



Rewarding Learning

General Certificate of Secondary Education
2013

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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.

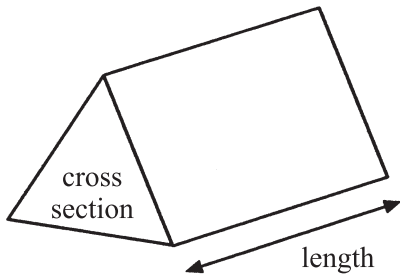
The Formula Sheet is on page 2.

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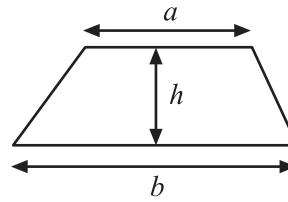


Formula Sheet

Volume of prism = area of cross section \times length

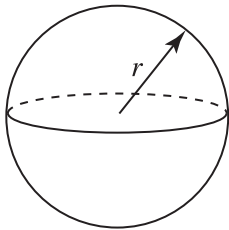


Area of trapezium = $\frac{1}{2}(a + b)h$



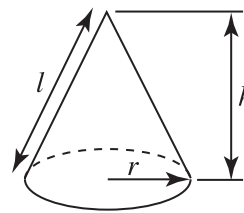
Volume of sphere = $\frac{4}{3}\pi r^3$

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

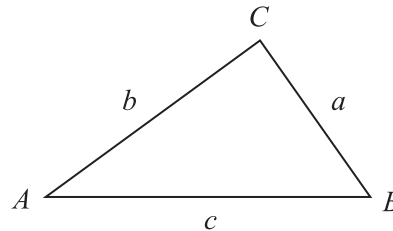


Volume of cone = $\frac{1}{3}\pi r^2 h$

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



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

(i) $16644 \div 21.9$

Answer _____ [1]

(ii) 75×219

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



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



6 (a) Simplify

(i) $p^3 \times p^4$

Answer _____ [1]

(ii) $(h^8 \div h^5) + h^3$

Answer _____ [1]

(iii) $\frac{e^3}{e^5}$

Answer _____ [1]

(b) Gary states; “When y is a prime number, y^2 is always odd”.
Give a counter example to this statement.

[1]

(c) Fill in the box to complete the identity

$2x^2(x - 2) \equiv \boxed{} - 4x^2$

[1]

Examiner Only	
Marks	Remark
Total Question 6	
Total Question 7	

7 Lyla tosses an ordinary dice twice. What is the probability that she gets a 5 both times?

Show clearly all your working.

Answer _____ [2]



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

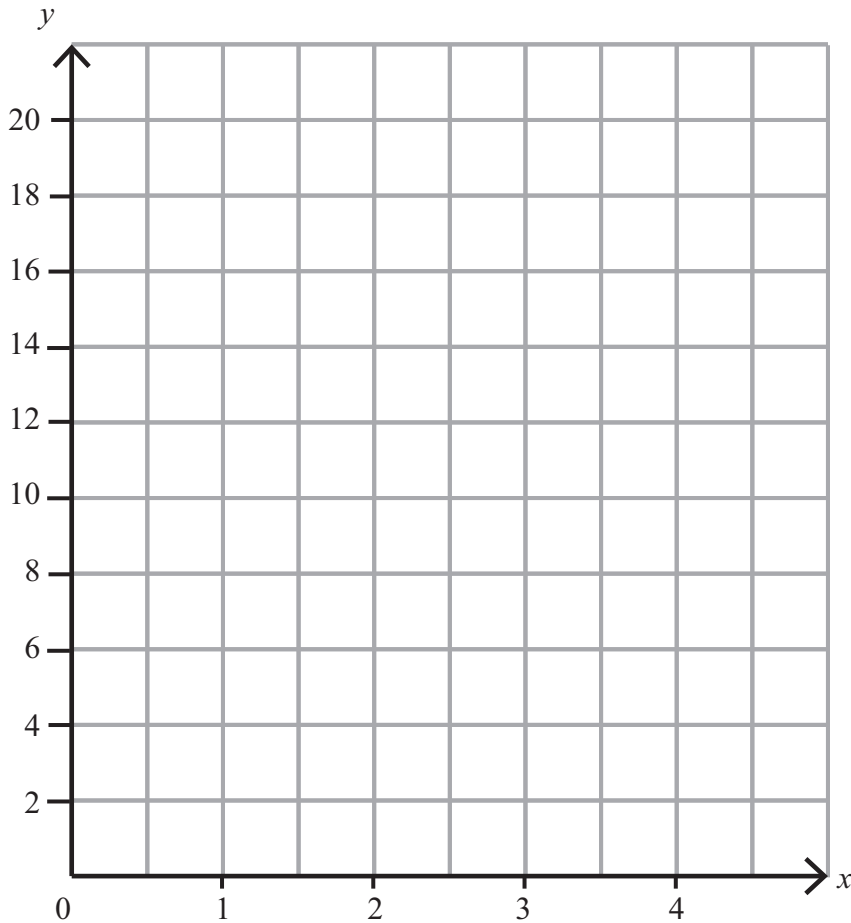


9 (a) Complete the table for $y = 2^x + 1$

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 cm^3 .
 Calculate the volume of cylinder B.

Answer _____ 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



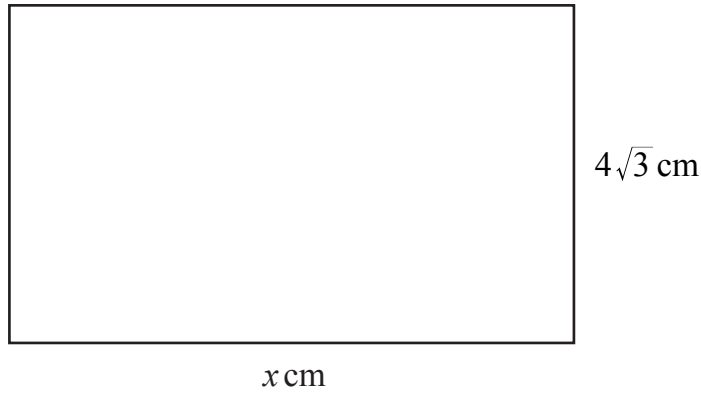
14 A bag contains 12 lettered tiles. 6 tiles have E, 4 tiles have P and 2 tiles have T.
 Morris takes three tiles one after the other without replacement.
 Calculate the probability that he can spell the word PET with his three tiles.

Answer _____ [3]

Examiner Only	
Marks	Remark
Total Question 14	



15 The area of the rectangle below is 60 cm^2 .



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

Answer $x =$ _____ [2]

THIS IS THE END OF THE QUESTION PAPER

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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15	

Total Marks	
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Examiner Number

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