



GCSE

3300U50 – 1

THURSDAY, 16 MAY 2024 – MORNING

MATHEMATICS

UNIT 1: NON – CALCULATOR

HIGHER TIER

1 hour 45 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.	6	
2.	6	
3.	3	
4.	5	
5.	5	
6.	4	
7.	3	
8.	3	
9.	5	
10.	3	
11.	3	
12.	6	
13.	5	
14.	2	
15.	3	
16.	9	
17.	4	
18.	5	
Total	80	

(Turn over)

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.

Model for Question 2

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

(Turn over)

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 $3 \cdot 14$

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

1. (a) Write the reciprocal of 4 as a decimal.

[1 mark]

- (b) Estimate the value of

$$\frac{79 \cdot 34}{40 \cdot 1 \times 0 \cdot 48}$$

You must show all your approximations in your working.

[2 marks]

continued on the next page . . .

(Turn over)

Question 1 continued**1. (c) Evaluate**

$$1\frac{5}{7} + 2\frac{11}{14}$$

Give your answer in its simplest form.

[3 marks]**(Turn over)**

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

Ask for the model for Question 2.

The model is NOT made to scale.

The model is a right – angled triangular prism.

Look at the diagram for Question 2 in the
separate Diagram Booklet.

The diagram is NOT drawn to scale.

The right – angled triangle ABC is a
cross – section of a prism, as shown in
the diagram.

In the diagram,

$AB = 9$ cm,

$BC = 10$ cm and angle $ABC = 90^\circ$

The length of the prism is 20 cm.

continued on the next page . . .

(Turn over)

Question 2 continued

Calculate the volume of the prism.

You must show all your working.

(Turn over)

[4 marks + 2 marks OCW]

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

Point P lies on:

- the bisector of angle ABC
- the perpendicular bisector of line BC .

Using only a ruler and a pair of compasses,
CONSTRUCT suitable lines and arcs to show the
position of point P .

Construction arcs must be clearly shown.

[3 marks]

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

The diagram is NOT drawn to scale.

The diagram shows a shape ***ABCDEF*** made by joining two rectangles together.

The area of the whole shape ***ABCDEF*** is 89 cm^2

In the diagram

$$AB = (y + 8) \text{ cm}$$

$$AF = 7 \text{ cm}$$

$$CD = 3 \text{ cm}$$

$$DE = (y + 1) \text{ cm}$$

Form and solve an equation to find the value of y

(Turn over)

[5 marks]

(Turn over)

- 5. Look at the information for Question 5 in the separate Diagram Booklet.**

It is information about a Lowest Common Multiple (LCM) and a Highest Common Factor (HCF).

Calculate the value of n .

You must show all your working.

[illegible]

(Turn over)

(Turn over)

15

n = _____

[5 marks]

(Turn over)

6. A group of people hired two buses, Bus A and Bus B, to take them home from a party.

Bus A left the party at 11:00 p.m.

Bus B left the party at midnight.

A person from the group is chosen at random.

The probability that this person left the party

on Bus A is $\frac{3}{8}$

The probability that this person sat on the left – hand side of the bus is equal to the probability that this person sat on the right – hand side.

- (a) Look at the diagram for Question 6 (a) in the separate Diagram Booklet.

The diagram is an incomplete tree diagram. Complete the tree diagram.

[2 marks]

continued on the next page . . .

(Turn over)

Question 6 continued

- 6. (b) What is the probability that this person sat on the right – hand side of the bus that left at midnight?**

[2 marks]

(Turn over)

7. (a) Express 0.0057 in standard form.

[1 mark]

(b) Calculate the value of

$$\frac{2 \times 10^4}{5 \times 10^{-3}}$$

Give your answer in standard form.

[2 marks]

(Turn over)

8. A car travels a distance of x miles in 2 hours.
In the next hour, it travels a further distance
of 36 miles.

Its average speed for the whole journey
is 42 mph.

Calculate the value of x .

You must show all your working.

[3 marks]

(Turn over)

9. Look at the diagrams for Question 9 in the separate Diagram Booklet.

The diagrams are NOT drawn to the same scale.

The diagrams show kite $ABCD$ and isosceles triangle PQR .

In the kite diagram:

$$AB = 13 \text{ cm}$$

$$AD = (2x + 3y) \text{ cm}$$

$$BC = 22 \text{ cm}$$

$$DC = (8x - 3y) \text{ cm}$$

In the isosceles triangle diagram:

$$PQ = x \text{ cm}$$

$$PR = x \text{ cm}$$

$$RQ = y \text{ cm}$$

continued on the next page . . .

Question 9 continued

**Using the information shown on the kite,
calculate the perimeter of the isosceles triangle.
Do not use a trial and improvement method.
You must show all your working.**

(Turn over)

Perimeter of the isosceles triangle

= _____ cm

[5 marks]

(Turn over)

10. Look at the diagram for Question 10 in the separate Diagram Booklet.

The diagram is NOT drawn to scale.

The area of the shaded sector AOB shown in

the diagram is $\frac{132\pi}{5} \text{ cm}^2$

In the diagram $AO = 6 \text{ cm}$

Angle $AOB = x$

Find the size of angle x .

In your working, you should express any areas in terms of π .

(Turn over)

(Turn over)

11. Look at the diagram for Question 11 in the separate Diagram Booklet.

The diagram shows triangle **A** and triangle **B** on a coordinate grid.

Describe fully the **SINGLE** transformation that transforms triangle **A** onto triangle **B**.

[3 marks]

12. x is proportional to $\sqrt{w}$ and $x = 24$
when $w = 36$

Also, y is inversely proportional to x ,
and $y = 8$ when $x = 15$

Find the value of y when $w = 25$

30

[6 marks]

(Turn over)

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

The diagram is NOT drawn to scale.

Points A , B , C , D lie on a circle.

The line FAE is a tangent to the circle at A .

Angle $BCD = 114^\circ$

Angle $DBA = x^\circ$

Angle $BAE = 2x^\circ$

Calculate the value of x .

You must state any circle theorems that you use.

(Turn over)

[5 marks]

(Turn over)

14. Factorise $2x^2 - 17x + 30$

[2 marks]

(Turn over)

15. (a) Circle the correct answer in each of the following questions:

(i) $\sqrt{20}$ is equal to

$5\sqrt{2}$	$2\sqrt{5}$	10	$5\sqrt{4}$	$4\sqrt{5}$
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[1 mark]

(ii) $\sqrt{2} + \sqrt{50}$ is equal to

$\sqrt{52}$	10	$6\sqrt{2}$	26	$26\sqrt{2}$
-------------	----	-------------	----	--------------

[1 mark]

continued on the next page . . .

(Turn over)

Question 15 continued

15. (b) When $q = \sqrt{18}$, which ONE of the following produces a rational number?
Circle your answer.

$\sqrt{q}$	$\frac{q}{2}$	$q - 2$	q^4	$18q$
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[1 mark]

(Turn over)

16. (a) Simplify $\frac{4y^2 + 8xy}{y^2 - 4x^2}$

This image shows a blank sheet of white paper with horizontal black ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

[4 marks]

continued on the next page . . .

(Turn over)

Question 16 continued

16. (b) Make f the subject of the following formula.

$$\sqrt{hf^2 - m} = 3f$$

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. There are no margins, text, or other markings on the paper.

(Turn over)

[5 marks]

17. Eleven cards are placed in a box.

Seven of the cards are red and the rest are blue.

Gareth selects two cards at random and does not replace them.

He claims that the probability of selecting two cards of the same colour is equal to the probability of selecting two cards of different colours.

Is Gareth correct?

You must show your working and justify your answer.

(Turn over)

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

The highest point of a curve is called a maximum point.

The diagram shows a sketch of the curve with equation $y = f(x)$

The maximum point of this curve has coordinates $(-2, 5)$

- (i) On the same diagram, sketch the curve $y = f(x - 6)$

Mark clearly the coordinates of any point where the new curve crosses an axis.

[2 marks]

- (ii) Complete the following sentence.

The maximum point of the curve $y = f(x - 6)$ has coordinates

[1 mark]

continued on the next page . . .

(Turn over)

Question 18 continued

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

The diagram shows a sketch of $y = g(x)$

On the same diagram, sketch the curve $y = -g(x)$

Mark clearly the coordinates of any point where the new curve crosses an axis.

[2 marks]

END OF PAPER

TOTAL 80 MARKS

(Turn over)

[illegible]

(Turn over)

[illegible]



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MATHEMATICS

UNIT 1: NON – CALCULATOR

HIGHER TIER

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

Diagram Booklet

Surname: _____

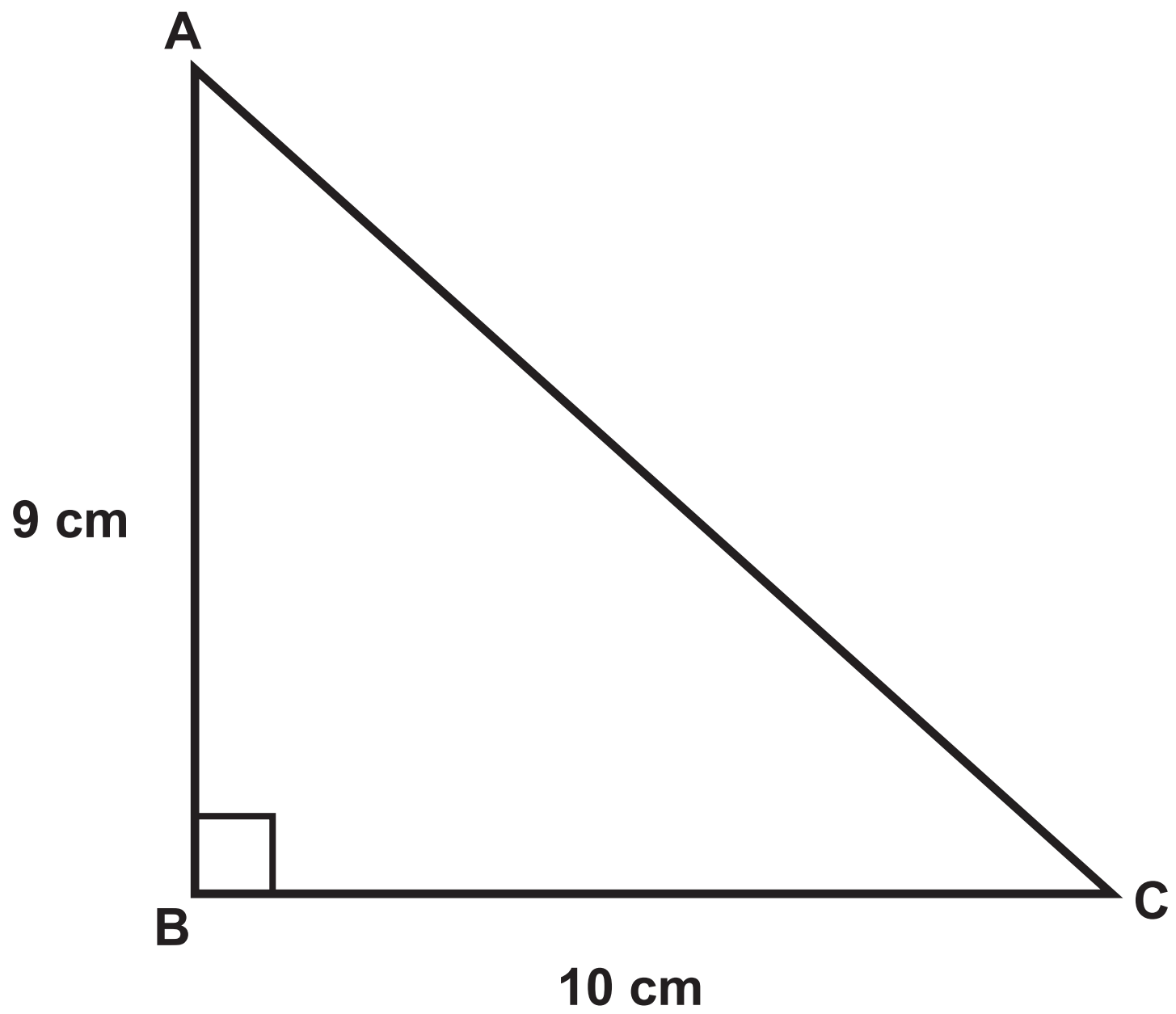
First name(s): _____

Centre Number: _____

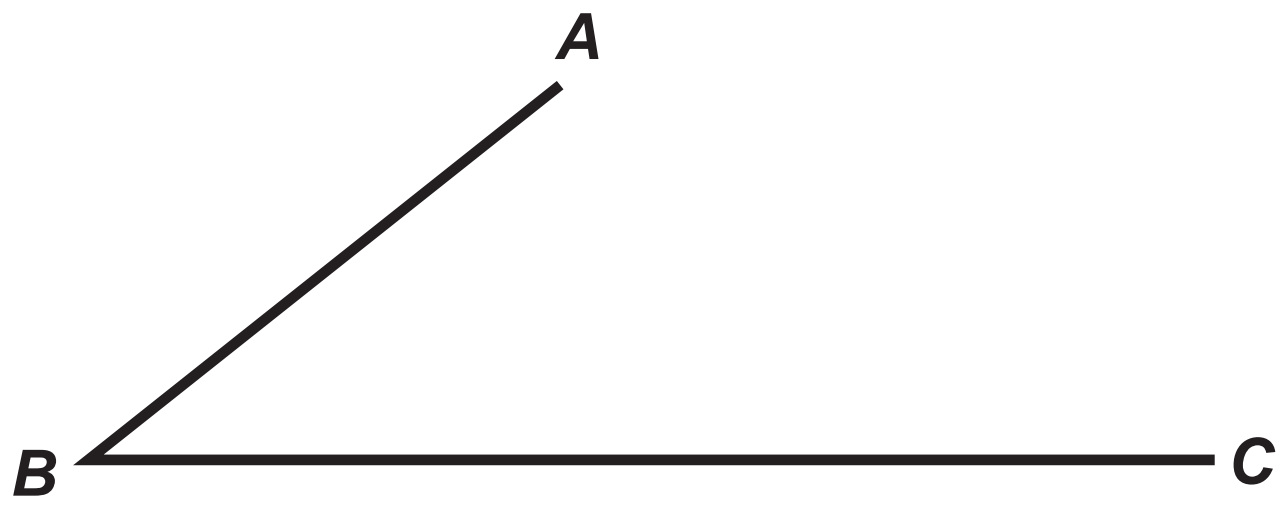
Candidate Number: 0 _____

Question 2

Diagram NOT drawn to scale

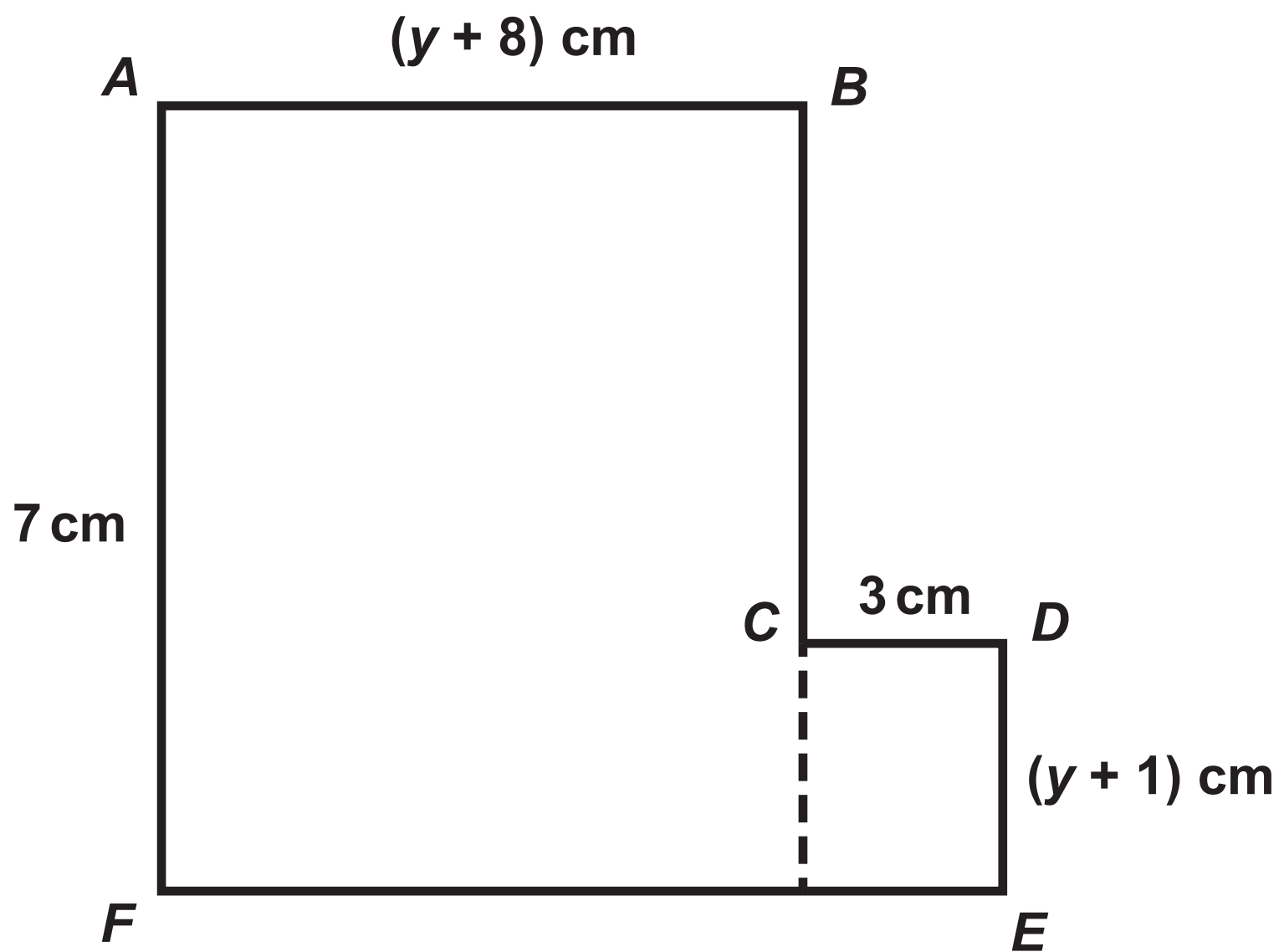


Question 3



Question 4

Diagram NOT drawn to scale



Question 5

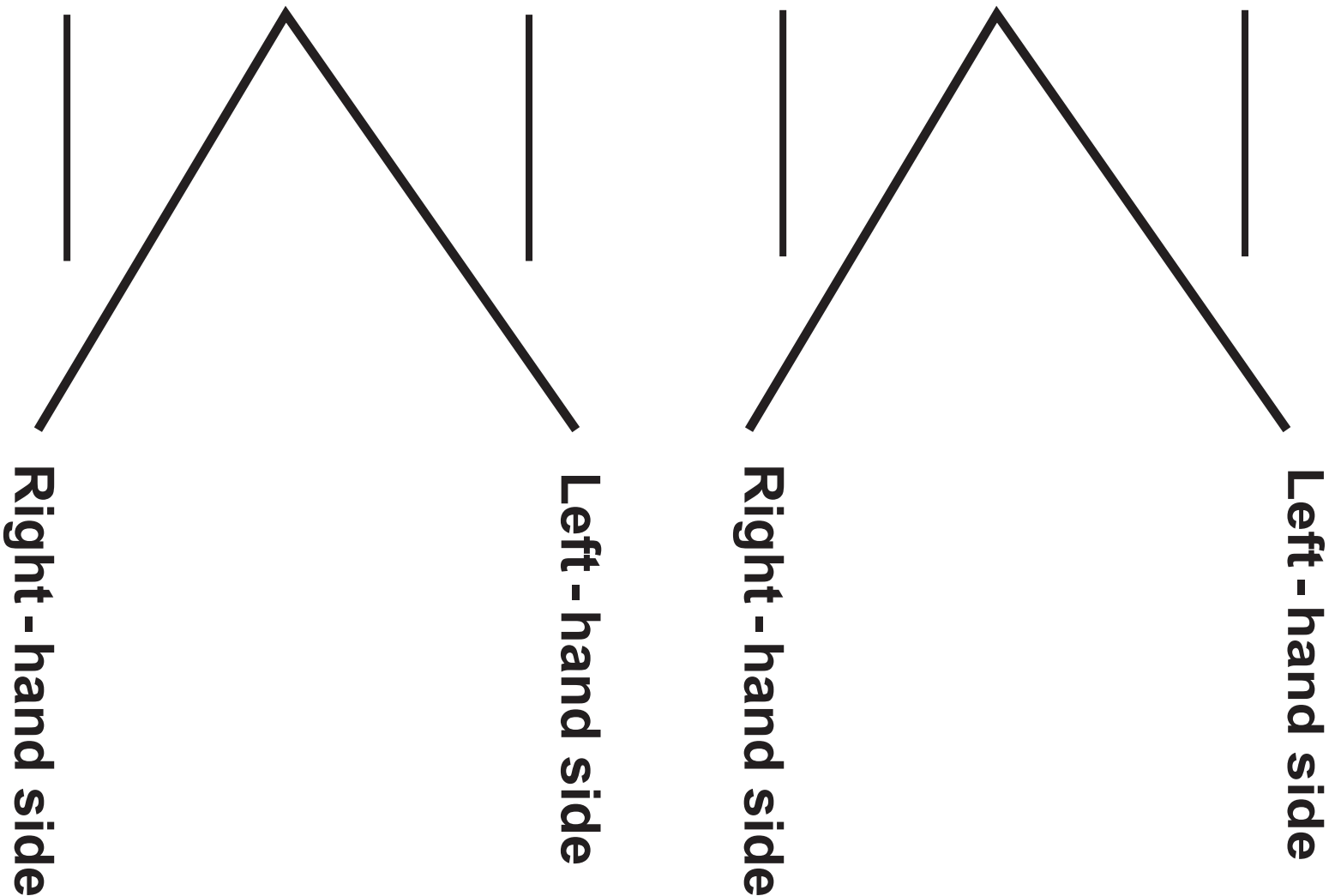
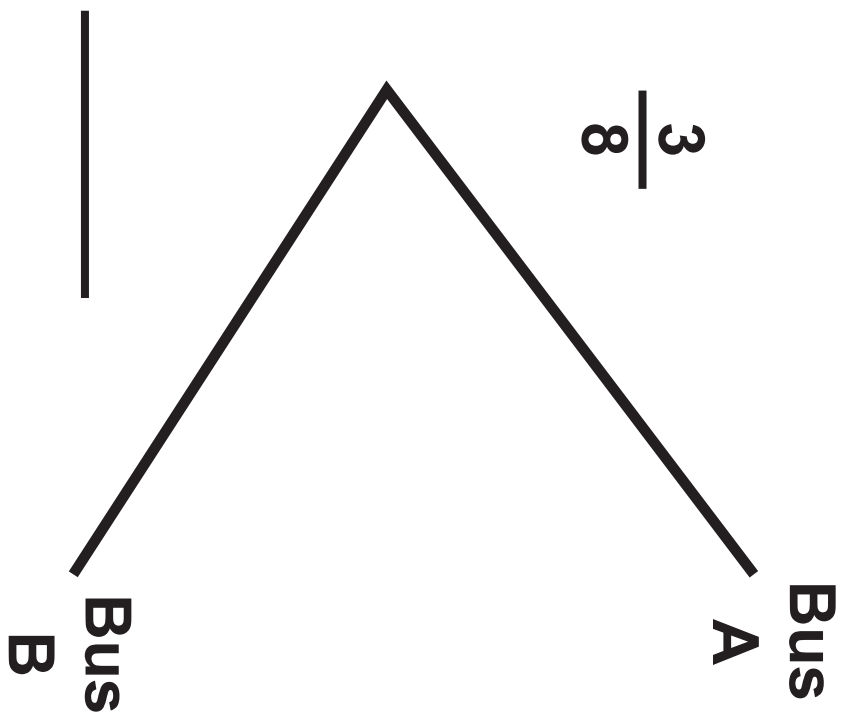
Information

**Lowest common multiple (LCM)
of 10 and 18**

= $n \times$

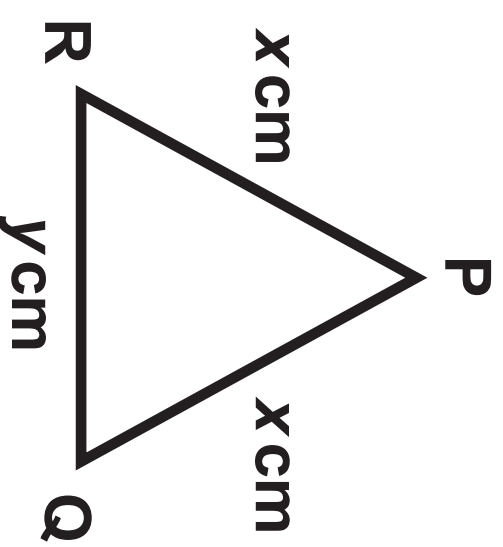
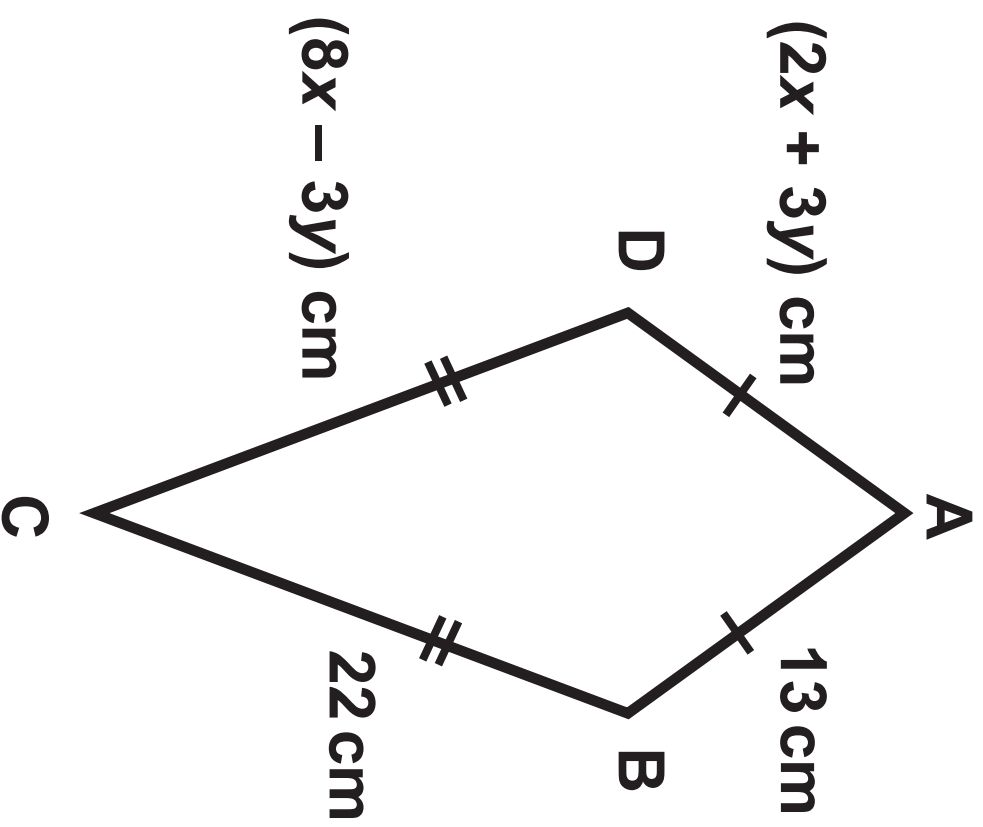
**Highest common factor (HCF)
of 30 and 72**

Question 6 (a)



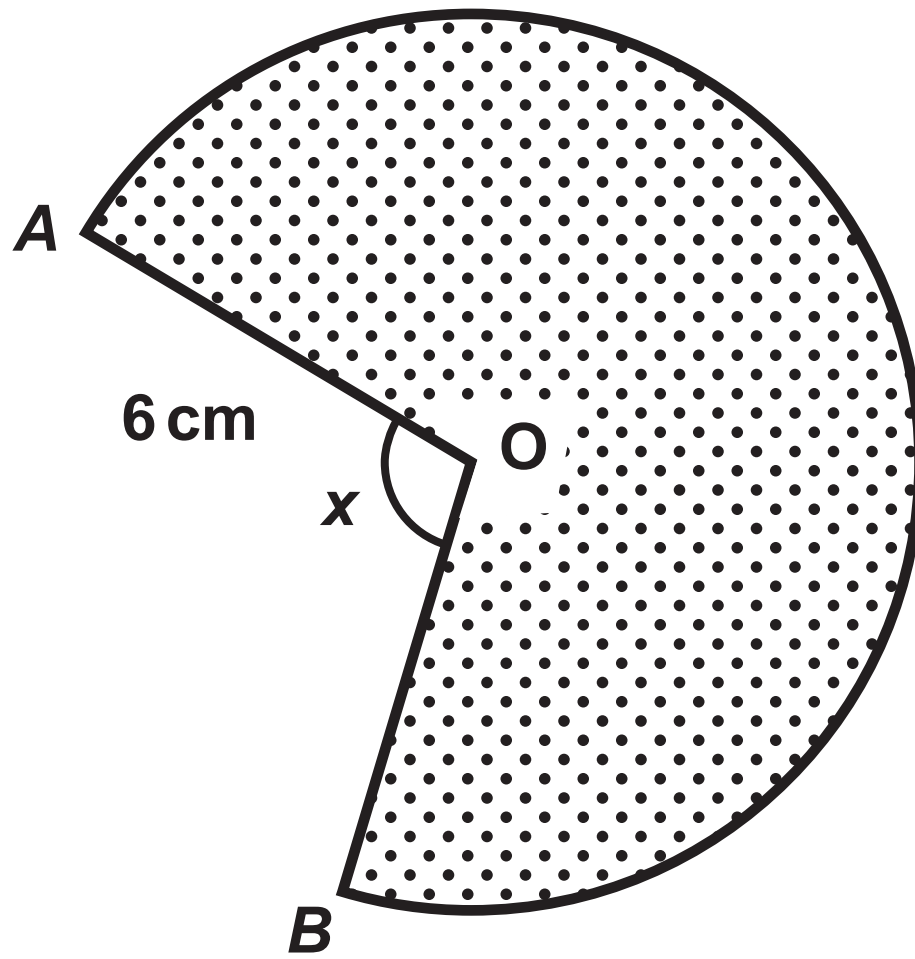
Question 9

Diagrams are NOT drawn to the same scale.

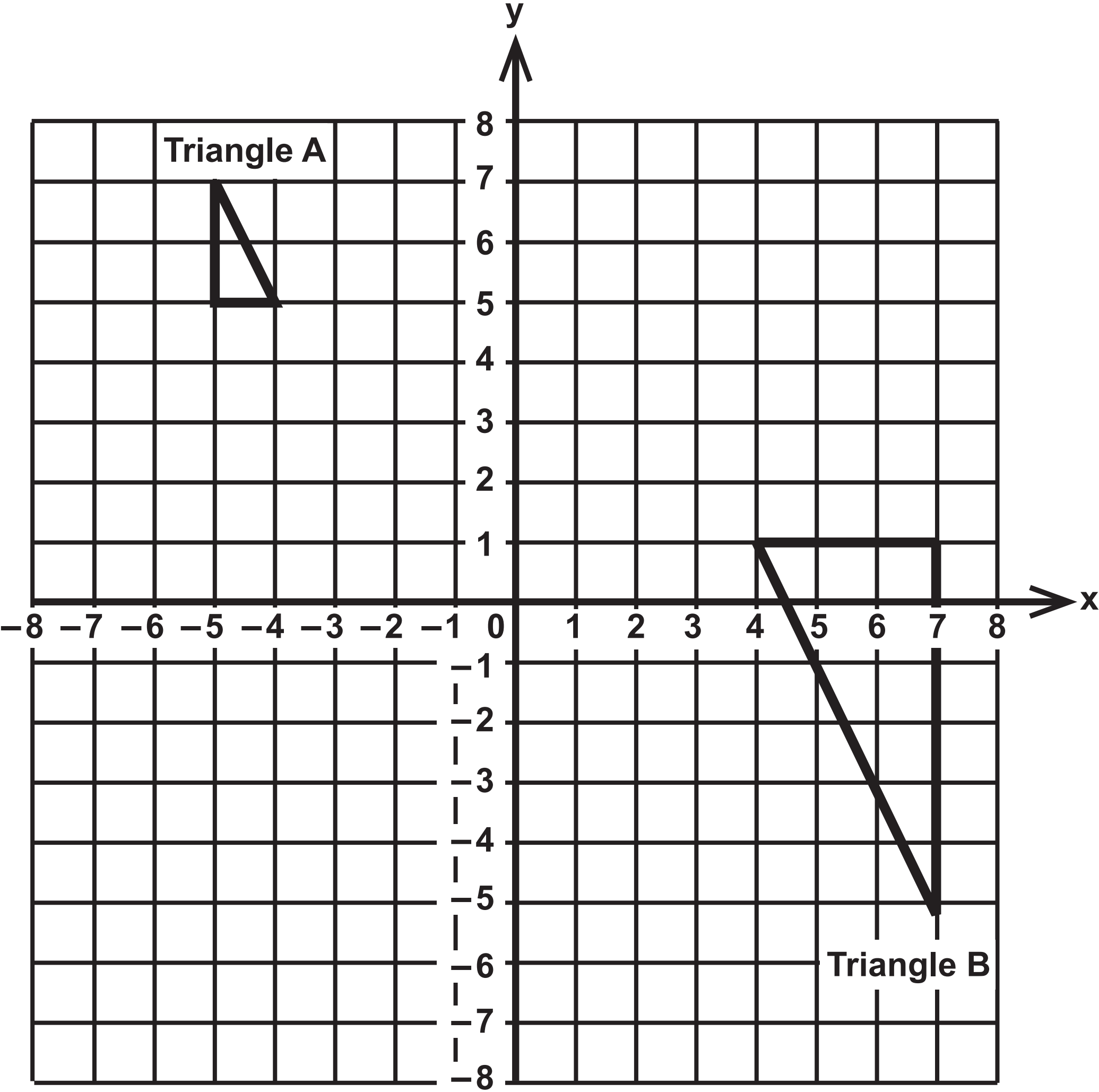


Question 10

Diagram NOT drawn to scale

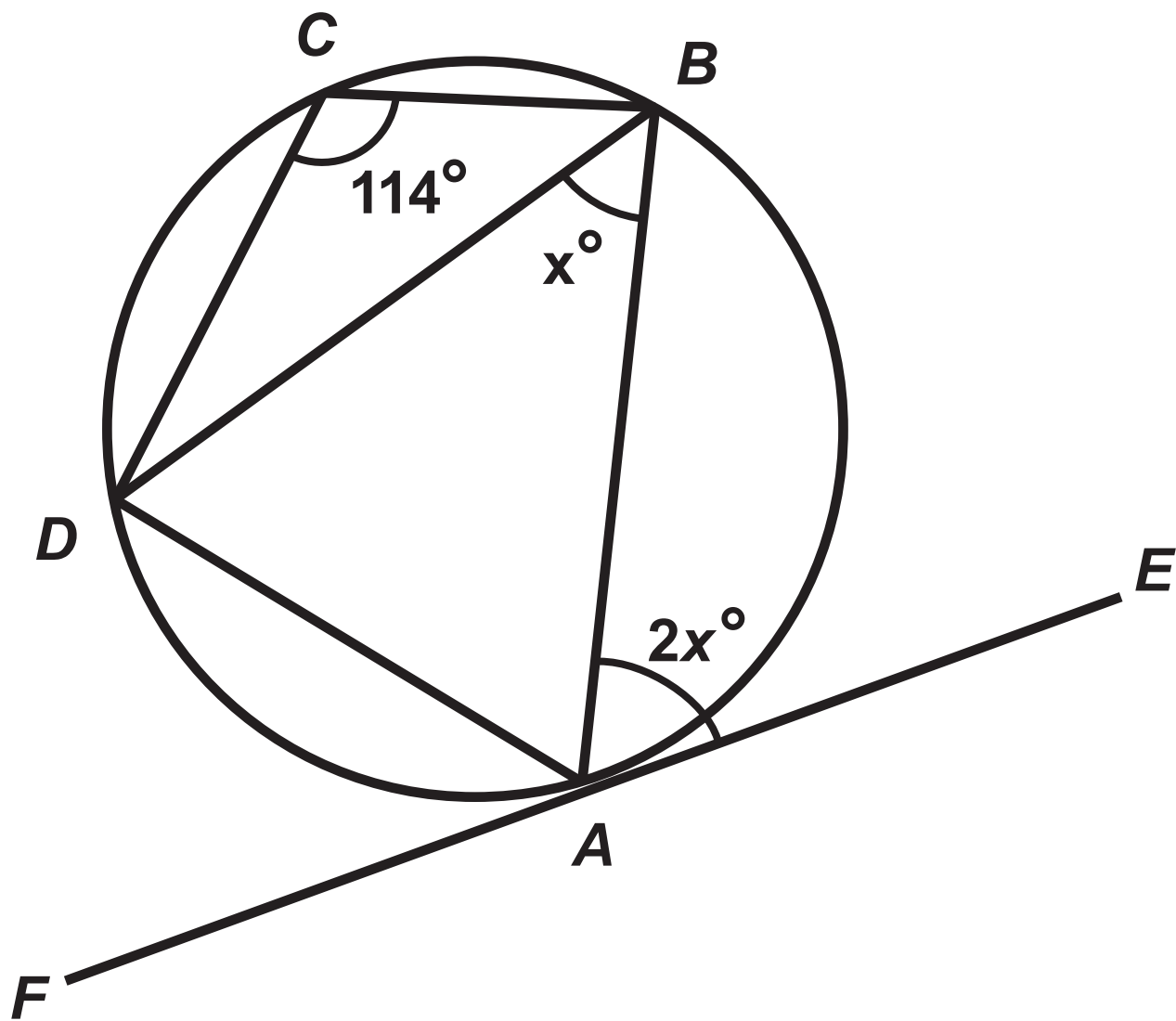


Question 11

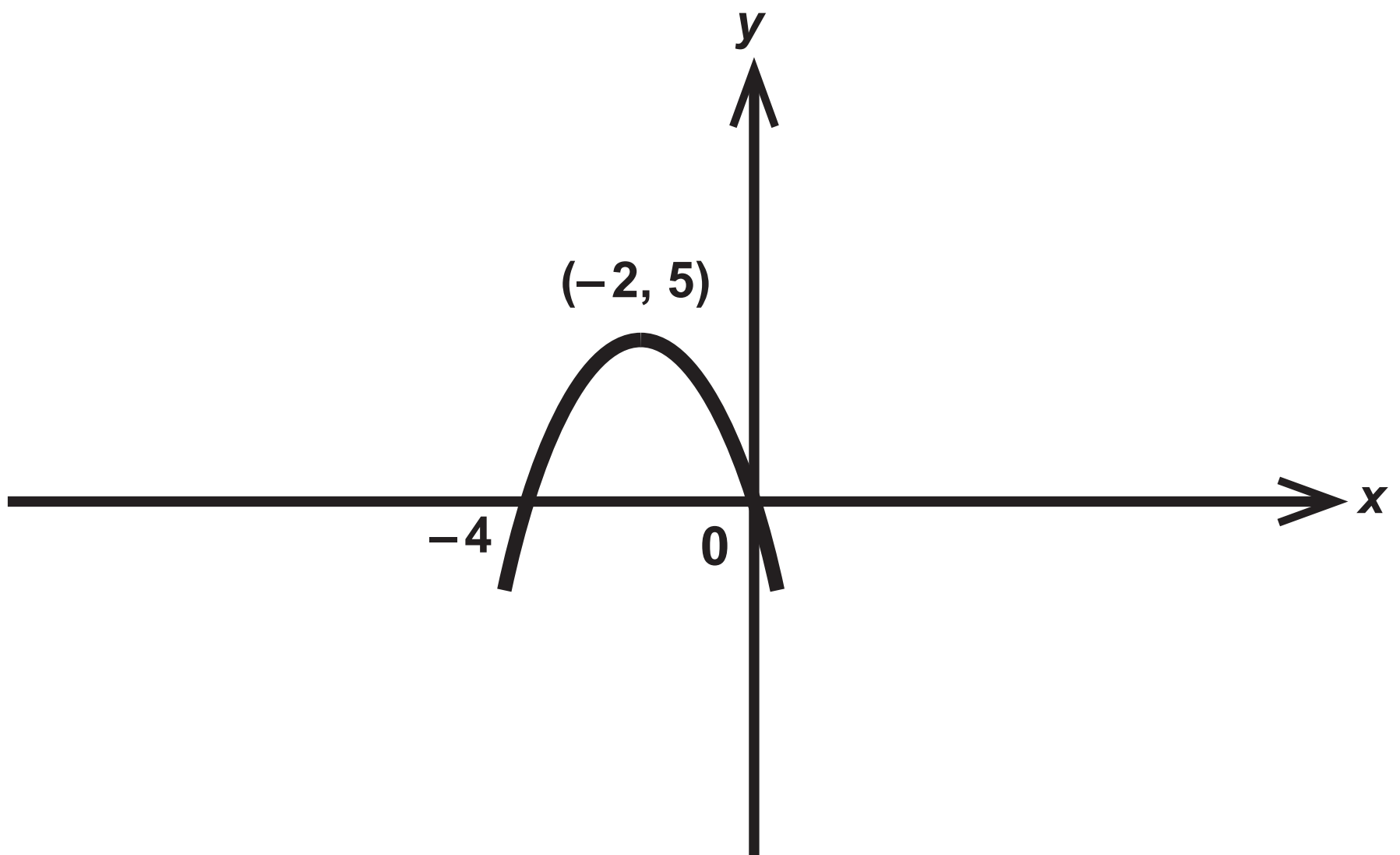


Question 13

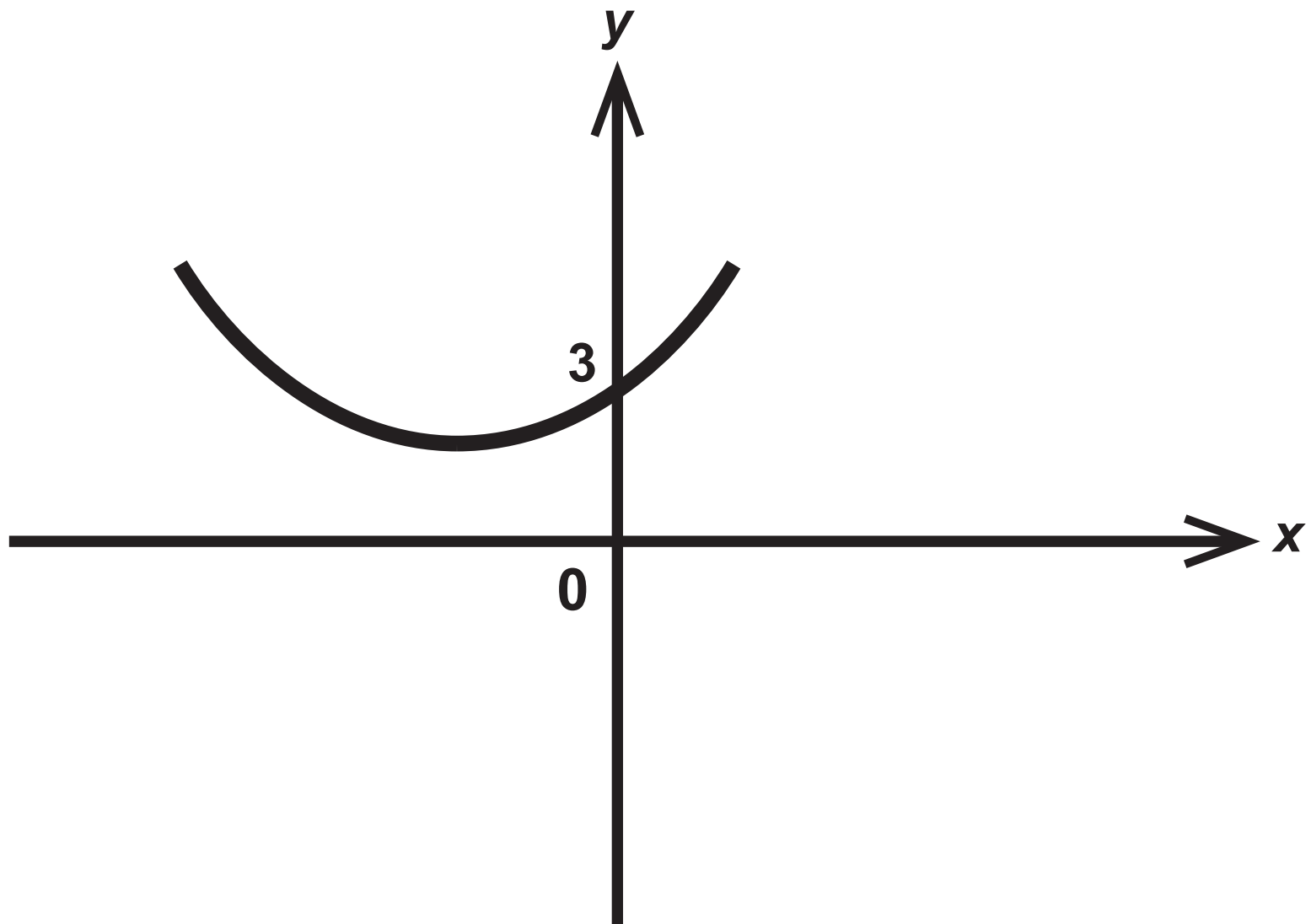
Diagram NOT drawn to scale



Question 18 (a)



Question 18 (b)



**GCSE
MATHEMATICS
and
NUMERACY**



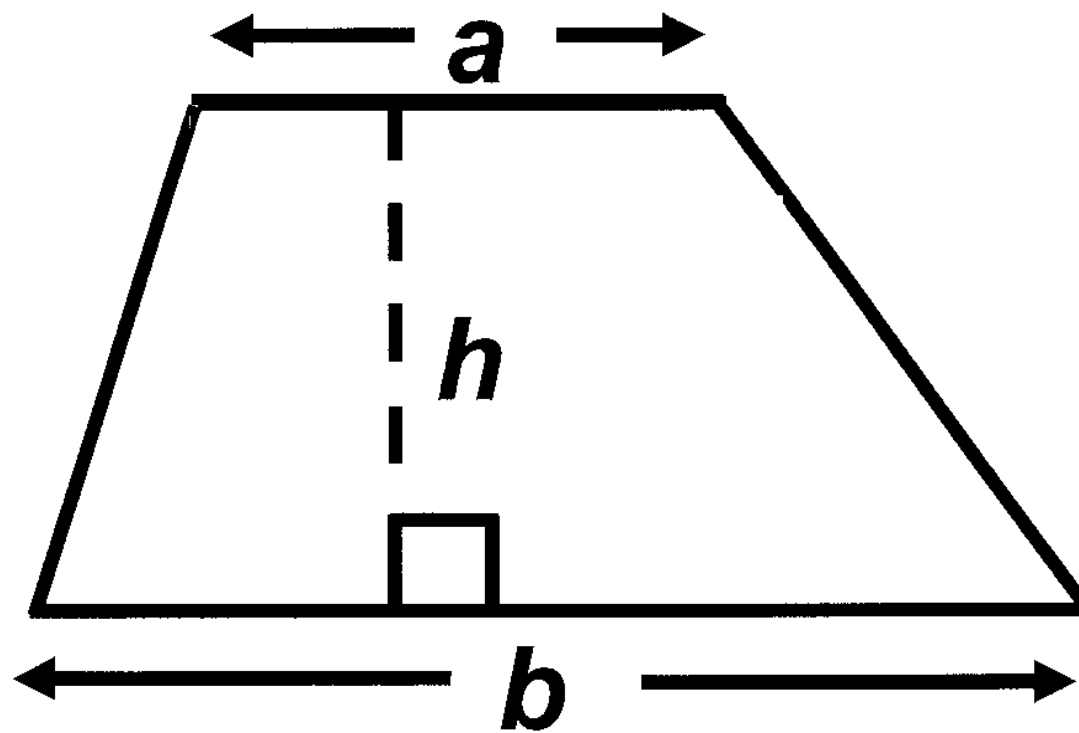
**FORMULA LIST
HIGHER TIER
GCSE**

You must not write on these formula pages.

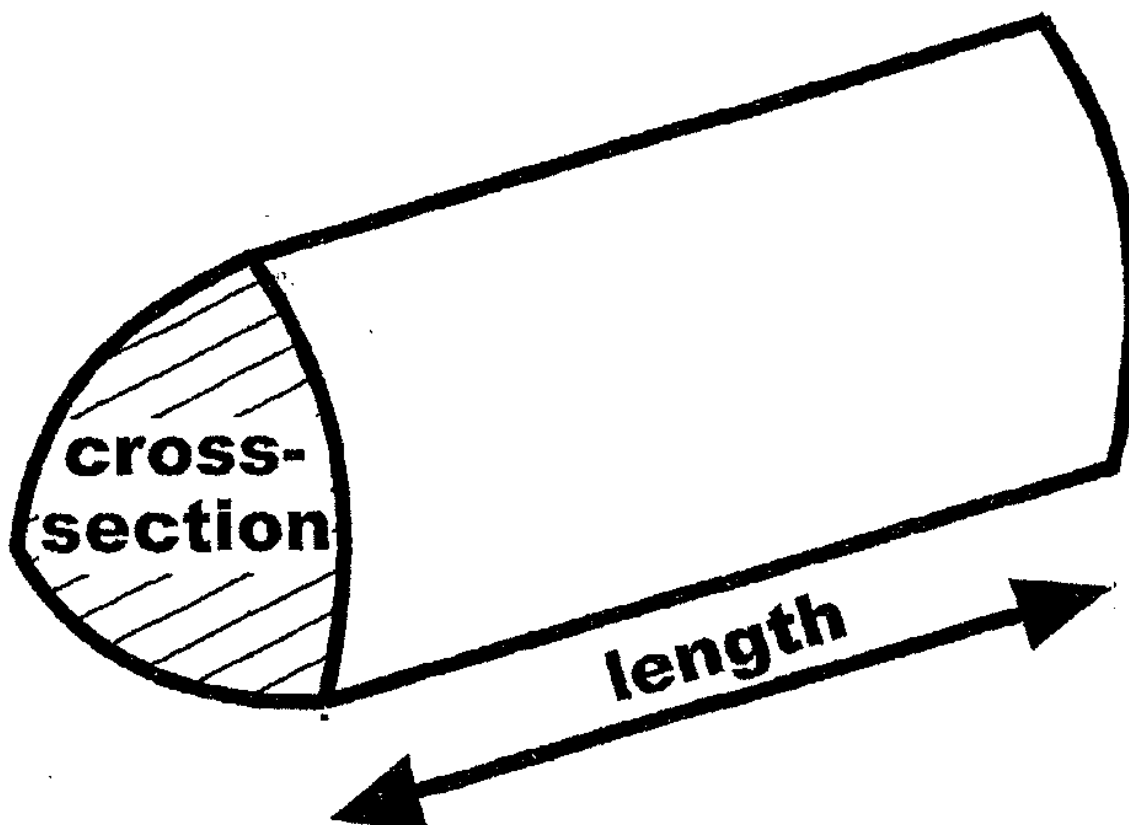
Anything you write on these formula pages will gain NO credit.

Formula List – Higher Tier

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

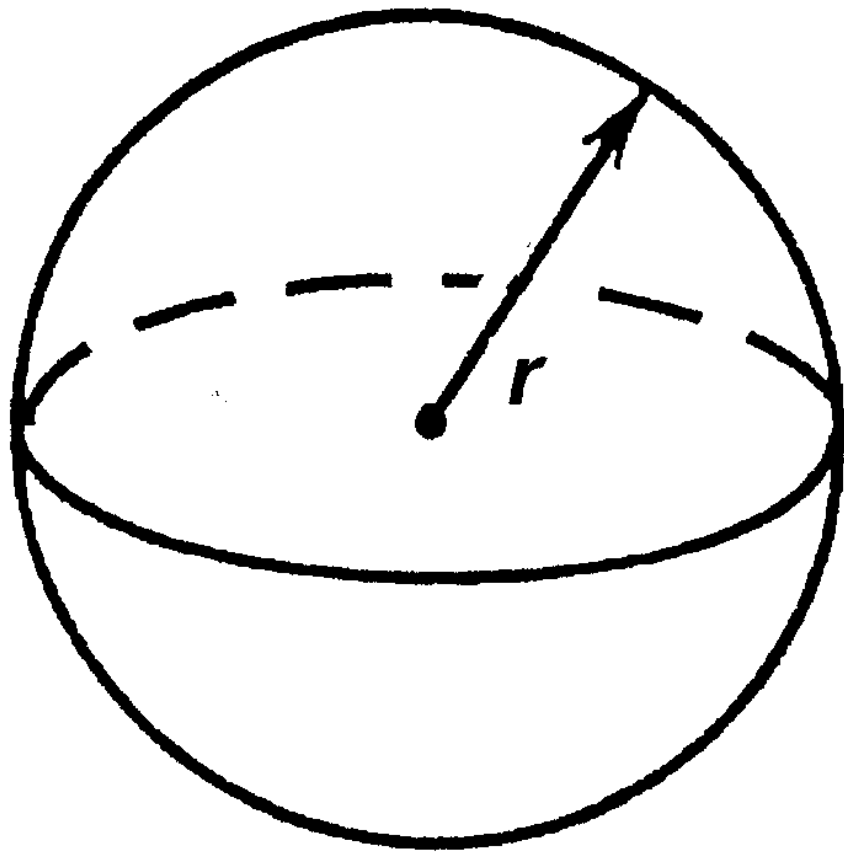


Volume of prism =
area of cross – section $\times$ length



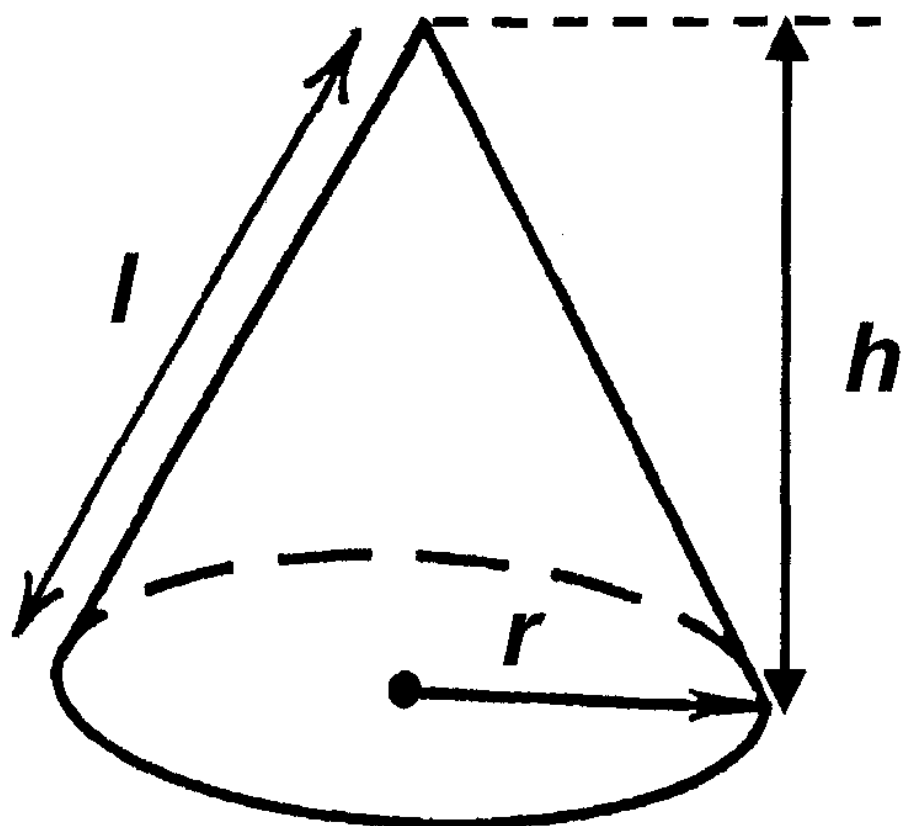
Volume of sphere = $\frac{4}{3}\pi r^3$

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

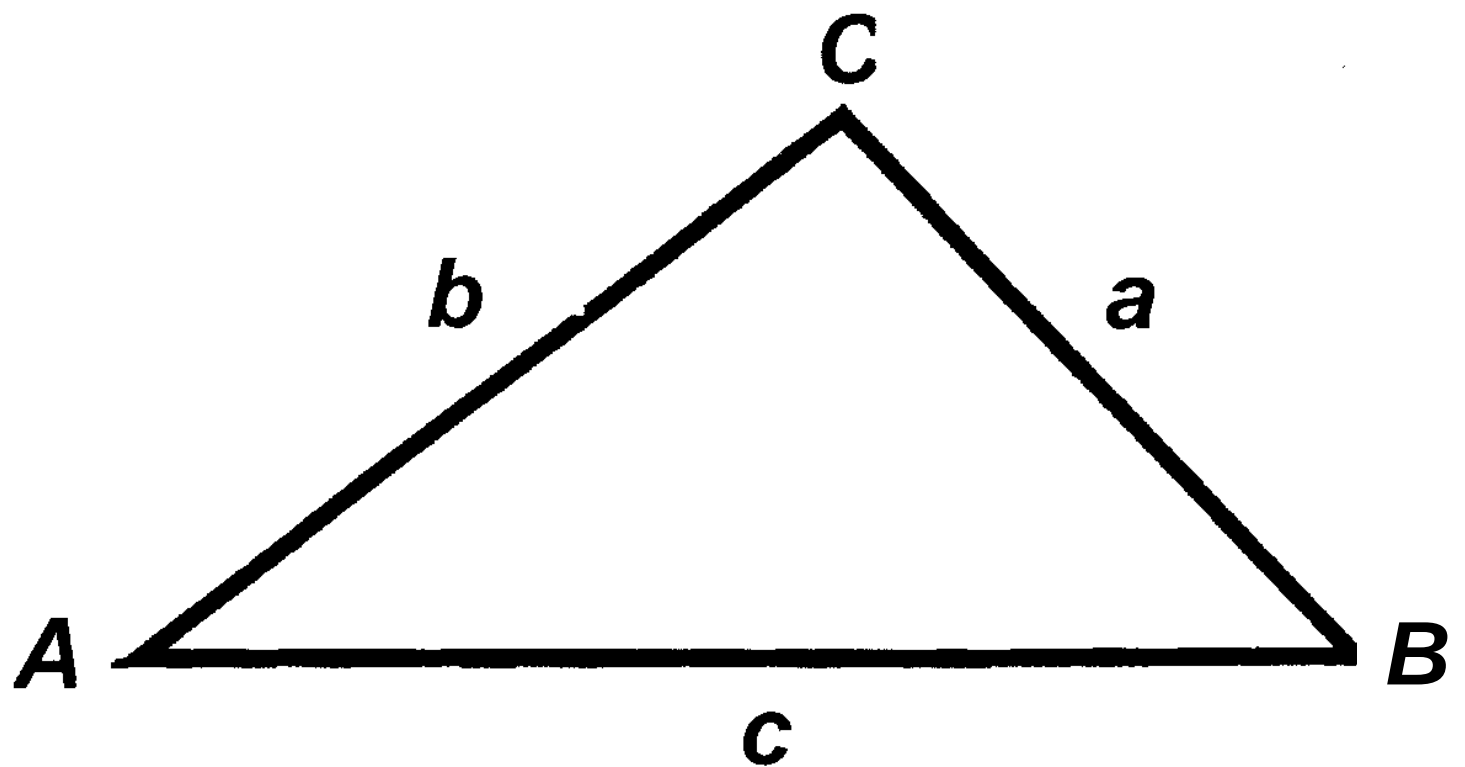


Volume of cone = $\frac{1}{3}\pi r^2 h$

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.