



General Certificate of Secondary Education
2018

Centre Number

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Candidate Number

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Mathematics

Unit T6 Paper 2
(With calculator)

Higher Tier



MV18

[GMT62]

THURSDAY 7 JUNE, 10.45–12 NOON

Time

1 hour 15 minutes, plus your additional time allowance.

Instructions to Candidates

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

You must answer the questions in the spaces provided.

Do not write on blank pages or tracing paper.

Complete in black ink only.

Answer **all twelve** questions.

All working should be clearly shown in the spaces provided.

Marks may be awarded for partially correct solutions.

You **may** use a calculator for this paper.

Information for Candidates

The total mark for this paper is 50.

Figures in brackets printed at the end of each question indicate the marks awarded to each question or part question.

Functional Elements will be assessed in this paper.

Quality of written communication will be assessed in

Question **12**.

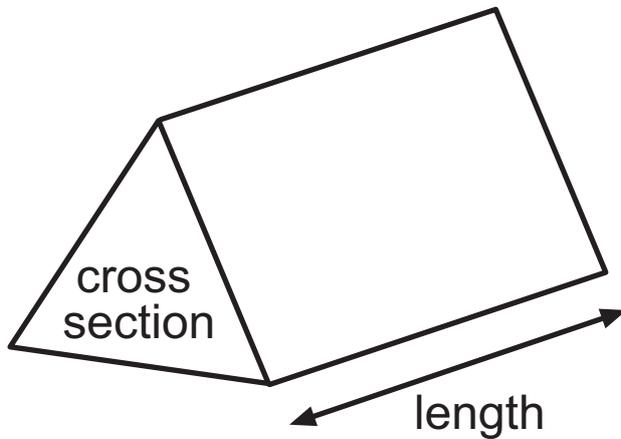
You should have a calculator, ruler, compasses and a protractor.

The Formula Sheet is on pages 4 and 5.

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(Questions start on page 6)

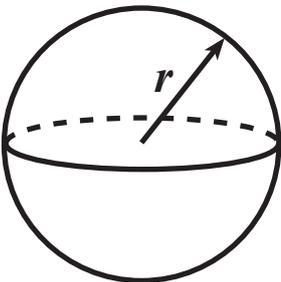
Formula Sheet

Volume of prism = area of cross section \times length



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

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



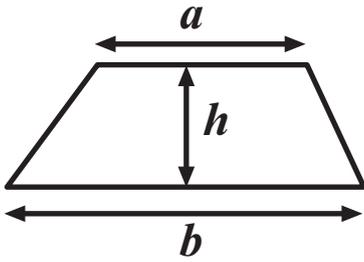
Quadratic Equation

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

where $a \neq 0$, are given by

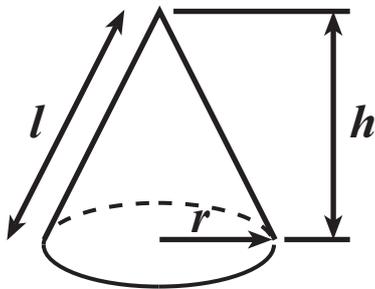
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

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

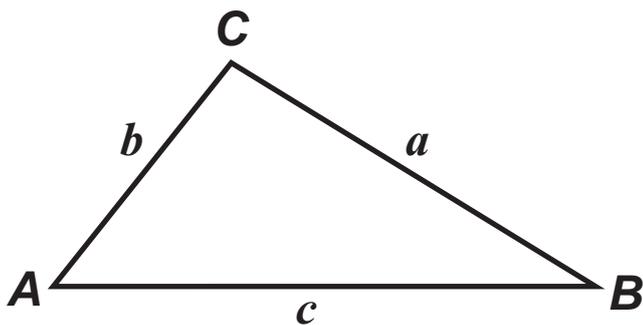


$$\text{Volume of cone} = \frac{1}{3} \pi r^2 h$$

$$\text{Curved surface area of cone} = \pi r l$$



In any triangle **ABC**

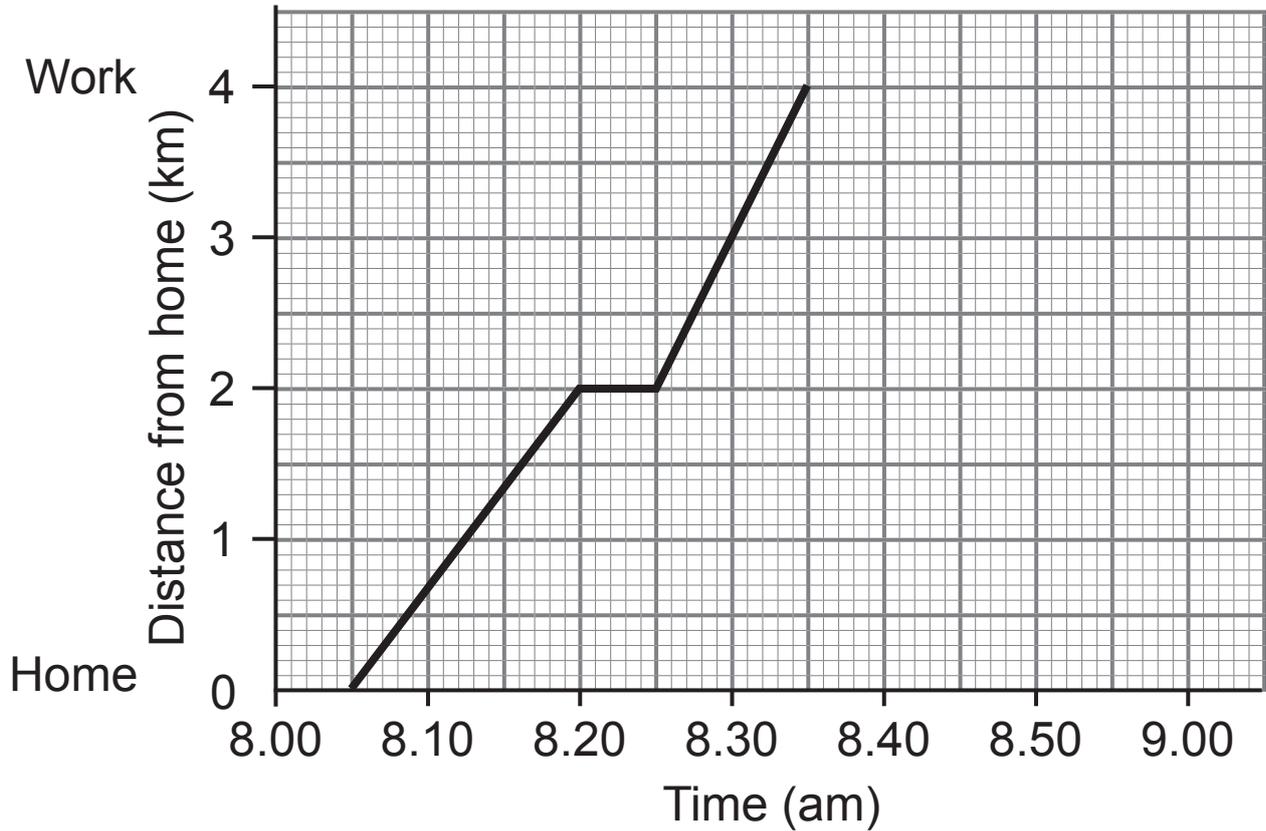


$$\text{Sine Rule: } \frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$\text{Cosine Rule: } a^2 = b^2 + c^2 - 2bc \cos A$$

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

1



Clare cycles from home to work.

Her journey is shown on the graph above.

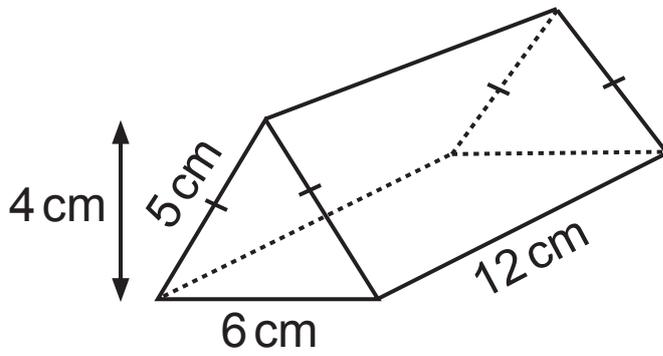
(a) What is the average speed of her journey? [2 marks]

Answer _____ km/hr

(b) At what stage is Clare cycling at the fastest average speed? [1 mark]

Answer _____

2



Calculate the **total** surface area of this triangular prism.
[3 marks]

Answer _____ cm²

- 3 The headmaster of Happy Valley High School records how long his Year 11 and Year 12 pupils take to get to school.

Time t (minutes)	Number in Year 11	Number in Year 12
$0 < t \leq 10$	15	17
$10 < t \leq 20$	28	25
$20 < t \leq 30$	34	40
$30 < t \leq 40$	3	4

The headmaster takes a pupil at random from Year 11

- (a) What is the probability the Year 11 pupil gets to school in 20 minutes or less? [2 marks]

Answer _____

Later, the headmaster takes one pupil at random from the whole of Year 11 and Year 12

- (b) What is the probability that this pupil gets to school in 20 minutes or less? [2 marks]

Answer _____

There are 450 pupils in Happy Valley High School.

(c) Estimate the number of pupils at this school who take longer than 30 minutes to get to school.

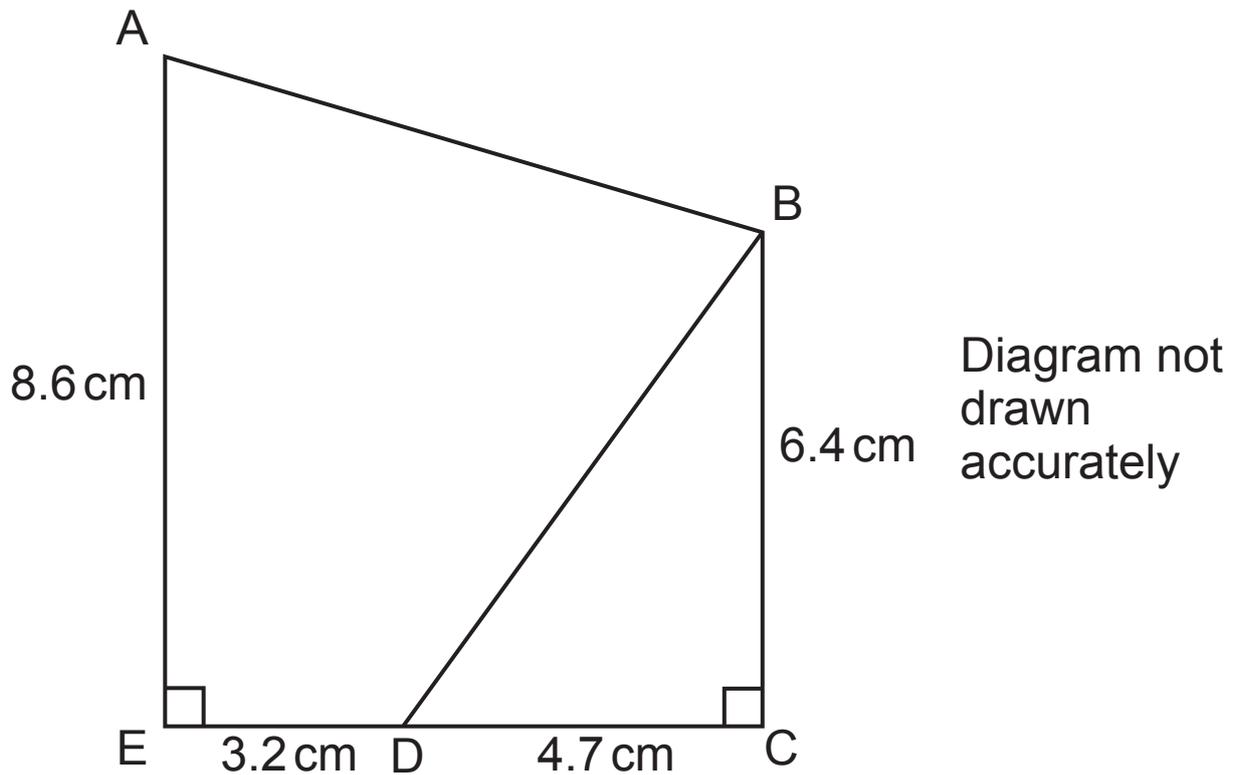
Show clearly how you get your answer. [3 marks]

Answer _____

4 ABCE is a quadrilateral with right angles at C and E.

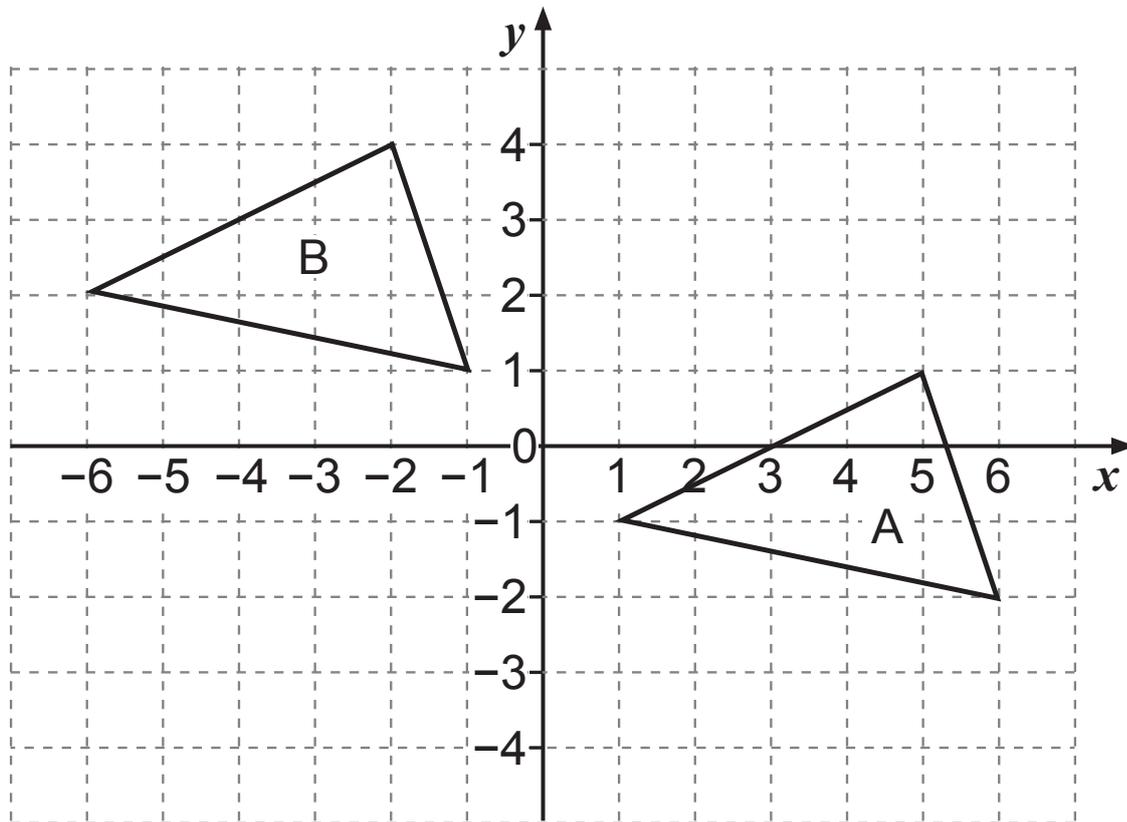
$BC = 6.4 \text{ cm}$, $CD = 4.7 \text{ cm}$, $DE = 3.2 \text{ cm}$ and $AE = 8.6 \text{ cm}$.

Calculate the area of ABDE. [4 marks]



Answer _____

5



Describe fully the single transformation that moves triangle A to triangle B. [2 marks]

Answer _____

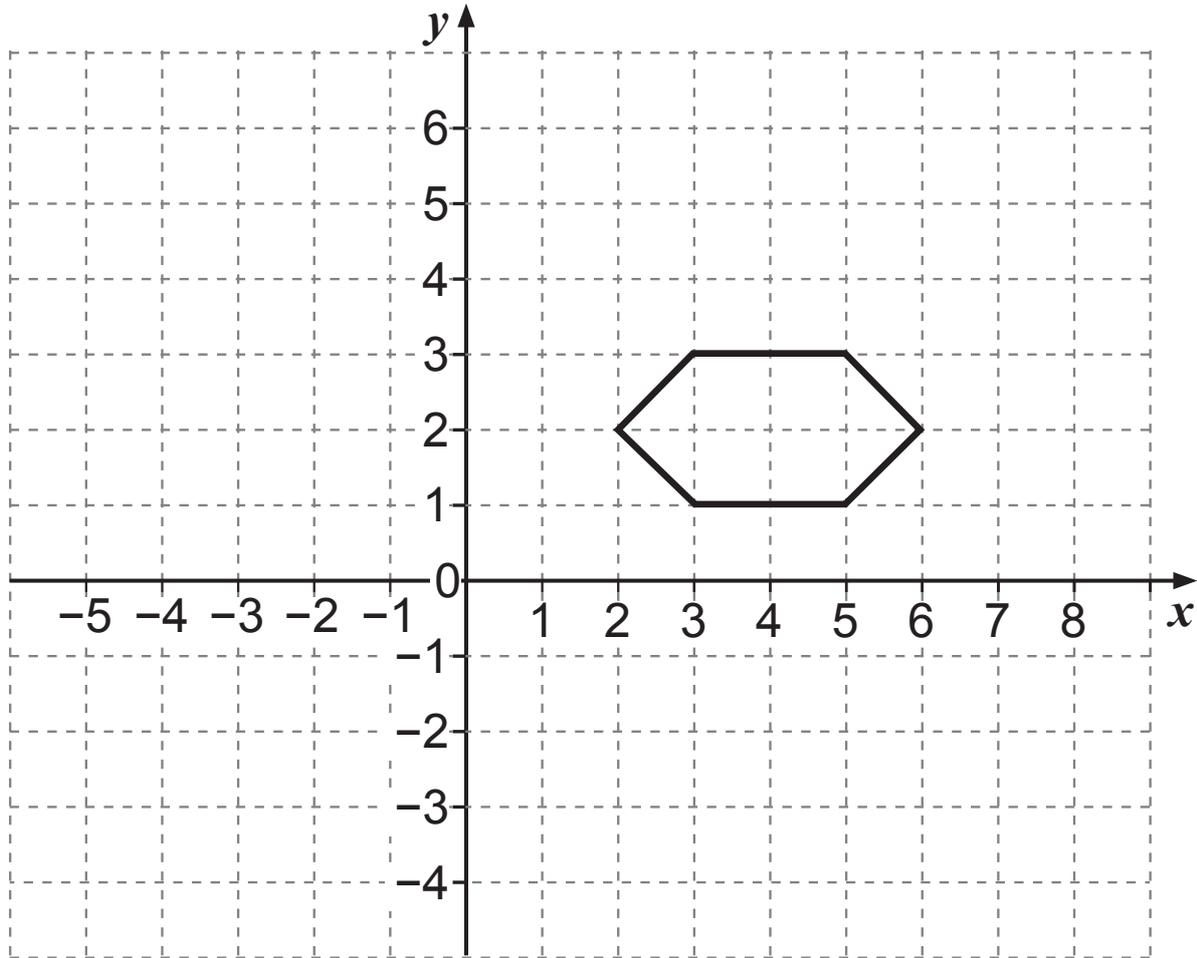
6 A restaurant provides lunch for 90 people.

They make 216 sandwiches and 162 buns.

How many sandwiches and buns would they need to provide a similar lunch for 130 people? [2 marks]

Answer _____ sandwiches
_____ buns

7



Enlarge the hexagon by a scale factor of 3 using (5, 2) as the centre of enlargement. [3 marks]

- 8 A sum of money was divided between Ann and Brian in the ratio 3 : 7

Ann received £30 less than Brian.

How much did each person receive? [3 marks]

Answer Ann £ _____

Brian £ _____

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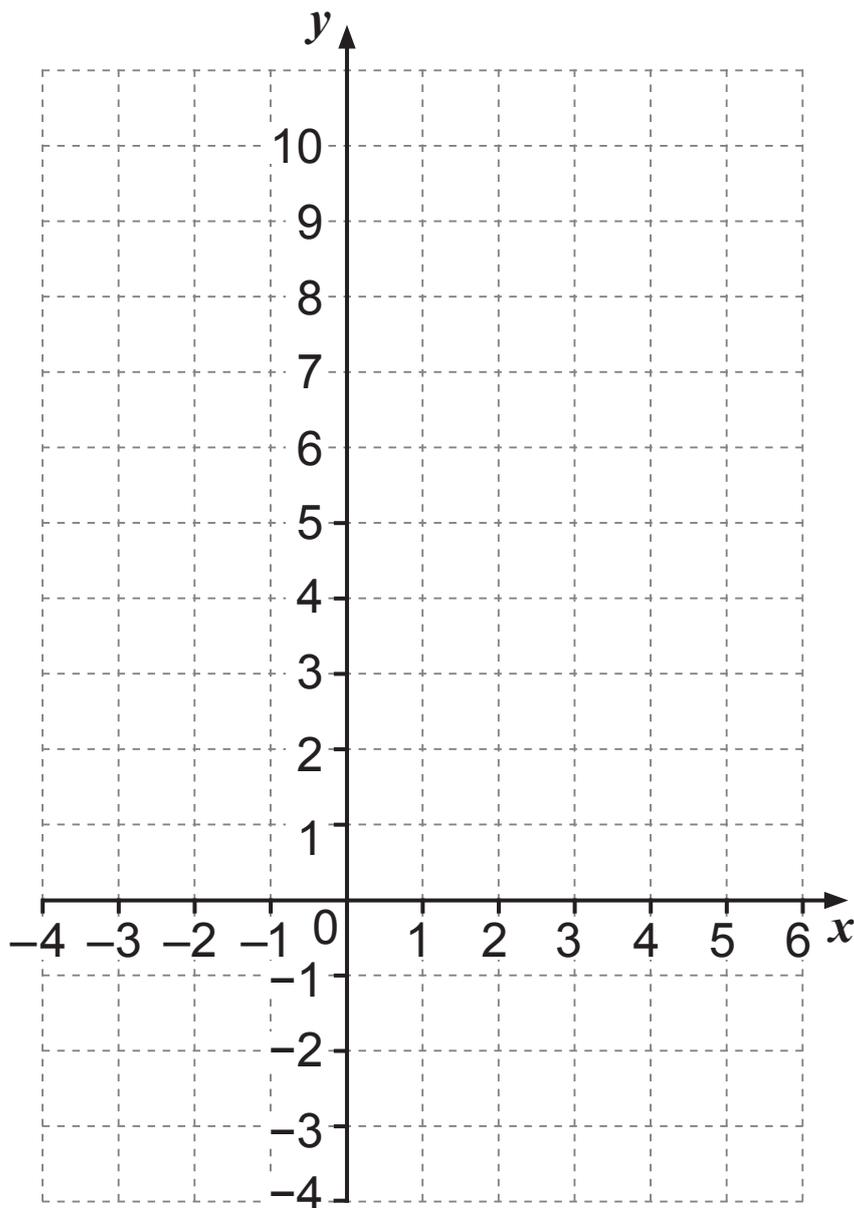
(Questions continue overleaf)

- 9 (a) On the grid below use suitable shading and the letter R to show the region represented by the inequalities.
[3 marks]

$$y \leq 10 - 2x$$

$$y \leq 3x$$

$$y \geq -2$$



(b) In the region R, what is the maximum value of $3x - 2y$?
[2 marks]

Answer _____

10 (a) Expand $(3x\sqrt{y})^2$ [2 marks]

Answer _____

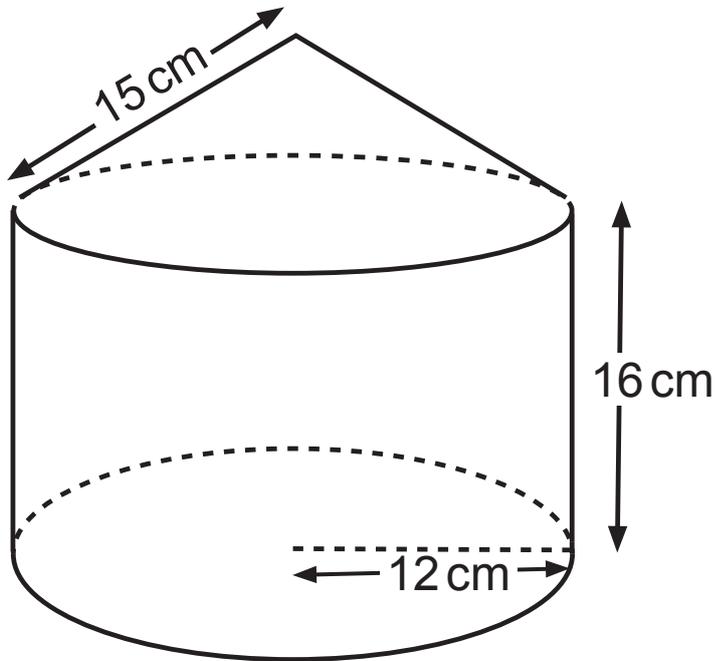
(b) Expand and simplify $(2n + 7)^2 - (2n - 7)^2$ [2 marks]

Answer _____

11 A cake tin is made up of a cylinder with a cone on top.

The cylinder has radius 12 cm and height 16 cm.

The slant height of the cone is 15 cm.



Calculate

(a) the total volume of the cake tin, [4 marks]

Answer _____ cm^3

(b) the total surface area of the cake tin. [4 marks]

Answer _____ cm^2

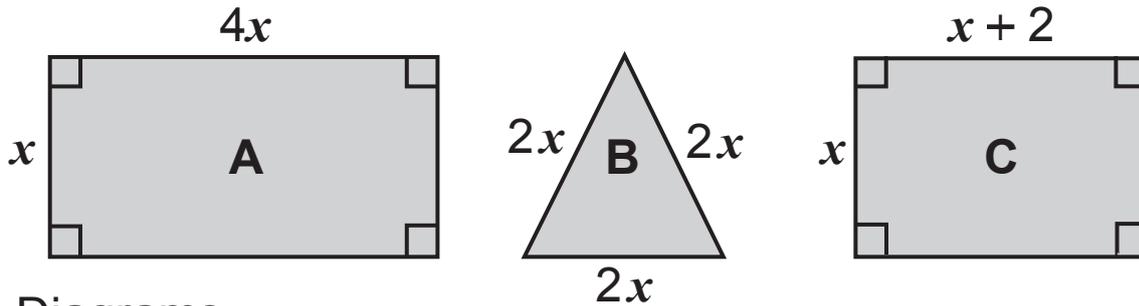
(c) A similar cake tin has all dimensions x times larger.

By what factor is its volume larger? [2 marks]

Answer _____

Quality of written communication will be assessed in this question.

12



Diagrams
not drawn
accurately

Each of the shapes above has an area of 3 cm^2

For each shape, decide whether the value of the lengths of the sides are rational or irrational. [4 marks]

You must show working to justify your answers.

Answer A _____

B _____

C _____

THIS IS THE END OF THE QUESTION PAPER

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
Total Marks	

Examiner Number

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