Centre Number

Candidate Number

Rewarding Learning

General Certificate of Secondary Education
January 2013

Mathematics

Unit T6 Paper 2
(With calculator)
Higher Tier

[GMT62]

GMT62

TUESDAY 15 JANUARY, 3.00 pm – 4.15 pm

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 box, around each page, on blank pages or tracing paper.
Complete in blue or black ink only. **Do not write in pencil or with a gel pen.**
Answer **all fifteen** questions.
Any working should be clearly shown in the spaces provided since marks may be awarded for partially correct solutions.
You **may** use a calculator for this paper.

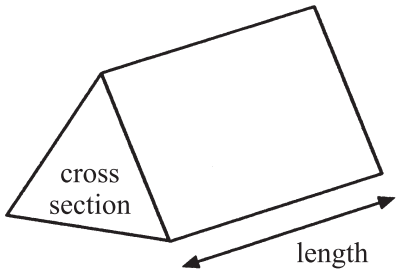
INFORMATION FOR CANDIDATES

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 **questions 10 and 13**.
You should have a calculator, ruler, compasses and a protractor.
The Formula Sheet is on page 2.

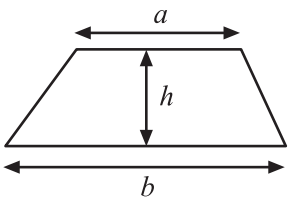
8128

Formula Sheet

Volume of prism = area of cross section × length

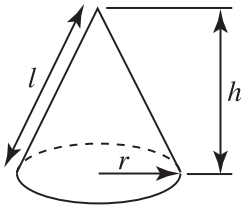


Area of trapezium $= \frac{1}{2}(a+b)h$



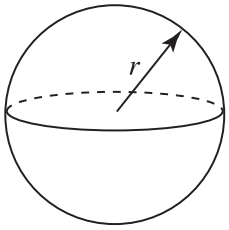
Volume of cone $= \frac{1}{3}\pi r^2 h$

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

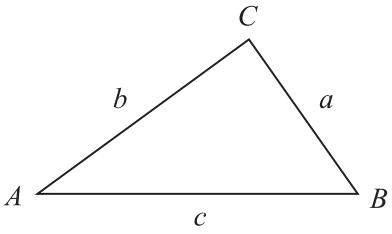


Volume of sphere $= \frac{4}{3}\pi r^3$

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



In any triangle *ABC*



Quadratic Equation

The solutions of $ax^2 + bx + c = 0$ where $a \neq 0$, are given by

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

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 $= \frac{1}{2}ab\sin C$

Examiner Only	
Marks	Remark

1 Calculate $\frac{3.4 \times 2.8}{5.8 - 2.9}$ giving your answer correct to 1 decimal place.

Answer _____ [2]

Total Question 1

2 Nathan earns £36 000 per year. His tax free allowance is £8 000
He pays 26% of the remaining salary in tax.
How much of his salary is left after tax has been deducted?

Answer £ _____ [3]

Total Question 2

[Turn over

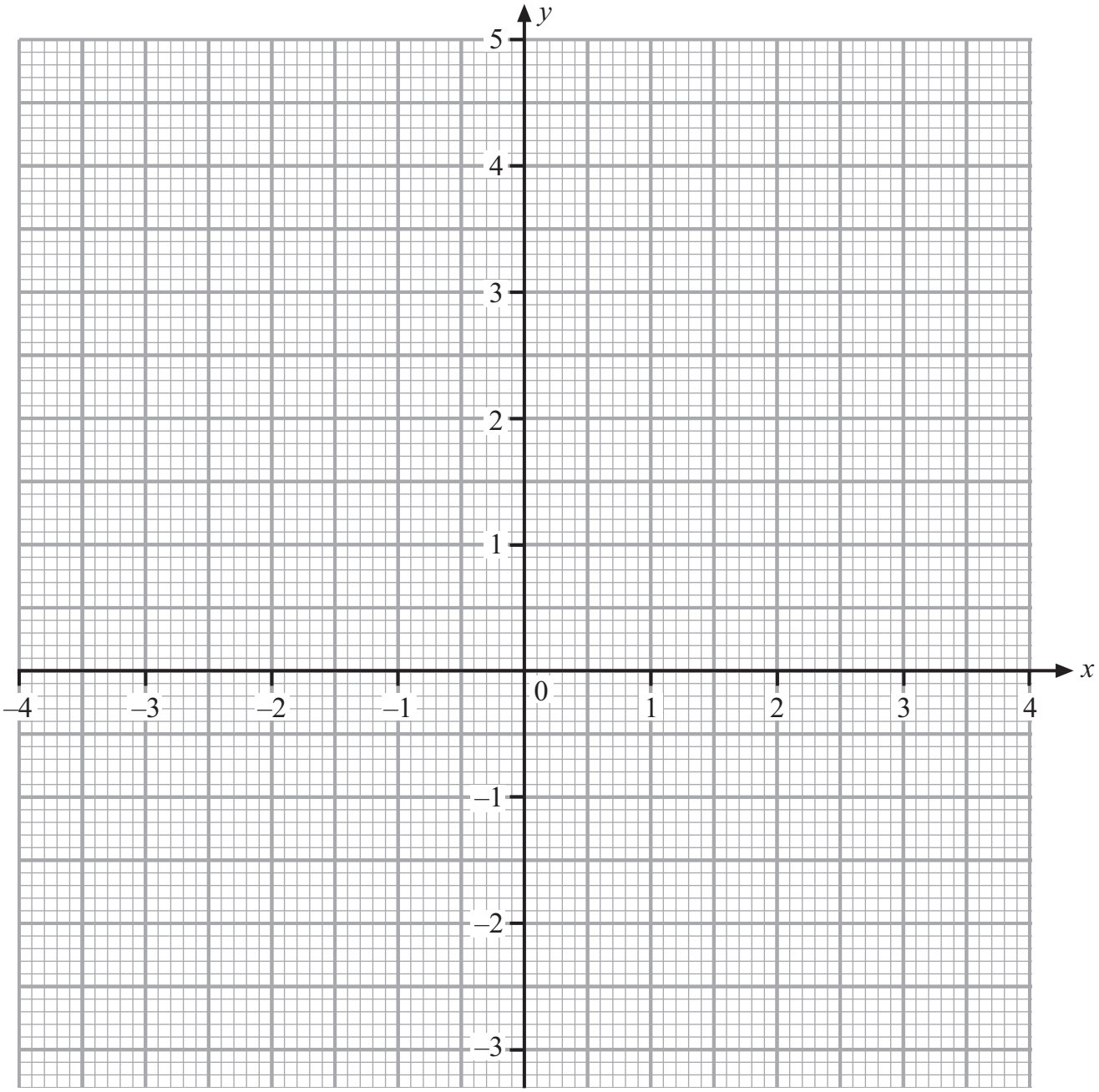
3 **(a)** Complete the table below for the curve $y = 4 - x^2$.

x	–2	–1	0	1	2
y	0		4	3	0

[1]

Examiner Only	
Marks	Remark

(b) Hence draw the graph of $y = 4 - x^2$ on the graph paper.



[2]

Examiner Only	
Marks	Remark
Total Question 3	

[Turn over

4 A factory machine fills bags of chocolate minibars. Each bag should contain 18 minibars.

Leanne tests the machine's accuracy by selecting 100 bags at random and counting the number of minibars.
The table shows her results.

Number of minibars	Less than 18	Exactly 18	More than 18
Number of Bags	8	76	16

A bag is then chosen at random from the 100

(a) (i) What is the probability that it contains at least 18 minibars?

Answer _____ [2]

(ii) What is the probability that it will **not** contain exactly 18 minibars?

Answer _____ [2]

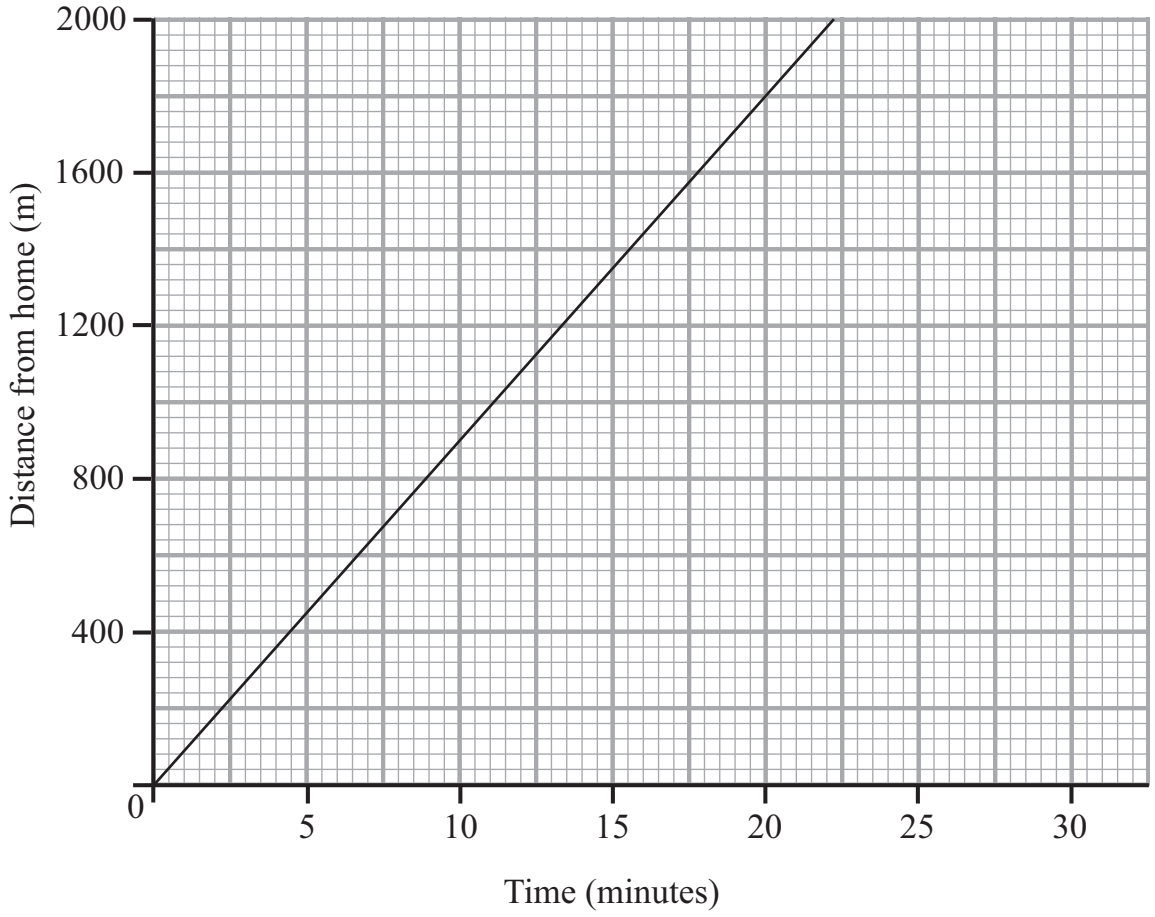
(b) 500 bags are delivered from the same factory to a nearby supermarket.
Estimate the number of bags which contain exactly 18 minibars.

Answer _____ [2]

Examiner Only	
Marks	Remark
Total Question 4	

5 Sarah cycles to school.

The graph illustrates the journey.



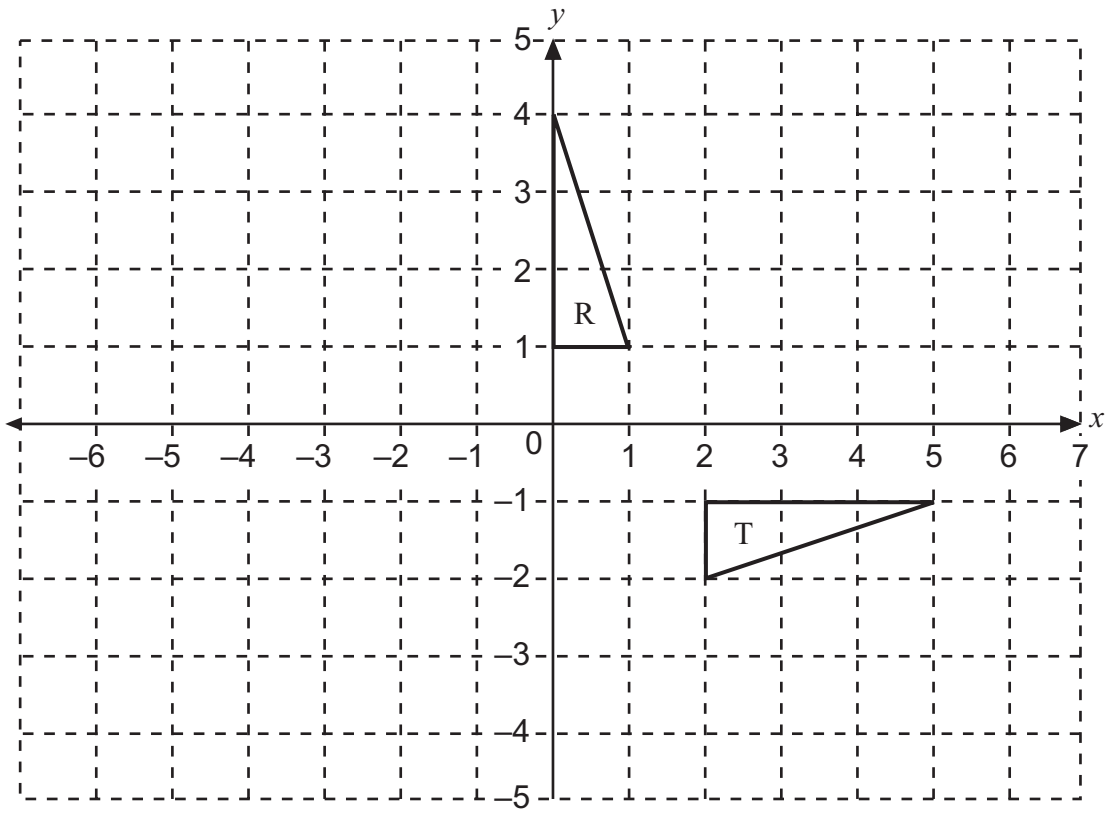
Calculate the average speed for Sarah cycling to school.

Answer _____ km/hr [2]

Examiner Only	
Marks	Remark
Total Question 5	

[Turn over

6 **(a)** Rotate triangle T, 90° clockwise, about the origin. [3]



(b) Describe fully the **single** transformation which takes triangle T onto triangle R.

_____

_____ [3]

Examiner Only	
Marks	Remark
Total Question 6	

7 Rewrite $k = ax - b$ to make x the subject.

Answer $x =$ _____ [2]

Examiner Only | Marks | Remark

Total Question 7

8 Audrey, Becks and Clare invest money in a business in the ratio 3:4:5
Audrey invests £5400
How much do Becks and Clare each invest?

Answer Becks £ _____

Clare £ _____ [2]

Total Question 8

9 There are 480 boys and 560 girls in Digby High School.
The probability that a boy has brown hair is 0.6
The probability that a girl has brown hair is 0.45
How many pupils in the school have brown hair?

Answer _____ [3]

Total Question 9

[Turn over

Quality of written communication will be assessed in this question.
Show your working.

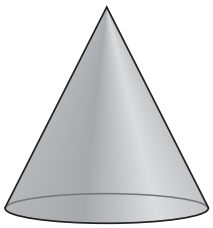
Examiner Only	
Marks	Remark

10 Show that $(2n + 1)^2 + n - 3n(n + 1) \equiv (n + 1)^2$ [2]

Total Question 10

11 A glass paperweight is cone shaped with a base radius of 5 cm and a slant height of 13 cm.
Calculate the curved surface area of the cone.

Give your answer to an appropriate degree of accuracy.



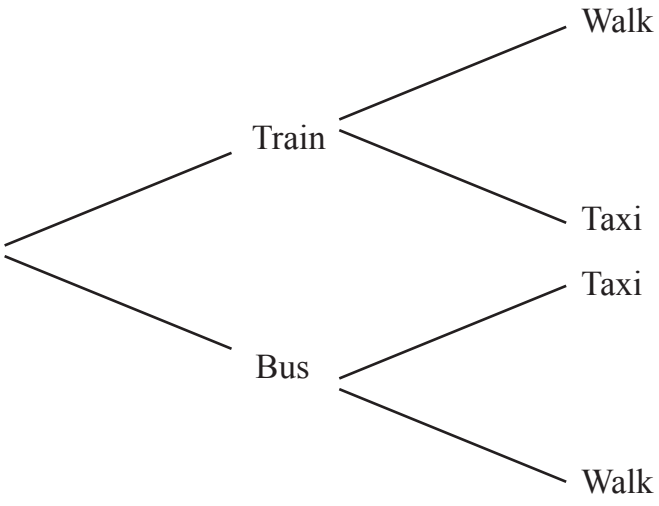
Answer _____ cm^2 [3]

Total Question 11

12 Nina has 4 ways of travelling home from work.
For the first part of her journey she can either go by train or by bus. The probability she will go by train is $\frac{2}{3}$. If she goes by train she will then either walk home with a probability of $\frac{3}{5}$ or take a taxi.

If she goes by bus on the first part of her journey home then she will either take a taxi with a probability of $\frac{3}{4}$ or walk.

(a) Complete the tree diagram to show the probabilities for her 4 ways home from work.



[2]

(b) What is Nina's most likely way home? Explain your answer.

_____

_____ [2]

(c) Calculate the probability that Nina walks part of the way home.

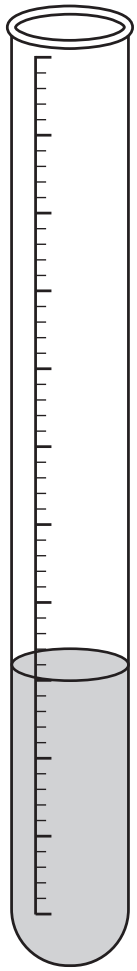
Answer _____ [2]

Examiner Only	
Marks	Remark
Total Question 12	

[Turn over

Quality of written communication will be assessed in this question.
Show your working.

Examiner Only	
Marks	Remark

13 

A hollow circular cylinder with internal radius of 0.9 cm is joined to a hollow hemisphere of the same internal radius to make a test tube 12 cm long.

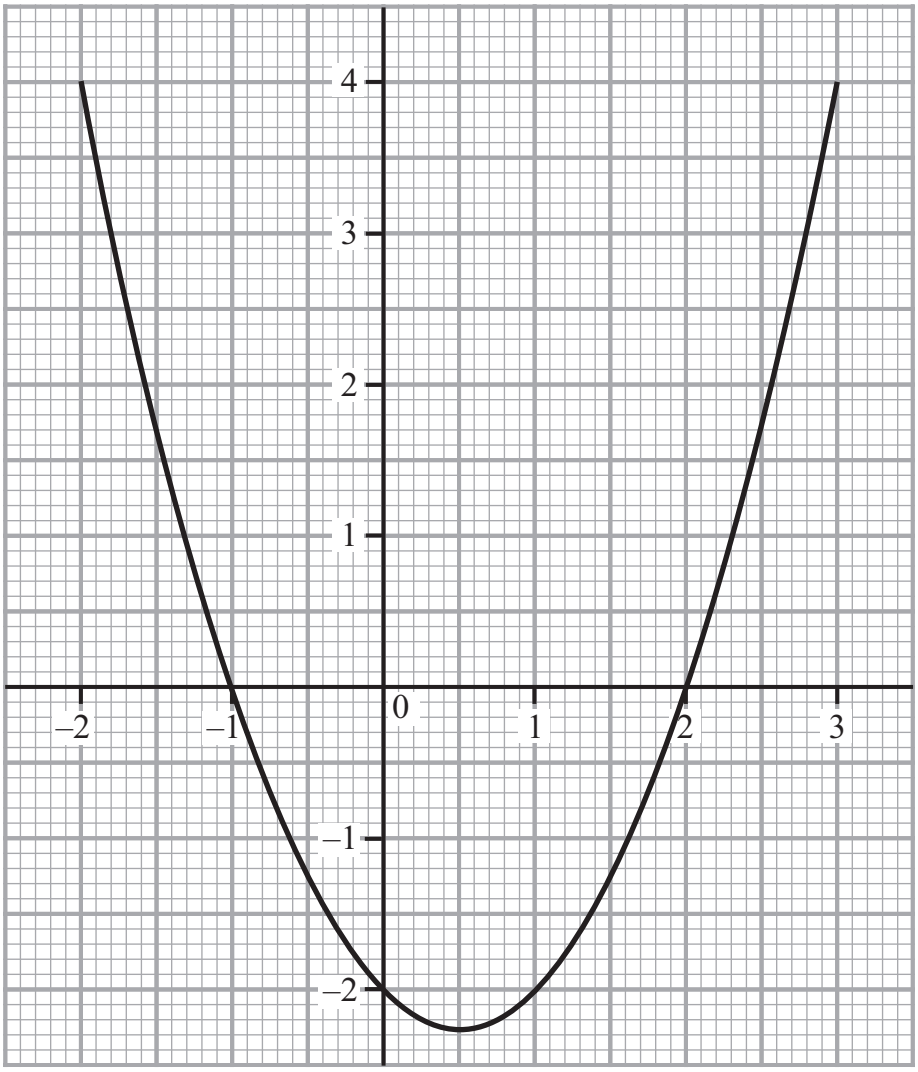
Will the test tube be large enough to hold 32 cm^3?
Explain your answer.

Show all your working.

Answer _____ because _____ [4]

Total Question 13

14 The grid shows the graph of $y = x^2 - x - 2$



By drawing an appropriate straight line, solve the equation $x^2 - 2x = 1$

Answer _____ [3]

Examiner Only	
Marks	Remark
Total Question 14	

[Turn over

15 Aine, Belle and Charlie take part in the school sports day.

The chance of each of them winning in the sack race and the egg and spoon race are as follows:

	Aine	Belle	Charlie
Sack Race	$\frac{3}{10}$	$\frac{1}{10}$	$\frac{2}{5}$
Egg and Spoon	$\frac{1}{12}$	$\frac{1}{2}$	$\frac{1}{3}$

What is the probability that both events are won by some other competitors?

Answer _____ [3]

Examiner Only	
Marks	Remark
Total Question 15	

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For Examiner's use only	
Question Number	**Marks**
1	
2	
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Total Marks	

Examiner Number