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General Certificate of Secondary Education  
2012

Centre

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Candidate Number

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## 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.

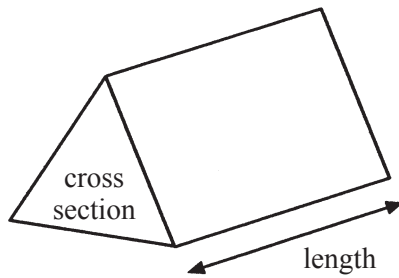
The Formula Sheet is on page 2.

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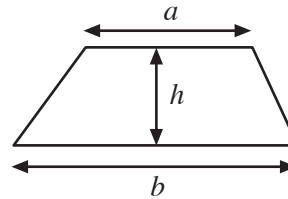


# Formula Sheet

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

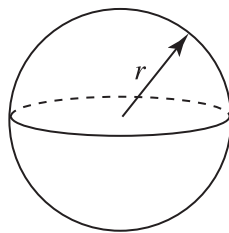


**Area of trapezium** =  $\frac{1}{2}(a + b)h$



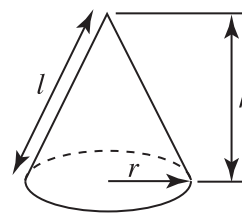
**Volume of sphere** =  $\frac{4}{3}\pi r^3$

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



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

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

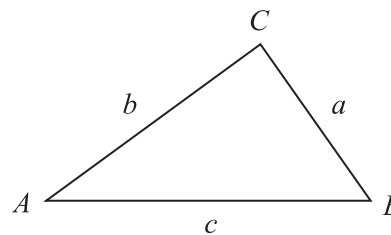


## Quadratic equation

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

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

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





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

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

(b) Given that  $689 \times 537 = 369993$ , write down the value of

(i)  $\frac{369993}{53700}$

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

(ii)  $\frac{36.9993}{0.0689}$

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

Examiner Only

Marks Remark

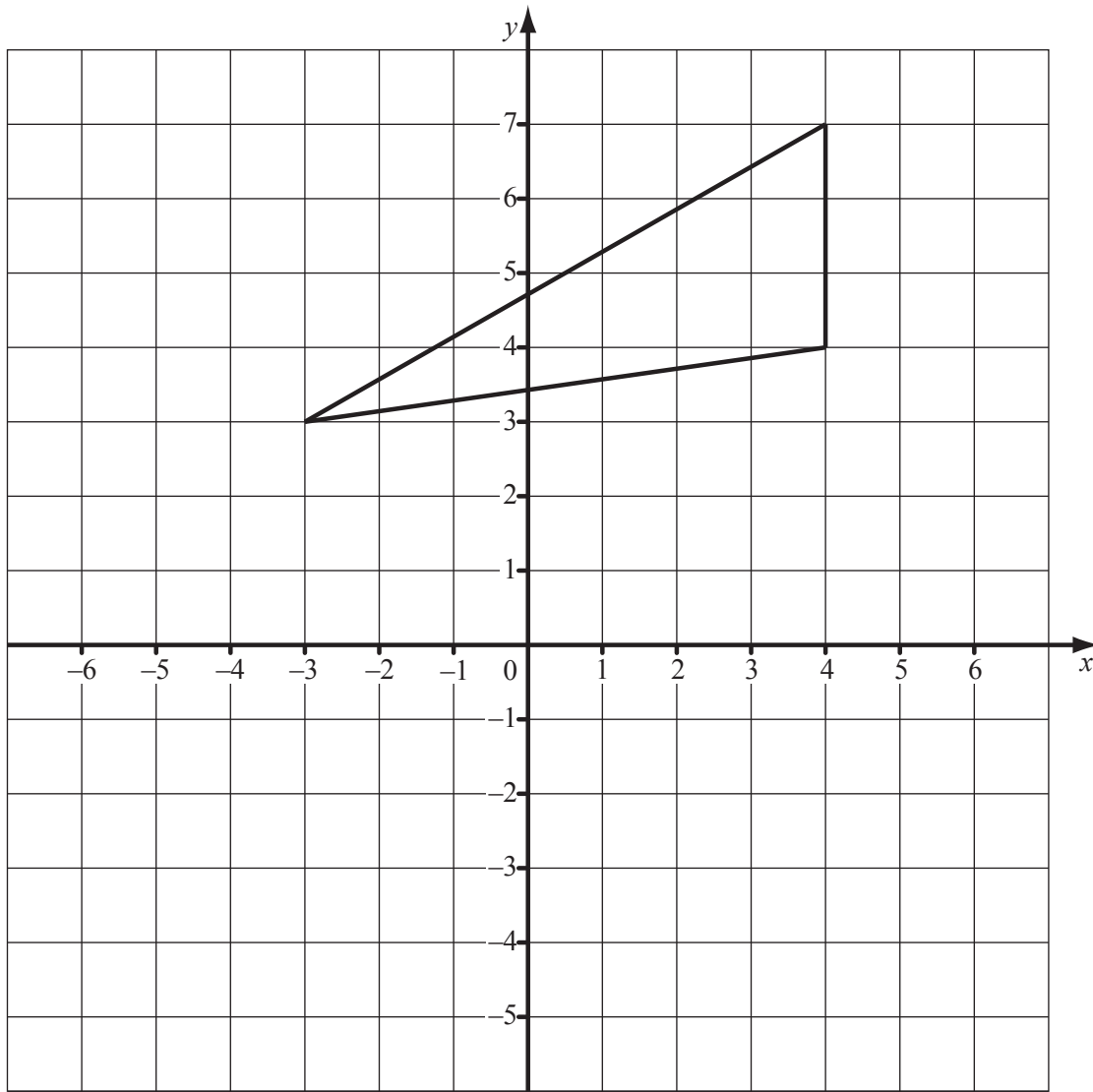
Total Question 2







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



[2]

Examiner Only	
Marks	Remark
Total Question 4	

[Turn over



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

(b) I eat 2 toffee sweets. What is the probability that the next sweet I take is toffee?

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

Examiner Only

Marks Remark

Total Question 5







7 Work out the reciprocal of 1.5

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

Examiner Only

Marks Remark

Total Question 7





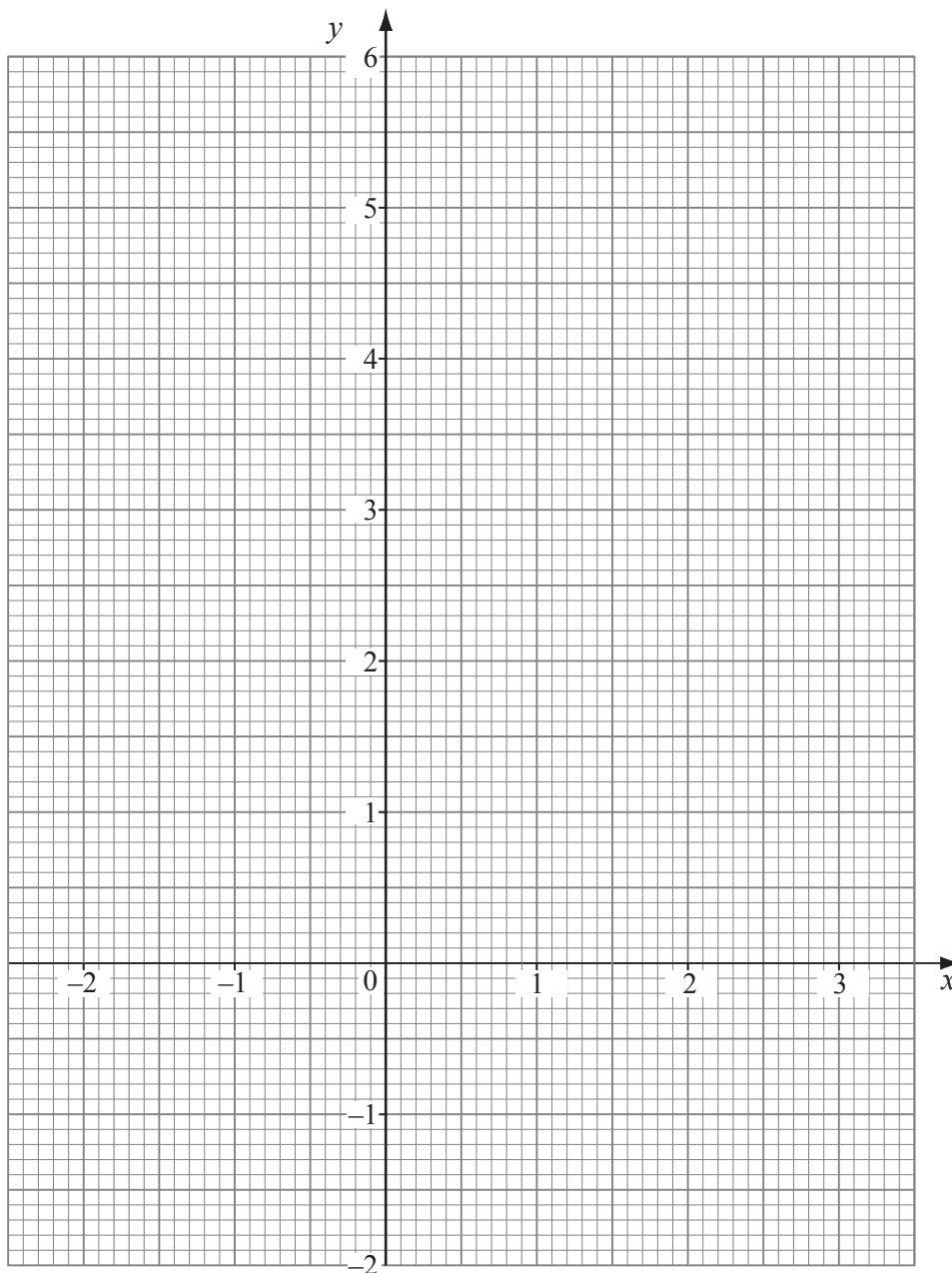
9 (a) Complete the table of values for  $y = x^2 - x - 1$

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

[1]

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

[2]



Examiner Only

Marks

Remark





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

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

Examiner Only

Marks Remark

Total Question 10





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

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

Examiner Only

Marks Remark

Total Question 12







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  $n$ .

[2]

Examiner Only	
Marks	Remark
Total Question 14	





**DO NOT WRITE ON THIS PAGE**

For Examiner's use only	
Question Number	Marks
1	
2	
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15	
QWC	

<b>Total Marks</b>	
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Examiner Number

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