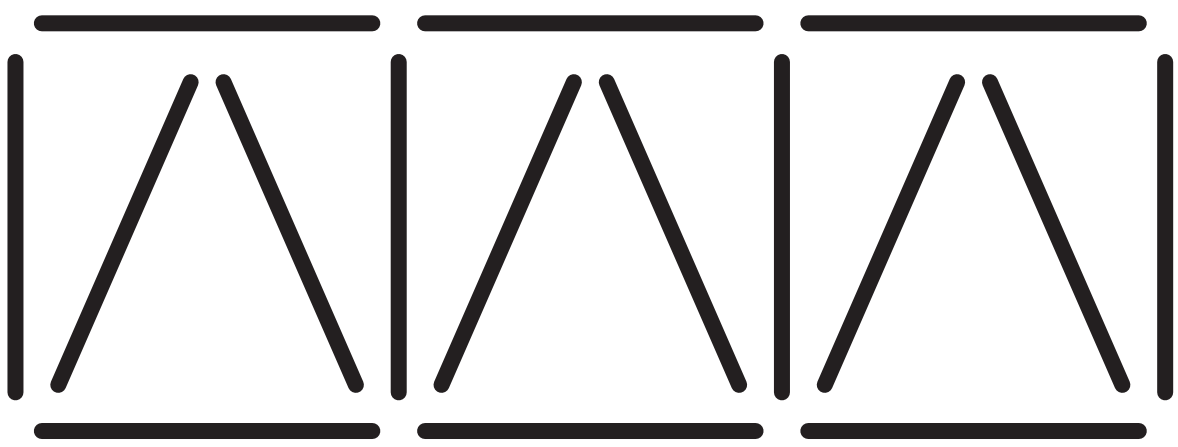
Question 4 (b)

Pattern 1

Pattern 2



Pattern 3

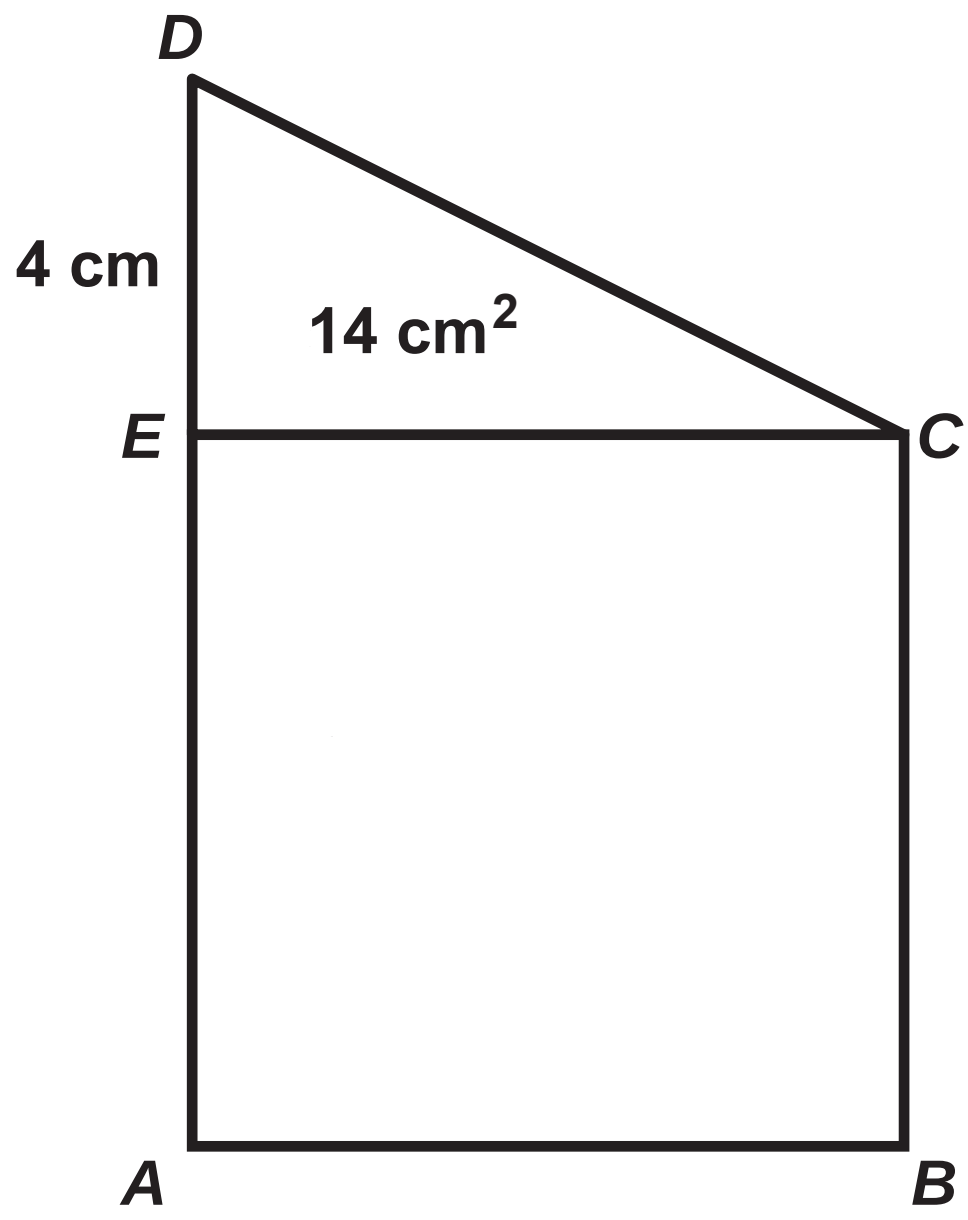


Question 6

Blank page to draw the Venn diagram

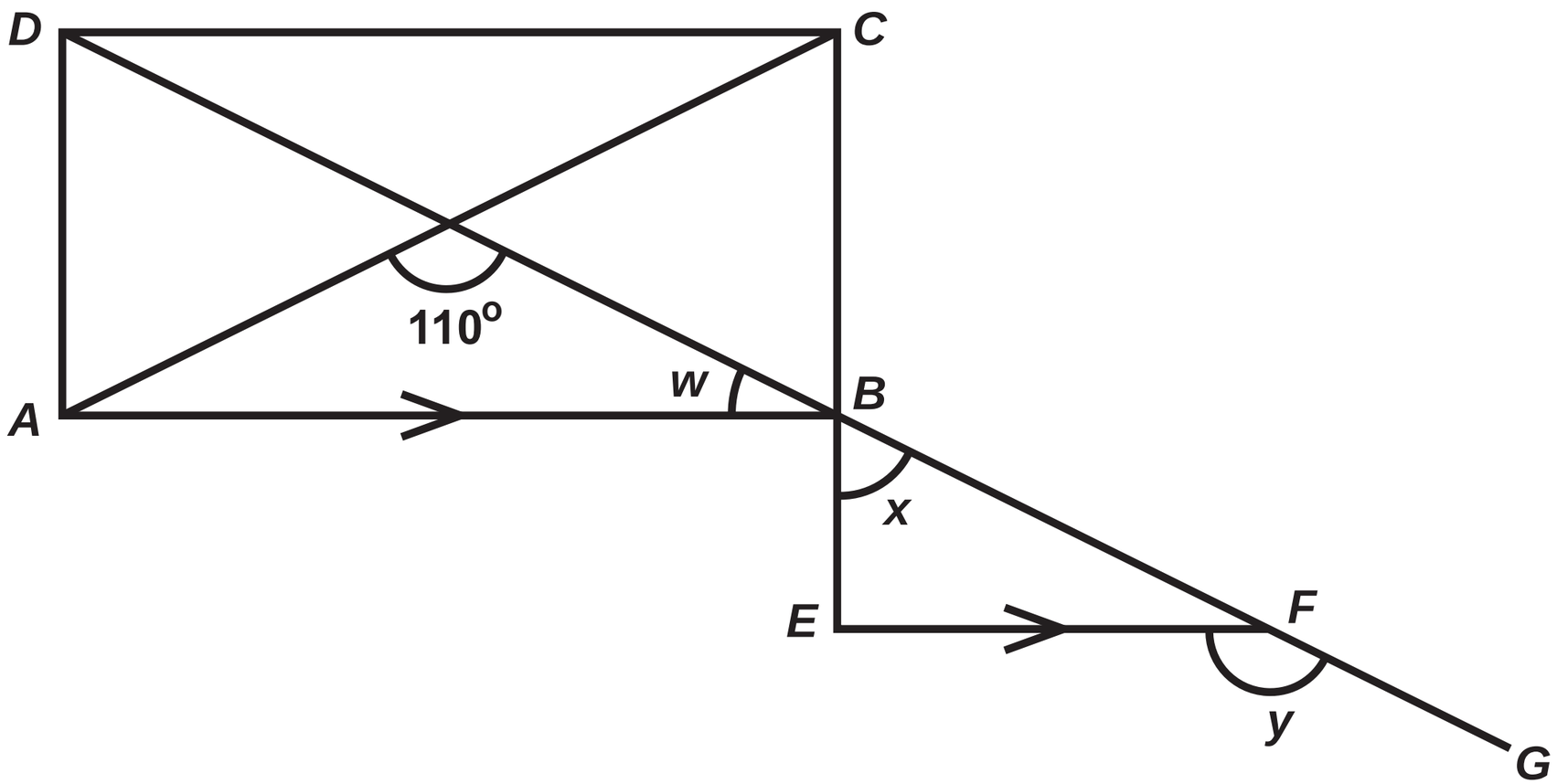
Question 8

Diagram NOT drawn to scale

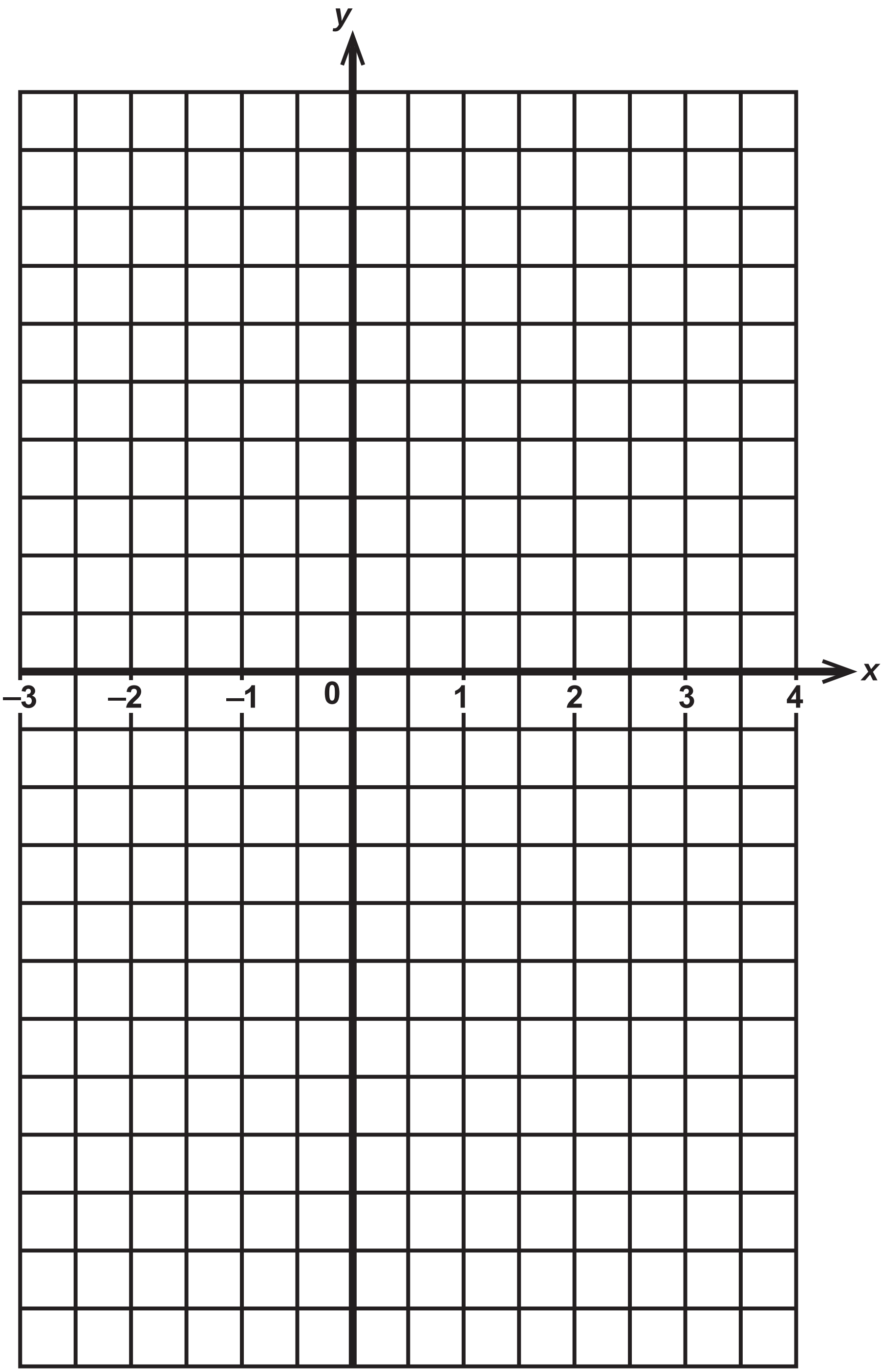


Question 9

Diagram NOT drawn to scale

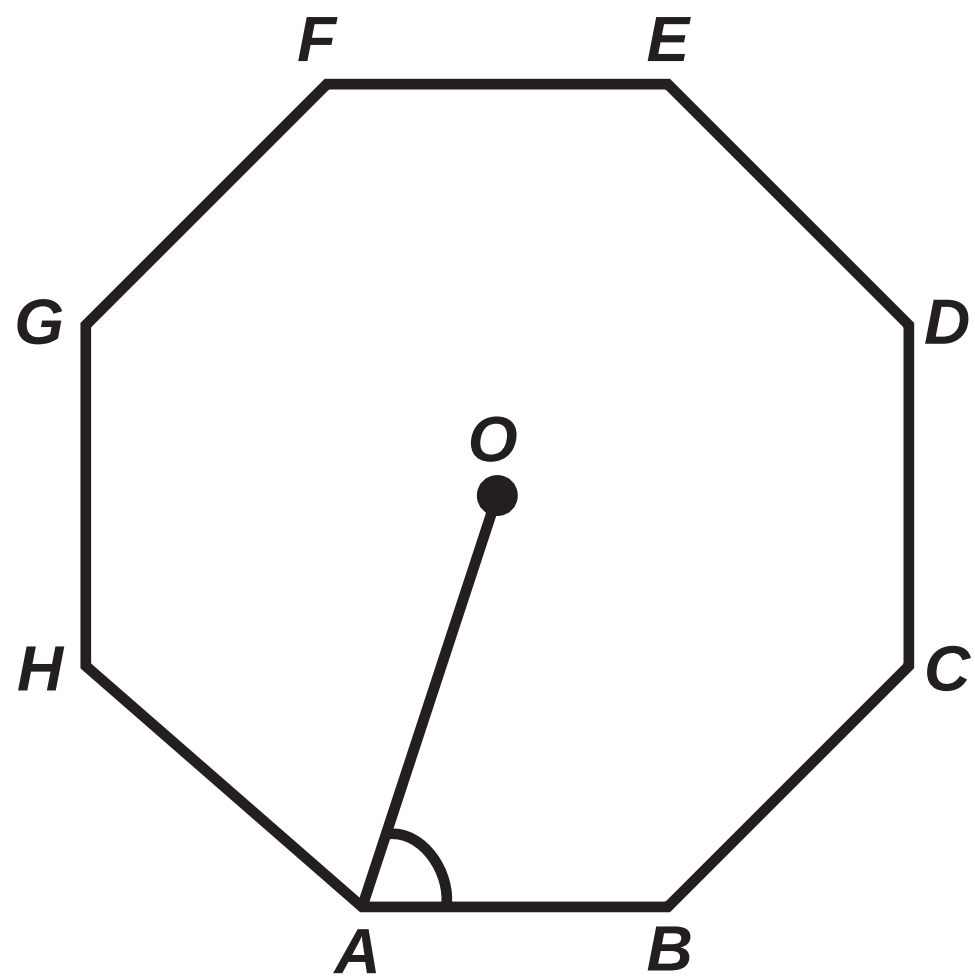


Question 11



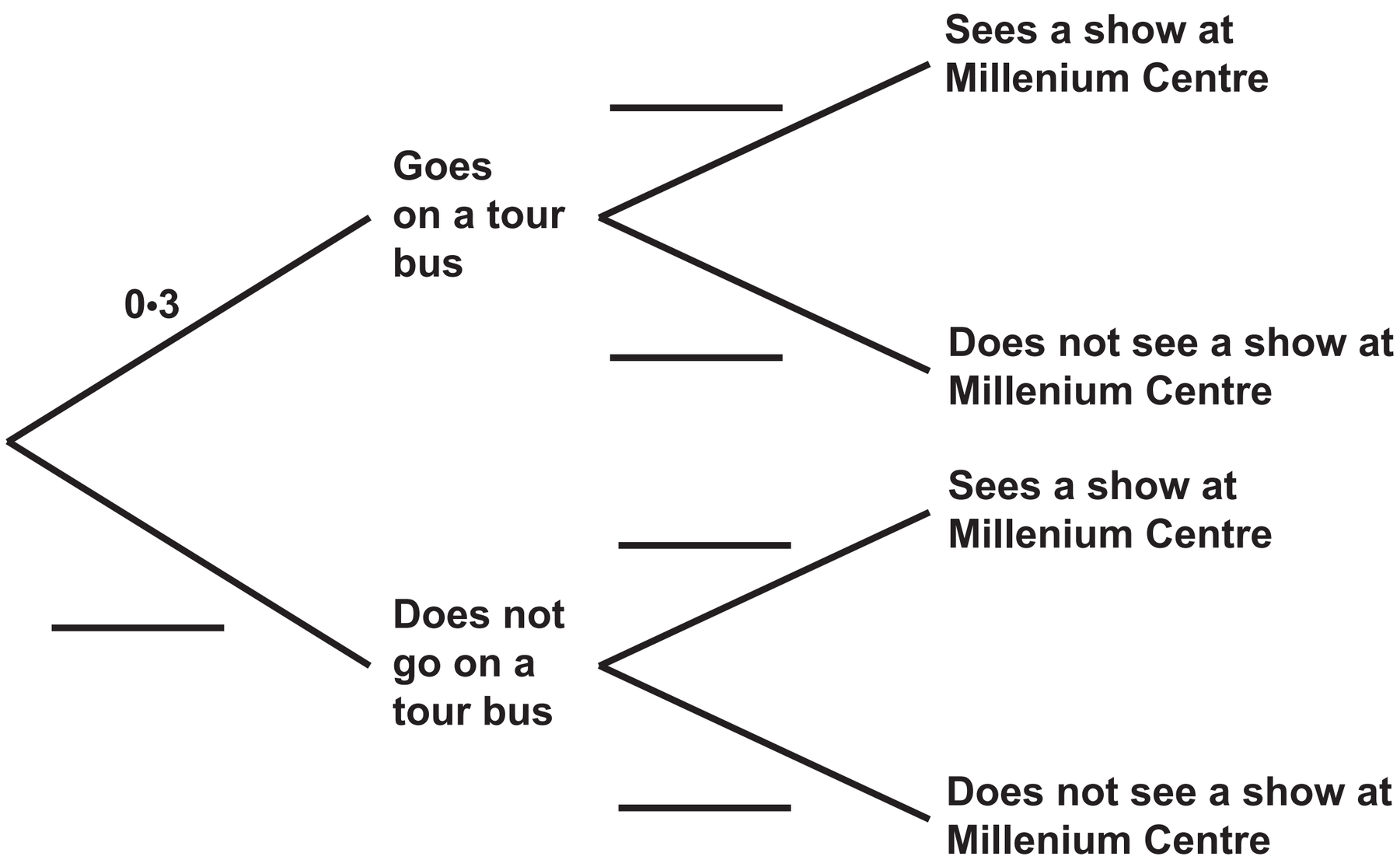
Question 12

Diagram NOT drawn to scale



Question 13

Question 18 (a)



GCSE

3300U30-1

MATHEMATICS

UNIT 1: NON – CALCULATOR

INTERMEDIATE TIER

TUESDAY, 21 MAY 2019 – MORNING

Spare Diagram Booklet

Surname:	
Other Names:	
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Question 1

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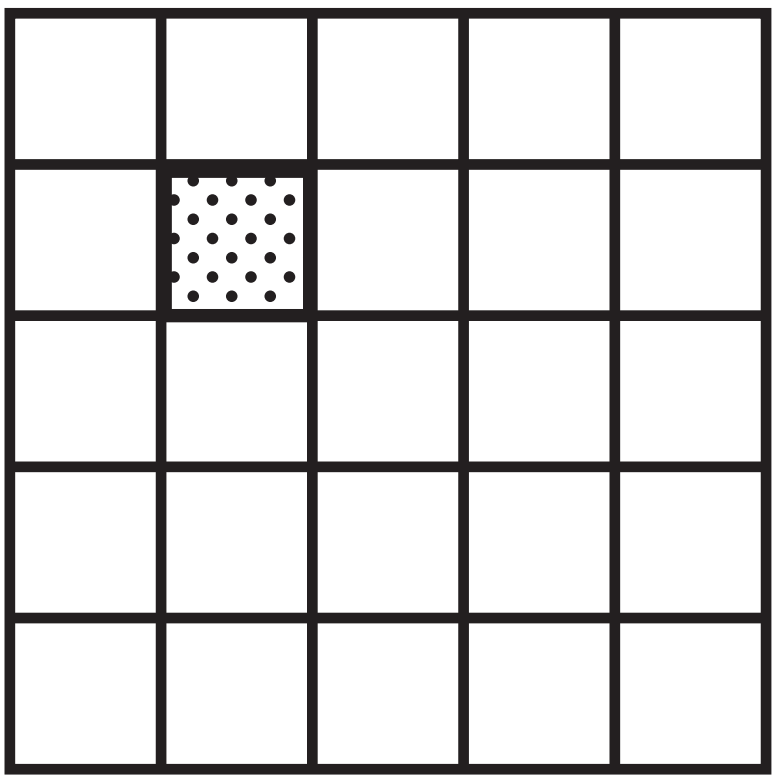
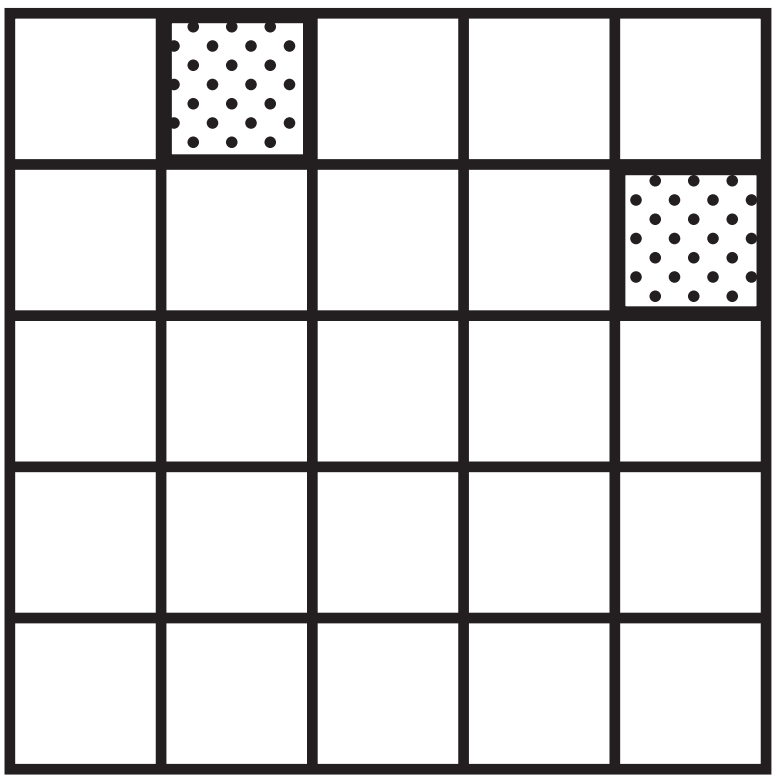
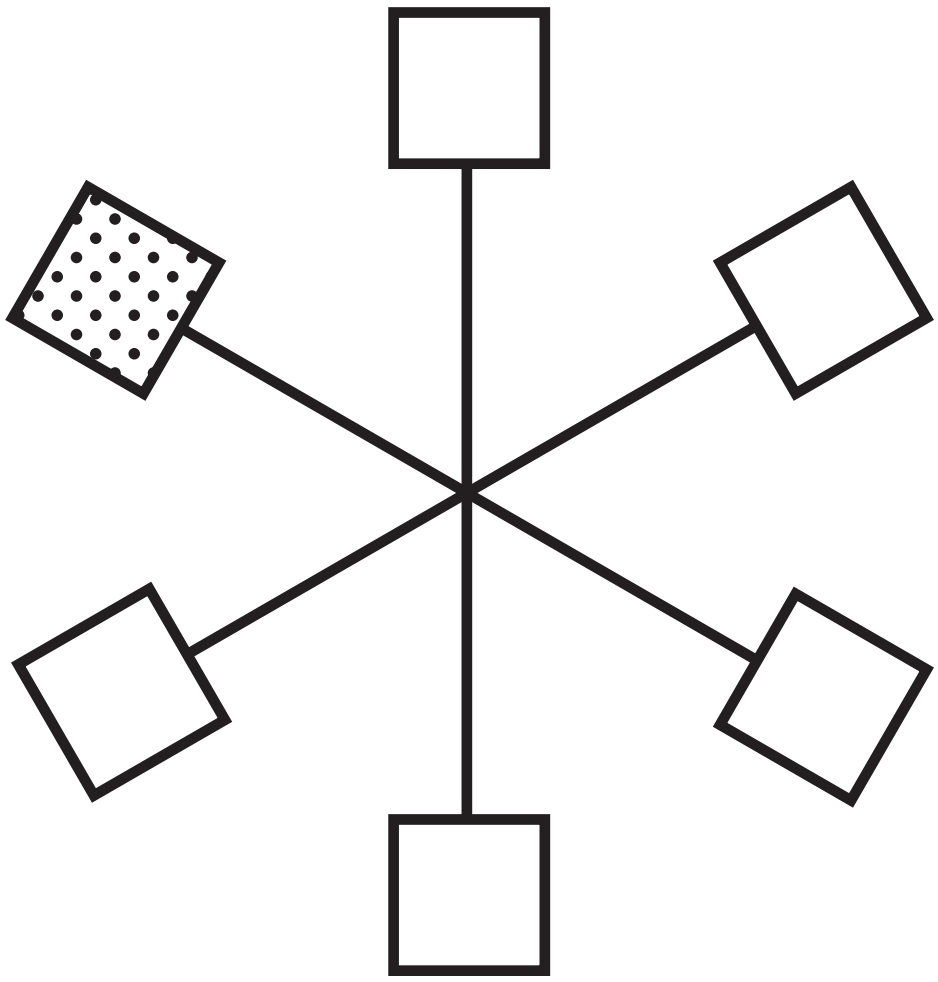


Question 3 (b)



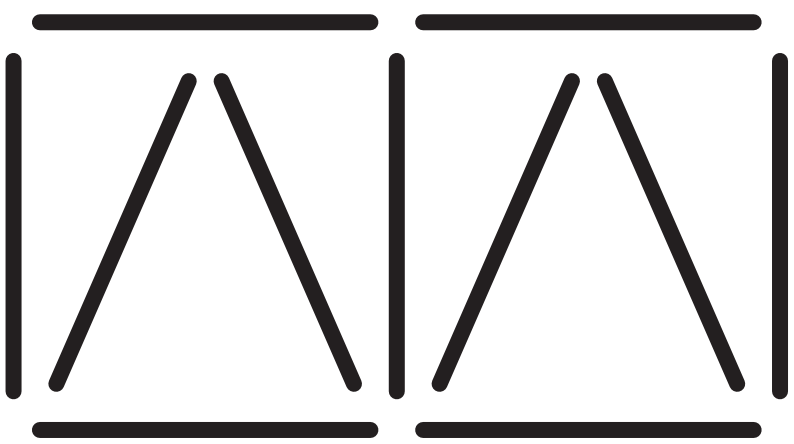
Question 3 (c)



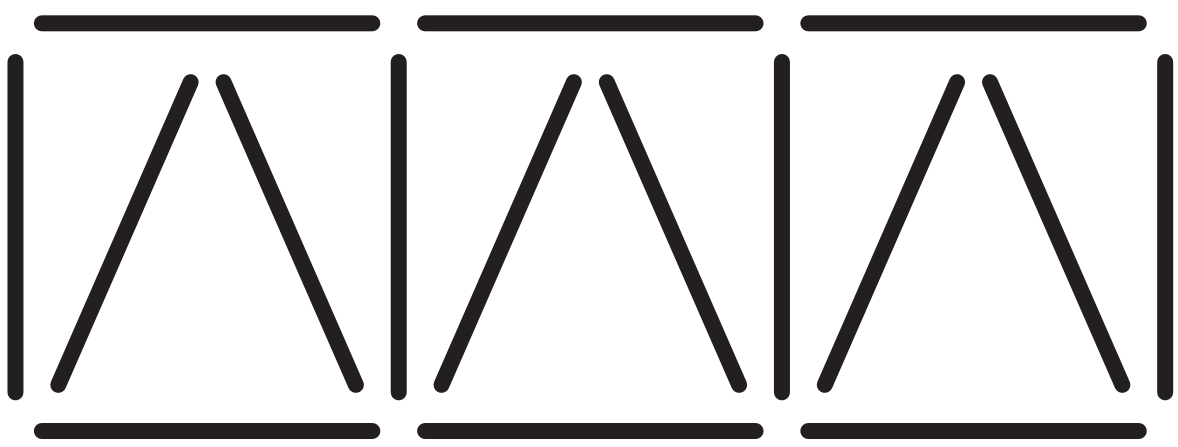
Question 4 (b)

Pattern 1

Pattern 2



Pattern 3

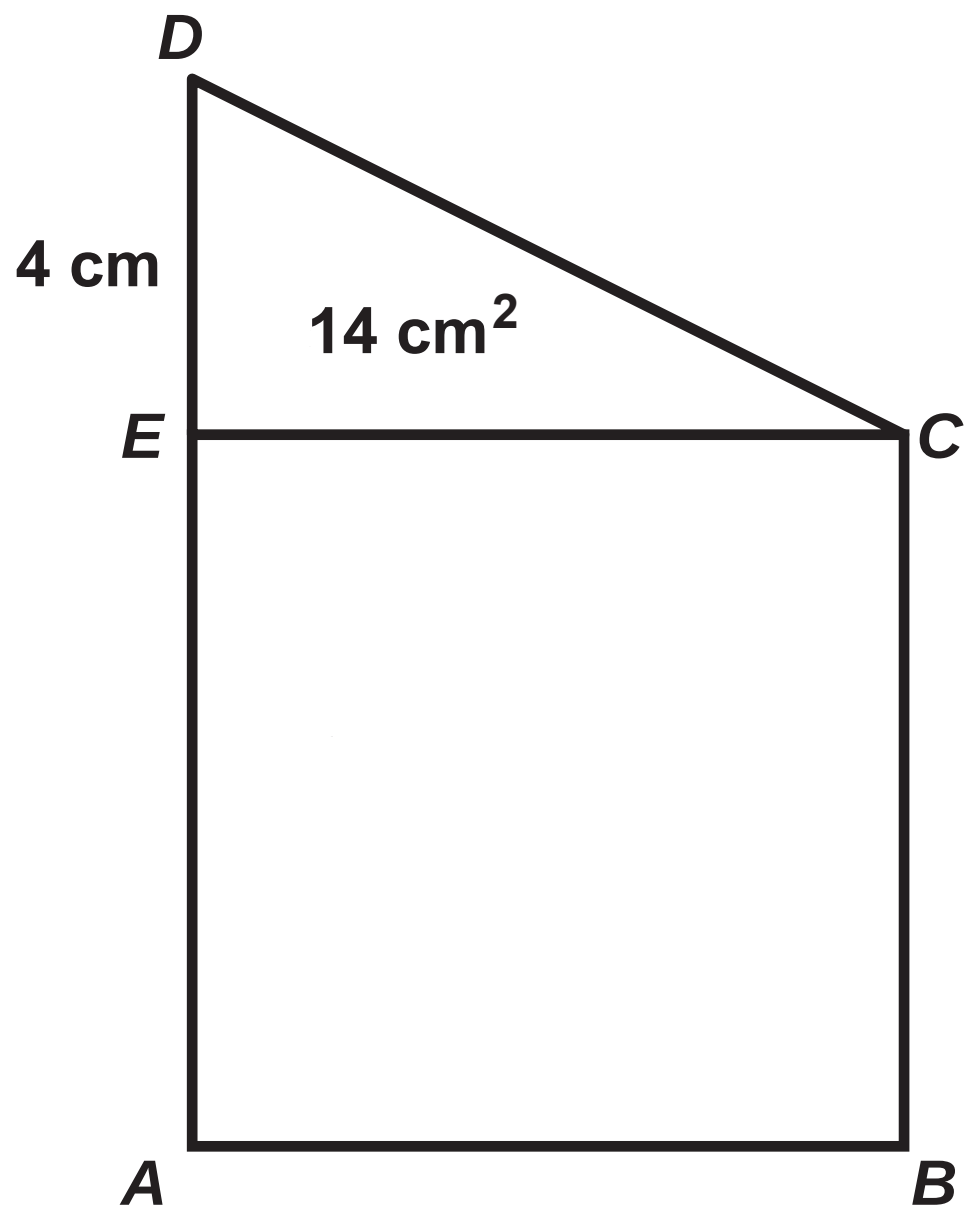


Question 6

Blank page to draw the Venn diagram

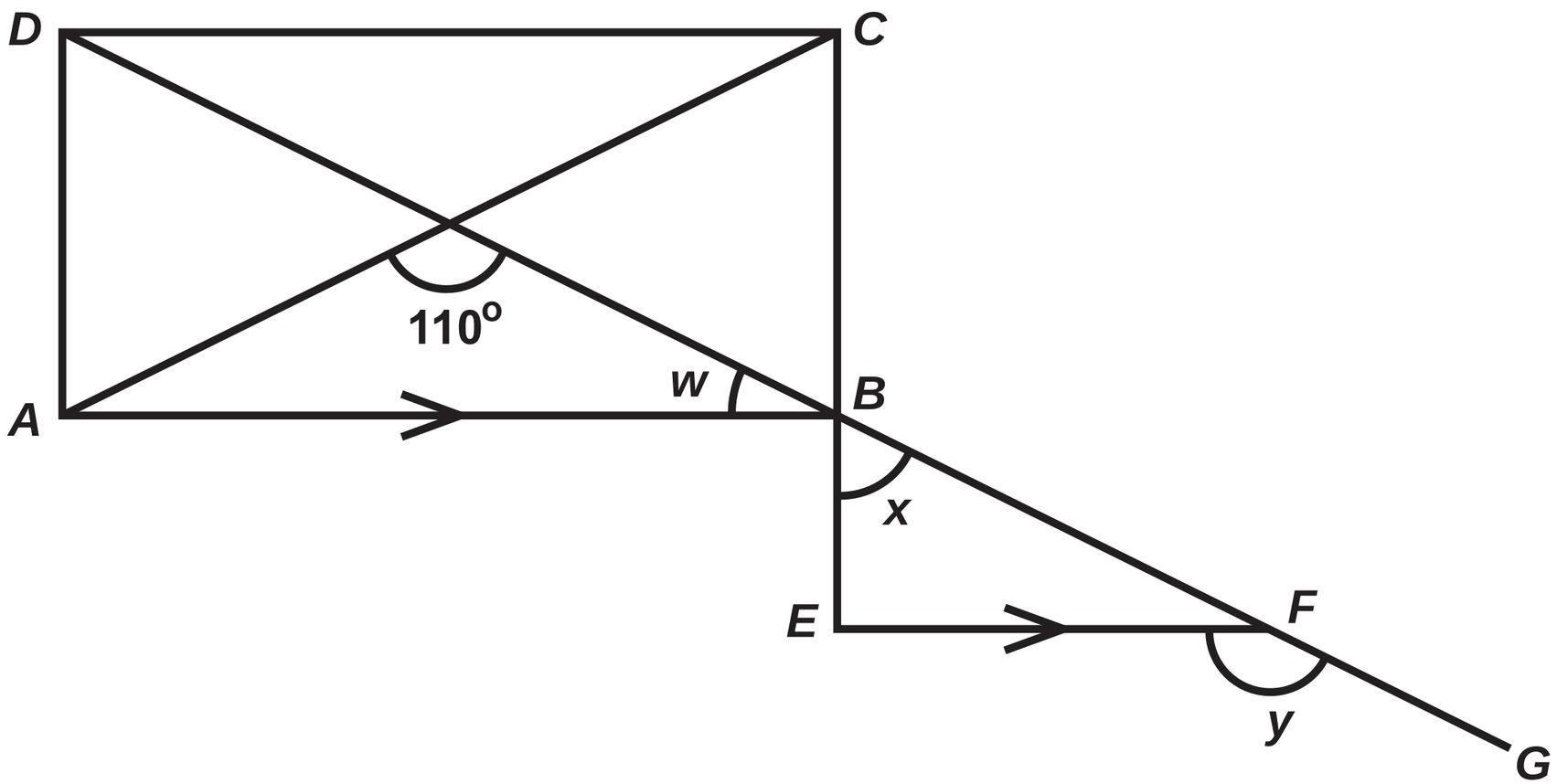
Question 8

Diagram NOT drawn to scale

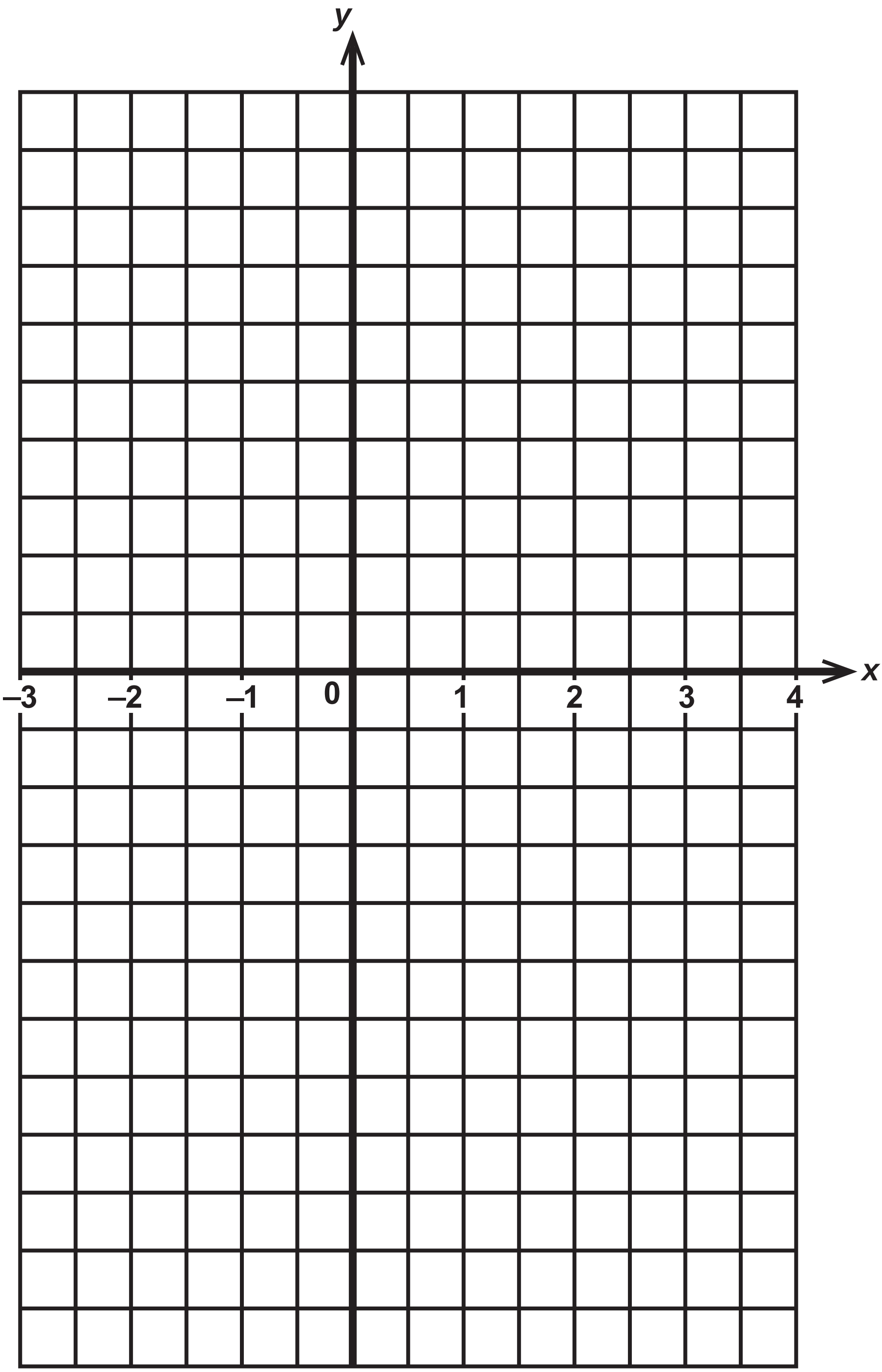


Question 9

Diagram NOT drawn to scale

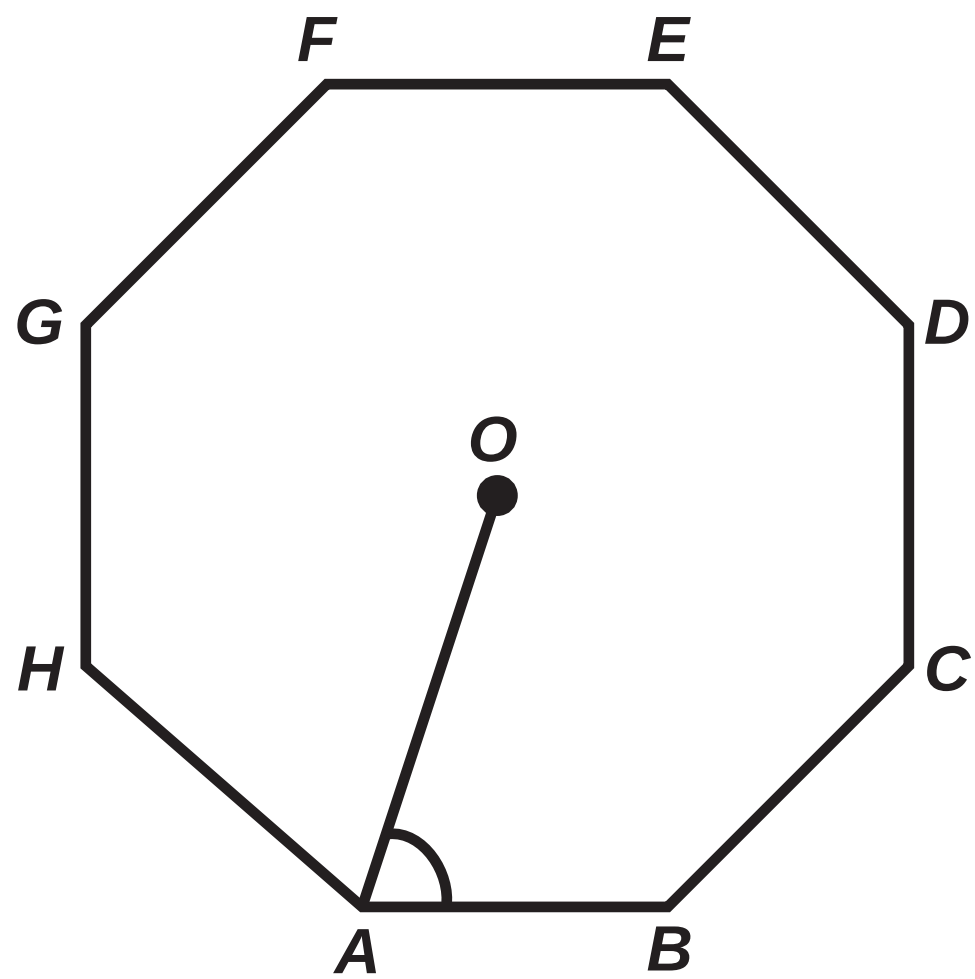


Question 11



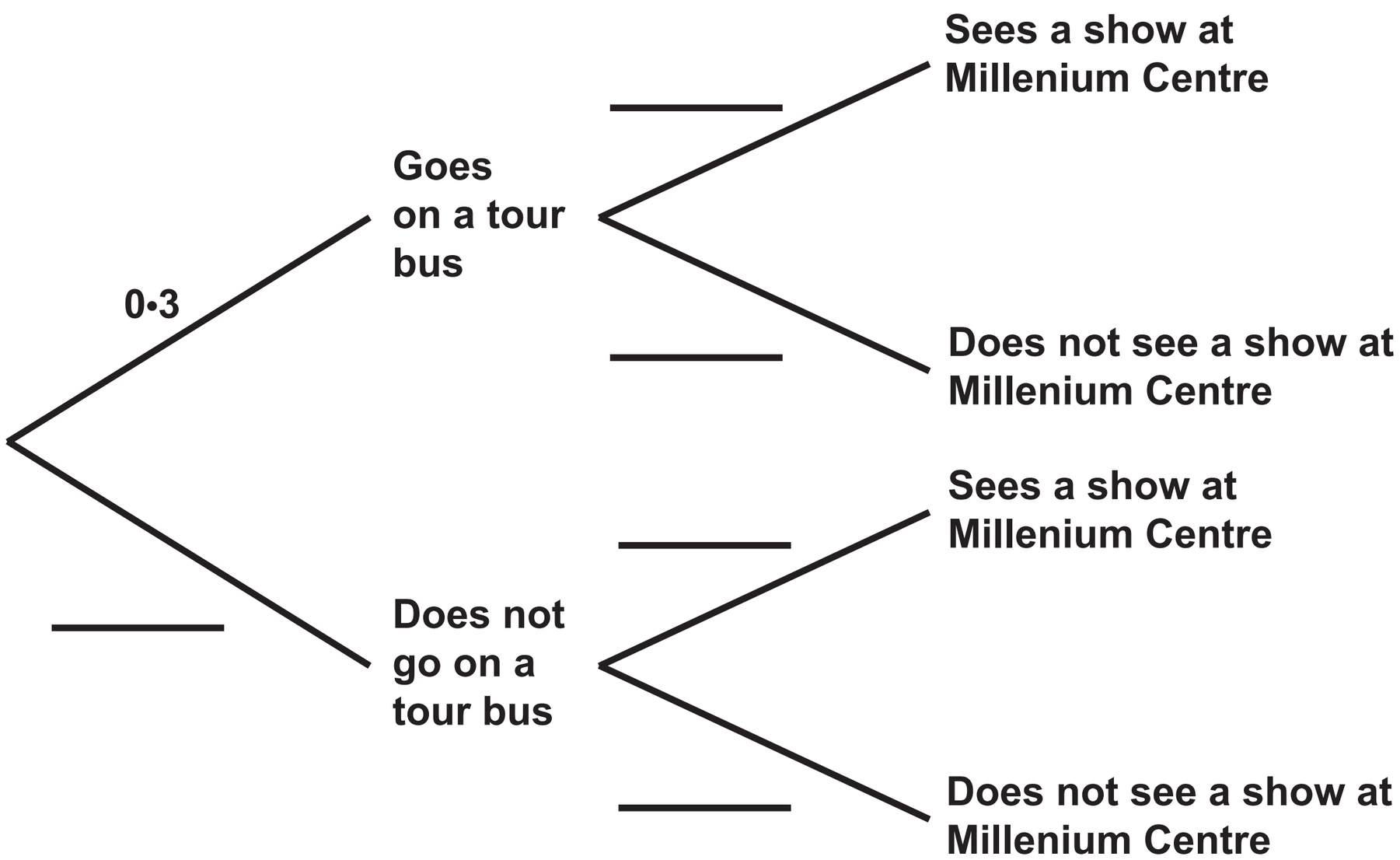
Question 12

Diagram NOT drawn to scale



Question 13

Question 18 (a)



GCSE
MATHEMATICS
and
NUMERACY

FORMULA LIST

INTERMEDIATE TIER

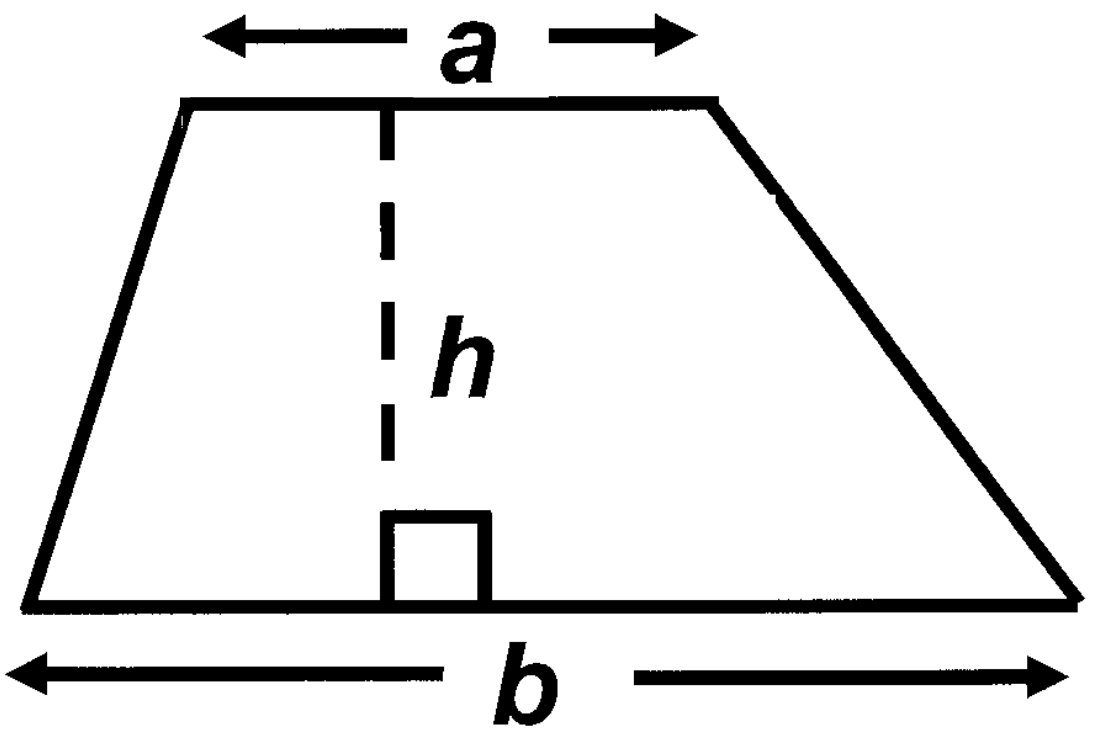
GCSE

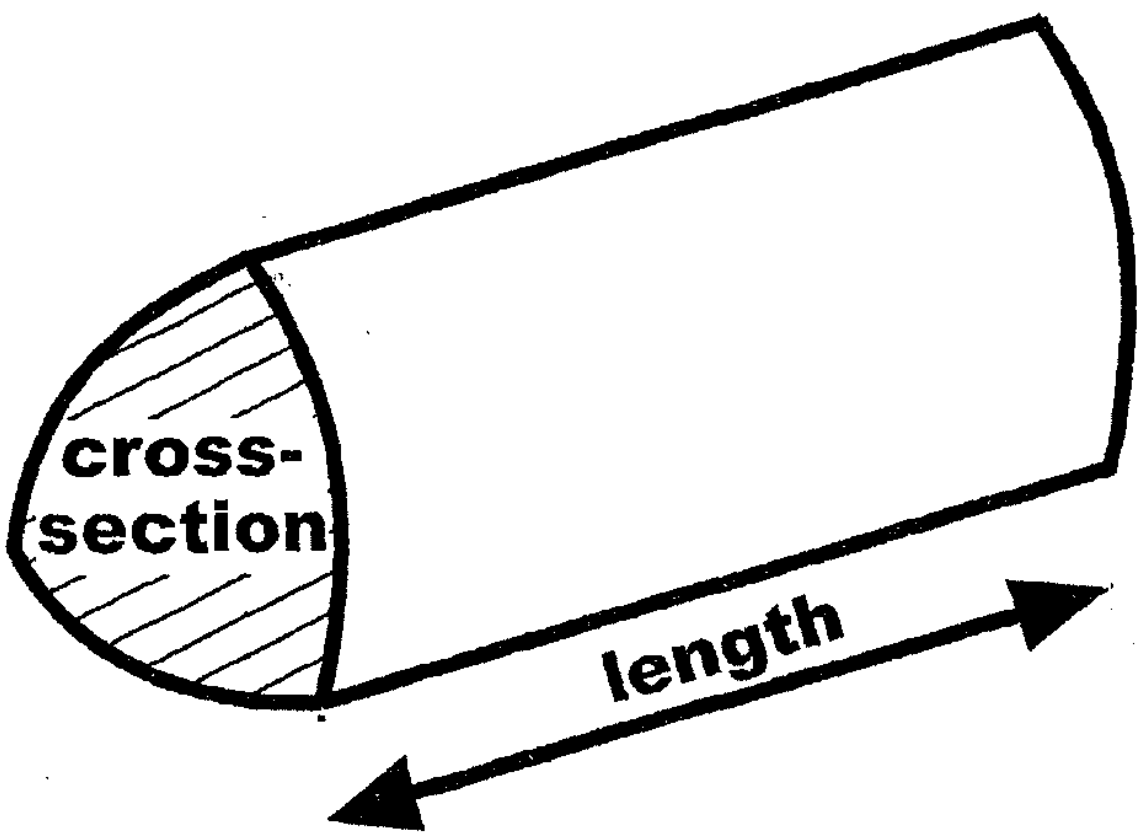
You must not write on these formula pages.

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