cea

Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2018

Mathematics

Unit T6 Paper 2
(With calculator)

Higher Tier

[GMT62]

GMT62

THURSDAY 7 JUNE, 10.45–12 NOON

TIME

1 hour 15 minutes.

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 outside the boxed area on each page, on blank pages or tracing paper.
Complete in black ink only. **Do not write with a gel pen.**
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 down the right-hand side of pages 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**.
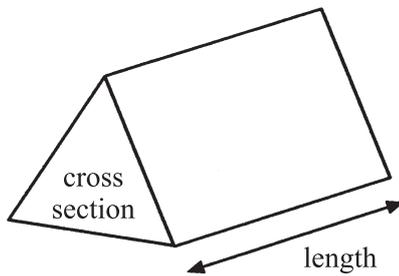You should have a calculator, ruler, compasses and a protractor.
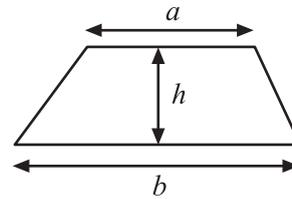The Formula Sheet is on page 2.

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Formula Sheet
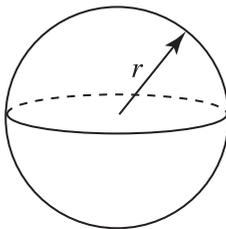
Volume of prism = area of cross section × length

cross section

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

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

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

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

Curved surface area of cone $= \pi rl$

In any triangle ABC

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

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

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

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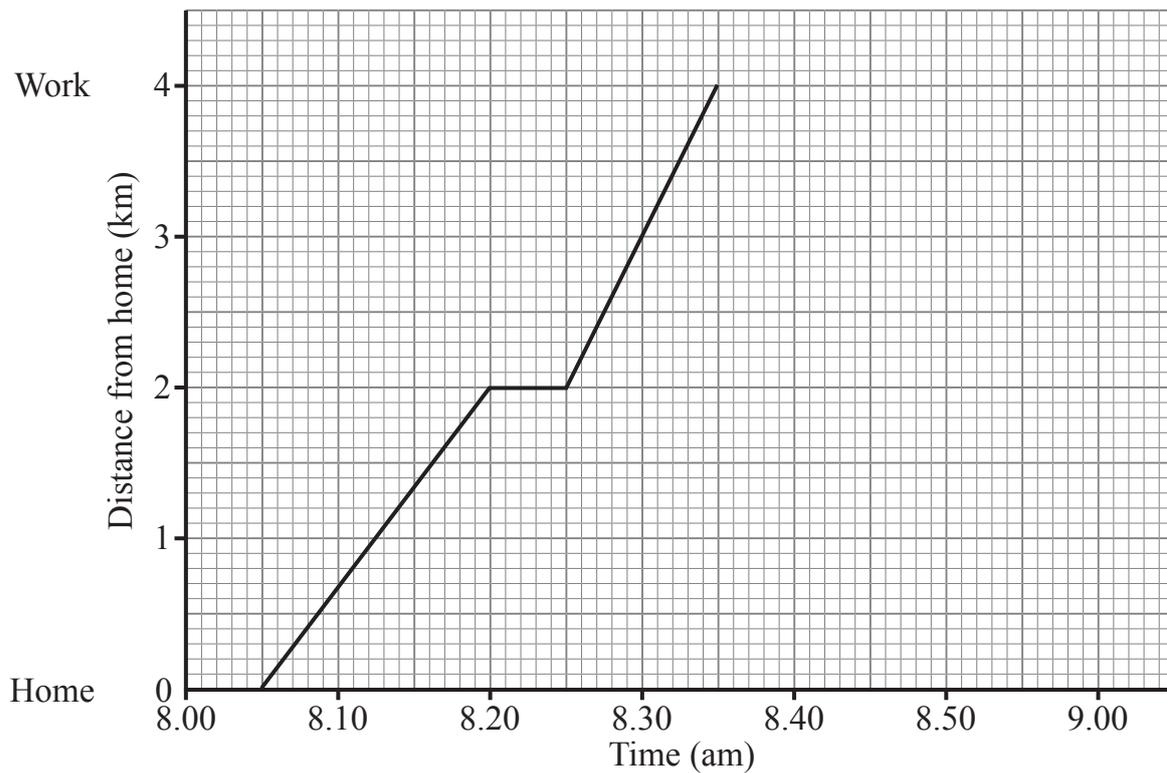**(Questions start overleaf)**

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1

Clare cycles from home to work.

Her journey is shown on the graph above.
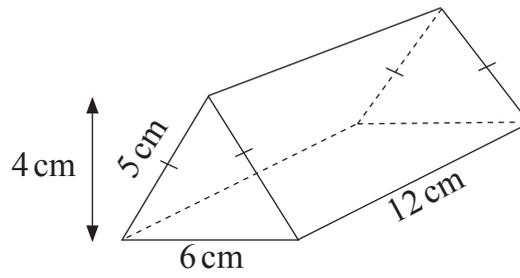
(a) What is the average speed of her journey?

Answer _____ km/hr [2]

(b) At what stage is Clare cycling at the fastest average speed?

Answer _____ [1]

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2

4 cm

5 cm

6 cm

12 cm

Calculate the **total** surface area of this triangular prism.

Answer _____ cm^2 [3]

[Turn over

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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
$0 < t \leqslant 10$	15	17
$10 < t \leqslant 20$	28	25
$20 < t \leqslant 30$	34	40
$30 < t \leqslant 40$	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?

Answer _____ [2]

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?

Answer _____ [2]

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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.

Answer _____ [3]

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

BC = 6.4 cm, CD = 4.7 cm, DE = 3.2 cm and AE = 8.6 cm.

Calculate the area of ABDE.

A

B

8.6 cm
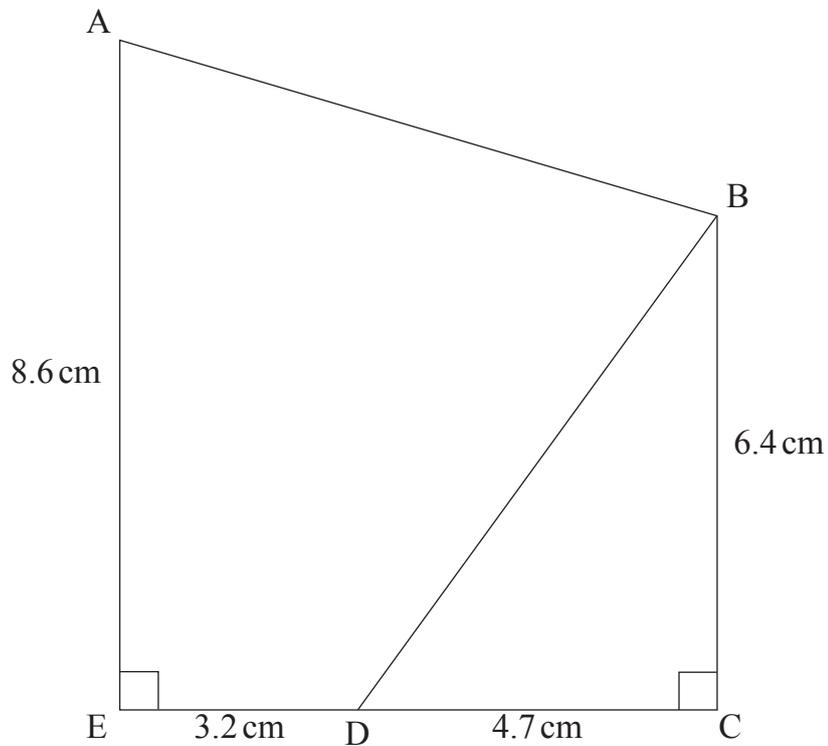
Diagram
not drawn
accurately

6.4 cm

E   3.2 cm   D   4.7 cm   C

Answer _____ [4]

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5
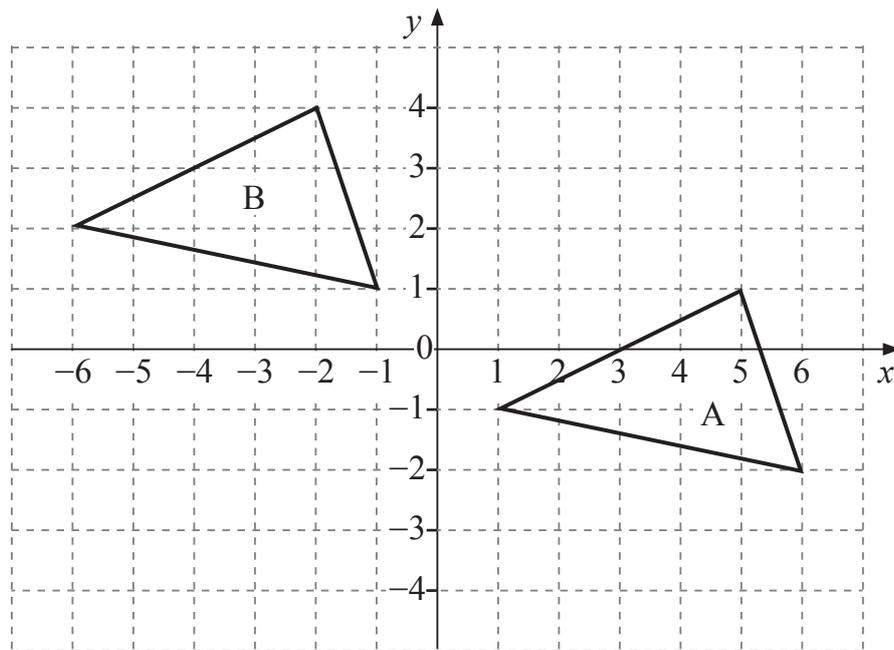
Describe fully the single transformation that moves triangle A to triangle B.

Answer _____

_____ [2]

[Turn over

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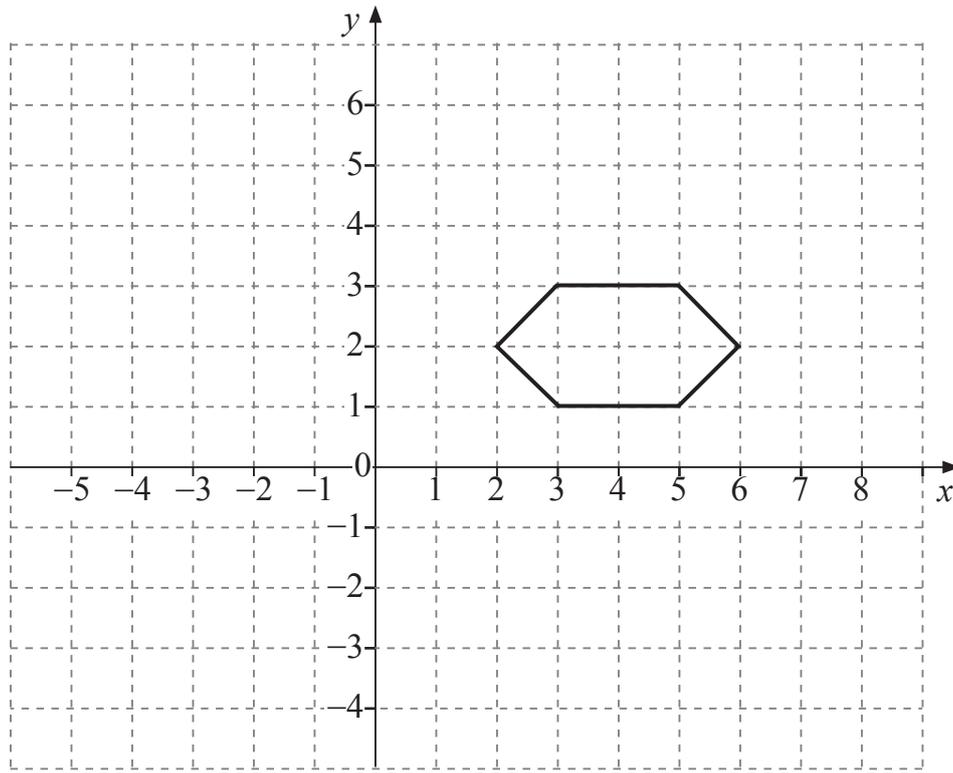**6**   A restaurant provides lunch for 90 people.

They make 216 sandwiches and 162 buns.

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

Answer _____ sandwiches

_____ buns   [2]

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7

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

[Turn over

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?

Answer Ann £ _____

Brian £ _____ [3]

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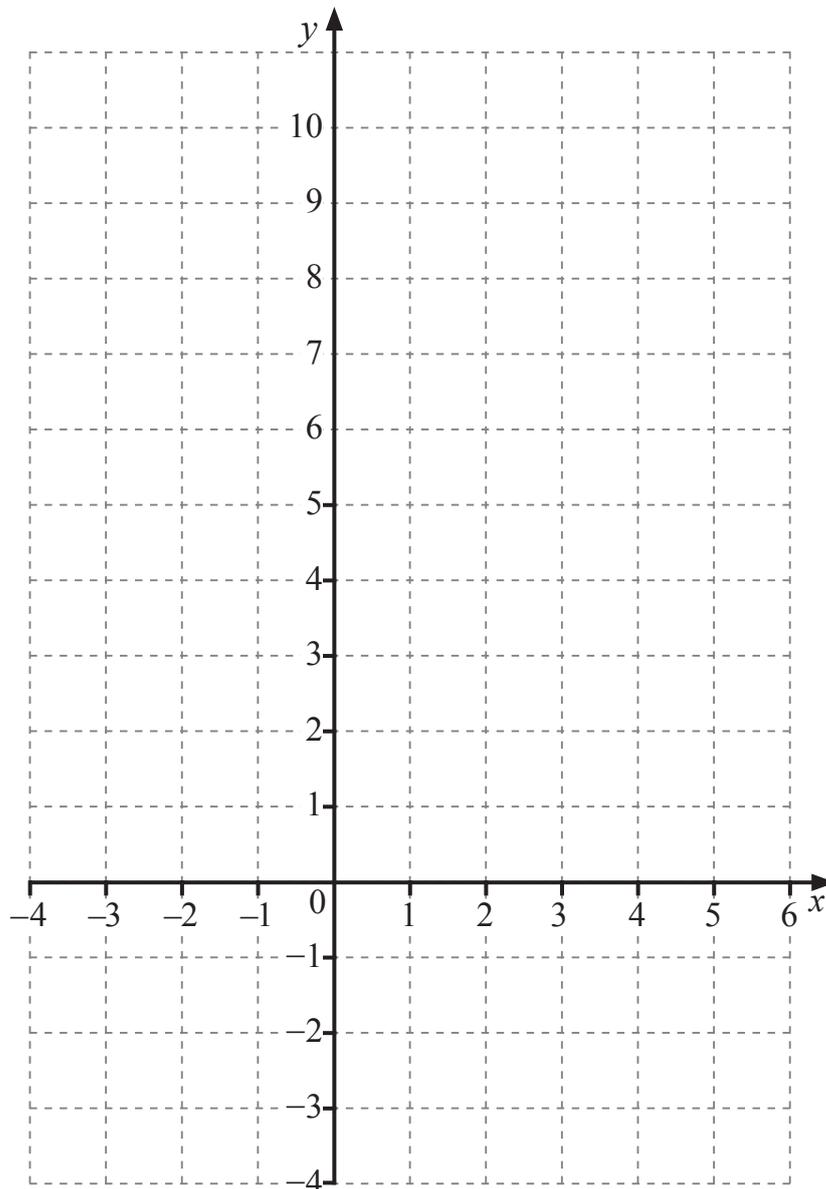**DO NOT WRITE ON THIS PAGE**

(Questions continue overleaf)

9 **(a)** On the grid below use suitable shading and the letter R to show the region represented by the inequalities.

$y \leqslant 10 - 2x$

$y \leqslant 3x$

$y \geqslant -2$

[3]

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

Answer _____ [2]

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

Answer _____ [2]

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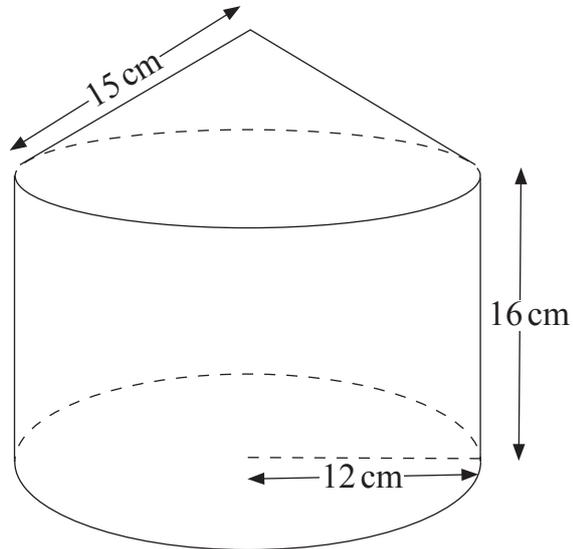
Answer _____ [2]

[Turn over

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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,

Answer _____ cm^3 [4]

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(b) the total surface area of the cake tin.

Answer _____ cm^2 [4]
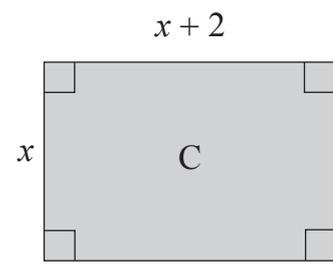
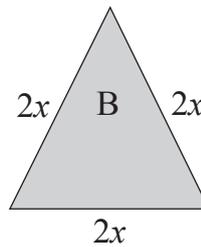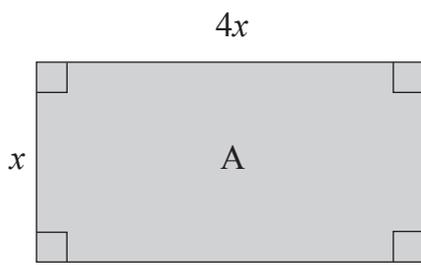**(c)** A similar cake tin has all dimensions x times larger.

By what factor is its volume larger?

Answer _____ [2]

[Turn over

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Quality of written communication will be assessed in this question.

12

$4x$

A

x

$2x$ B $2x$

$2x$

$x + 2$

C

x

Diagrams not drawn accurately

Each of the shapes above has an area of $3\,\text{cm}^2$

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

You must show working to justify your answers.

Answer A _____

B _____

C _____ [4]

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