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Centre Number

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General Certificate of Secondary Education
2018

# Mathematics

Unit T6 Paper 1
**(Non-calculator)**
Higher Tier

**MV18**

**[GMT61]**

**THURSDAY 7 JUNE, 9.15am–10.30am**

## 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 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.

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## 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 **13**.
You should have a ruler, compasses and a protractor.
The Formula Sheet is on pages 4 and 5.

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**(Questions start on page 6)**

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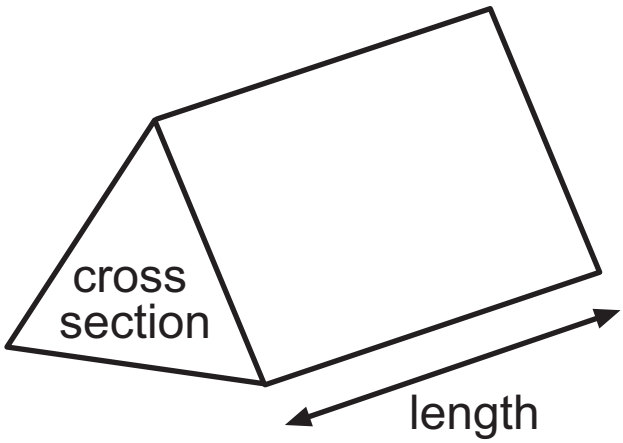
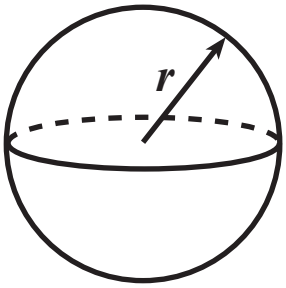
# Formula Sheet

**Volume of prism =** area of 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

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

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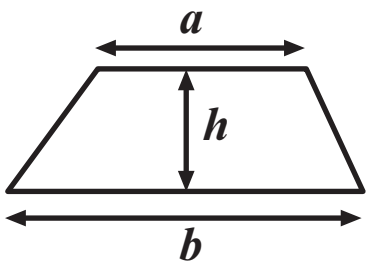
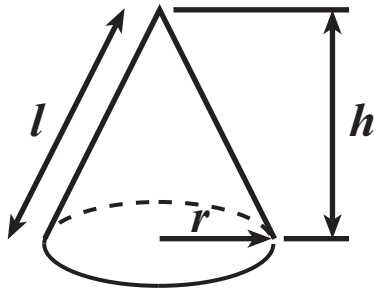
**Area of trapezium** $= \frac{1}{2}(a + b)h$

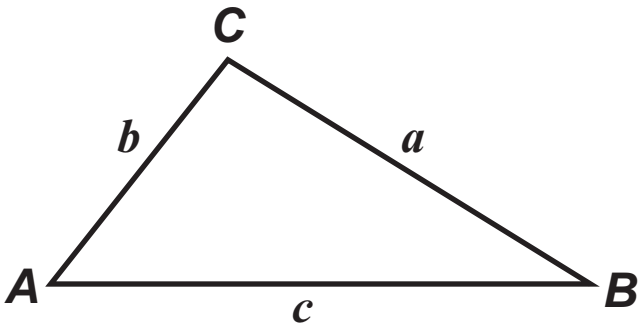



**Volume of cone** $= \frac{1}{3}\pi r^2 h$

**Curved surface area of cone** $= \pi rl$




**In any triangle *ABC***




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

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

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

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**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 marks]

**(b)** 800 people play the game.

Estimate how much prize money is won. [3 marks]

Answer £ _____

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**2** Estimate the value of $\frac{494.7 \times 3.29}{2.19 - 1.71}$ [3 marks]

Answer _____

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

**(a)** $370 \times 0.00238$ [1 mark]

Answer _____

**(b)** $\frac{88.06}{0.37}$ [1 mark]

Answer _____

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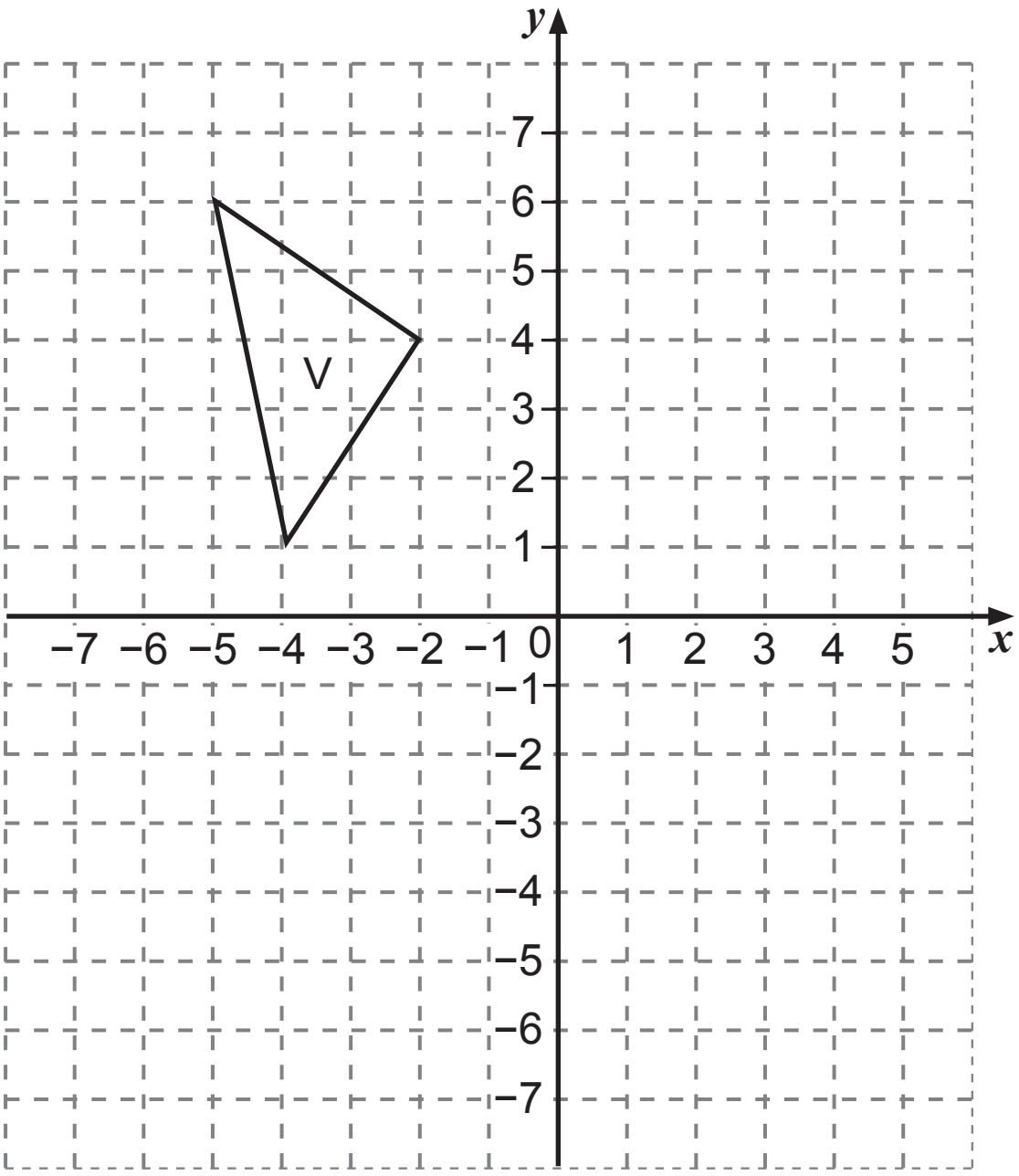
**4**




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

Label the image T. [2 marks]

**(b)** Rotate the shape V 90° clockwise about the point (–6, –1)

Label the image R. [2 marks]

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**5** Work out the missing value in each of the following.
[1 mark for each value]

**(a)** $t^4 \times t^3 = t^{\square}$

**(b)** $(p^3)^3 = p^{\square}$

**(c)** $\frac{y^{16}}{y^4} = y^{\square}$

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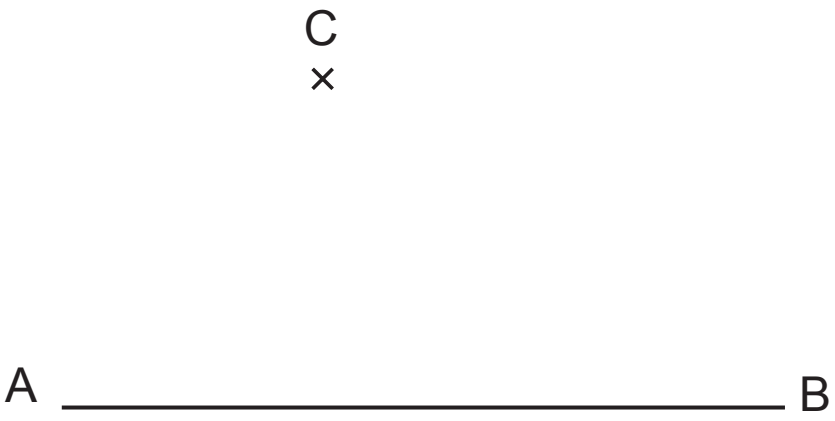
**6** Using a ruler and compasses only, construct a line from the point C to cross the line AB at right angles. Leave in all your construction arcs. [2 marks]



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**7** Solve the inequality $14 + a > 5a$ [2 marks]

Answer _____

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**8** Make T the subject of the formula $R = 7T + Q$
[2 marks]

Answer _____

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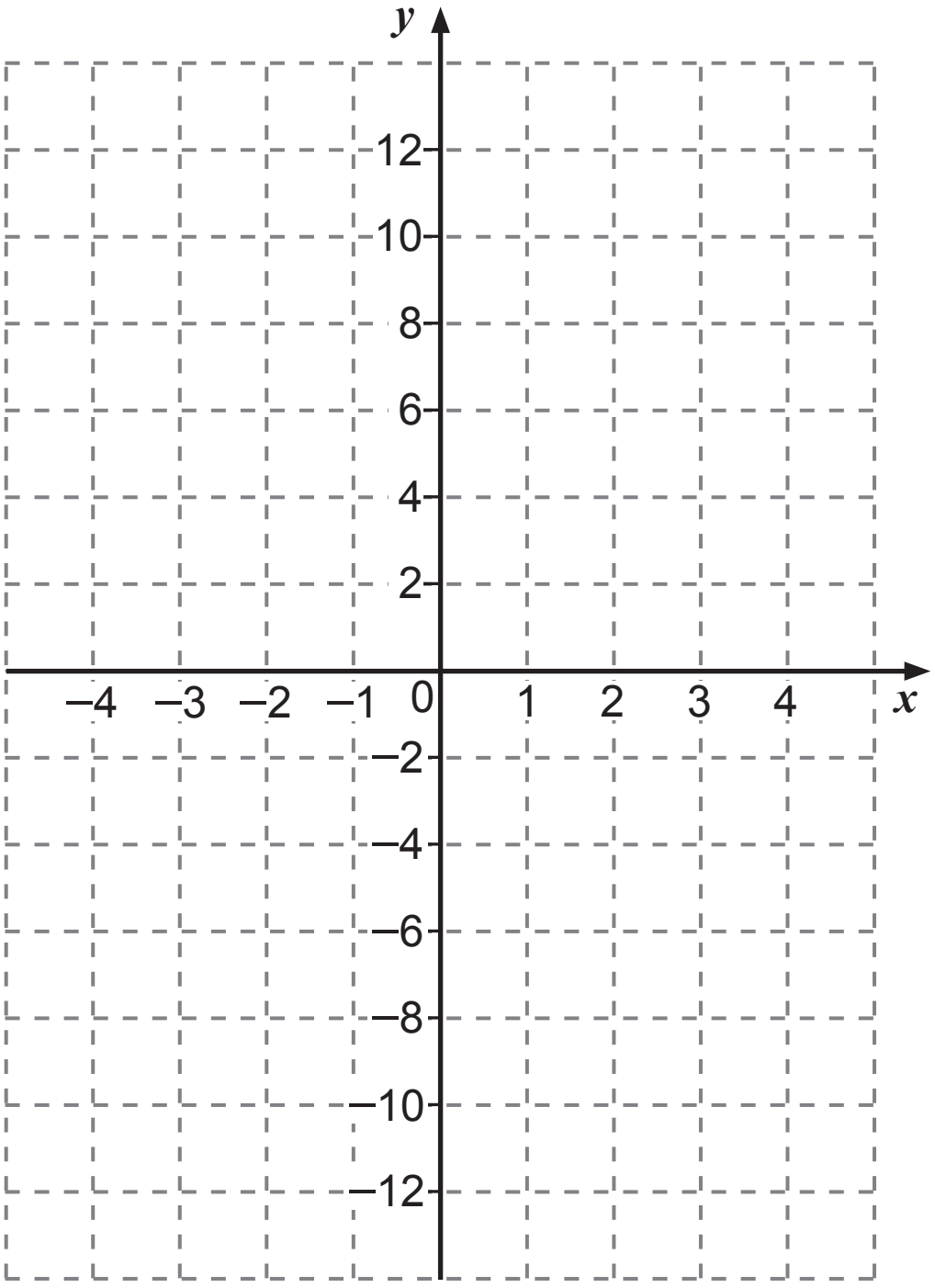
**9** **(a)** Complete the table of values for $y = \frac{6}{x}$ [2 marks]

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

**(b)** Hence draw the graph of $y = \frac{6}{x}$ on the grid below. [2 marks]



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

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

$y = \frac{6}{x}$ and $y = 2x + 1$ [2 marks]

Answer $x =$ _____

**(ii)** What equation has been solved to give these two answers in **(i)**? [1 mark]

Answer _____

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**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. [4 marks]

Answer _____

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

Give your answer in standard form. [2 marks]

Answer _____

**(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 $r$, [1 mark]

Answer $r =$ _____

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**(ii)** one set of possible values for $p$ and $q$. [1 mark]

Answer $p$ = _____ $q$ = _____

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**12** Change $0.3\dot{5}\dot{7}$ to a fraction in its simplest form. [3 marks]

Answer _____

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**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. [5 marks]

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

Answer _____

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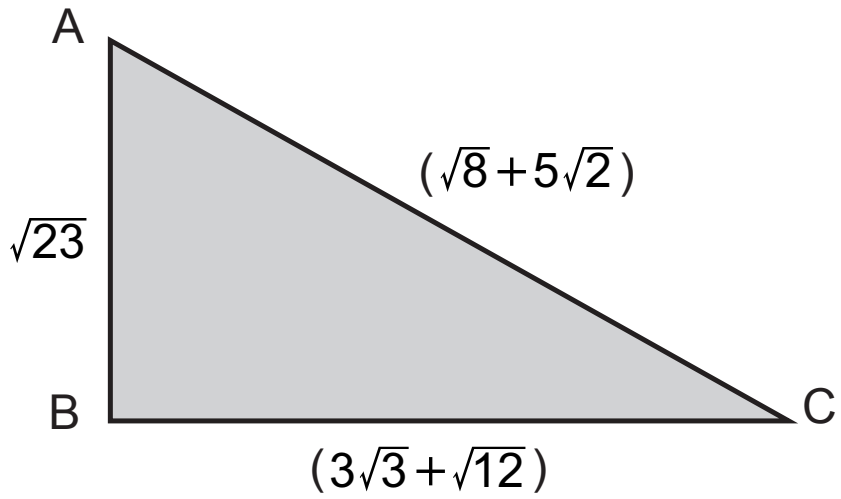
**14**




$AB = \sqrt{23}$ cm

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

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

Is triangle ABC right-angled?

You must justify your answer. [4 marks]

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THIS IS THE END OF THE QUESTION PAPER

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| For Examiner's use only | |
|---|---|
| **Question Number** | **Marks** |
| 1 | |
| 2 | |
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| 14 | |
| **Total Marks** | |

**Examiner Number**

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