



General Certificate of Secondary Education  
2018

Centre Number

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Candidate Number

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# Mathematics

Unit T6 Paper 1  
(Non-calculator)

Higher Tier



[GMT61]

\*GMT61\*

**THURSDAY 7 JUNE, 9.15am–10.30am**

## 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 fourteen** questions.

All working should be clearly shown in the spaces provided. 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 13.

You should have a ruler, compasses and a protractor.

The Formula Sheet is on page 2.

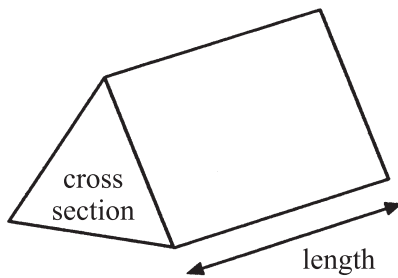
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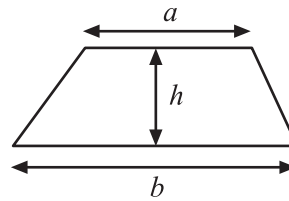
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# Formula Sheet

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

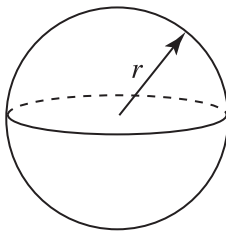


**Area of trapezium** =  $\frac{1}{2}(a+b)h$



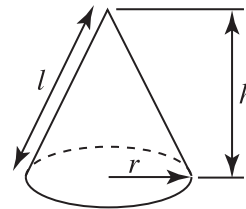
**Volume of sphere** =  $\frac{4}{3}\pi r^3$

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

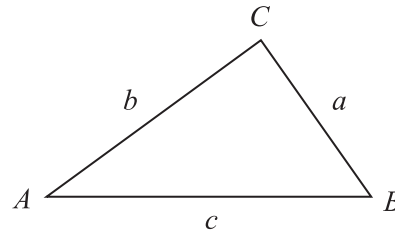


**Volume of cone** =  $\frac{1}{3}\pi r^2 h$

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



**In any triangle ABC**



## 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:**  $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

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

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





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**(Questions start overleaf)**

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1 There are four outcomes from a game.

Outcome	Win £5	Win £2	Win £1	No Prize
Probability	0.05	0.1		0.6

(a) Complete the table. [2]

(b) 800 people play the game.

Estimate how much prize money is won.

Answer £ \_\_\_\_\_ [3]

2 Estimate the value of  $\frac{494.7 \times 3.29}{2.19 - 1.71}$

Answer \_\_\_\_\_ [3]



3 Given that  $37 \times 238 = 8806$ , find

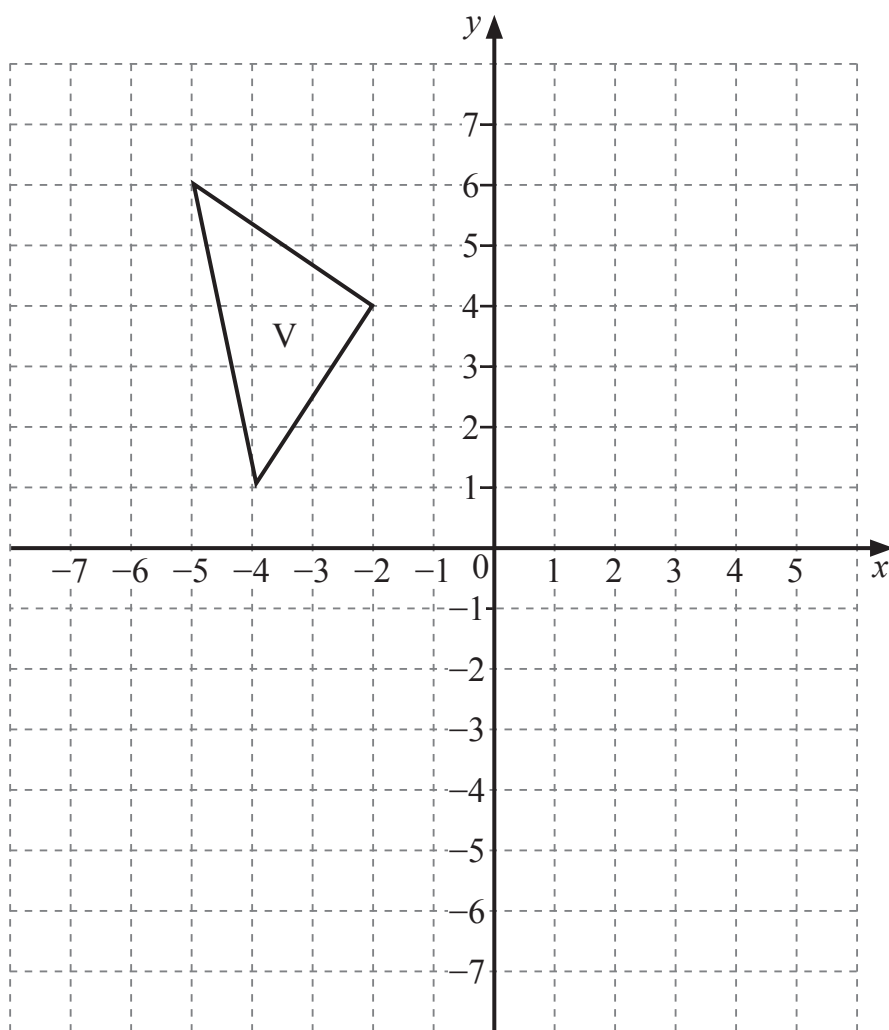
(a)  $370 \times 0.00238$

Answer \_\_\_\_\_ [1]

(b)  $\frac{88.06}{0.37}$

Answer \_\_\_\_\_ [1]





- (a) Reflect the shape V in the line  $x = -1$

Label the image T.

[2]

- (b) Rotate the shape V  $90^\circ$  clockwise about the point  $(-6, -1)$

Label the image R.

[2]



5 Work out the missing value in each of the following.

(a)  $t^4 \times t^3 = t \square$  [1]

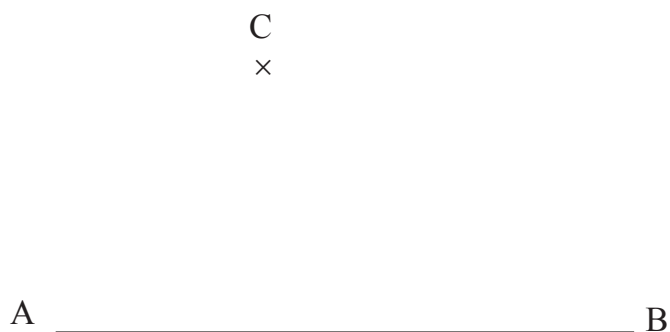
(b)  $(p^3)^3 = p \square$  [1]

(c)  $\frac{y^{16}}{y^4} = y \square$  [1]

[Turn over



- 6 Using a ruler and compasses only, construct a line from the point C to cross the line AB at right angles. Leave in all your construction arcs.



[2]





7 Solve the inequality  $14 + a > 5a$

Answer \_\_\_\_\_ [2]

8 Make T the subject of the formula  $R = 7T + Q$

Answer \_\_\_\_\_ [2]

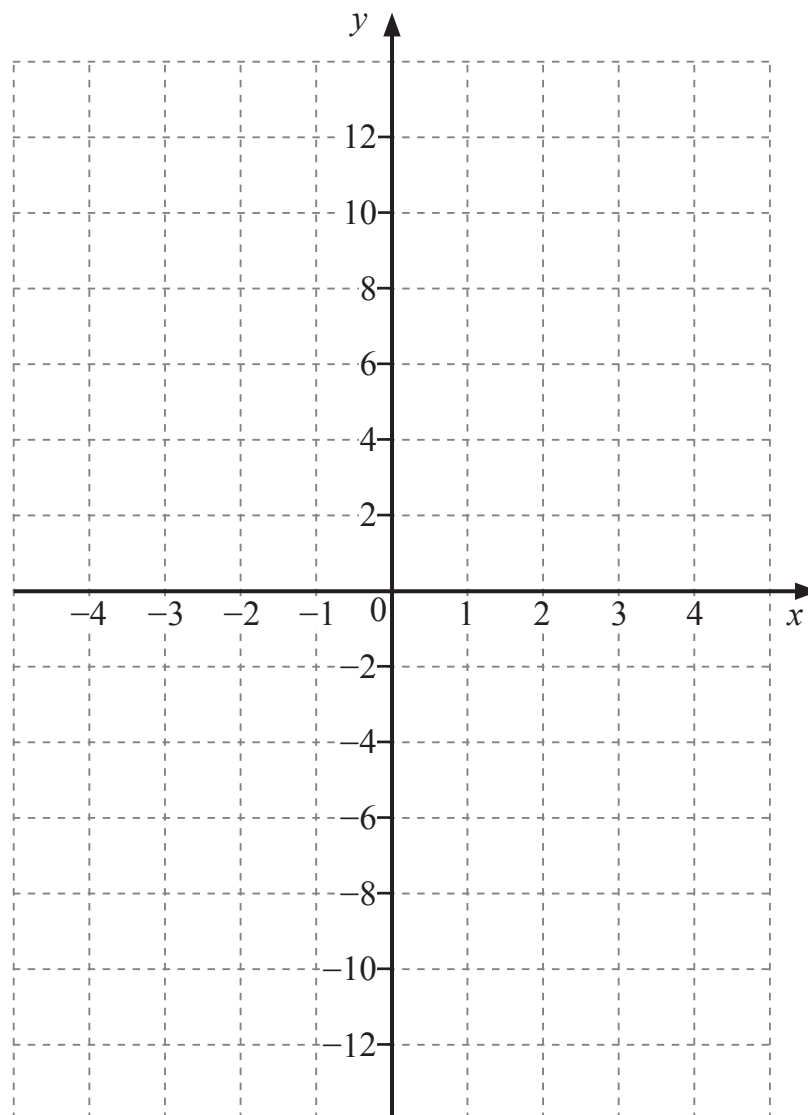


9 (a) Complete the table of values for  $y = \frac{6}{x}$

$x$	-4	-3	-2	-1	-0.5	0.5	1	2	3	4
$y$	-1.5	-2	-3	-6			6	3	2	1.5

[2]

(b) Hence draw the graph of  $y = \frac{6}{x}$  on the grid below.



[2]



(c) (i) Draw the line  $y = 2x + 1$  on the grid.

Write down the  $x$  values of the points of intersection of

$$y = \frac{6}{x} \text{ and } y = 2x + 1$$

Answer  $x =$  \_\_\_\_\_ [2]

(ii) What equation has been solved to give these two answers in (i)?

Answer \_\_\_\_\_ [1]



10 In a school there are 860 pupils.

420 of the pupils are boys.

The total number of pupils who play on a school hockey team is 184

The probability that a girl plays on a school hockey team is 0.3

Calculate the probability that a boy plays on a school hockey team.

Answer \_\_\_\_\_ [4]



11 (a) Work out  $7.218 \times 10^2 - 2.9 \times 10^{-1}$

Give your answer in standard form.

Answer \_\_\_\_\_ [2]

(b) Given that  $(2.4 \times 10^p) \times (7 \times 10^q) = (r \times 10^5)$

where all three numbers are in standard form, find

(i) the value of  $r$ ,

Answer  $r =$  \_\_\_\_\_ [1]

(ii) one set of possible values for  $p$  and  $q$ .

Answer  $p =$  \_\_\_\_\_  $q =$  \_\_\_\_\_ [1]

[Turn over



12 Change  $0.3\overline{57}$  to a fraction in its simplest form.

Answer \_\_\_\_\_ [3]



**Quality of written communication will be assessed in this question.**

**13** A bag only contains 5 blue balls and  $x$  green balls.

Colin takes 2 balls at random without replacement from the bag.

The probability that both balls are blue is  $\frac{5}{14}$

By forming an equation in  $x$ , find how many green balls are in the bag.

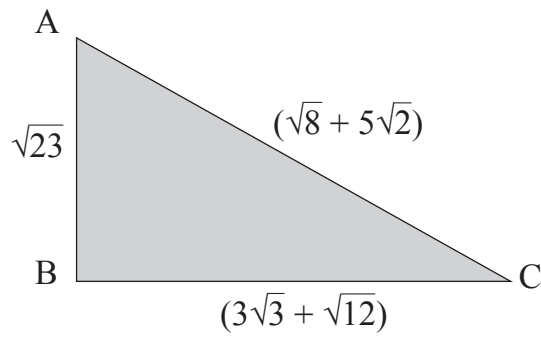
**A solution by trial and improvement will not be accepted.**

Answer \_\_\_\_\_ [5]

[Turn over



14



$$AB = \sqrt{23} \text{ cm}$$

$$BC = (3\sqrt{3} + \sqrt{12}) \text{ cm}$$

$$AC = (\sqrt{8} + 5\sqrt{2}) \text{ cm}$$

Is triangle ABC right-angled?

You must justify your answer.

[4]





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Question Number	Marks
1	
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<b>Total Marks</b>	
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Examiner Number

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