GCSE

3300U40 – 1

WEDNESDAY, 13 NOVEMBER 2024 – MORNING

MATHEMATICS
UNIT 2: CALCULATOR – ALLOWED
INTERMEDIATE TIER

1 hour 45 minutes plus your additional time allowance

A CALCULATOR WILL BE REQUIRED FOR THIS EXAMINATION

Surname: _____

First name(s): _____

Centre Number: _____

Candidate Number: 0 _____

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

ADDITIONAL MATERIALS

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

ITEMS INCLUDED WITH QUESTION PAPER

A separate Formula List.

A separate Diagram Booklet.

Shapes for Question 4, Question 8 (a) and Question 8 (b).

Model for Question 17.

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 this booklet, taking care to number the question(s) correctly.

Take π as $3 \cdot 14$ or use the π button on your calculator.

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

1. (a) Look at the diagram for Question 1 (a) in the separate Diagram Booklet. The diagram is NOT drawn to scale. The diagram shows a triangle labelled *ABC*.

In the diagram:

Angle *ABC* = 62°

Angle *CAB* = *x*

Calculate the size of angle *x*.

x = _____ °

[2 marks]

continued on the next page . . .

Question 1 continued

1. (b) Look at the diagram for Question 1 (b) in the separate Diagram Booklet. The diagram is NOT drawn to scale. The diagram shows a quadrilateral labelled *PQRS.*

In the diagram:

***QRT* is a straight line**

Angle *PQR* = 115°

Angle *PSR* = 60°

Angle *TRS* = 78°

Angle *QPS* = *y*

Calculate the size of angle *y.*

_____

_____

_____

_____

_____

_____

_____

_____

***y* = _____ °**

[3 marks]

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

Owen says,

"If the longer side of a rectangle is doubled and the shorter side is halved, then the perimeter of the rectangle will stay the same."

Is Owen correct?
SHOW CLEARLY, using an example, how you decided.

[4 marks + 2 marks OCW]

3. (a) Calculate the following.

$$\frac{17}{50} \text{ of } 24 \cdot 5 + 78\% \text{ of } 103 \cdot 5$$

You must show all your working.

[2 marks]

continued on the next page . . .

Question 3 continued

3. (b) Express £19.44 as a percentage of £36

[2 marks]

4. Look at the diagram for Question 4 in the separate Diagram Booklet. The diagram shows some shaded squares on a grid.

Shade the least number of squares so that the grid has rotational symmetry of order 2

Cut out squares are provided for this question.

[3 marks]

5. Look at the diagram for Question 5 in the separate Diagram Booklet.

The diagram shows 7 playing cards.

Megan has these 7 playing cards.

She turned the cards face down.

Megan then chose a card at random and recorded the number.

(a) What is the probability that Megan recorded the number 5?

Circle your answer.

$\frac{5}{7}$	$\frac{1}{7}$	1	5	$\frac{7}{5}$

[1 mark]

continued on the next page . . .

Question 5 continued

5. (b) (i) What is the probability that Megan recorded a square number?

Circle your answer.

$\frac{2}{5}$	$\frac{1}{7}$	$\frac{2}{7}$	$\frac{4}{7}$	$\frac{4}{5}$

[1 mark]

continued on the next page . . .

Question 5 (b) continued

5. (b) (ii) Megan chooses a card at random 91 times.
How many times would you expect Megan to record a square number?
You must show all your working.

[2 marks]

6. (a) Solve each of the following equations.

(i) $3y - 5 = 19$

[2 marks]

continued on the next page . . .

Question 6 (a) continued

6. (a) (ii) $7(2t + 3) = 56$

[3 marks]

continued on the next page . . .

Question 6 (a) continued

6. (a) (iii) $8p + 5 = 3p - 25$

[3 marks]

continued on the next page . . .

Question 6 continued

6. (b) Factorise $w^2 - 6w$

[1 mark]

7. **A bag contains 1 yellow counter and 2 pink counters.**
Olga puts more yellow counters into the bag.

She takes one counter out of the bag at random.
The probability of taking a yellow counter out of the bag is $\frac{3}{4}$

How many MORE yellow counters did Olga put into the bag?

Olga put _____ more yellow counters into the bag

[2 marks]

8. (a) Look at the diagram for Question 8 (a) in the separate Diagram Booklet. The diagram shows a triangle on a coordinate grid.

Rotate the triangle through 90° clockwise, about the origin.

A cut out triangle is provided for this question.

[2 marks]

(b) Look at the diagram for Question 8 (b) in the separate Diagram Booklet. The diagram shows a triangle on a coordinate grid.

Reflect the triangle in the line $x = -2$

A cut out triangle is provided for this question.

[2 marks]

9. **Look at the diagram for Question 9 in the separate Diagram Booklet. The diagram is an incomplete Venn diagram.**

Display the following information in the Venn diagram.

- **Universal Set ε = {Integers between 1 and 7 inclusive}**
- **Set A = {even numbers}**
- **Set B = {factors of 6}**
- **Set C = {prime numbers}**

[4 marks]

10. A money box contains some 20p coins and some 50p coins.
The value of the 20p coins is £19.20

The ratio of the number of 20p coins to the number of 50p coins is 8 : 5

Find the total value of the coins in the money box.
You must show all your working.

[5 marks]

11. A solution of the equation

$$x^3 + 5x - 4 = 0$$

lies between 0 and 1

Use the method of trial and improvement to find this solution correct to 1 decimal place.

You must show all your working.

[4 marks]

12. Find five numbers so that:

- **their mean is $4 \cdot 5$**
- **their mode is $3 \cdot 5$**

Write your five numbers in the boxes on the next page.

The five numbers are

[3 marks]

13. The interior angle of a regular polygon is $171°$

How many sides does the polygon have?

[3 marks]

14. (a) Look at the diagram for Question 14 (a) in the separate Diagram Booklet. The diagram is NOT drawn to scale. The diagram shows a triangle labelled *ABC*.

In the diagram:

***CB* = 10•8 cm**

***AB* = 13•5 cm**

Angle *ABC* is a right angle.

Calculate the length of *AC*.

[3 marks]

continued on the next page . . .

Question 14 continued

14. (b) Look at the diagram for Question 14 (b) in the separate Diagram Booklet. The diagram is NOT drawn to scale. The diagram shows a triangle labelled *PQR*.

In the diagram:

$PQ = 19 \cdot 8$ cm

$PR = 8 \cdot 7$ cm

Angle *RPQ* is a right angle.

Angle $PRQ = x°$

Calculate the value of *x*.

[3 marks]

15. Look at the diagram for Question 15 in the separate Diagram Booklet. The diagram shows line *AB*.

Point *C* lies BELOW the line *AB*.
The region in which point *C* is located is such that:

- **Angle *ABC* ≤ 30°**
- **line *BC* ≤ 6 cm.**

Use a ruler and a pair of compasses to CONSTRUCT suitable arcs and lines to show this region.
You must show your construction arcs.
Shade the region in which point *C* is located.

[4 marks]

16. Look at the diagram for Question 16 in the separate Diagram Booklet. The diagram shows a graph.

PowrUp is a company that makes batteries.

The quality of the batteries is tested regularly.

PowrUp calculates the relative frequency of faulty batteries after checking a total of 1000, 2000, 3000, 4000 and 5000 batteries.

The results are plotted on the graph.

(a) One battery is selected at random.

Write down the best estimate for the probability that this battery will be faulty.

You must give a reason for your choice.

Probability = _____

Reason:

_____

_____

_____

_____

_____

_____

[2 marks]

continued on the next page . . .

Question 16 continued

16. (b) It costs the company 2•6p to dispose of each of the faulty batteries.

How much will it cost the company to dispose of all the faulty batteries after testing the first 3000 batteries?

You must show all your working.

[3 marks]

17. **Ask for the model for Question 17. The model is NOT made to scale. The model represents a SOLID cylinder with radius 10 cm.**

The total SURFACE AREA of the solid cylinder is $1570 \cdot 8\ cm^2$

Find the height of the cylinder.

[5 marks]

18. **2400 tickets were sold for a concert.**

The table below shows the cost of the different types of ticket.

Ticket	Cost per ticket
SEATED	£45
STANDING	£23

The total cost of all the 2400 tickets sold was £89 520

Let *x* represent the number of seated tickets sold.

Let *y* represent the number of standing tickets sold.

continued on the next page . . .

Question 18 continued

18. (a) Complete the following table.

	Equation in terms of x and y
Total number of tickets sold	$x + y = 2400$
Total cost of tickets sold	

[1 mark]

continued on the next page . . .

Question 18 continued

18. (b) Use an algebraic method to find the value of *x* and the value of *y*.

You must show all your working.

The number of seated tickets sold,

***x* = _____**

The number of standing tickets sold,

***y* = _____**

[3 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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MATHEMATICS

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INTERMEDIATE TIER

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

Diagram Booklet

Surname: _____

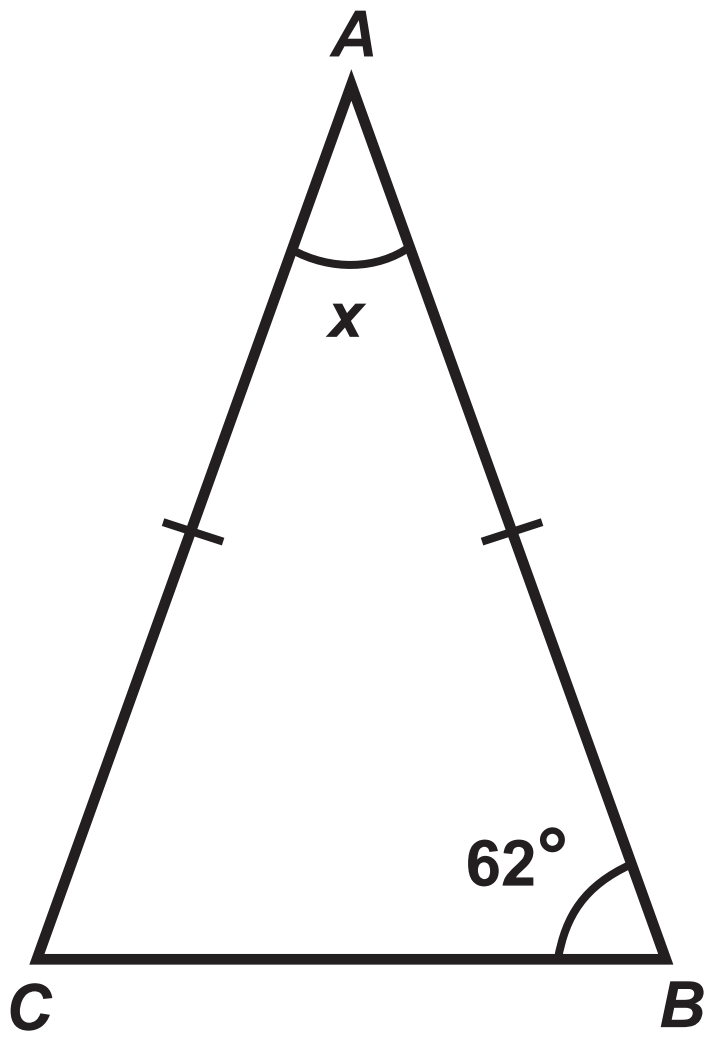
First name(s): _____

Centre Number: _____

Candidate Number: 0_____

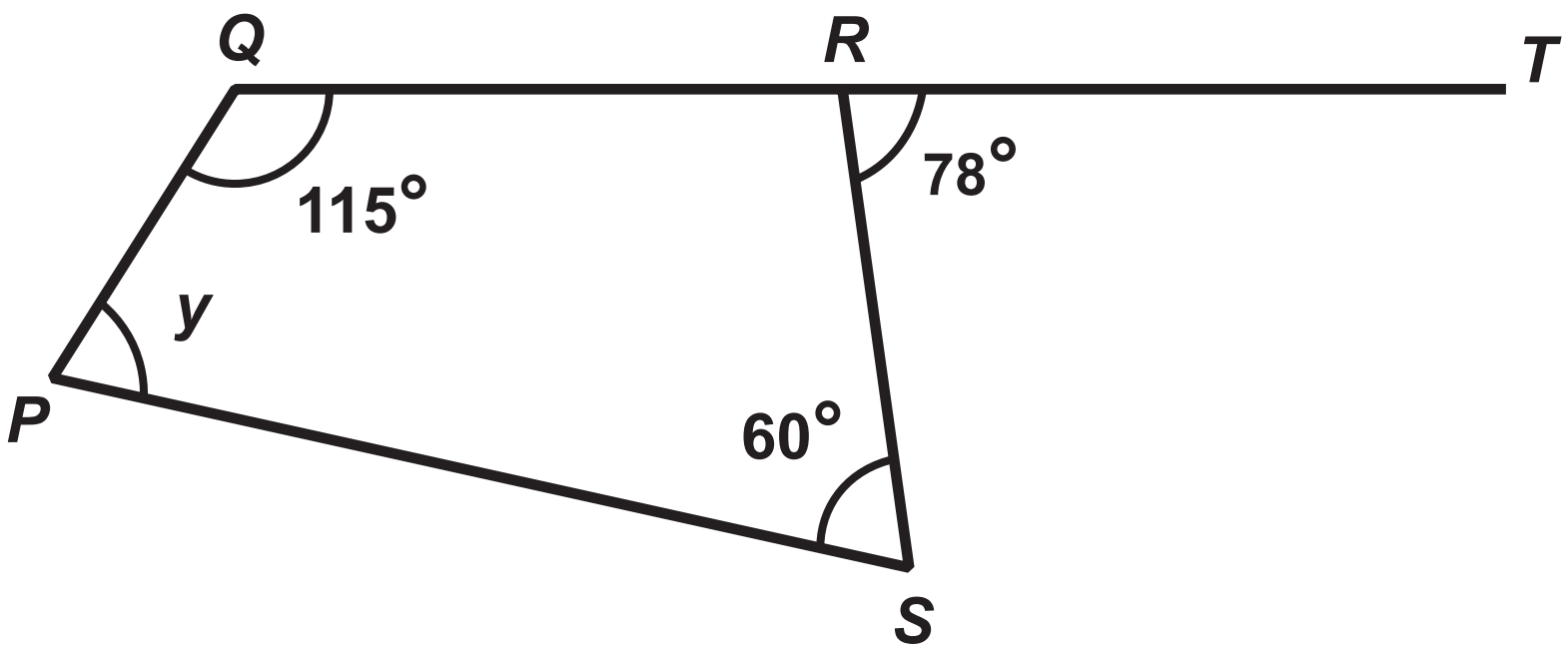
Question 1 (a)

Diagram NOT drawn to scale

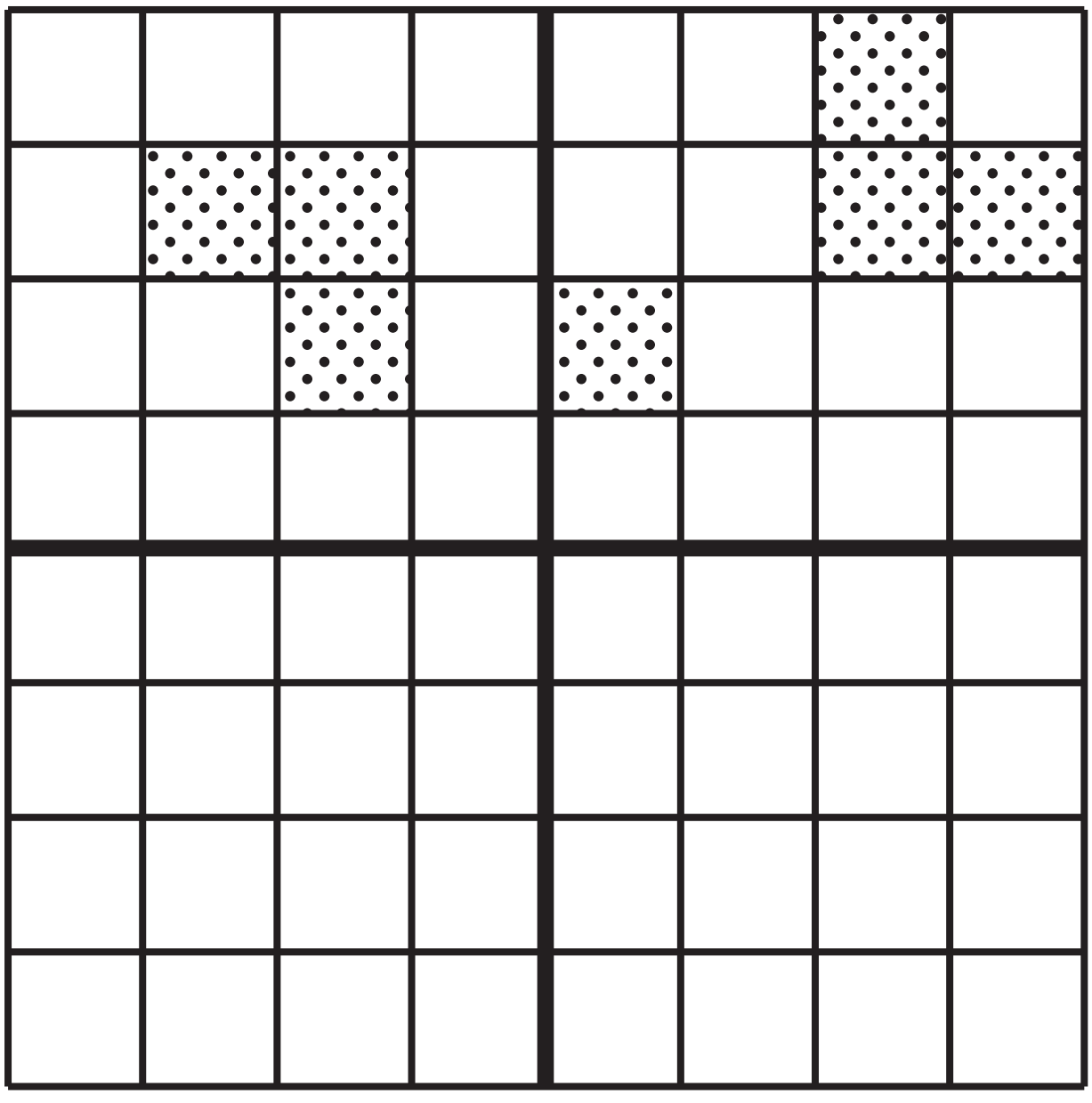


Question 1 (b)

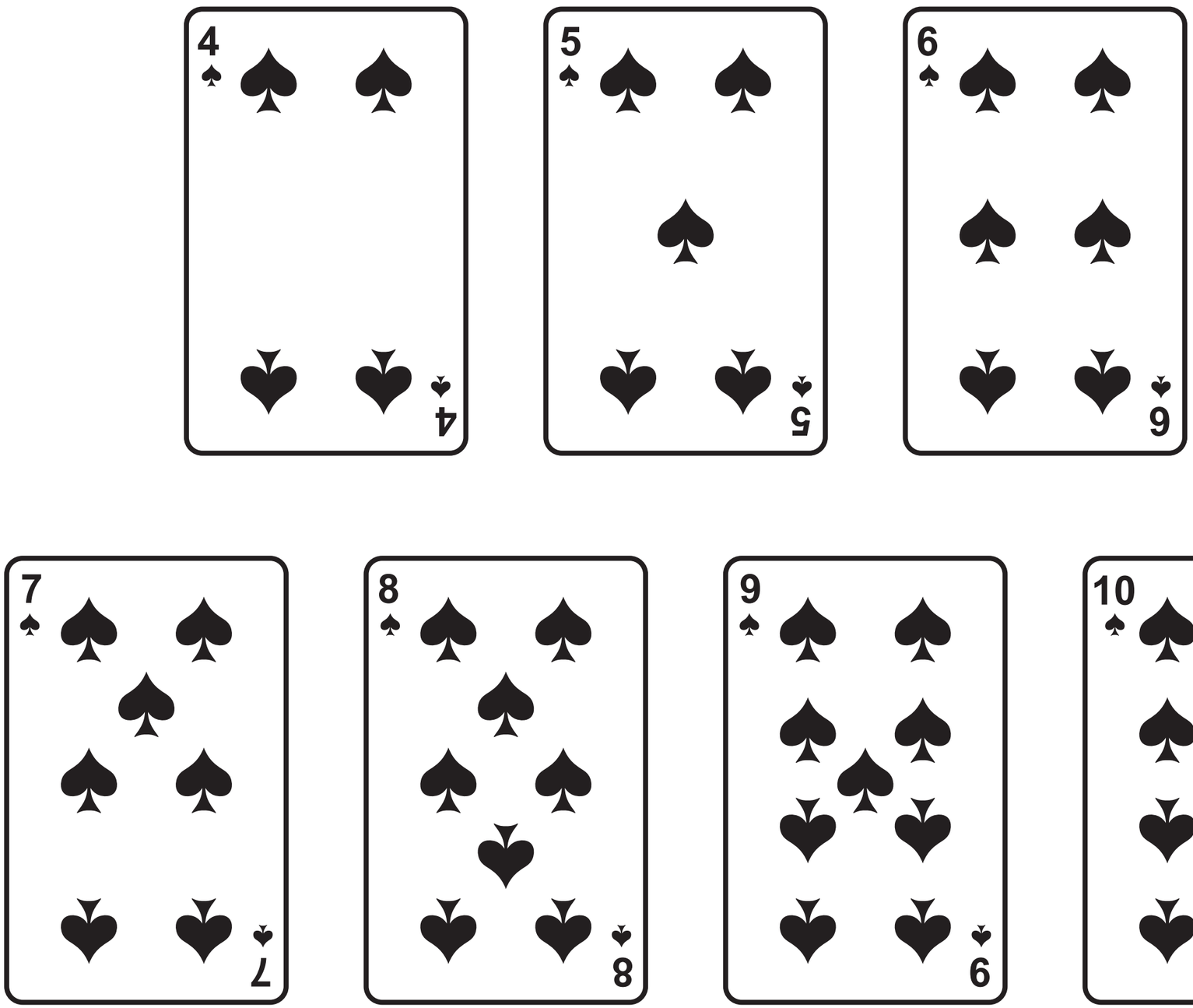
Diagram NOT drawn to scale



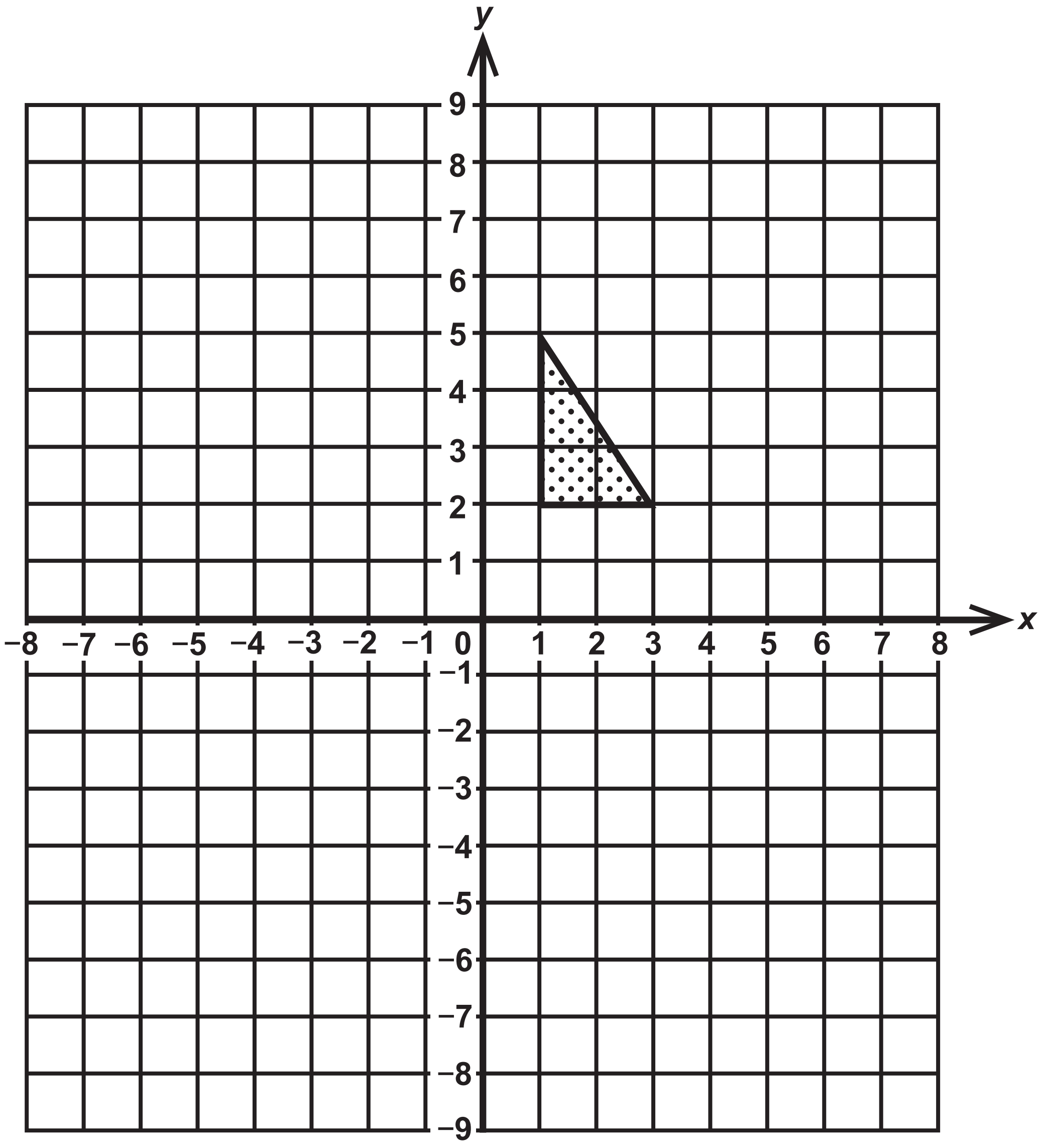
Question 4



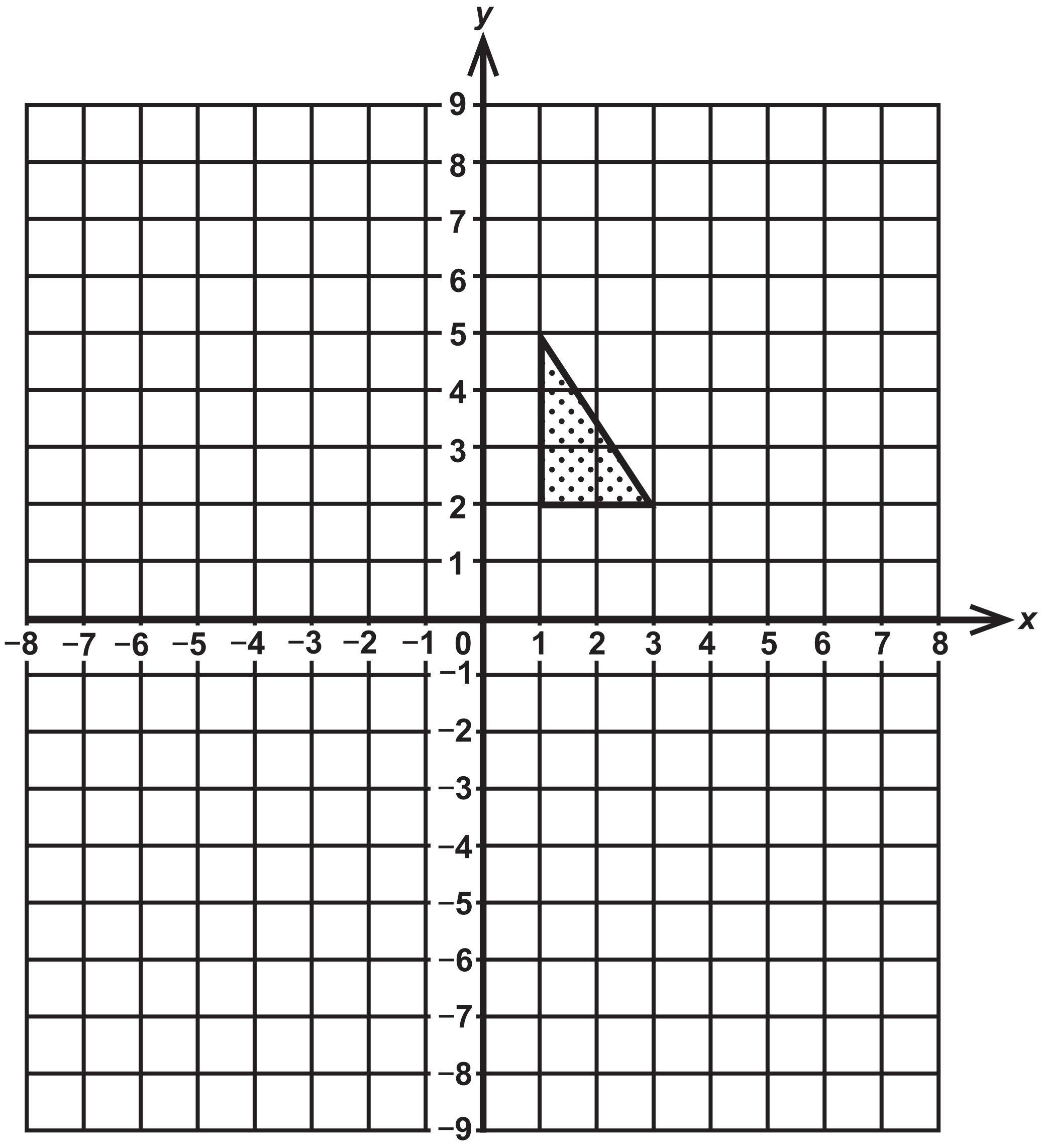
Question 5



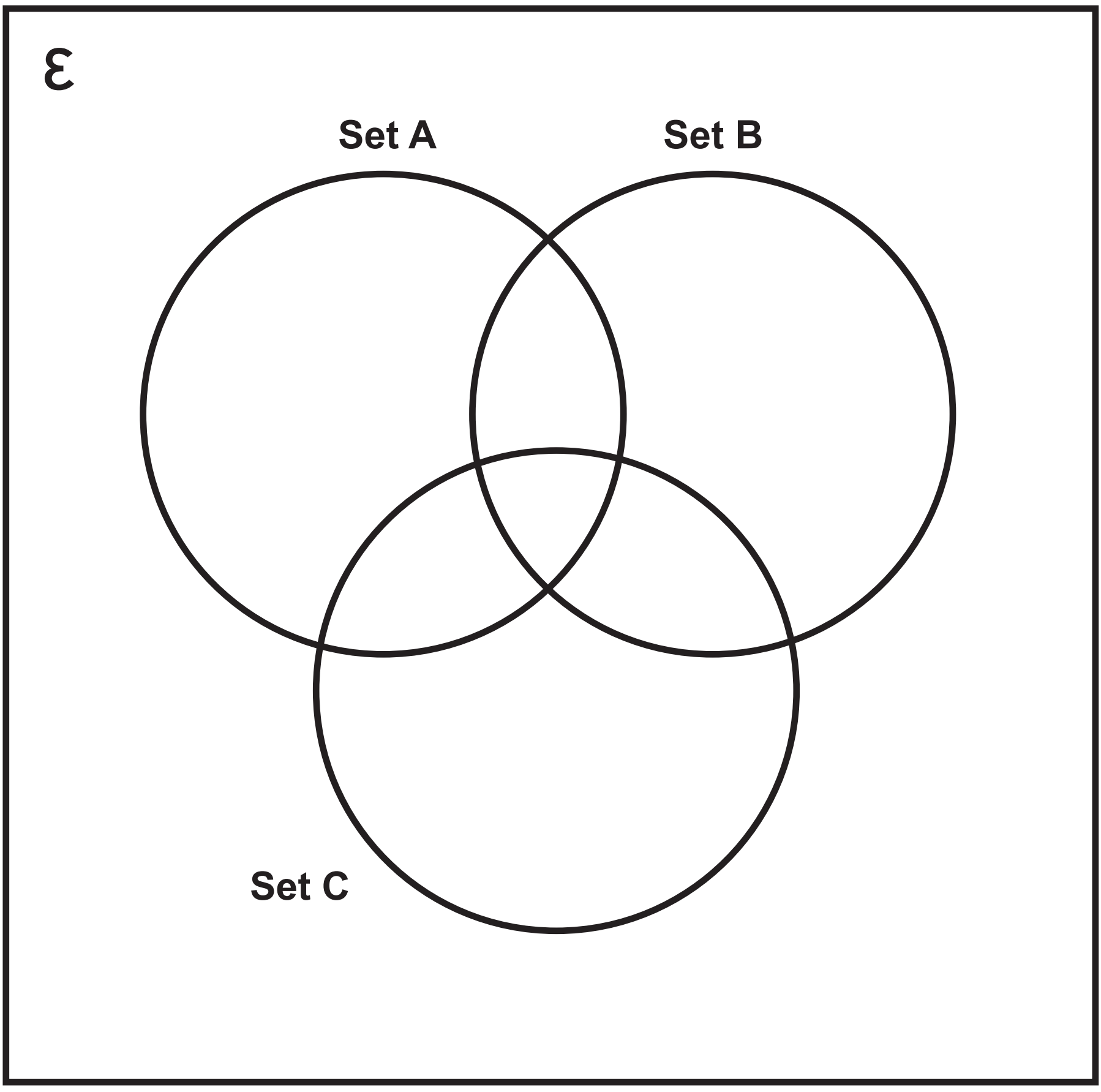
Question 8 (a)



Question 8 (b)

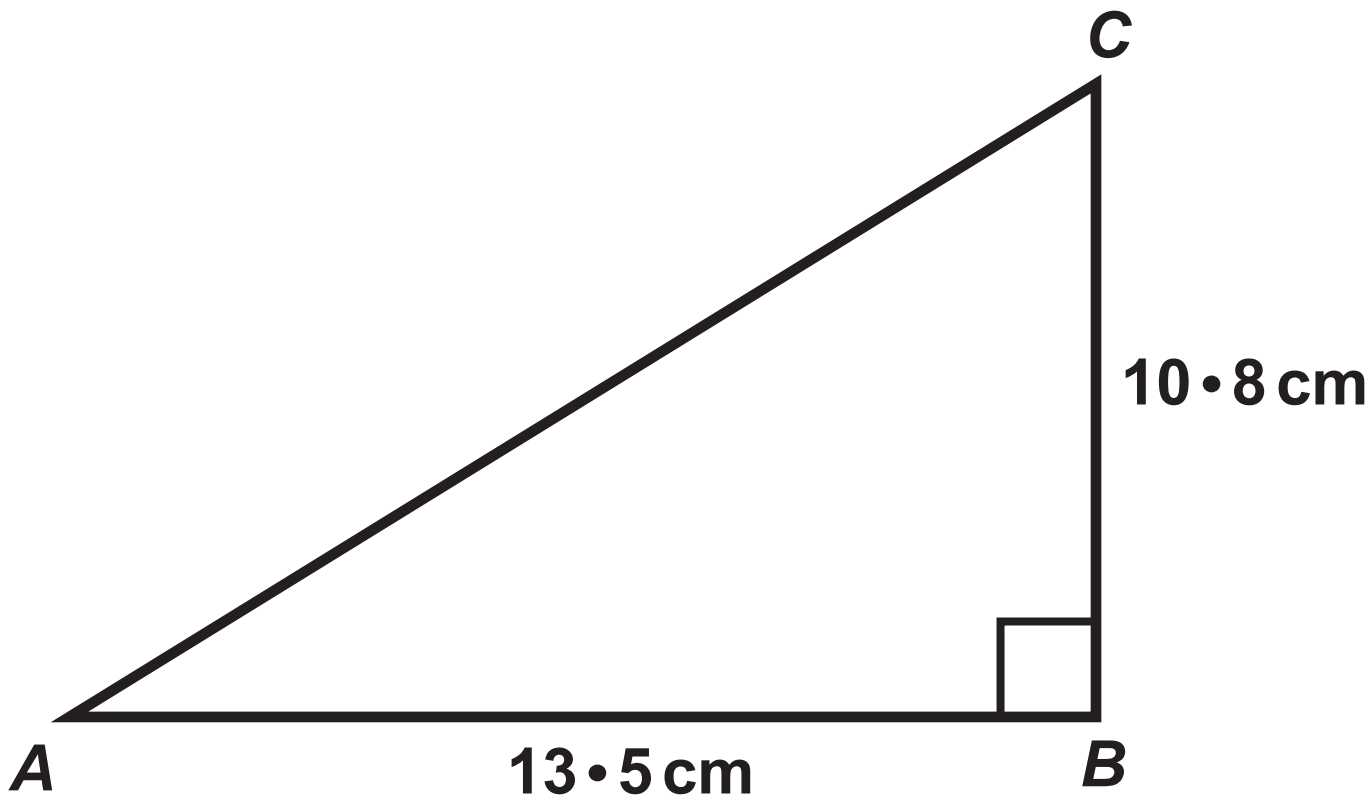


Question 9



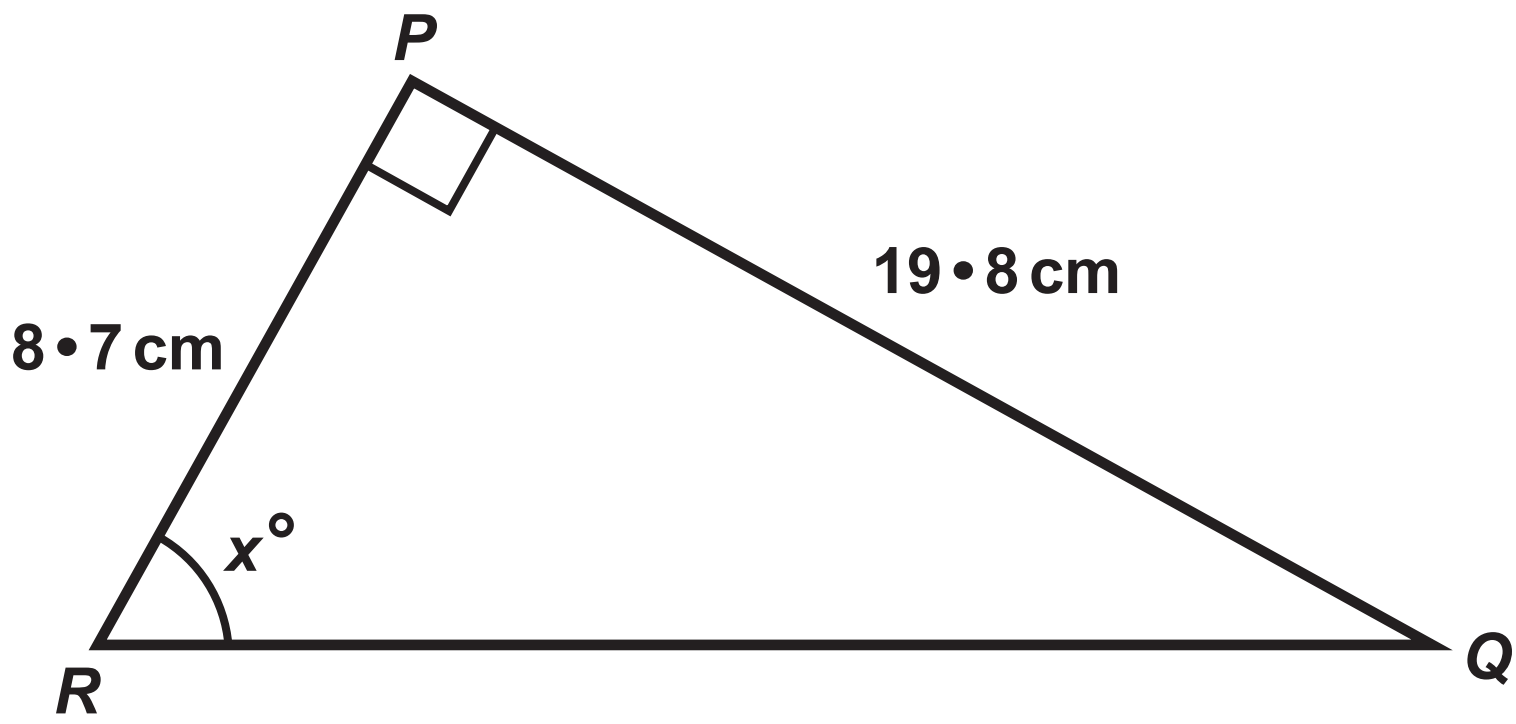
Question 14 (a)

Diagram NOT drawn to scale



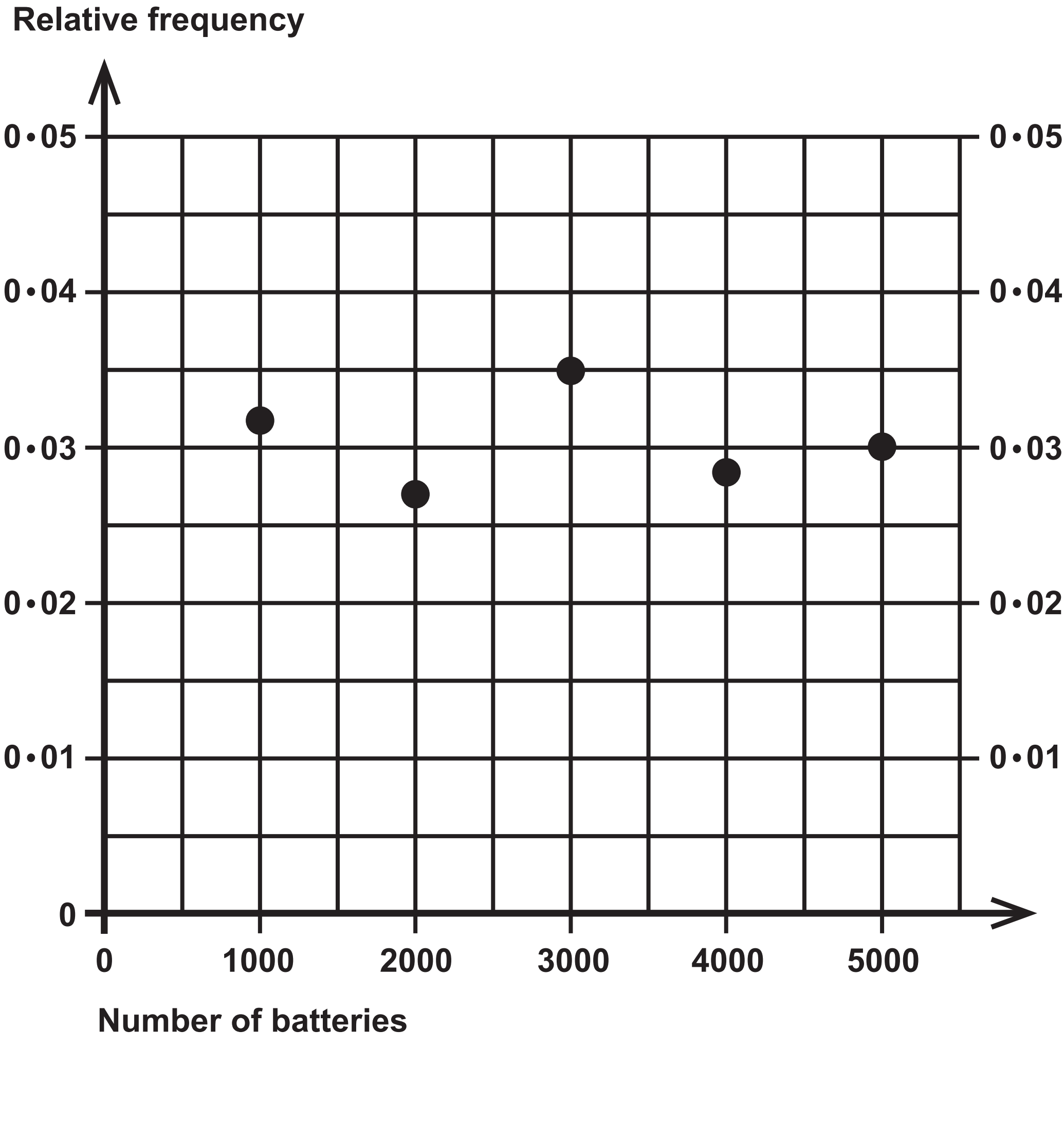
Question 14 (b)

Diagram NOT drawn to scale



Question 15

Question 16


Relative frequency
0•05
0•04
0•03
0•02
0•01
0
0
1000
2000
3000
4000
5000
Number of batteries

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MATHEMATICS

and

GCSE

MATHEMATICS – NUMERACY

FORMULA LIST
INTERMEDIATE TIER
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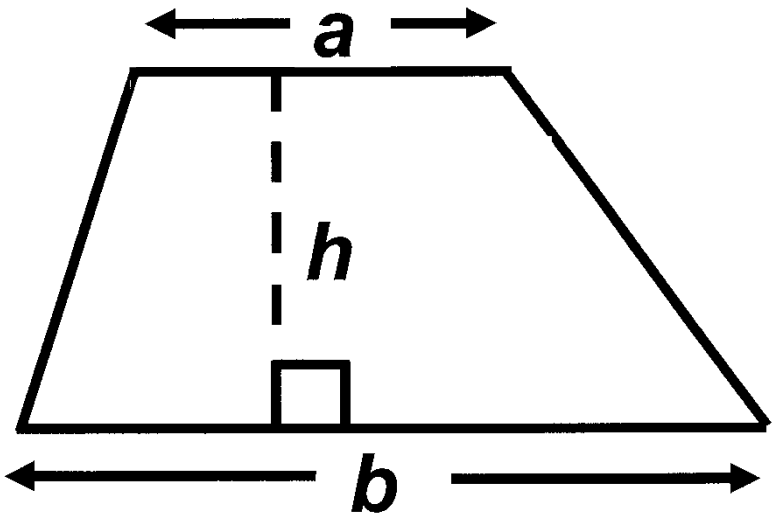
You must not write on these formula pages.

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