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General Certificate of Secondary Education 2017

Mathematics

Unit T6 Paper 1 (Non-calculator)
Higher Tier





GMT61

[GMT61] FRIDAY 2 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 9.

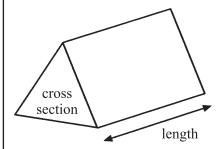
You should have a ruler, compasses and a protractor.

The Formula Sheet is on page 2.



Formula Sheet

Volume of prism = area of cross section \times length



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

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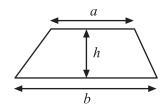
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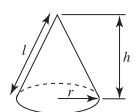
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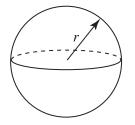
Volume of cone = $\frac{1}{3}\pi r^2 h$

Curved surface area of cone = πrl

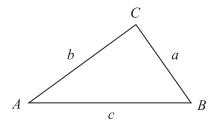


Volume of sphere = $\frac{4}{3}\pi r^3$

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



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

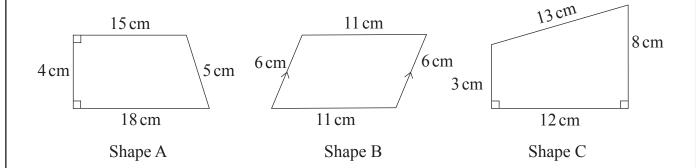


1
$$W = 5X - 2Y^2Z$$

Work out the value of W for X = 5, Y = -3, Z = 4

Answer
$$W =$$
 [3]

2 Explain why two of the shapes below have an area of 66 cm² while the other shape does not.



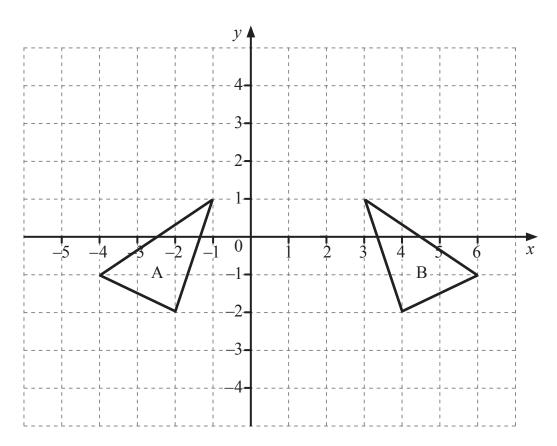
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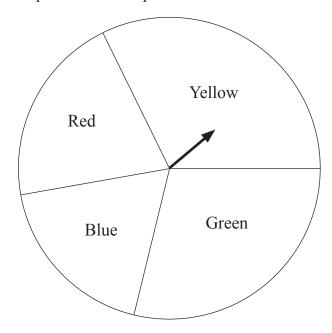
(a) Describe fully the single transformation which maps triangle A to triangle B.

Answer	[2]

(b) Draw the image of triangle A after a rotation of 90° anticlockwise about the point (-1, 3).



4 The diagram shows a pointer which spins about the centre of a circular disc.



The disc is divided into sectors which are coloured Yellow, Green, Red and Blue.

When the pointer is spun, it stops on one of the colours.

The probability that it will stop on Red, Blue or Green is given in the table.

Red	Blue	Green	Yellow
0.19	0.22	0.27	

Jonathan is going to spin the pointer once.

(a) Work out the probability that the pointer will stop on Yellow.

Answer _____[2]

(b) Work out the probability that the pointer will stop on Red or Green.

Answer _____[2]

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5	(a)	Lucy has a bag containing only 5p and 20p coins.		
		The ratio of the number of 5p coins to the number of 20p coins is 5:4		
		Work out the ratio of the total value of the 5p coins to the total value of the 20p coins.		
		Give your answer in its simplest form.		
		Answer[2]		
	(b)	John and Mark share an amount of money in the ratio 5 : 6		
		Mark's share is £48		
		What was the total amount shared?		
		Answer £[2]		
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6 The length of a rectangle is 3 times its width.

The width is wcm



(a) Write down a formula for the area A of the rectangle in terms of w.

Answer _____[1]

(b) The area of the rectangle is 48 cm²

Calculate the width of the rectangle.

Answer _____ cm [2]

7 Complete the boxes

[2]

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8	Find the	e reciprocal	of 2.5

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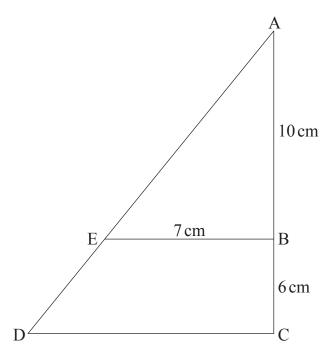
Quality of written communication will be assessed in this question.

9 Rearrange $p = 2q - 5r^2t$ to make r the subject of the formula.

Answer
$$r =$$
 [3]



10



In the diagram above ABC and AED are straight lines.

EB is parallel to DC.

 $AB = 10 \, cm$

BC = 6 cm

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EB = 7 cm

Work out the length of DC.

Answer _____ cm [2]

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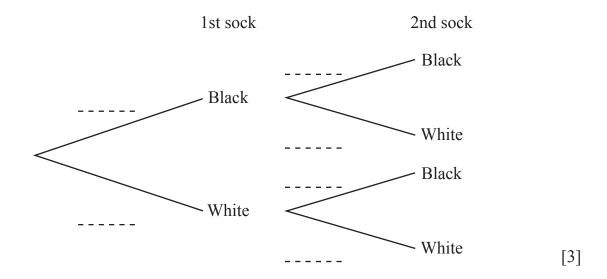
11 There are 12 socks in a drawer.

7 of the socks are black.

5 of the socks are white.

Stephen takes at random two socks from the drawer one after another without replacement.

(a) Complete the probability tree diagram below.

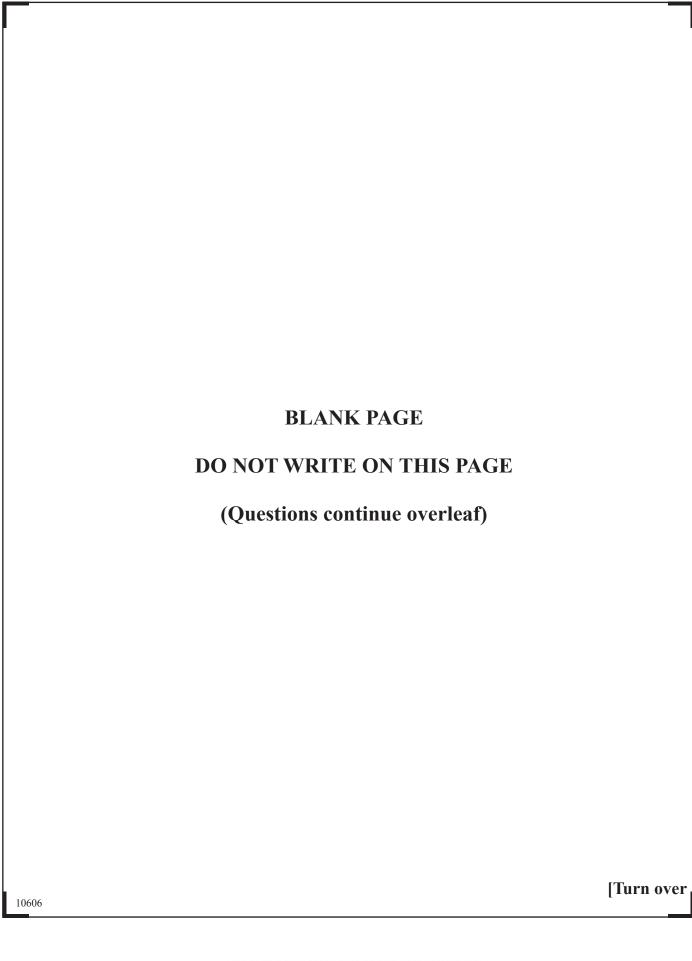


(b) Work out the probability that Stephen takes two socks of the same colour.

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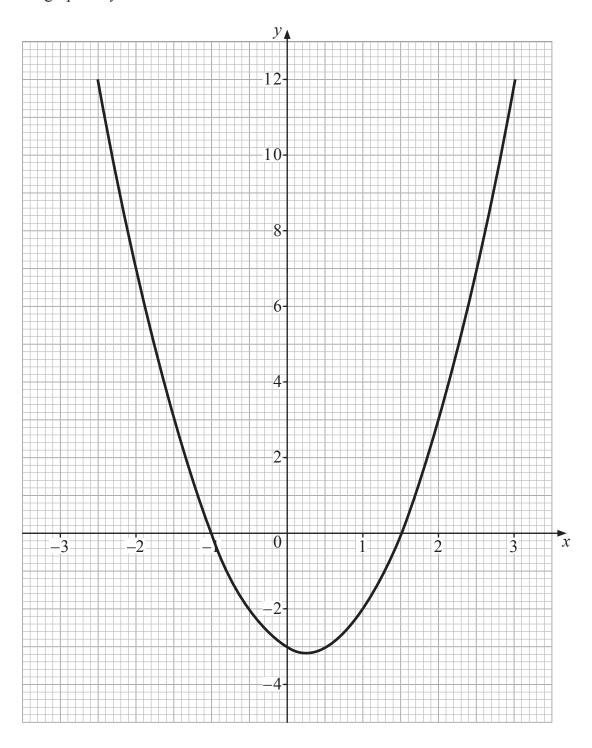




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12 The graph of $y = 2x^2 - x - 3$ for $-2.5 \le x \le 3$ is shown below.



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Use the graph to solve the equation

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$$2x^2 - x - 3 = 3 - 1.5x$$

Answer
$$x =$$
 [3]

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13 (a) Work out and simplify

$$(\sqrt{3}+\sqrt{27})^2$$

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(b)
$$(6 - \sqrt{5})(3 + 2\sqrt{5}) = a + c\sqrt{5}$$

Find the values of a and c.

Answer
$$a = ______, c = _____[3]$$



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	THIS IS THE END OF THE QUESTION PAPER				
	Answer $r = $ [4				
	Find an expression for r in terms of x .				
	The cylinder is melted down and made into a sphere of radius <i>r</i> . All lengths are in cm.				
	A solid metal cylinder has a base radius of $3x$ and a height of $32x$.				

Learning

Reading I

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For Examiner's use only			
Question Number	Marks		
1			
2			
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Total Marks

Examiner Number

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