

GCSE – NEW

3300U50-1

MATHEMATICS

UNIT 1: NON – CALCULATOR

HIGHER TIER

TUESDAY,

13 JUNE 2017 – MORNING

1 hour 45 minutes

**(plus your additional
time allowance)**

<p>THE USE OF A CALCULATOR IS NOT PERMITTED IN THIS EXAMINATION</p>
--

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1.	4	
2.	5	
3.	4	
4.	3	
5.	4	
6.	3	
7.	5	
8.	4	
9.	2	
10.	6	
11.	6	
12.	5	
13.	5	
14.	3	
15.	3	
16.	6	
17.	6	
18.	4	
19.	2	
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.

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

Take π as 3.14

(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 5, the assessment will take into account the quality of your linguistic and mathematical organisation and communication.

In question 10, the assessment will take into account the quality of your linguistic and mathematical accuracy in writing.

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

Ceri has a set of cards.

Each of her cards is labelled

North, East, South or West.

The table shows the probability distribution when a card is taken from the set of cards at random.

- (a) Ceri chooses one card at random from her set of cards.

What is the probability that the card is labelled East or South?

[2 marks]

continued on the next page . . .

(Turn over)

Question 1 continued

1. (b) **Sasha has an identical set of cards.
Ceri and Sasha each choose one card
at random from their set of cards.**

**What is the probability that they both
choose a card labelled North?**

[2 marks]

2. The table below shows some of the values of $y = x^2 - 5x + 2$ for values of x from -1 to 5

x	$y = x^2 - 5x + 2$
-1	8
0	2
1	-2
2	-4
3	
4	-2
5	2

- (a) Complete the table above.

[1 mark]

(Turn over)

Question 2 continued

2. (b) On the graph paper provided for Question 2 (b) in the separate Diagram Booklet, draw the graph of $y = x^2 - 5x + 2$ for values of x from -1 to 5

[2 marks]

- (c) Draw the line $y = -3$ on the graph paper.

Write down the values of x where the line

$y = -3$ cuts the curve $y = x^2 - 5x + 2$

Give your answers correct to 1 decimal place.

Values of x are _____ and _____

[2 marks]

(Turn over)

Question 3 continued

3. (b) The number **33 554 432** is equal to 2^{25}

Explain how this tells you that

33 554 432 is not a square number.

[1 mark]

(Turn over)

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

The diagram is a graph.

Which ONE of the following equations could represent the line shown in the graph?

Circle your answer.

$y = -x - 2$
$y = -x + 2$
$y = x + 2$
$y = x - 2$
$y = -x$

[1 mark]

continued on the next page . . .

(Turn over)

Question 4 continued

4. (b) Which ONE of the following points lies on the line $2y = 3x + 4$?

Circle your answer.

$(2, -5)$	$(5, 2)$	$(-2, 5)$	$(2, 5)$	$(-2, -5)$
-----------	----------	-----------	----------	------------

[1 mark]

continued on the next page . . .

(Turn over)

Question 4 continued

4. (c) Look at the diagram for Question 4 (c) in the separate Diagram Booklet.
The diagram is a graph.

What is the gradient of the line shown in the graph?

Circle your answer.

$\frac{3}{2}$	$-\frac{3}{2}$	$\frac{2}{3}$	$-\frac{2}{3}$	-6
---------------	----------------	---------------	----------------	------

[1 mark]

(Turn over)

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

A WHOLE number is written on a card.

You are given three clues to help you work out the number on the card.

Clue 1: DOUBLE the number is between 8 and 18 inclusive.

Clue 2: The number is a prime number.

Clue 3: The number is NOT a factor of 100

What is the number on the card?

You must show all your working.

6. Look at the table provided for Question 6 in the separate Diagram Booklet.

The table shows six formulae.

In the formulae, each measurement of length is represented by a letter.

Consider the dimensions implied by the formulae.

Write down, for each case, whether the formula could be for a length, an area, a volume or none of these.

The first one has been done for you.

[3 marks]

(Turn over)

7. A group of **20** people visited Anglesey for a weekend break.
- **10** of the group visited Beaumaris Castle.
 - **13** of the group visited South Stack Lighthouse.
 - **4** of the group did not visit either of these places.

(a) Look at the diagram for Question 7 (a) in the separate Diagram Booklet. The diagram is a Venn diagram.

Complete the Venn diagram to show the information given above.

The universal set, \mathcal{U} , contains all of the **20** people in the group.

[3 marks]

7. (b) One person is chosen at random from the group.

What is the probability that this person visited only one of the two places?

[2 marks]

(Turn over)

9. Calculate the value of

$$(5.41 \times 10^5) + (2.3 \times 10^4)$$

Give your answer in standard form.

[2 marks]

(Turn over)

10. IN THIS QUESTION, YOU WILL BE ASSESSED ON THE QUALITY OF YOUR LINGUISTIC AND MATHEMATICAL ACCURACY IN WRITING.

Rashid owned n sheep.

Eifion had exactly 4 times as many sheep as Rashid.

Rashid buys 17 extra sheep.

Eifion sells 8 of his sheep.

Eifion still has more sheep than Rashid.

Form an inequality, in terms of n .

Solve the inequality to find the LEAST value of n .

You must show all your working.

11. (a) Evaluate $49^{-\frac{1}{2}}$

[1 mark]

(b) Express $0.3\dot{7}\dot{2}$ as a fraction.

[2 marks]

(Turn over)

Question 11 continued

11. (c) Find the value of $(\sqrt{63} - \sqrt{7})^2$

[3 marks]

(Turn over)

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

A, ***B*** and ***C*** are points on the circumference of a circle.

XY is a tangent to the circle at the point ***A***.

Angle ***BAY*** = 74° and angle ***ABC*** = 53°

Prove that triangle ***ABC*** is an isosceles triangle.

You must give a reason for any statement that you make or any calculation that you carry out.

(Turn over)

[5 marks]

(Turn over)

13. (a) On the graph paper provided for Question 13 (a) in the separate Diagram Booklet, draw the region which satisfies all of the following inequalities.

$$x + y \leq 6$$

$$y \geq \frac{x}{2} + 3$$

$$x \geq -2$$

Clearly indicate the region that represents your answer.

[3 marks]

continued on the next page . . .

(Turn over)

Question 13 continued

13. (b) (i) What is the greatest possible value of X such that all three conditions are met?

$X =$ _____

[1 mark]

- (ii) What is the greatest possible value of y such that all three conditions are met?

$y =$ _____

[1 mark]

(Turn over)

14. **SSS, SAS, ASA** and **RHS** are notations used to describe the conditions required to prove that two triangles are congruent. [**S** \equiv Side, **A** \equiv Angle, **R** \equiv Right angle and **H** \equiv Hypotenuse.]

- (a) Look at the diagram for Question 14 (a) in the separate Diagram Booklet. The diagram shows a pair of triangles. The triangles are **NOT** drawn to scale. For this pair of triangles, circle the correct statement.

congruent: SSS
congruent: SAS
congruent: ASA
congruent: RHS
definitely not congruent
not necessarily congruent

[1 mark]
(Turn over)

Question 14 continued

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

The diagram shows a pair of triangles.

The triangles are NOT drawn to scale.

For this pair of triangles,

circle the correct statement.

congruent: SSS
congruent: SAS
congruent: ASA
congruent: RHS
definitely not congruent
not necessarily congruent

[1 mark]

continued on the next page . . .

(Turn over)

Question 14 continued

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

The diagram shows a pair of triangles.

The triangles are NOT drawn to scale.

For this pair of triangles,

circle the correct statement.

congruent: SSS
congruent: SAS
congruent: ASA
congruent: RHS
definitely not congruent
not necessarily congruent

[1 mark]

(Turn over)

15. (a) Using the axes provided for Question 15 (a) in the separate Diagram Booklet, **SKETCH** the graph of $y = \sin x$ for values of x from 0° to 360°
- You must label any important values on both axes.

[2 marks]

- (b) Circle the value that is equal to $\sin 200^\circ$

$\sin 20^\circ$
$\sin 100^\circ$
$\sin 160^\circ$
$\sin 220^\circ$
$\sin 340^\circ$

[1 mark]

(Turn over)

17. A bag contains **6** red blocks,
4 green blocks and **2** yellow blocks.
Three blocks are taken from the bag,
at random, **WITHOUT REPLACEMENT.**

(a) What is the probability that the first block removed is red, the second is green and the third is yellow?

[2 marks]

continued on the next page . . .

(Turn over)

Question 17 continued

17. (c) Write down the probability that the three blocks will NOT be the same colour.

[1 mark]

(Turn over)

[4 marks]

(Turn over)

GCSE – NEW

3300U50-1



MATHEMATICS

UNIT 1: NON – CALCULATOR

HIGHER TIER

TUESDAY, 13 JUNE 2017 – MORNING

Diagram Booklet

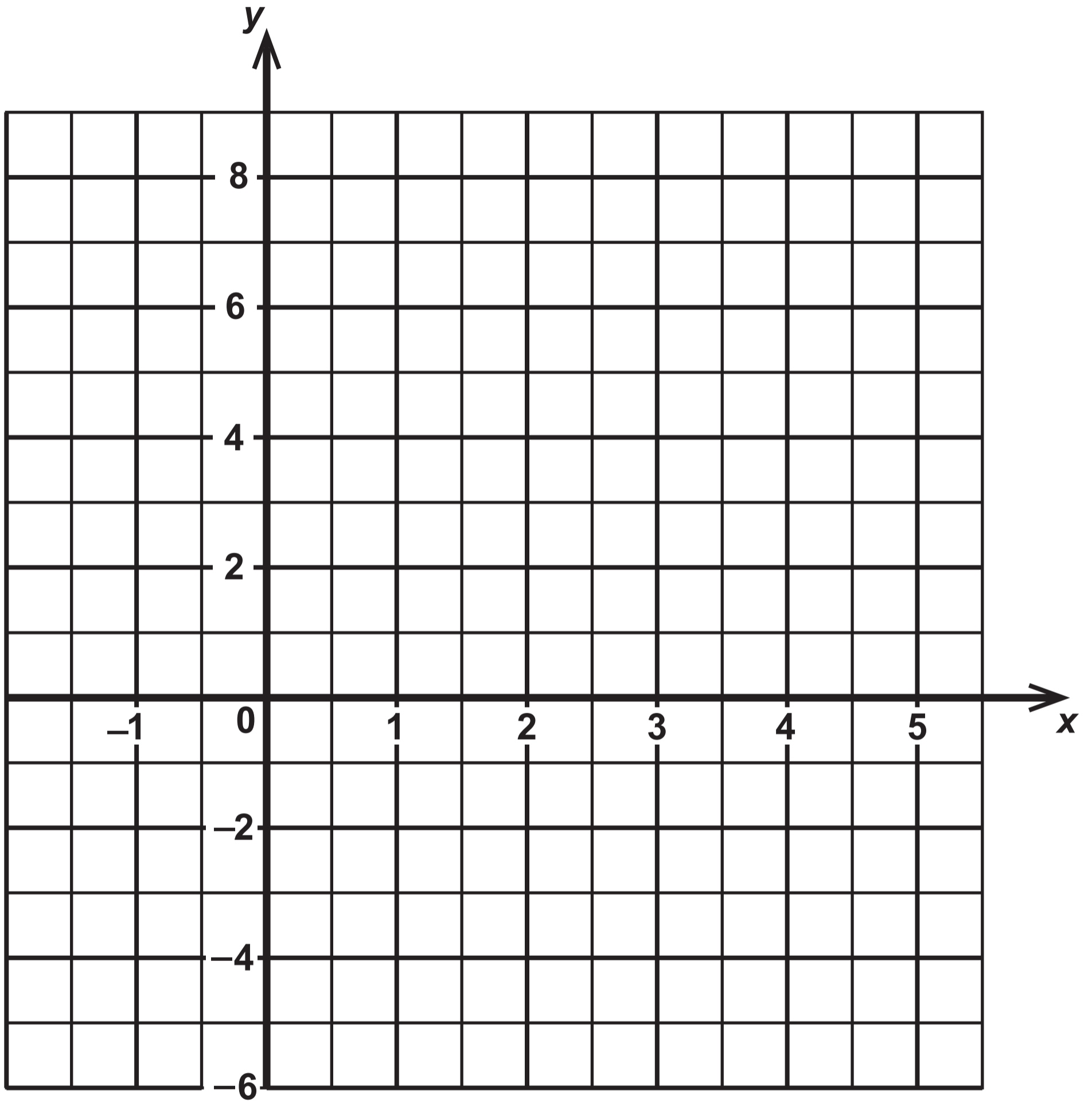
Surname:	
Other Names:	
Centre Number:	
Candidate Number:	0

Question 1

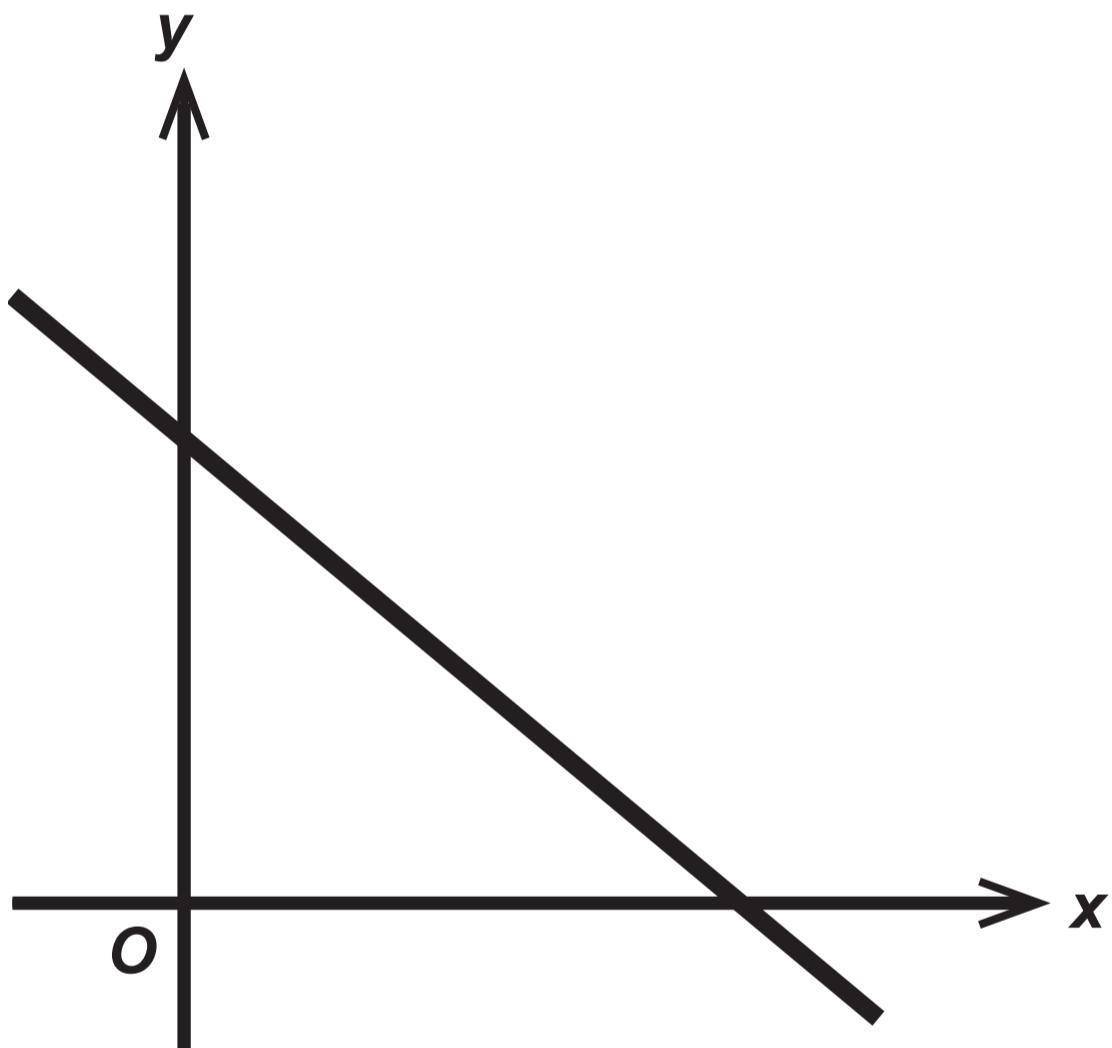
Table

Label	North	East	South	West
Probability	0.4	0.25	0.2	0.15

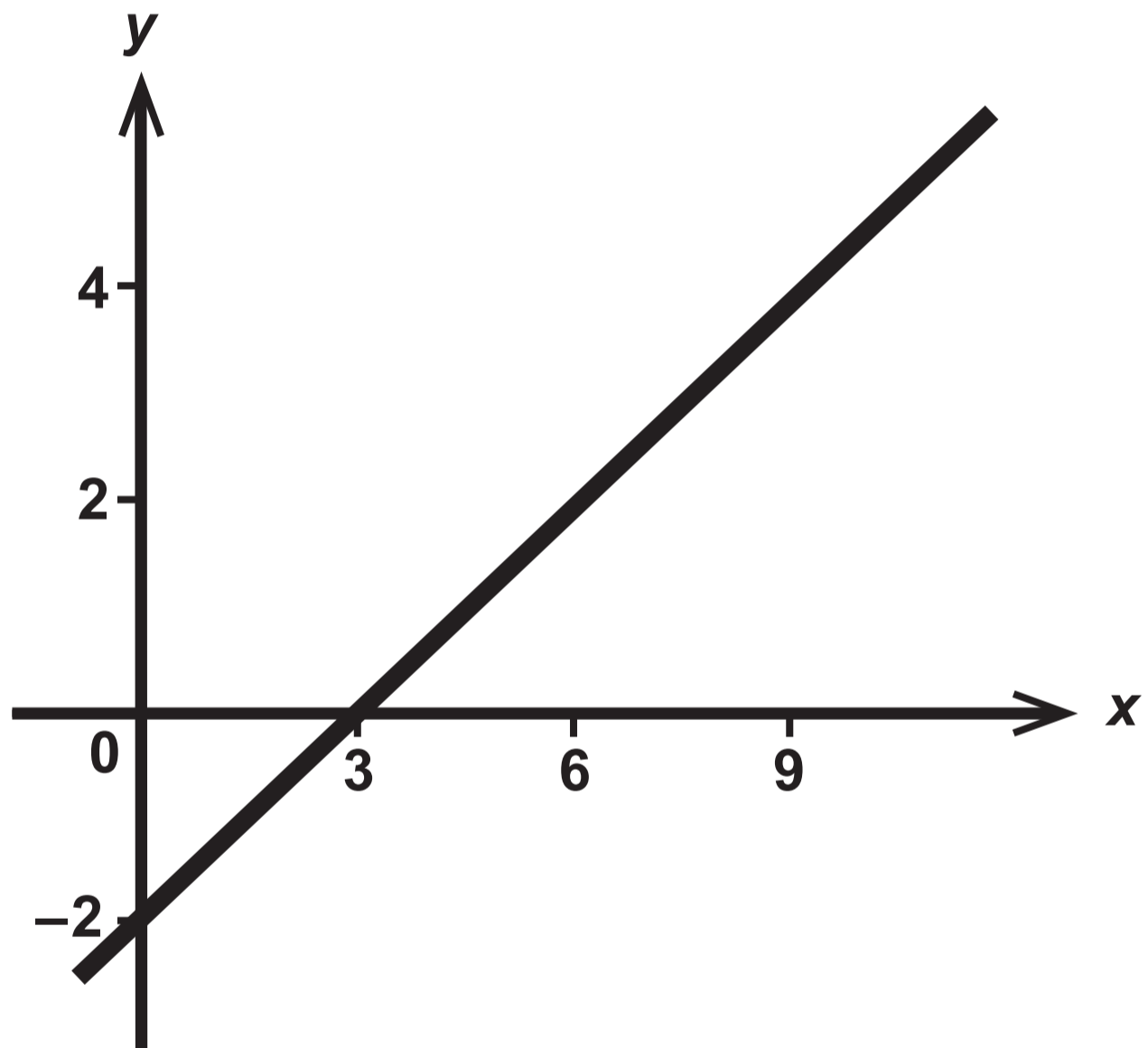
Question 2 (b)



Question 4 (a)



Question 4 (c)



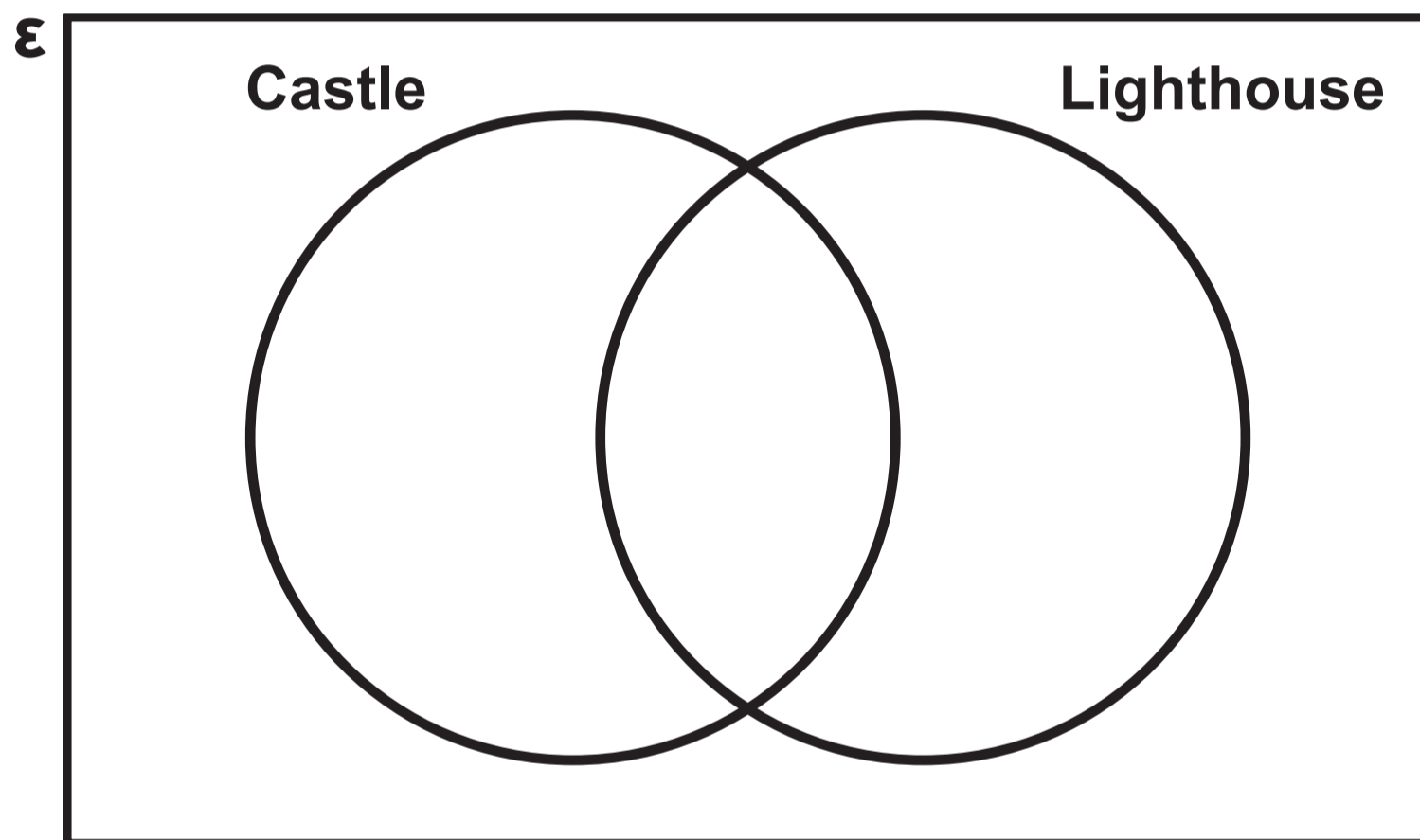
Question 6

Table

FORMULA	FORMULA COULD BE FOR
$d^3 - 3.14r^2h$	volume
$d^2 + hw$	
$d + w + h$	
$2\pi r - \pi r^2$	
$(d + h)w$	
$d^3 + dwh$	

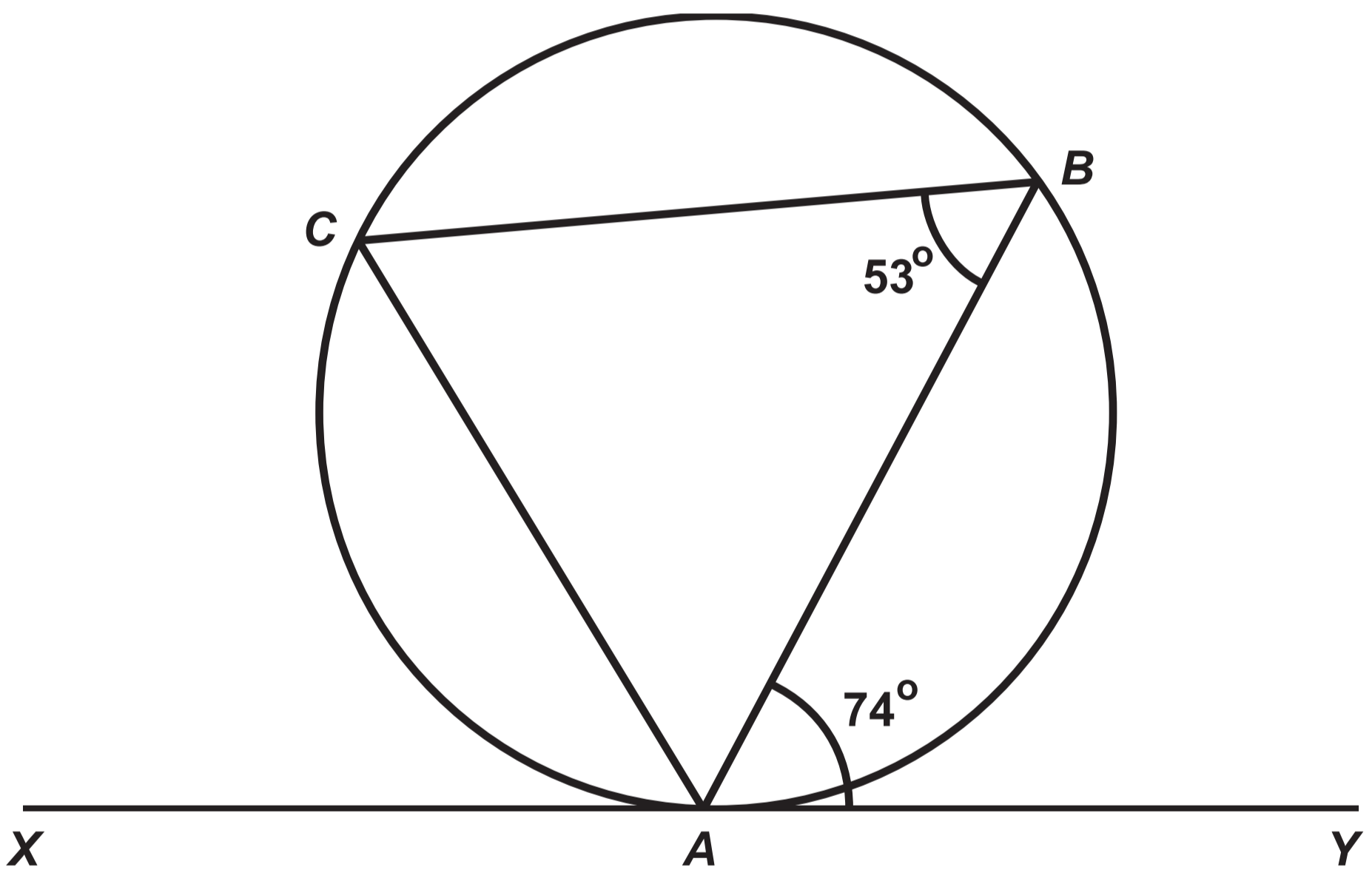
Question 7 (a)

The universal set, \mathcal{E} , contains all of the 20 people in the group.

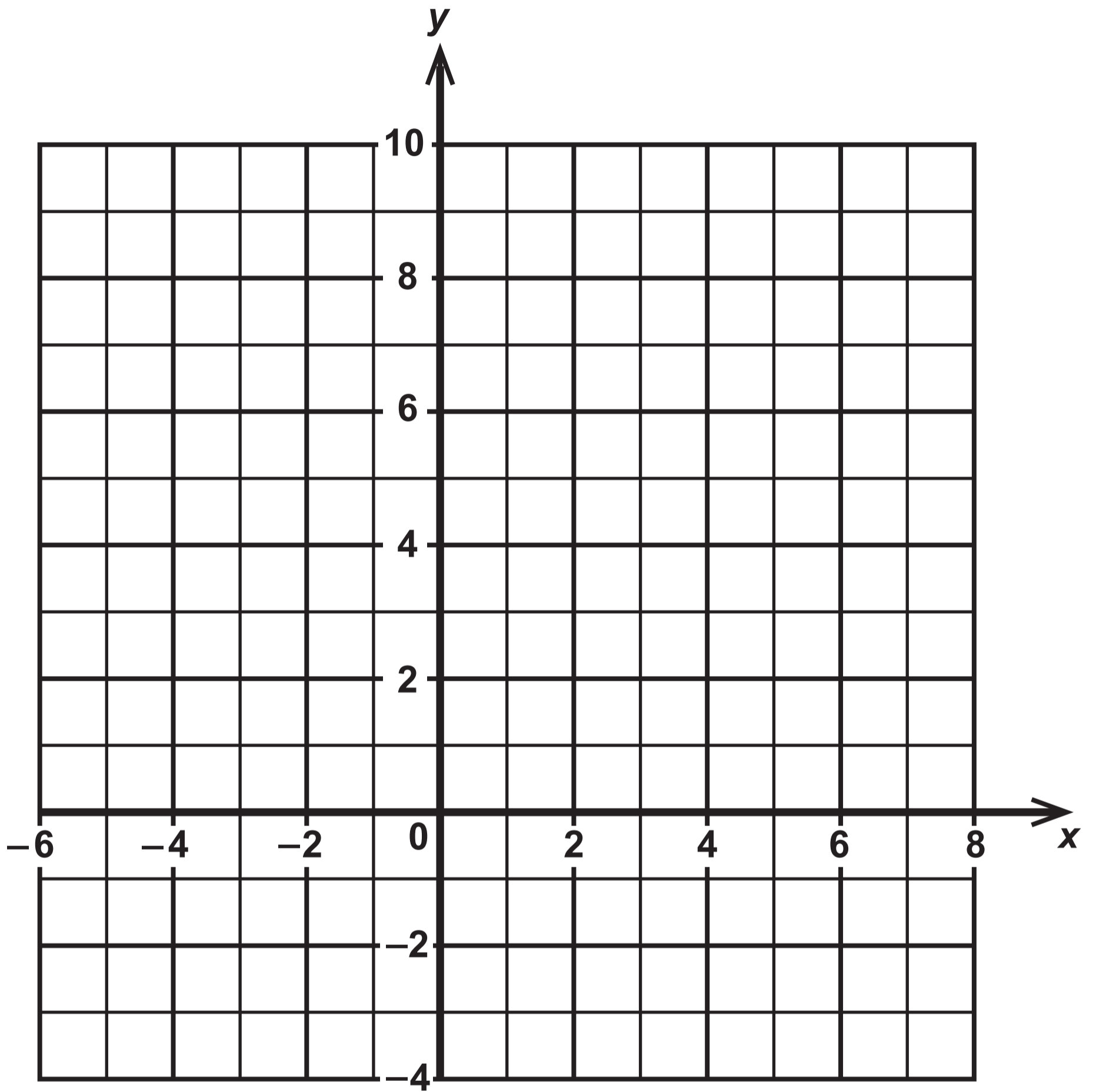


Question 12

Diagram NOT drawn to scale

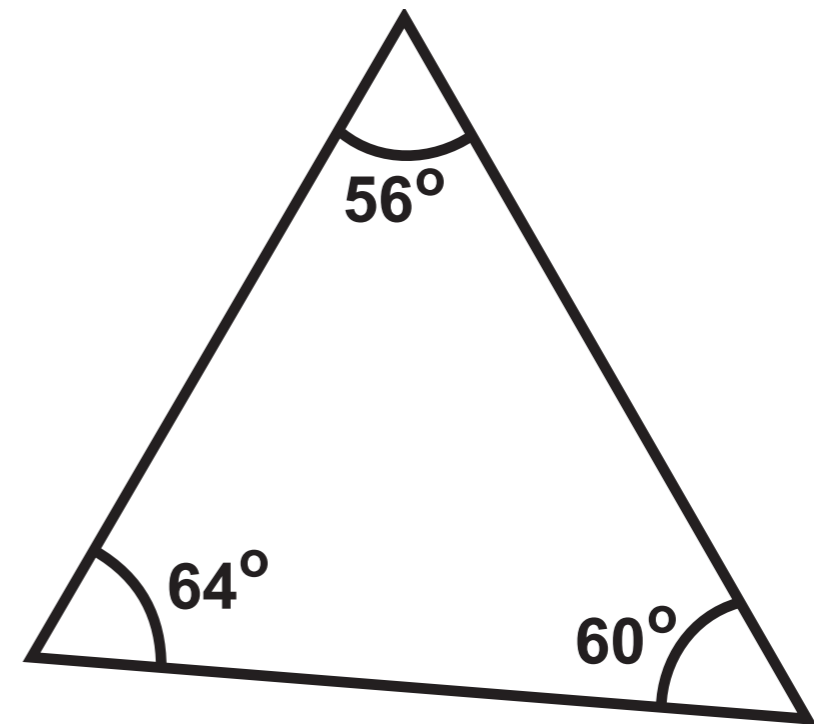
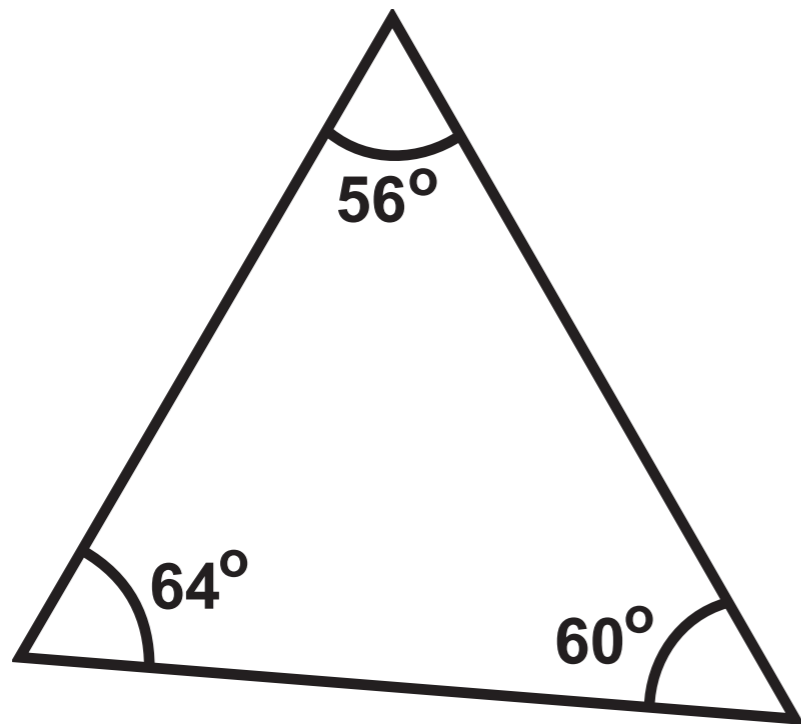


Question 13 (a)



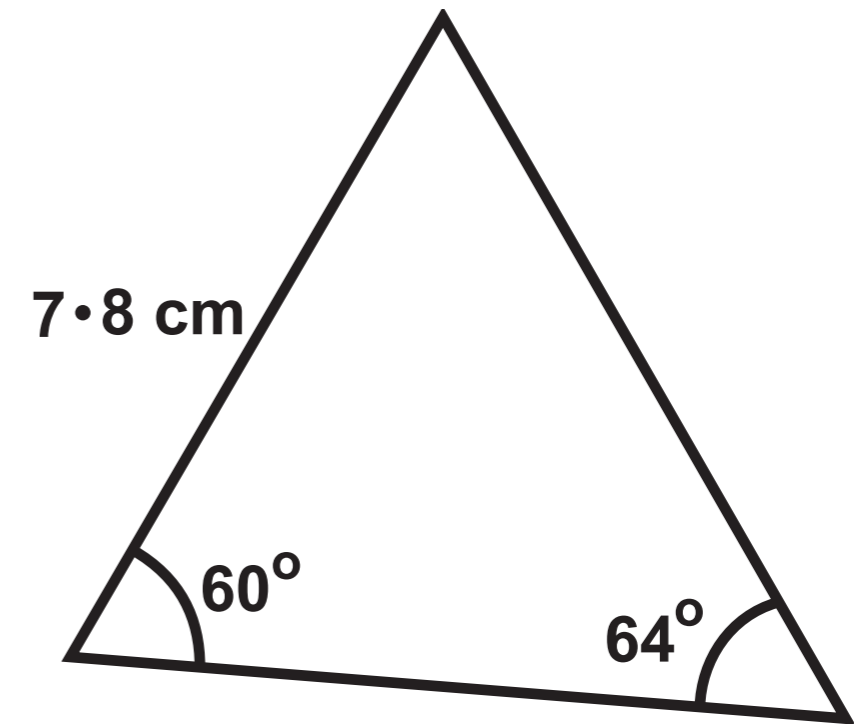
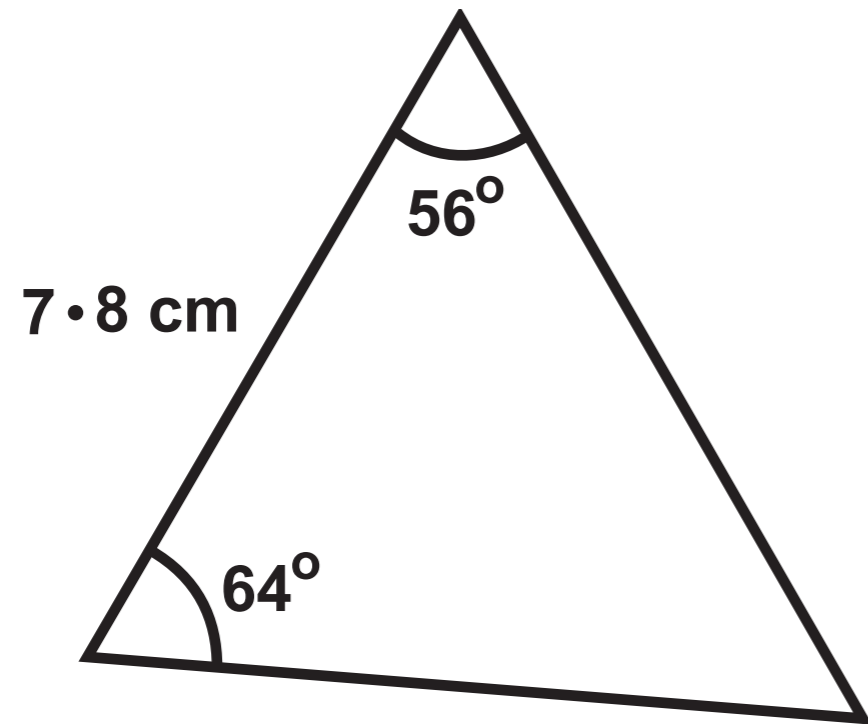
Question 14 (a)

Triangles NOT drawn to scale



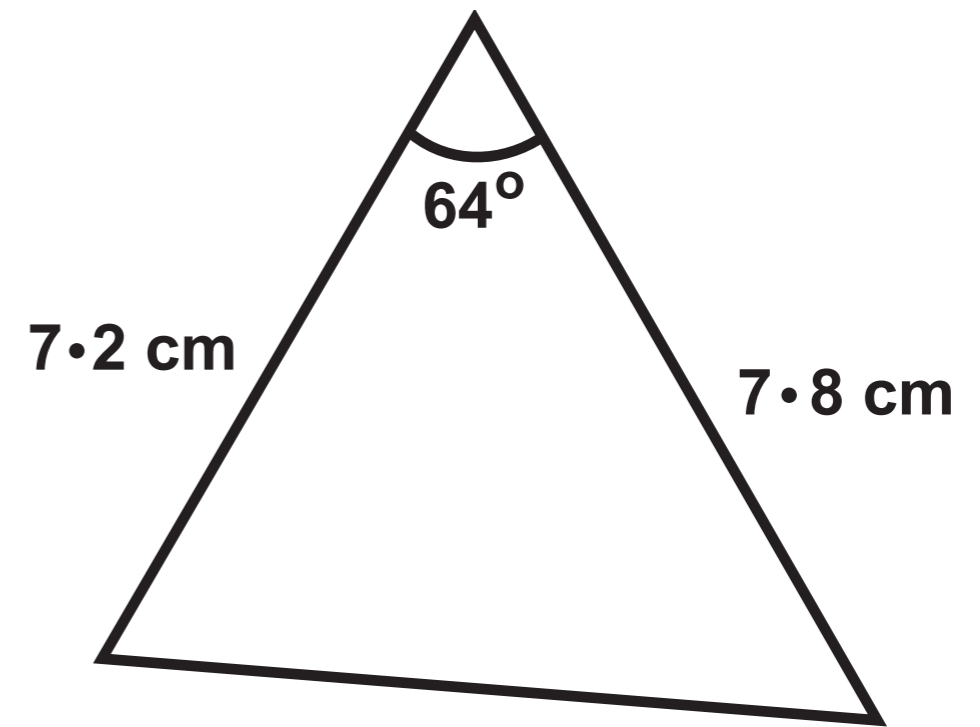
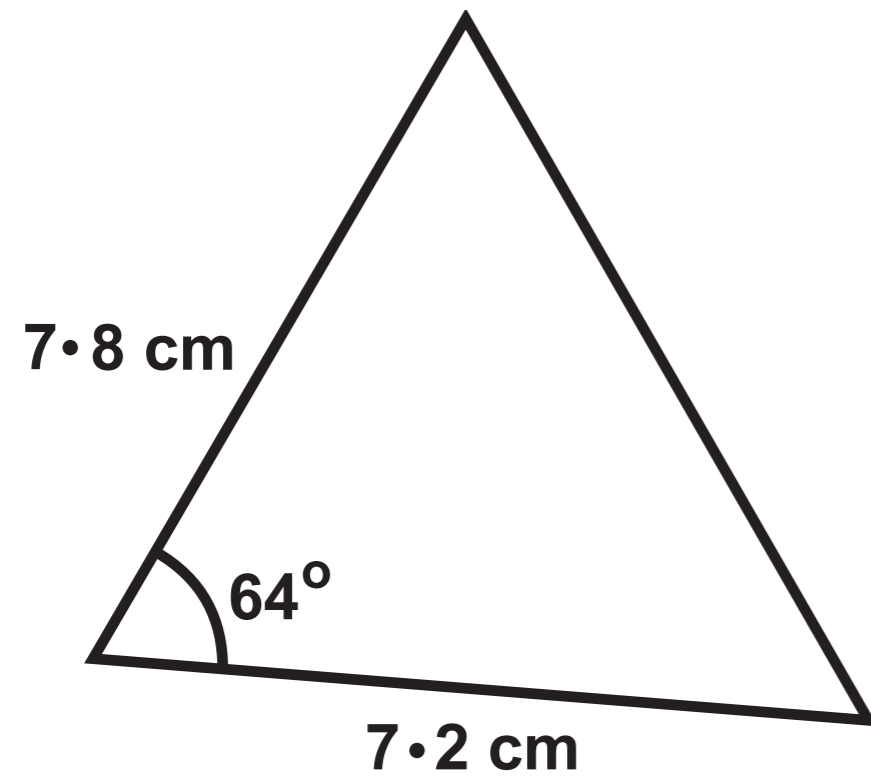
Question 14 (b)

Triangles NOT drawn to scale

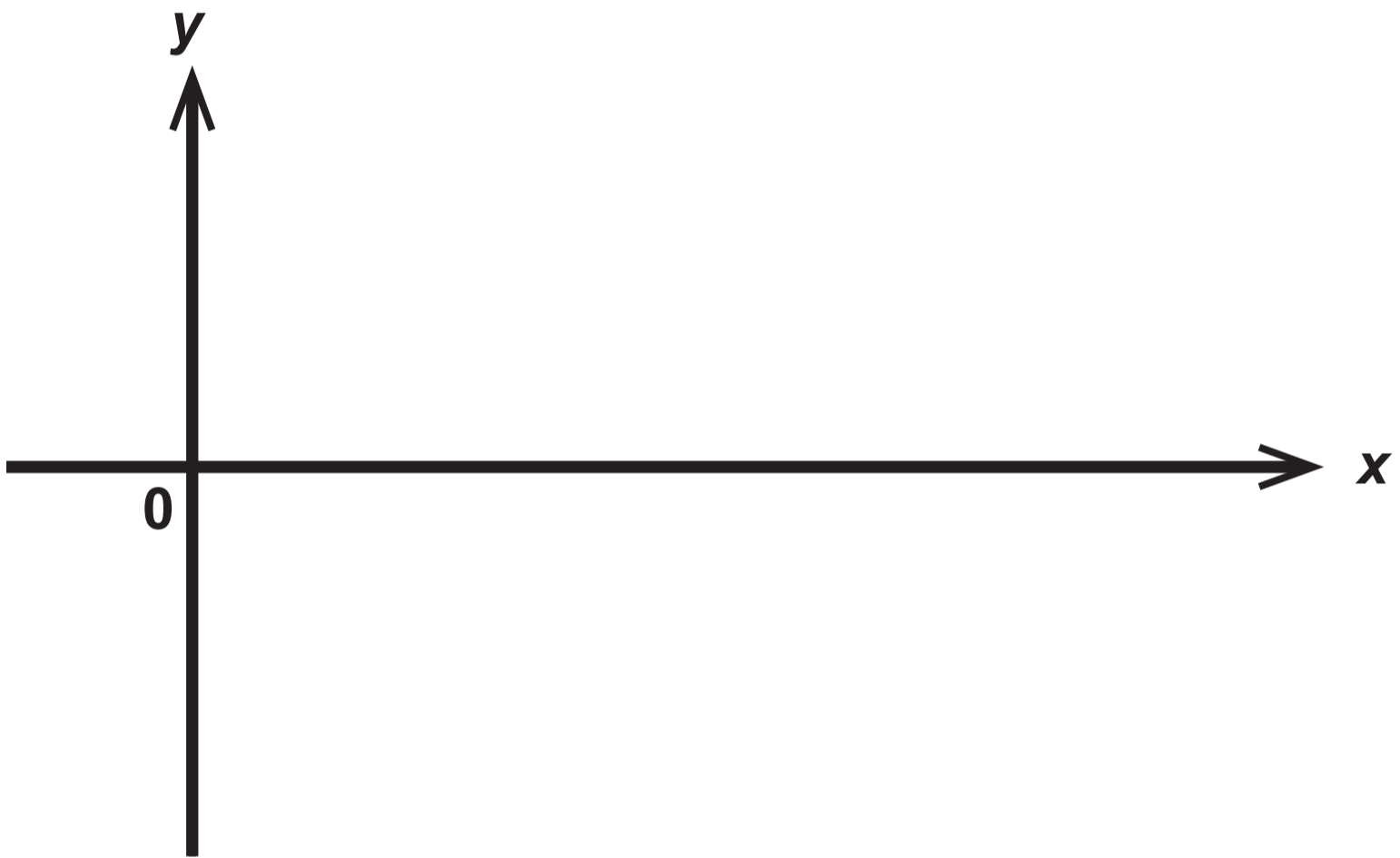


Question 14 (c)

Triangles NOT drawn to scale

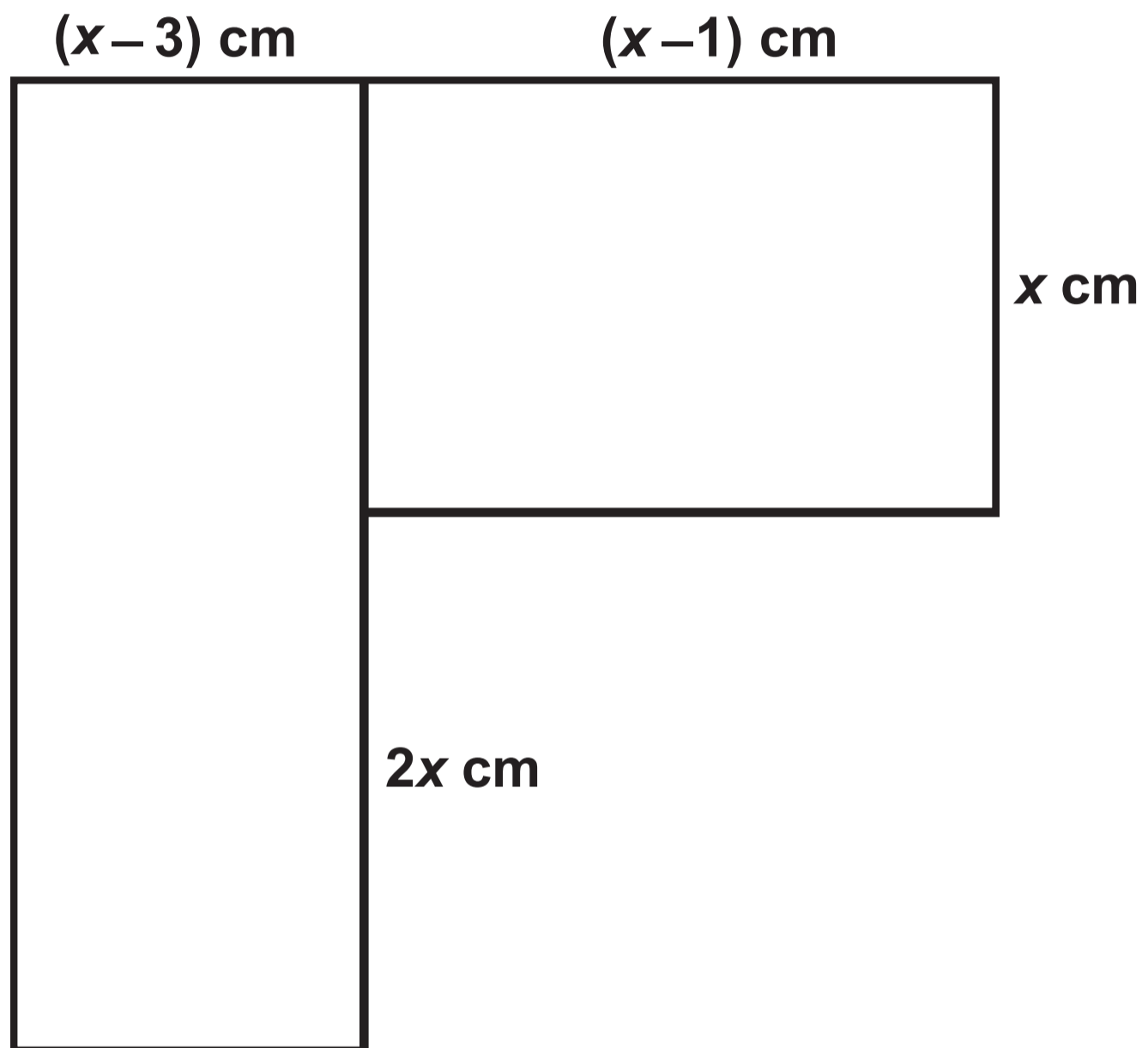


Question 15 (a)

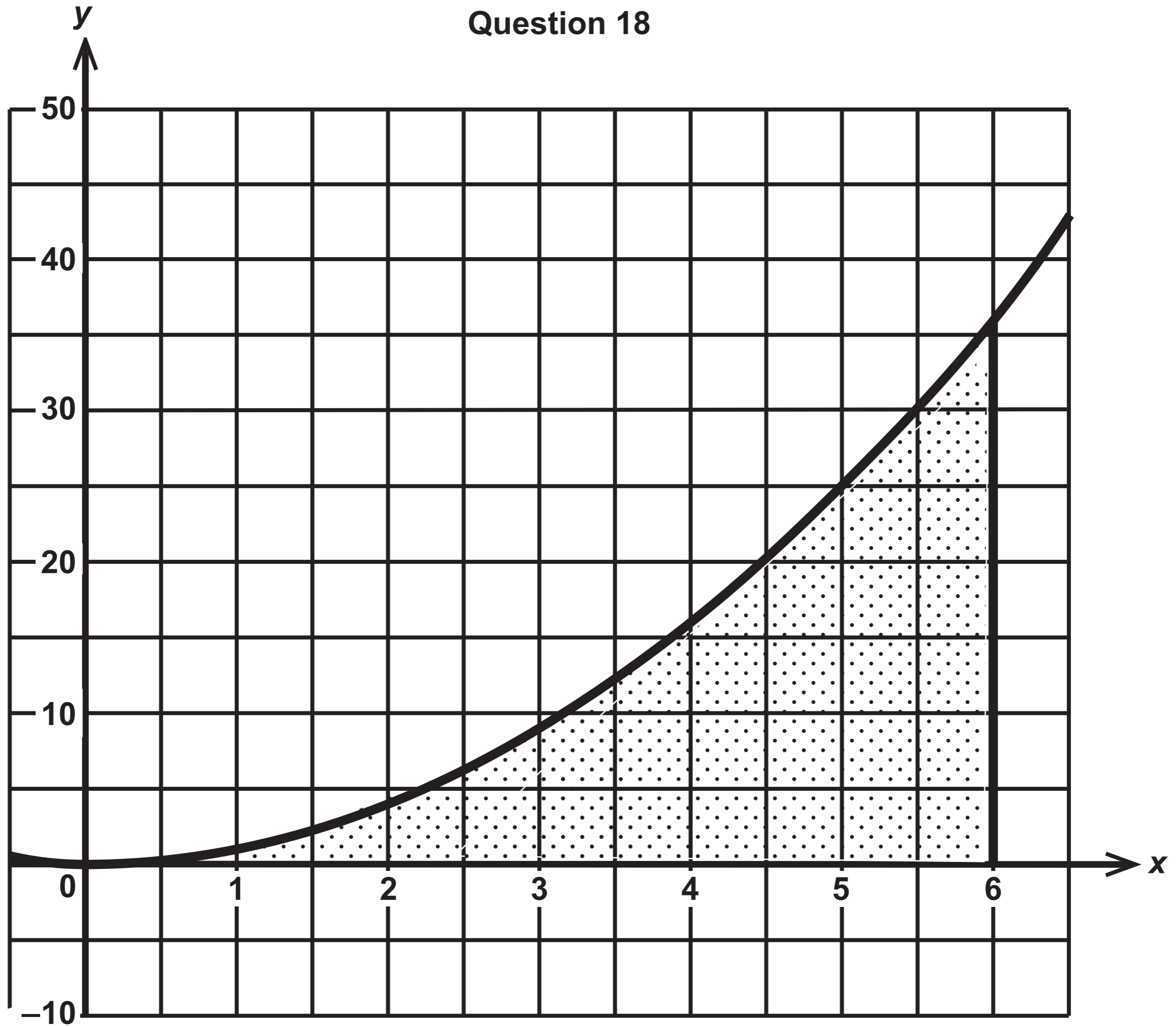


Question 16

Diagram NOT drawn to scale



Question 18



GCSE – NEW

3300U50-1



MATHEMATICS

UNIT 1: NON – CALCULATOR

HIGHER TIER

TUESDAY, 13 JUNE 2017 – MORNING

Spare Diagram Booklet

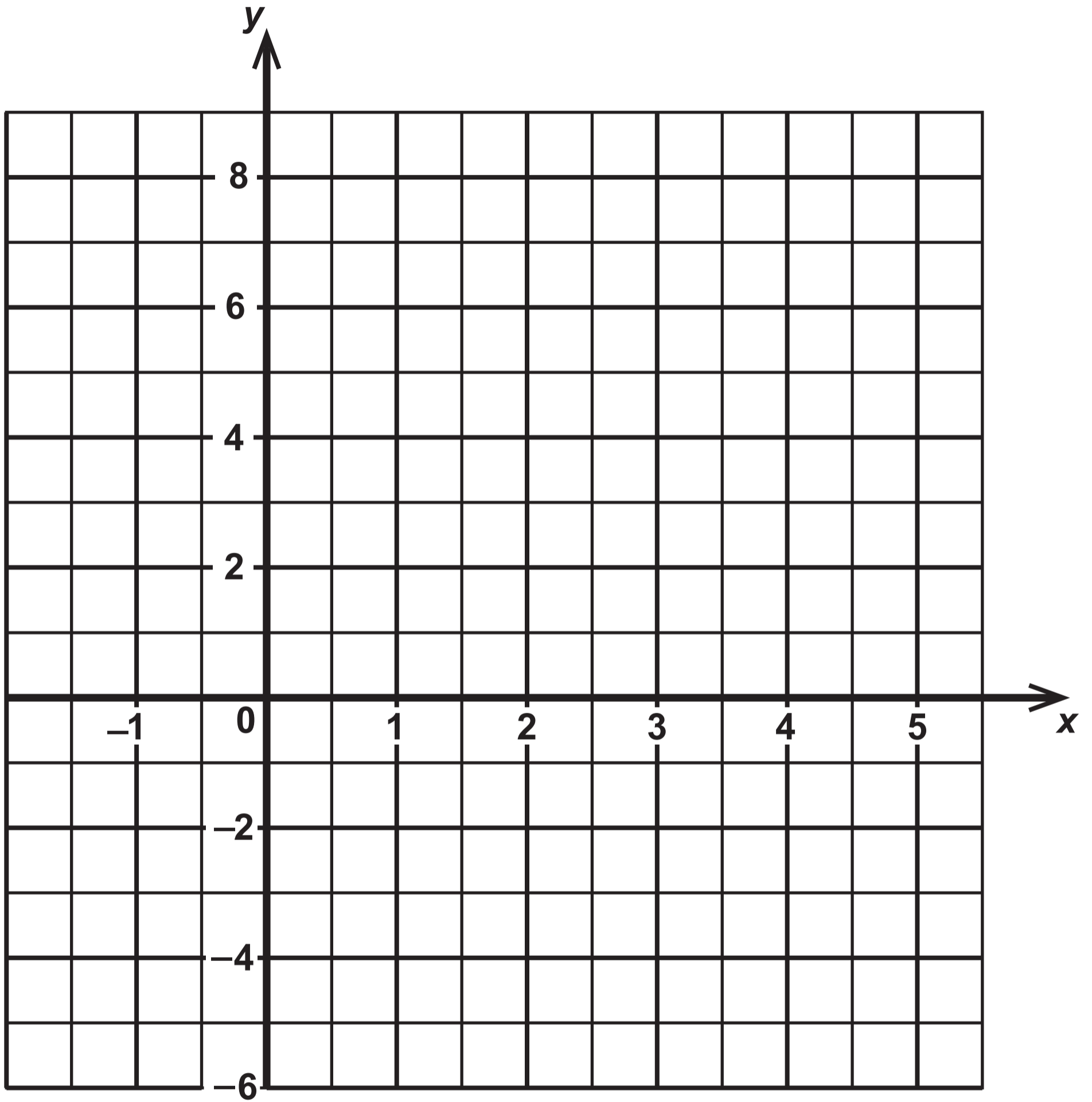
Surname:	
Other Names:	
Centre Number:	
Candidate Number:	0

Question 1

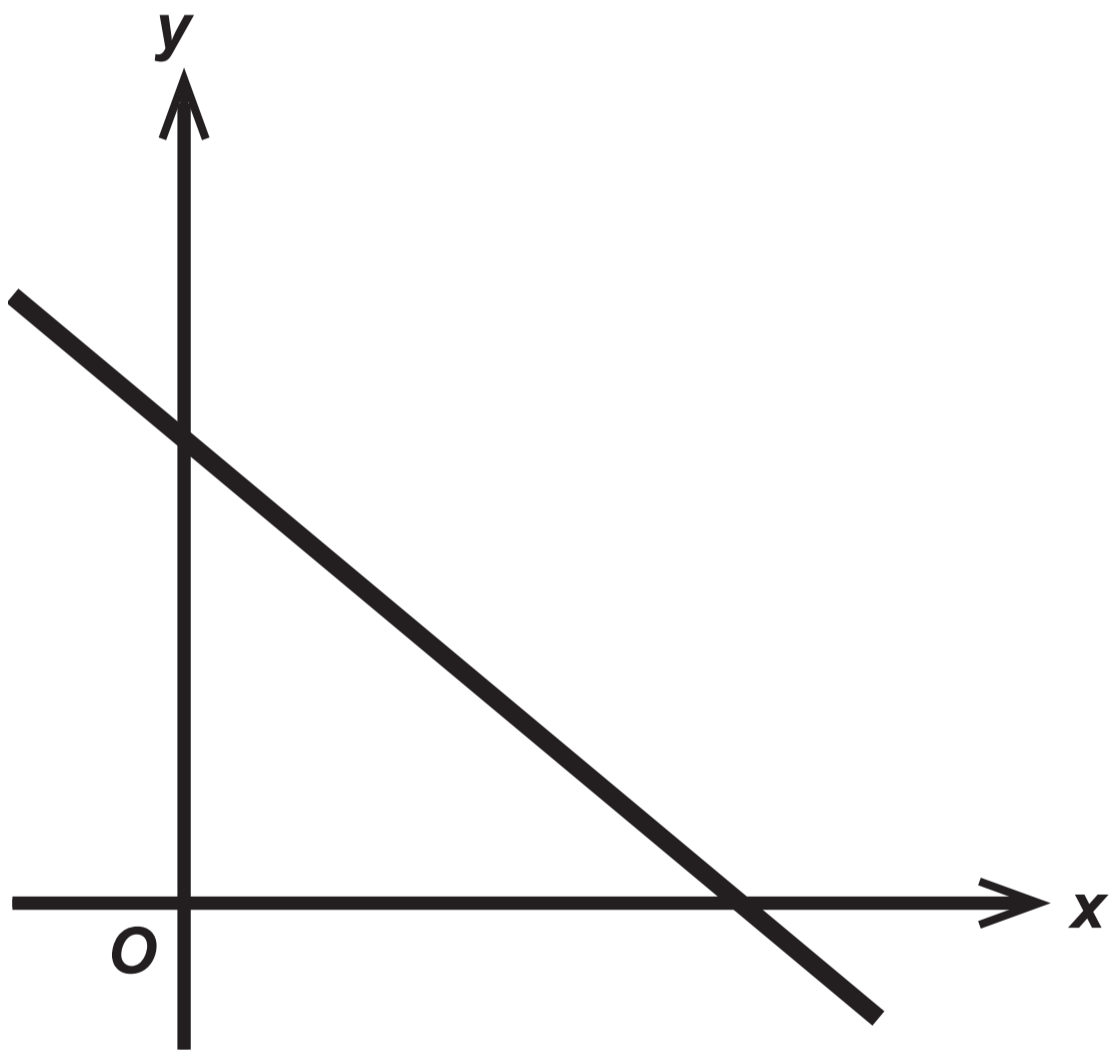
Table

Label	North	East	South	West
Probability	0.4	0.25	0.2	0.15

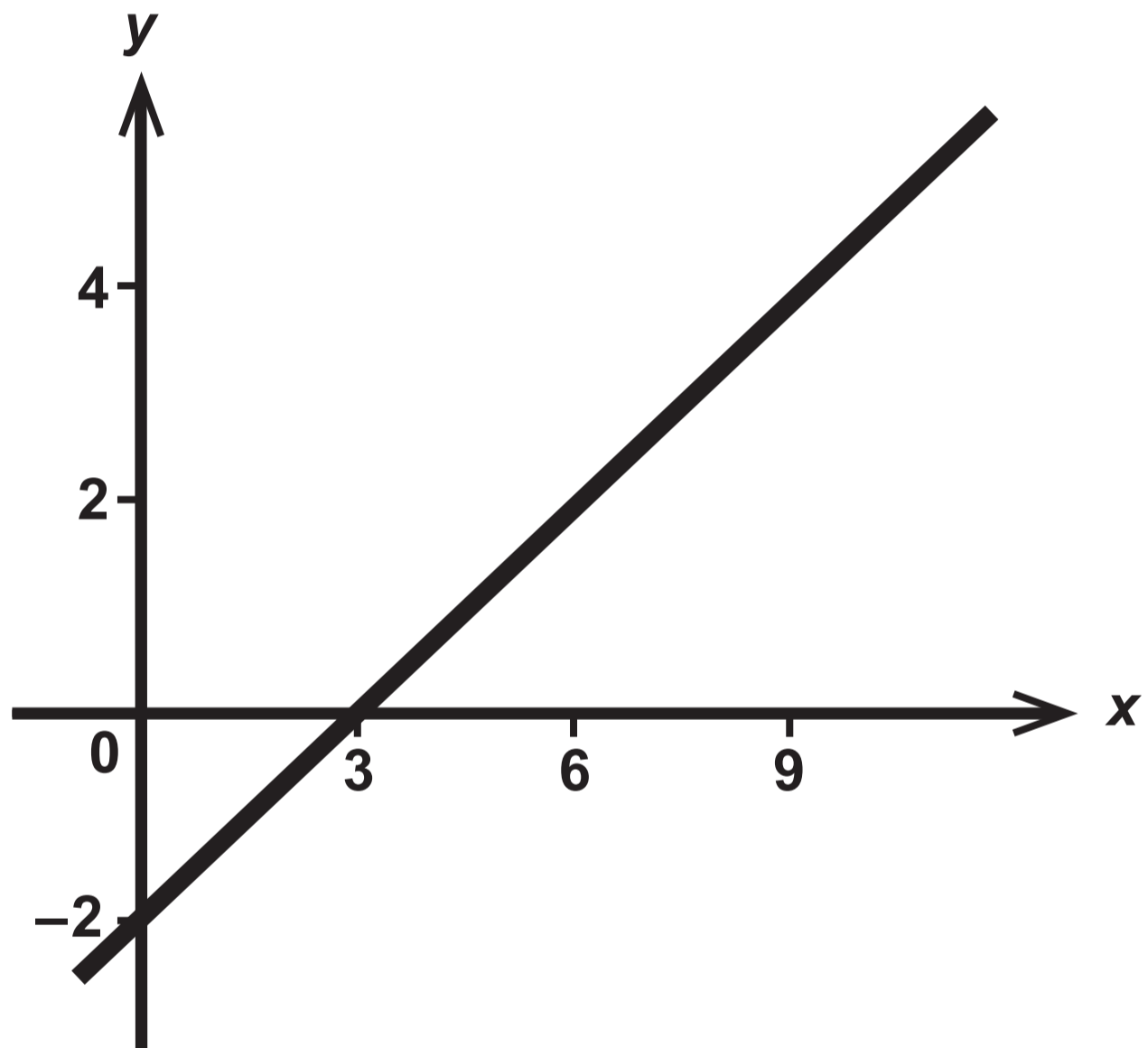
Question 2 (b)



Question 4 (a)



Question 4 (c)



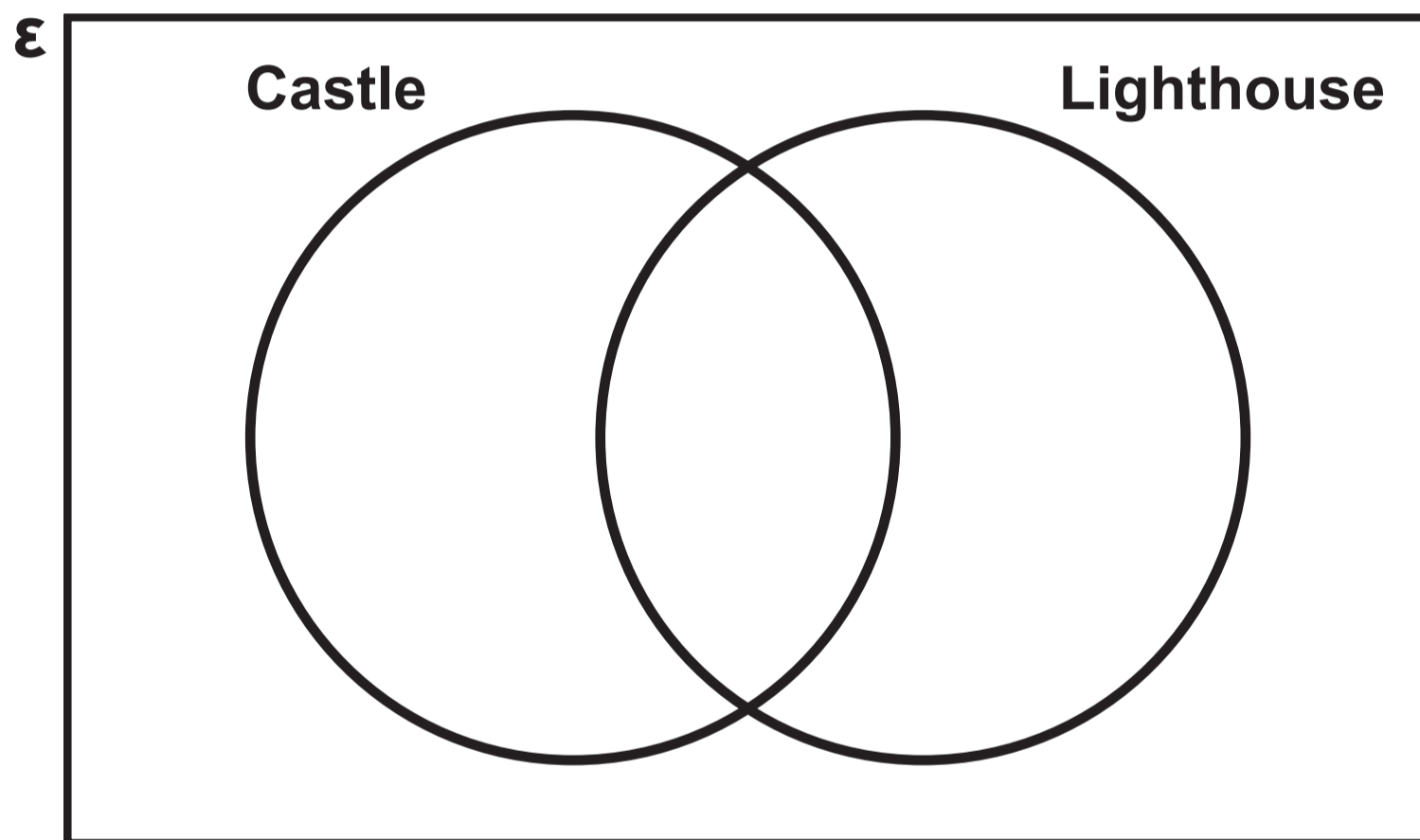
Question 6

Table

FORMULA	FORMULA COULD BE FOR
$d^3 - 3.14r^2h$	volume
$d^2 + hw$	
$d + w + h$	
$2\pi r - \pi r^2$	
$(d + h)w$	
$d^3 + dwh$	

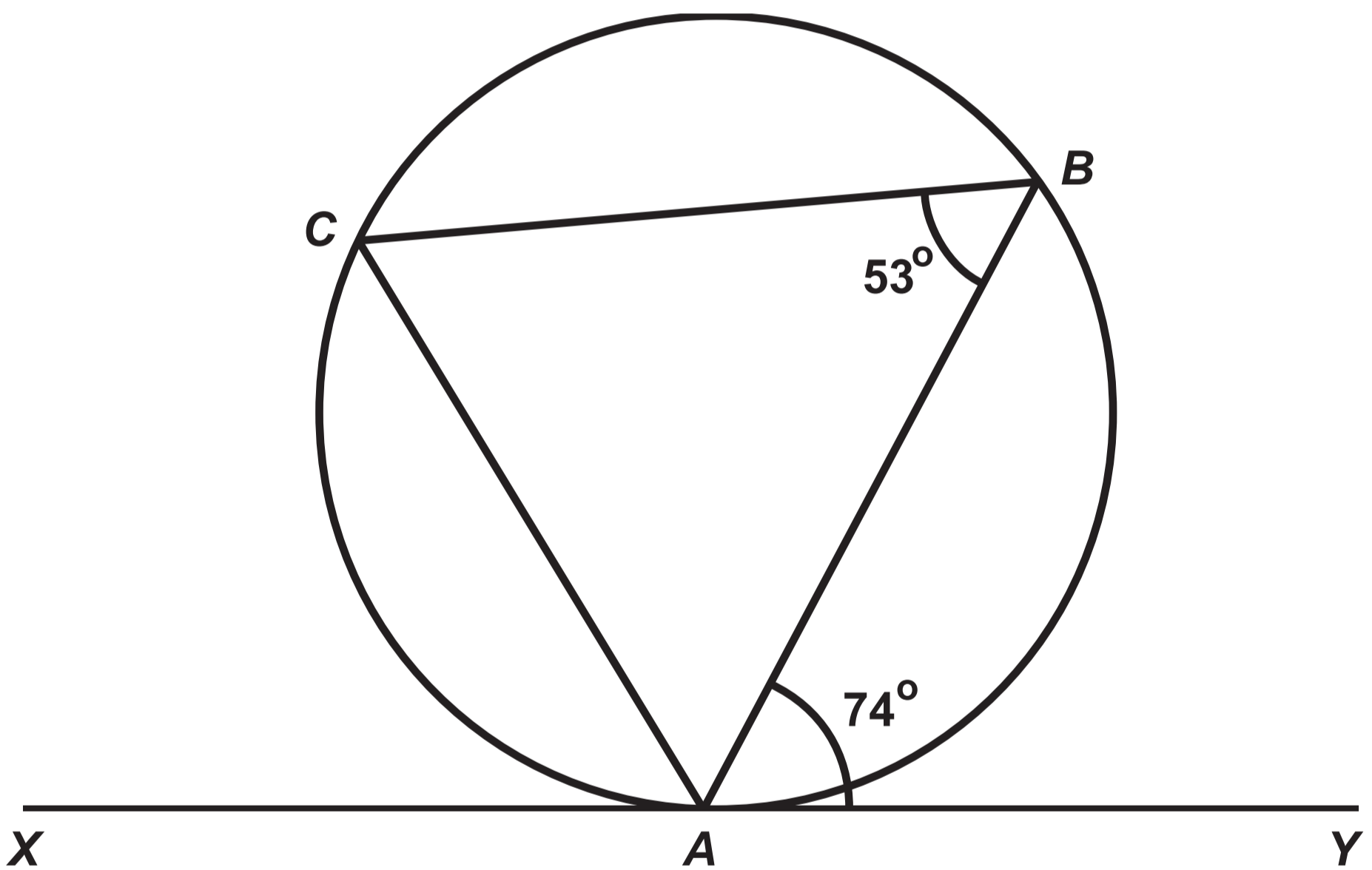
Question 7 (a)

The universal set, \mathcal{E} , contains all of the 20 people in the group.

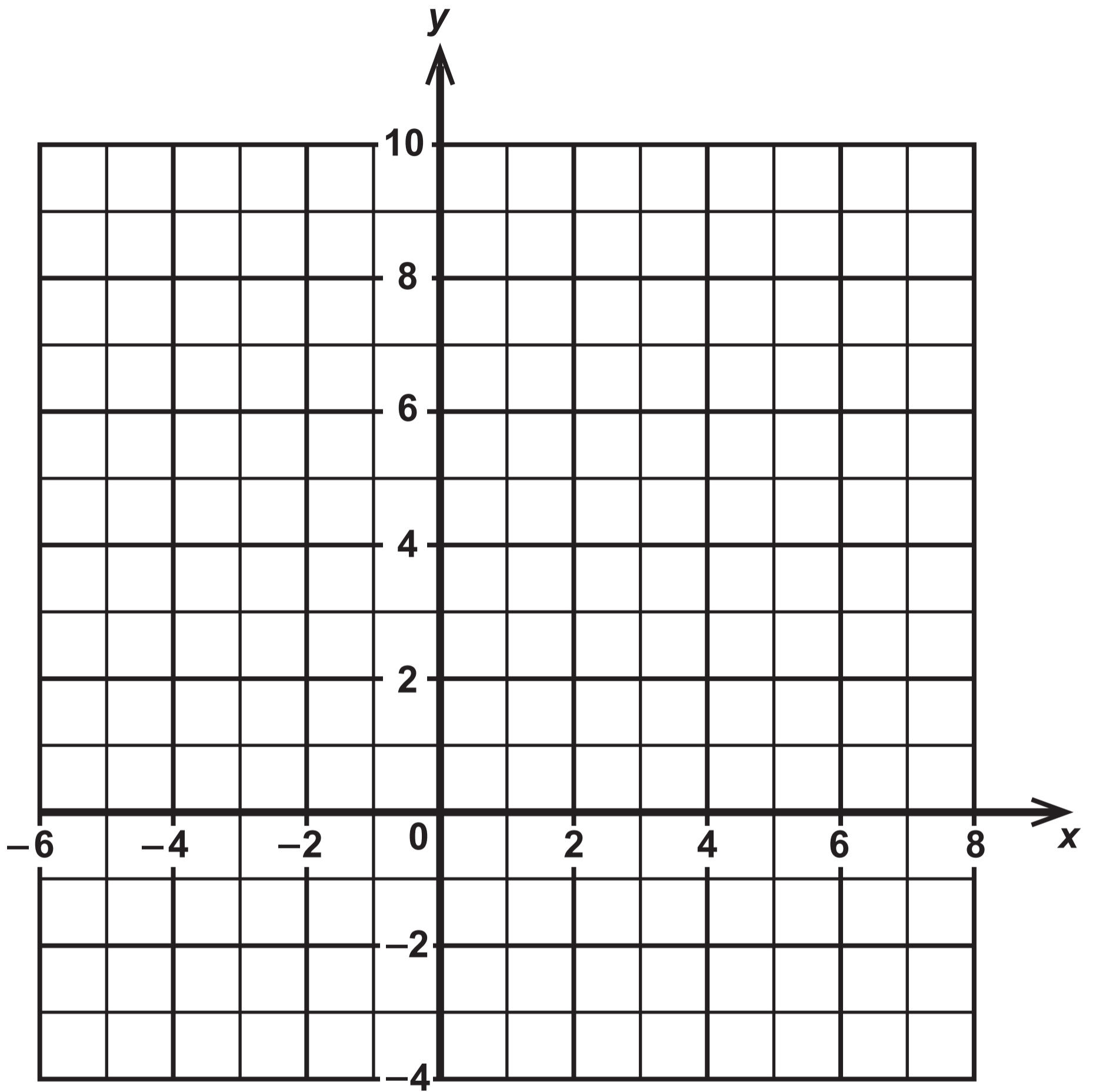


Question 12

Diagram NOT drawn to scale

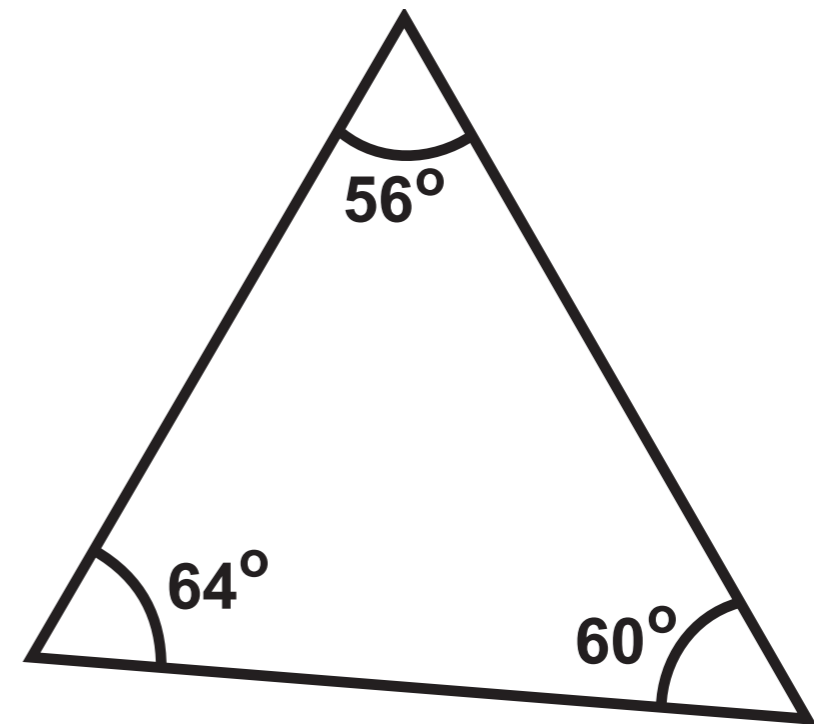
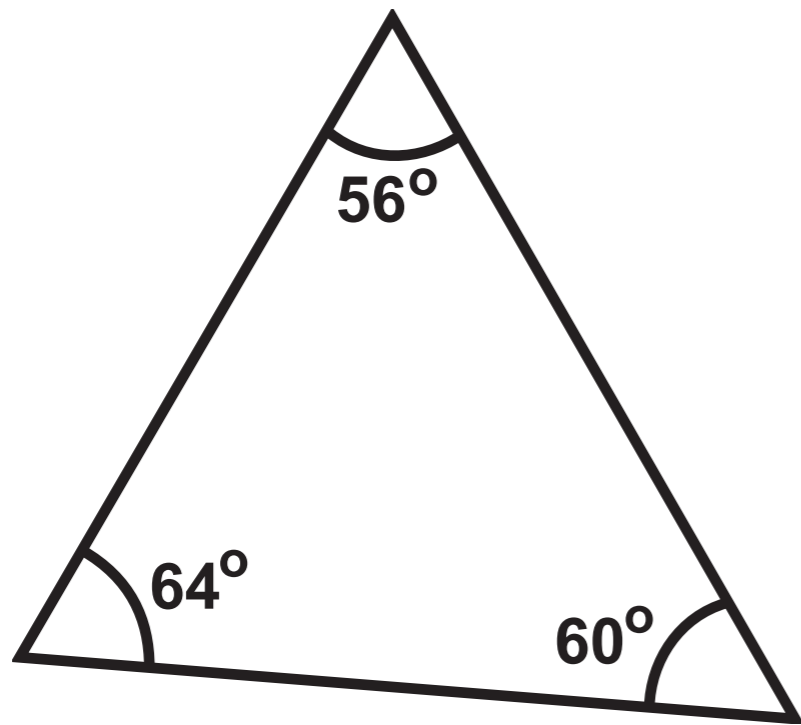


Question 13 (a)



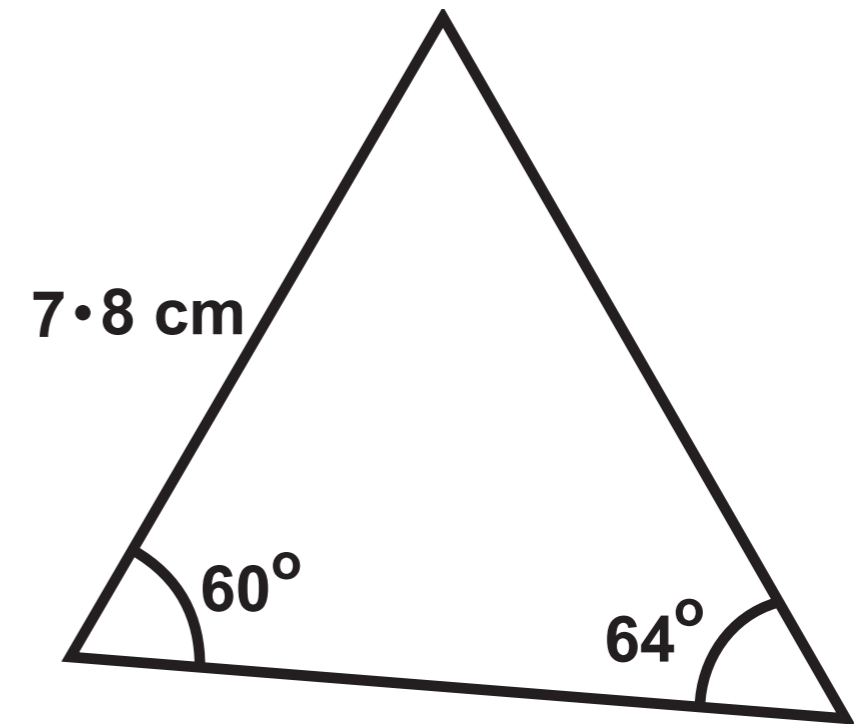
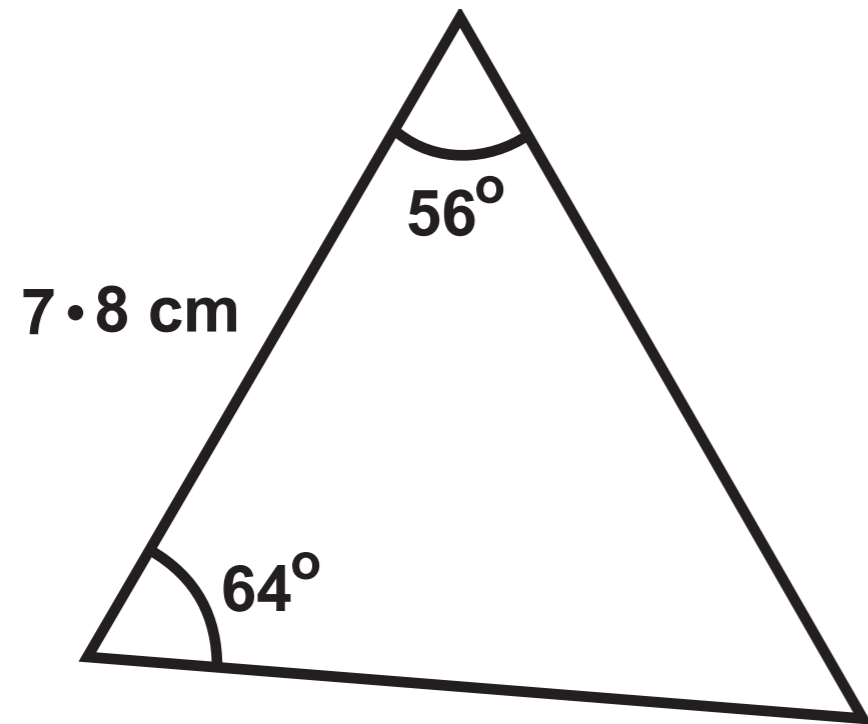
Question 14 (a)

Triangles NOT drawn to scale



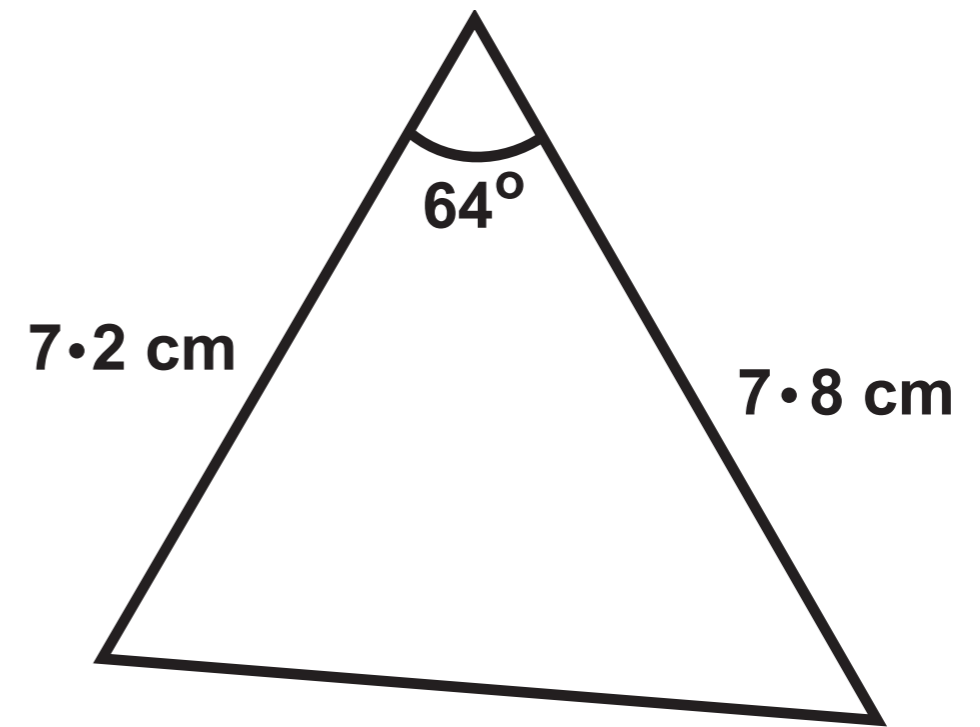
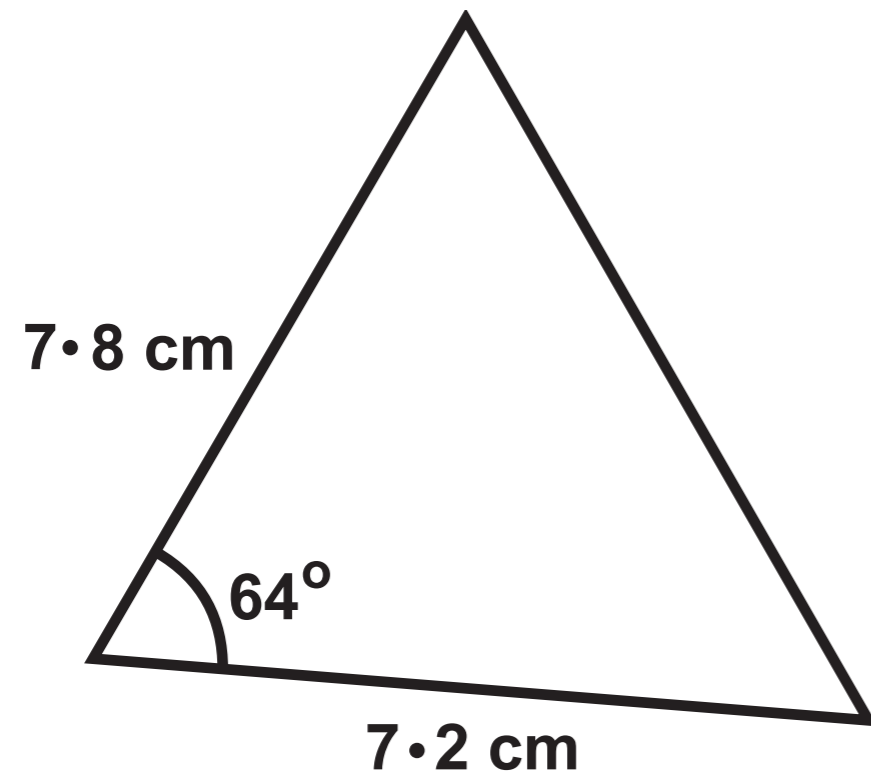
Question 14 (b)

Triangles NOT drawn to scale

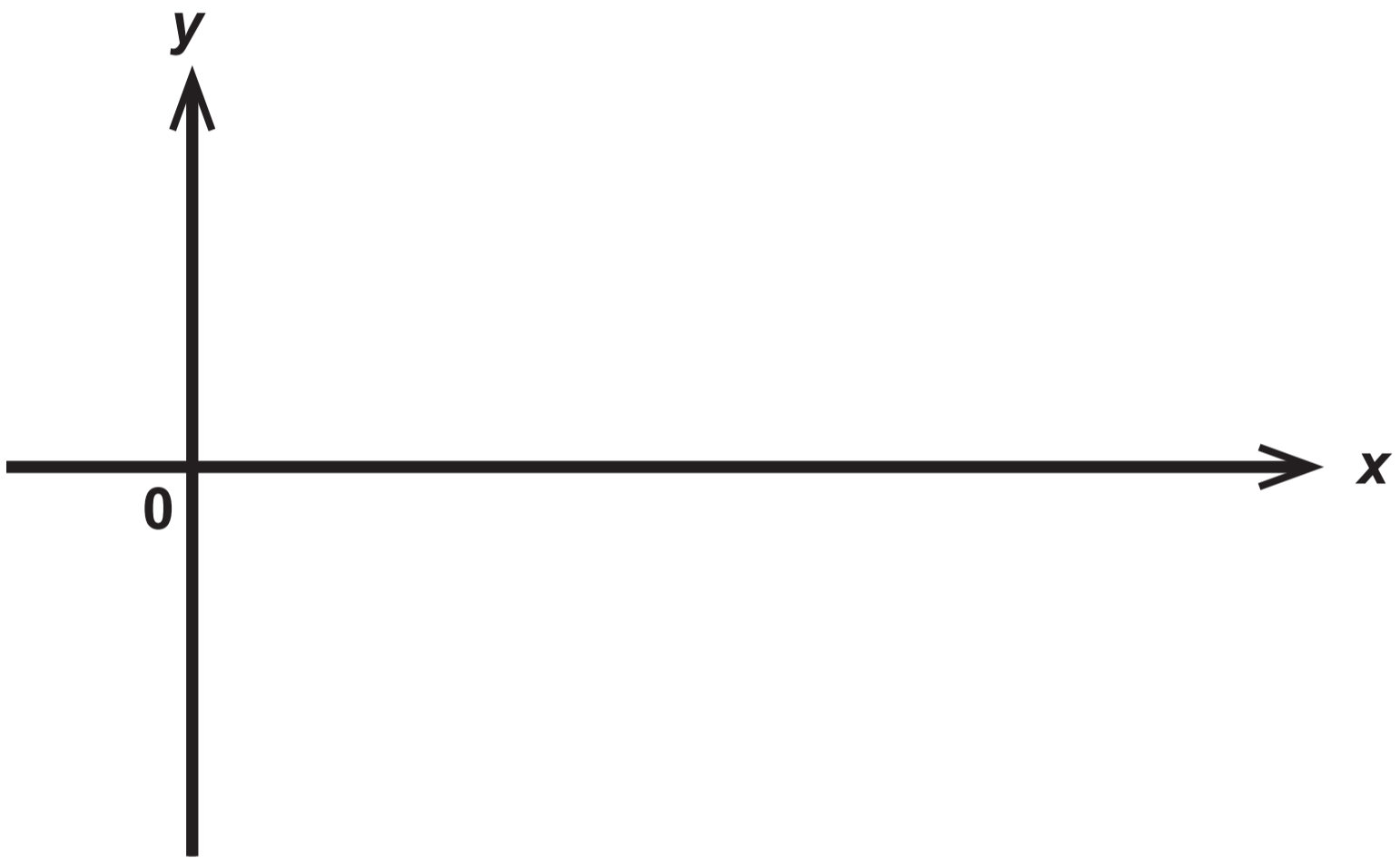


Question 14 (c)

Triangles NOT drawn to scale

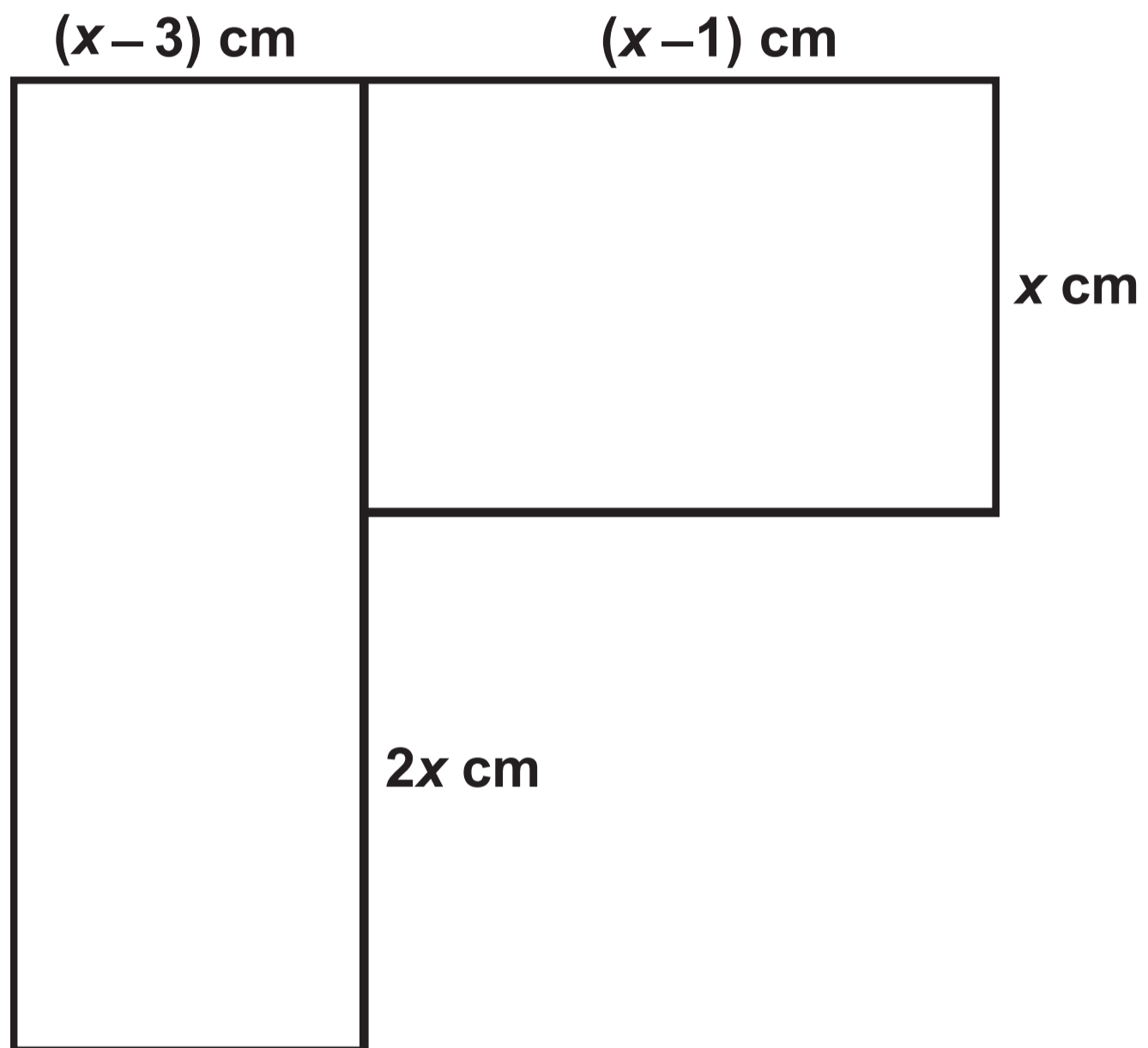


Question 15 (a)

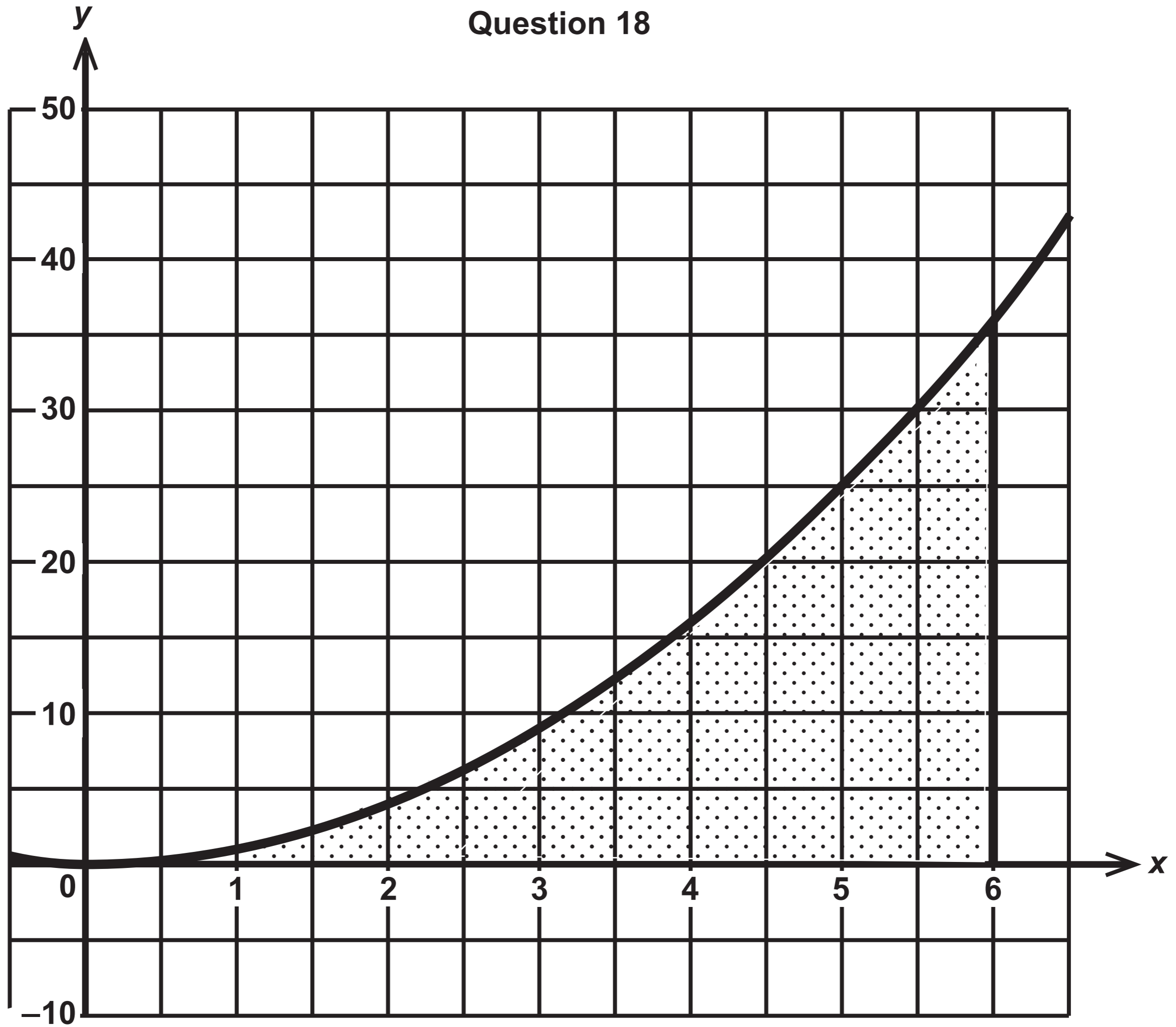


Question 16

Diagram NOT drawn to scale



Question 18



**GCSE – NEW
MATHEMATICS**



and

NUMERACY

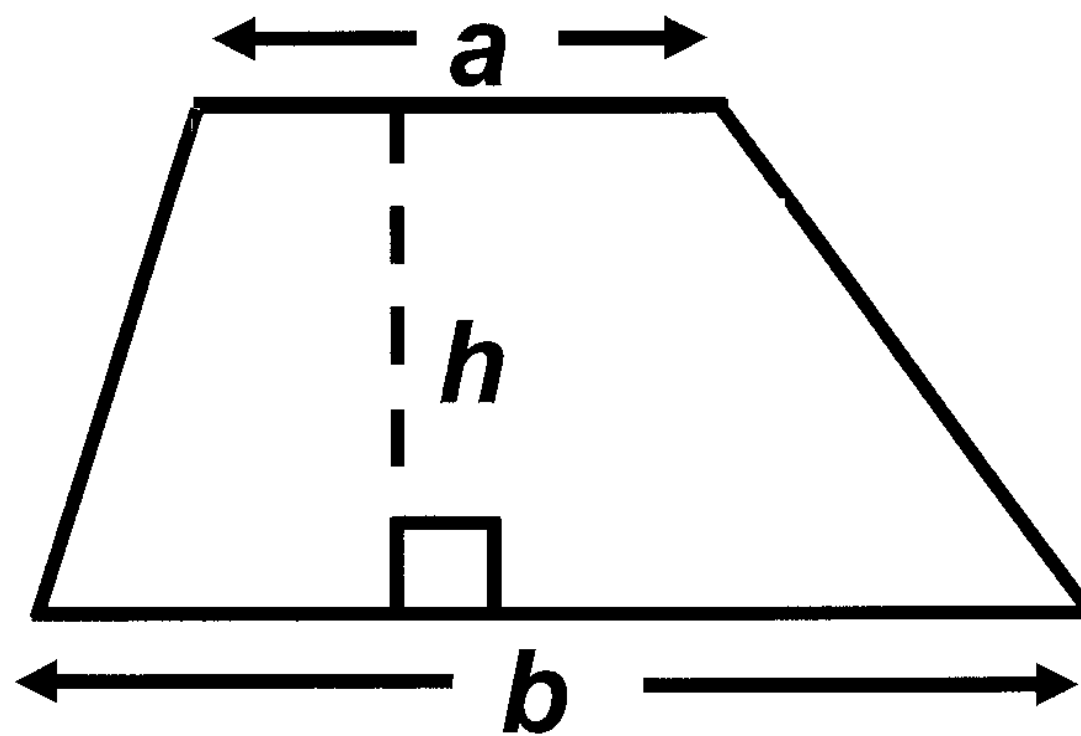
**FORMULA LIST
HIGHER TIER
GCSE**

**You must not write on these formula
pages.**

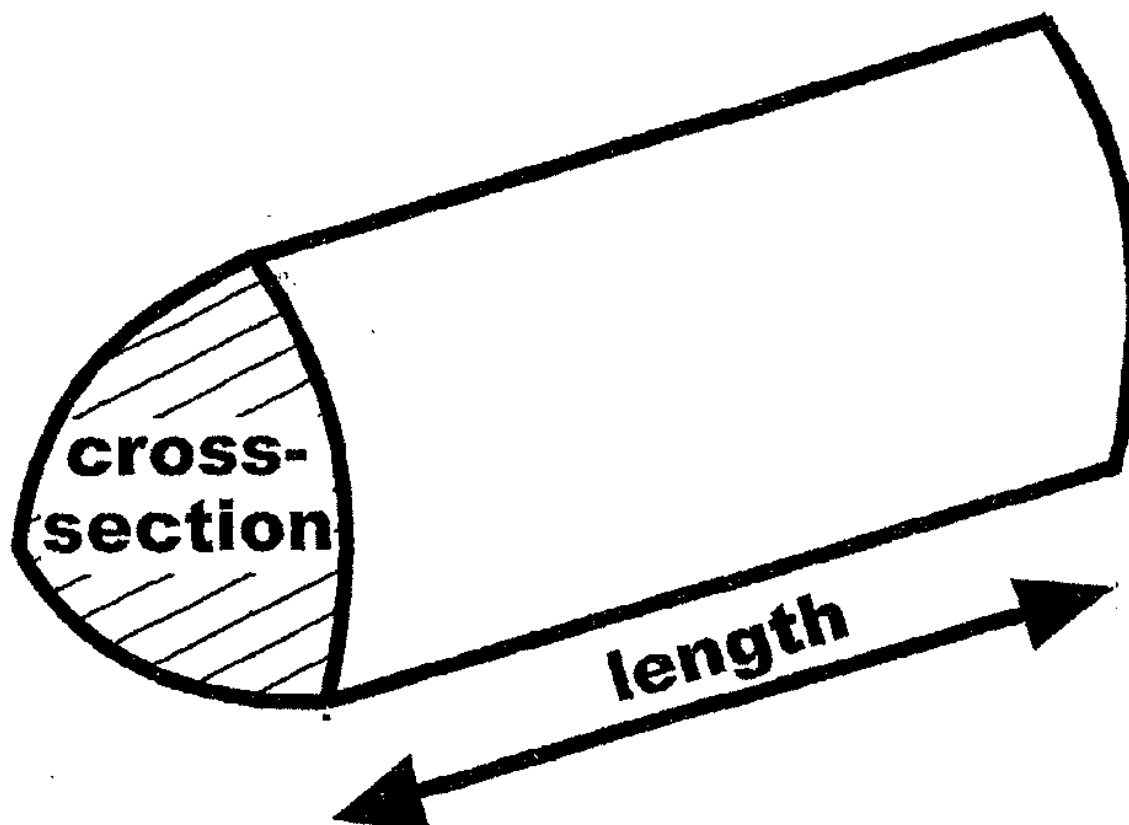
**Anything you write on these formula
pages will gain NO credit.**

Formula List – Higher Tier

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

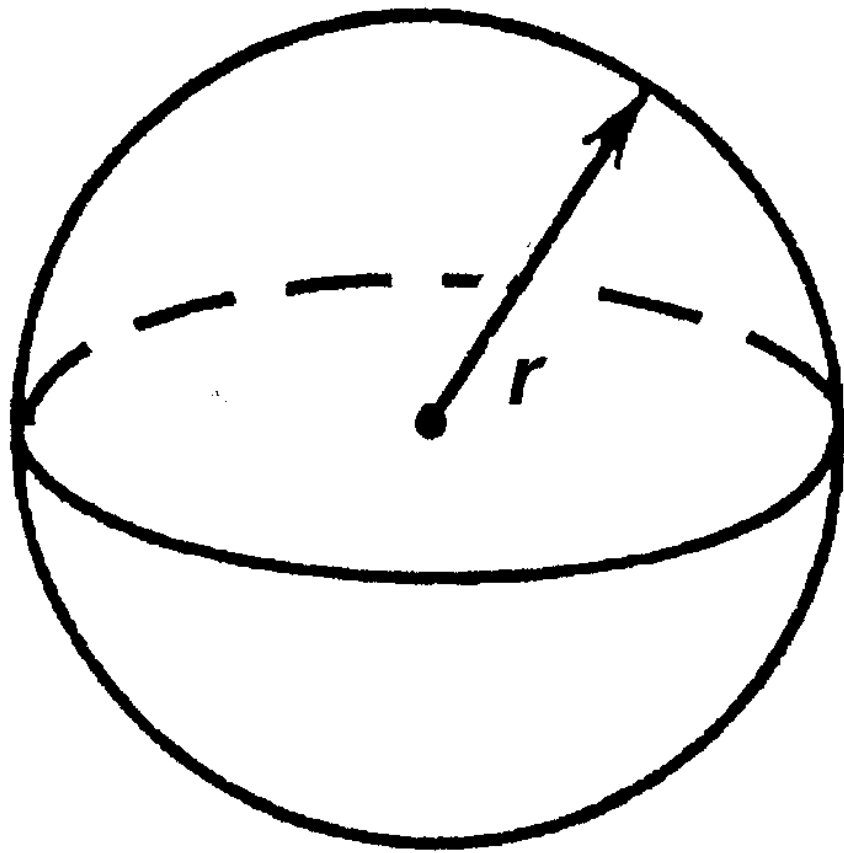


Volume of prism =
area of cross – section \times length



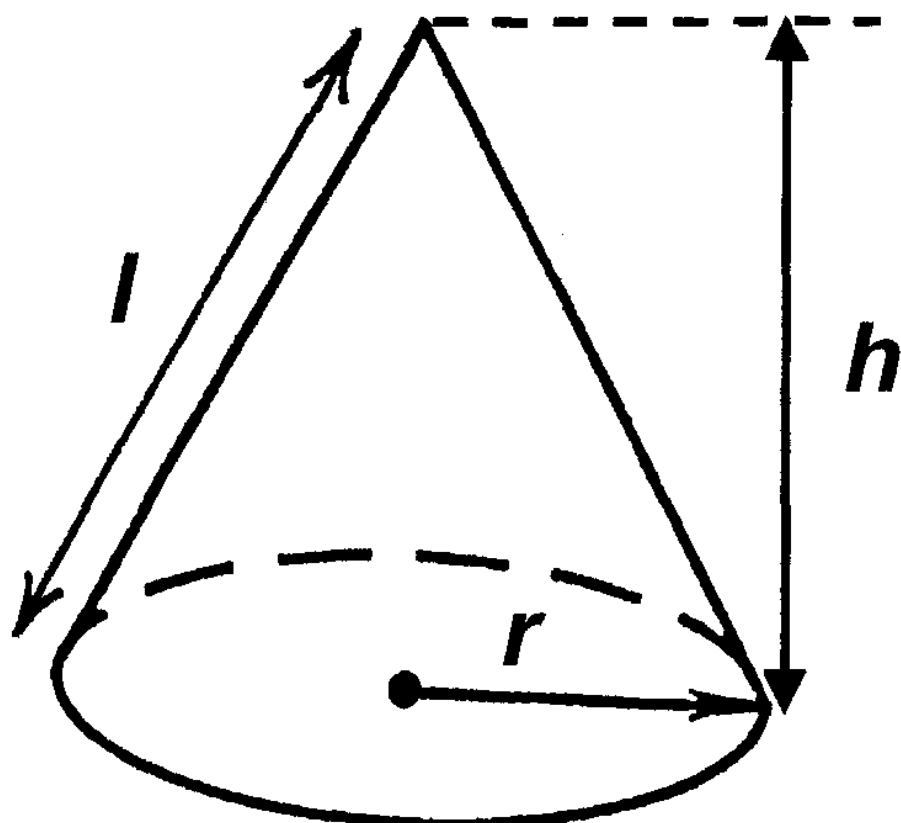
Volume of sphere = $\frac{4}{3}\pi r^3$

Surface area of sphere = $4\pi r^2$

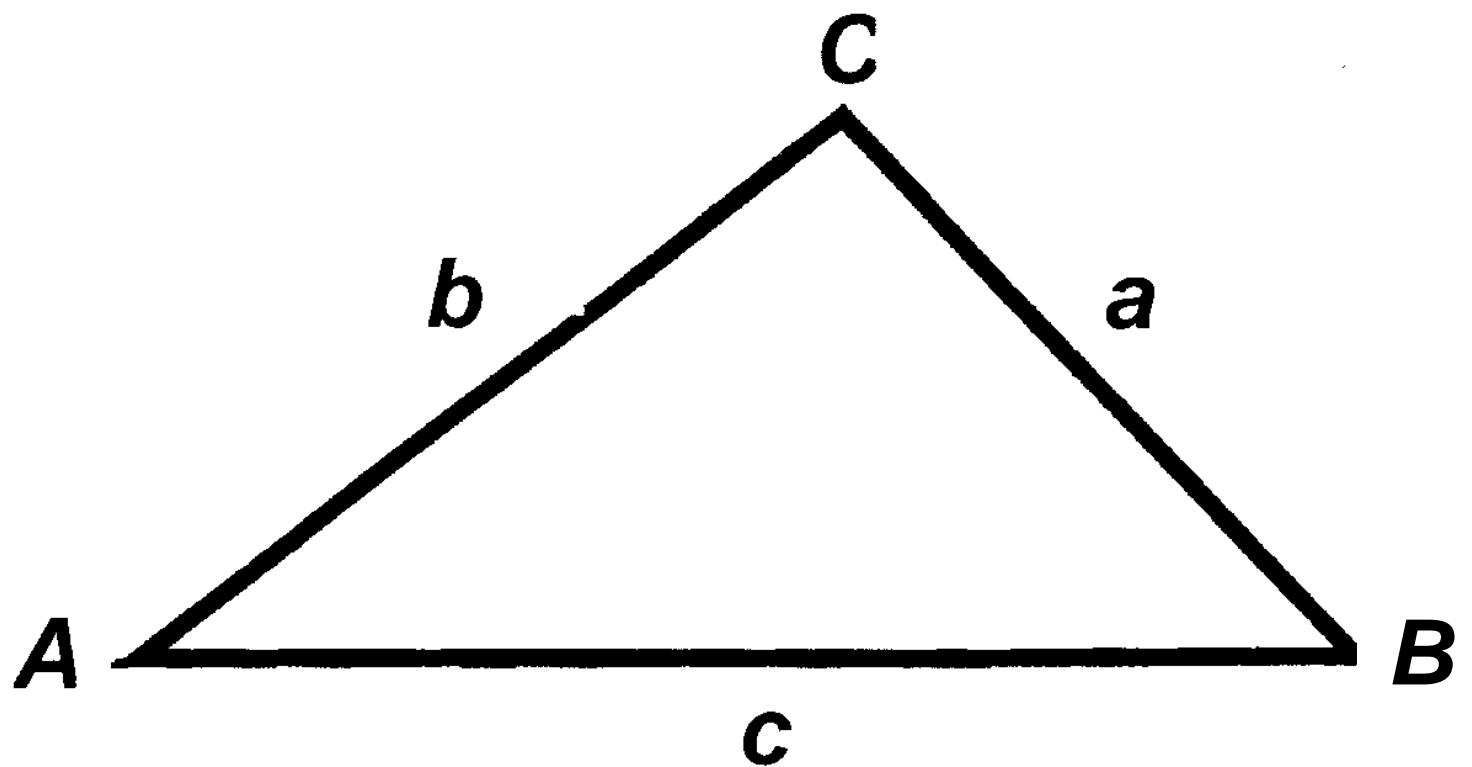


Volume of cone = $\frac{1}{3}\pi r^2 h$

Curved surface area of cone = $\pi r l$



In any triangle ABC



Sine Rule $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

Cosine Rule $a^2 = b^2 + c^2 - 2bc \cos A$

Area of triangle $= \frac{1}{2} ab \sin C$

The Quadratic Equation

The solutions of $ax^2 + bx + c = 0$

where $a \neq 0$, are given by

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Annual Equivalent Rate (AER)

AER, as a decimal, is calculated using the formula $\left(1 + \frac{i}{n}\right)^n - 1$, where i is the nominal interest rate per annum as a decimal and n is the number of compounding periods per annum.