



Rewarding Learning

General Certificate of Secondary Education  
2013

Centre Number

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Candidate Number

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## Mathematics

Unit T6 Paper 1

**(Non-calculator)**  
Higher Tier



[GMT61]

\*GMT61\*

**FRIDAY 14 JUNE, 09.15 am–10.30 am**

### 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 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 13**.

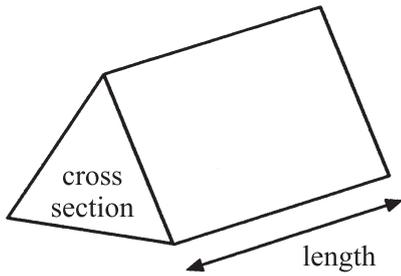
You should have a ruler, compasses and a protractor.

The Formula Sheet is on page 2.

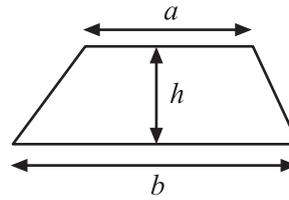


## Formula Sheet

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

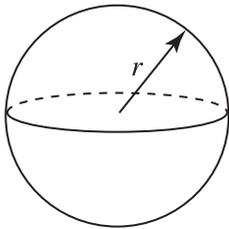


**Area of trapezium** =  $\frac{1}{2}(a + b)h$



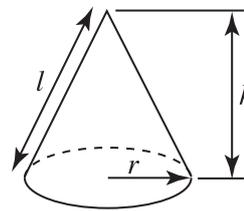
**Volume of sphere** =  $\frac{4}{3}\pi r^3$

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

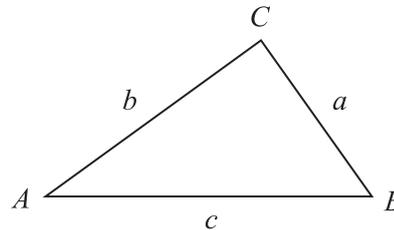


**Volume of cone** =  $\frac{1}{3}\pi r^2 h$

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



1 (a) Given that  $76 \times 219 = 16644$  work out the value of

(i)  $16644 \div 21.9$

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

(ii)  $75 \times 219$

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

(b)  $\frac{1}{3}$  of the pupils in a class are boys.  
What is the ratio of boys to girls in the class?

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

Examiner Only

Marks	Remark
Total Question 1	

[Turn over



- 2 A fair red dice has faces marked 1, 2, 3, 4, 5, 6  
A fair blue dice has faces marked 1, 1, 3, 3, 6, 7

The table below shows all possible outcomes when the dice are thrown together.

		Red Dice					
		1	2	3	4	5	6
Blue Dice	1	(1, 1)	(1, 2)	(1, 3)	(1, 4)	(1, 5)	(1, 6)
	1	(1, 1)	(1, 2)	(1, 3)	(1, 4)	(1, 5)	(1, 6)
	3	(3, 1)	(3, 2)	(3, 3)	(3, 4)	(3, 5)	(3, 6)
	3	(3, 1)	(3, 2)	(3, 3)	(3, 4)	(3, 5)	(3, 6)
	6	(6, 1)	(6, 2)	(6, 3)	(6, 4)	(6, 5)	(6, 6)
	7	(7, 1)	(7, 2)	(7, 3)	(7, 4)	(7, 5)	(7, 6)

- (a) Calculate the probability of getting a larger score on the blue dice than on the red dice.

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

- (b) If the two dice are thrown together 360 times how many times would you expect to get a **total** score of 6?

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

Examiner Only

Marks Remark

Total Question 2



3 Find the value of the following expressions when  $a = 3$   $b = -2$   $c = -1$

(a)  $b(c - a)$

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

(b)  $\frac{a^2 + c^2}{b}$

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

Examiner Only

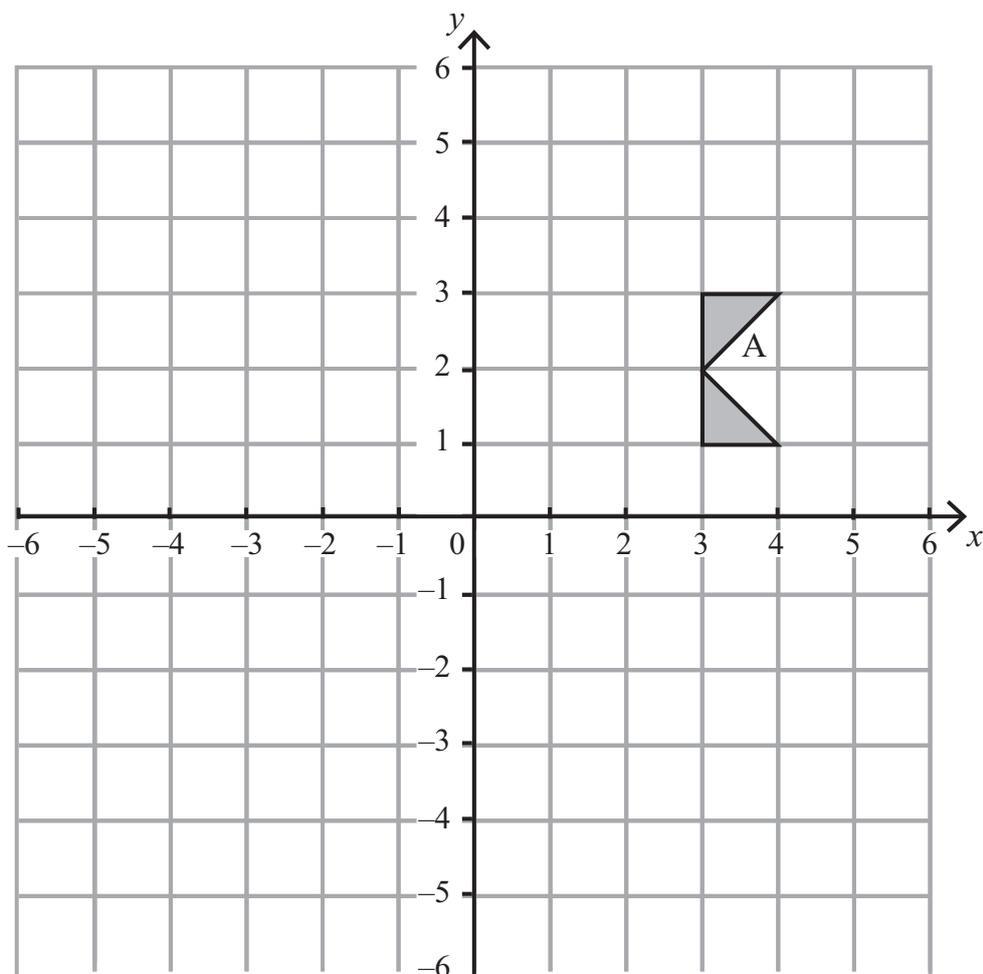
Marks Remark

Total Question 3

[Turn over



4



- (a) Reflect the shape A in the diagram in the line  $x = 2$   
Label the new shape B. [2]
- (b) Enlarge the shape A by a scale factor of 2 with centre of enlargement at (2, 1). [3]
- (c) Rotate the shape A through  $90^\circ$  anticlockwise about the point (0, -2).  
Label the new shape C. [2]

Examiner Only	
Marks	Remark
Total Question 4	



5 John discovered that the probability that a girl has blue eyes is 0.6

John asks 20 girls their eye colour. He writes some probabilities in the following table.

Colour of eyes	Brown	Green	Blue	Other
Probability	0.35	0.05		0.05

(a) Complete John's table. [2]

(b) Why do you think that John's calculated probability for blue eyes is not 0.6?

\_\_\_\_\_

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

Examiner Only

Marks Remark

Total Question 5

[Turn over





8 (a) Work out the reciprocal of 1.8

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

(b) Express  $\frac{7}{11}$  as a recurring decimal.

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

Examiner Only

Marks Remark

Total Question 8

[Turn over

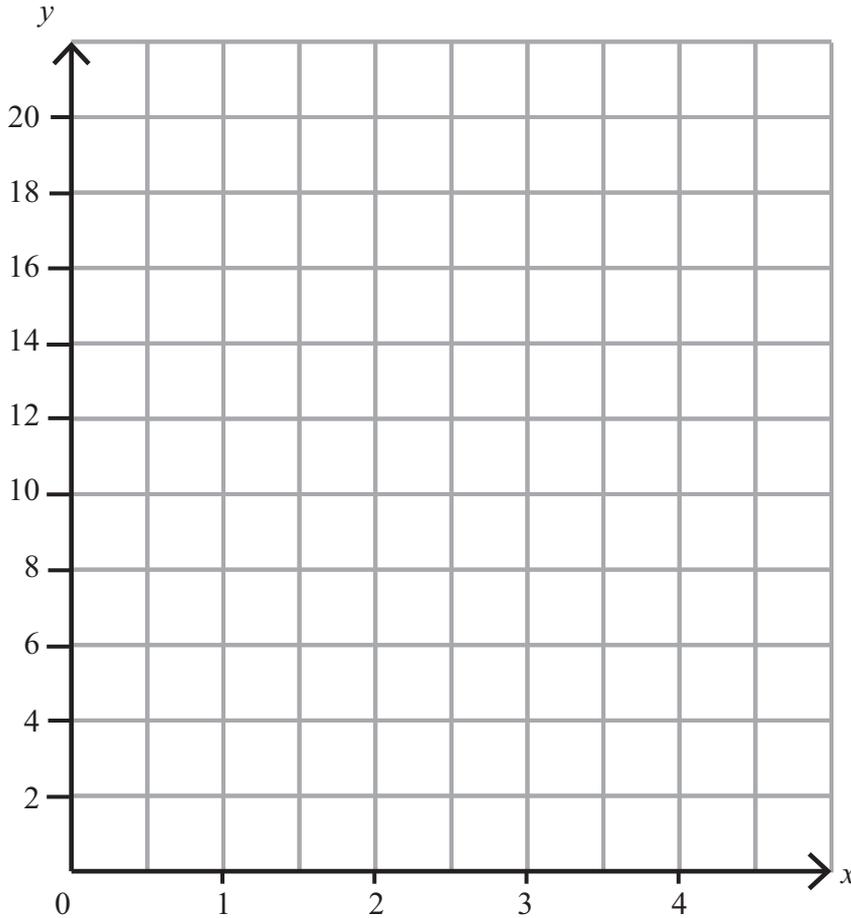


9 (a) Complete the table for  $y = 2^x + 1$

$x$	0	1	2	3	4
$y = 2^x + 1$		3	5		17

[2]

(b) Draw the graph of  $y = 2^x + 1$



[2]

Examiner Only	
Marks	Remark
Total Question 9	



10  $a, b, c, d, g$  and  $r$  represent lengths.  
By considering the dimensions of the following formulae decide which formula measures length and which one measures volume.

(i)  $W = a^2b - 2ab$

(ii)  $Q = \pi c (a + 2b + d)^2$

(iii)  $Z = ag - \pi r^2$

(iv)  $P = \sqrt{(a^2 + b^2 + c^2)}$

Answer \_\_\_\_\_ measures length [1]

Answer \_\_\_\_\_ measures volume [1]

Examiner Only	
Marks	Remark
Total Question 10	

[Turn over





12 Two cylinders A and B are similar.  
 Cylinder A has a base radius of 5 cm and cylinder B has a base radius of 10 cm.  
 The volume of cylinder A is  $60 \text{ cm}^3$ .  
 Calculate the volume of cylinder B.

Answer \_\_\_\_\_  $\text{cm}^3$  [2]

Examiner Only	
Marks	Remark
Total Question 12	

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

13 Show that the recurring decimal  $0.1\dot{8}\dot{2}$  can be written as the fraction  $\frac{181}{990}$

[2]

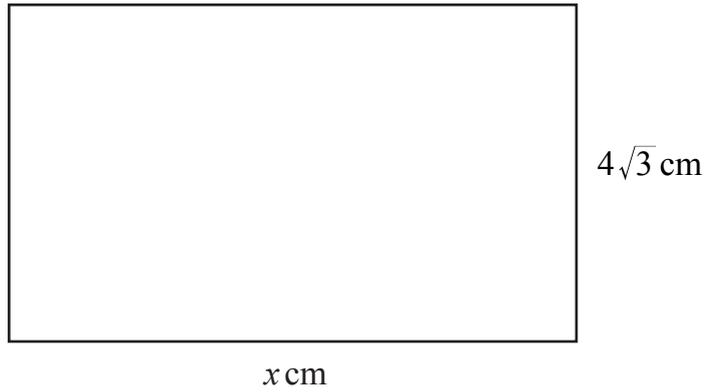
Total Question 13	

[Turn over





15 The area of the rectangle below is  $60 \text{ cm}^2$ .



Find the value of  $x$  in the form  $a\sqrt{b}$  where  $a$  and  $b$  are integers.

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

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**THIS IS THE END OF THE QUESTION PAPER**

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Examiner Only

Marks Remark

Total Question 15



**DO NOT WRITE ON THIS PAGE**

For Examiner's use only	
Question Number	Marks
1	
2	
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<b>Total Marks</b>	
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