

Rewarding Learning

## Mathematics

## Unit T6 Paper 1 (Non-calculator)

Higher Tier

[GMT61]
*GMT61*
MONDAY 11 JUNE 1.30 pm-2.45 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.
Write your answers in the spaces provided in the question 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 must not 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 14.
You should have a ruler, compasses and protractor.
The Formula Sheet is on page 2.
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## Formula Sheet

Volume of prism $=$ area of cross section $\times$ 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 $=\pi r l$

In any triangle $A B C$

Sine Rule: $\frac{a}{\sin A}=\frac{b}{\sin B}=\frac{c}{\sin C}$
Cosine Rule: $a^{2}=b^{2}+c^{2}-2 b c \cos A$

Area of triangle $=\frac{1}{2} a b \sin C$
Quadratic equation
The solutions of $a x^{2}+b x+c=0$ where $a \neq 0$, are given by

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

$\qquad$


1 A letter is taken at random from the word
GEOGRAPHICAL
Write down the probability that the letter is not in the word GRAPH.

Answer $\qquad$ [2]

2 (a) Share 72 sweets in the ratio $8: 1$

Answer $\qquad$ , $\qquad$
(b) Given that $689 \times 537=369993$, write down the value of
(i) $\frac{369993}{53700}$

Answer $\qquad$
(ii) $\frac{36.9993}{0.0689}$ Answer $\qquad$ [1]

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| Examiner Only |  |
| :---: | :---: |
| Marks | Remark |
| Total Question 2 |  |
|  |  |

3 Find the area of the trapezium.


Answer $\qquad$ $\mathrm{cm}^{2}$ [2]


4 (a) Enlarge the shape A by scale factor 2 from the centre $\mathrm{C}(-4,1)$.

(b) Reflect the triangle below in the line $y=1$

[2]

5 A bag contains 4 toffee sweets, 6 nut sweets and some fruit sweets.
(a) The probability of me taking a fruit sweet from the bag is $\frac{1}{2}$

How many fruit sweets are in the bag?

Answer $\qquad$ [1]
(b) I eat 2 toffee sweets. What is the probability that the next sweet I take is toffee?

Answer $\qquad$ [2]

| Examiner Only |  |
| :---: | :---: |
| Marks | Remark |
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|  |  |
|  |  |

6 （a）Write down all the values of $n$ ，where $n$ is an integer，such that $-9 \leqslant 3 n<3$

Answer $\qquad$ ［2］
（b）Work out the value of $\frac{a(5 b+6)}{c}$ when $a=-3, b=2$ and $c=4$

Answer $\qquad$

7 Work out the reciprocal of 1.5

Answer $\qquad$

| Examiner Only |  |
| :---: | :---: |
| Marks | Remark |
|  |  |

8 Using ruler and compasses only, construct the bisector of the angle RST.


9 (a) Complete the table of values for $y=x^{2}-x-1$

| $x$ | -2 | -1 | 0 | 1 | 2 | 3 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $y$ |  | 1 | -1 |  | 1 | 5 |

(b) On the axes below, draw the graph of $y=x^{2}-x-1$ for values of $x$ from -2 to 3

(c) Use your graph to solve the equation

$$
x^{2}-x-1=0
$$

Answer $x=$ $\qquad$
(d) Use your graph to find the value of $y$ when $x=-1.7$

Answer $y=$ $\qquad$
(e) From your graph estimate the minimum value of $y$.

Answer $y=$ $\qquad$
(f) By drawing an appropriate straight line on the grid opposite, find the positive solution of the equation

$$
x^{2}+x-3=0
$$

Answer $x=$ $\qquad$

10 Rearrange the formula $\mathrm{V}=\frac{4}{3} \pi r^{3}$ to make $r$ the subject.

Answer $r=$ $\qquad$ [2]

| Examiner Only |  |
| :---: | :---: |
| Marks | Remark |
|  |  |
|  |  |

11 (a) Work out the value of $\sqrt{5} \times \sqrt{5}$
Answer $\qquad$ [1]
(b) Write the number 0.000000567 in standard form.

Answer $\qquad$ [1]

12 Rationalise the denominator of $\frac{30}{\sqrt{6}}$
Give your answer in its simplest form.

Answer $\qquad$

Answer $\qquad$ $m^{3}$ [5]


13 The diagram shows an oil-tank made from a cylinder of radius 3 metres and height 4 metres with a hemisphere on top.

Calculate the volume of the oil-tank, giving your answer in terms of $\pi$.

$\square$

Quality of written communication will be assessed in this question.
14 Explain why $(n+1)^{2}+(n-1)^{2}$ is always even for any integer value of $n$.

15 What is the area of a square of side $(5+\sqrt{3}) \mathrm{cm}$ ?
Give your answer in the form $a+b \sqrt{3}$

Answer $\qquad$ $\mathrm{cm}^{2}$ [2]

THIS IS THE END OF THE QUESTION PAPER

## DO NOT WRITE ON THIS PAGE

| $\qquad$For Examiner's <br> use only  <br> Question <br> Number Marks <br> 1  <br> 2  <br> 3  <br> 4  <br> 5  <br> 6  <br> 7  <br> 8  <br> 9  <br> 10  <br> 11  <br> 12  <br> 13  <br> 14  <br> 15  <br> QWC  <br> Total <br> Marks  |
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