Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2017

Mathematics

Unit T6 Paper 1
(Non-calculator)
Higher Tier

ML

[GMT61]

FRIDAY 2 JUNE, 9.15am–10.30am

TIME

1 hour 15 minutes, plus your additional time allowance.

INSTRUCTIONS TO CANDIDATES

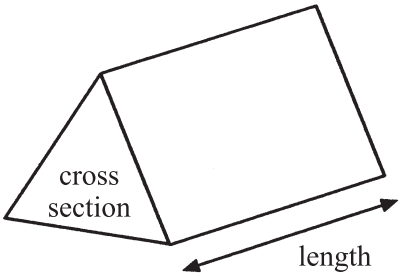
Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
You must answer the questions in the spaces provided.
Do not write outside the boxed area on each page, on blank pages or tracing paper.
Complete in black ink only.
Answer **all fourteen** questions.
All working 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.

INFORMATION FOR CANDIDATES

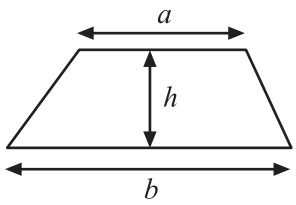
The total mark for this paper is 50.
Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.
Functional Elements will be assessed in this paper.
Quality of written communication will be assessed in Question **9**.
You should have a ruler, compasses and a protractor.
The Formula Sheet is on page 2.

Formula Sheet

Volume of prism = area of cross section × length

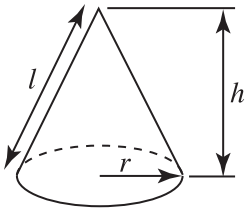


Area of trapezium $= \frac{1}{2}(a+b)h$



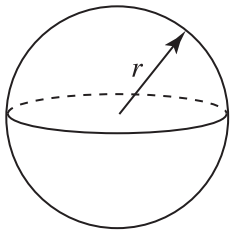
Volume of cone $= \frac{1}{3}\pi r^2 h$

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

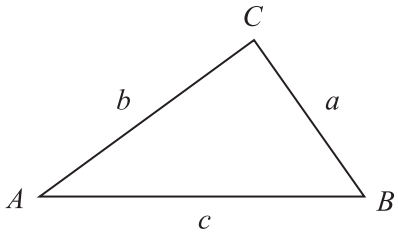


Volume of sphere $= \frac{4}{3}\pi r^3$

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: $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$

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

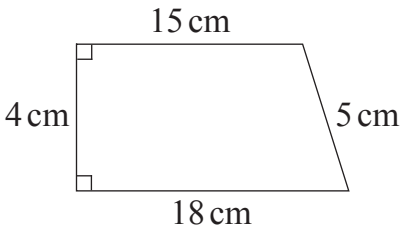
Area of triangle $= \frac{1}{2}ab\sin C$

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

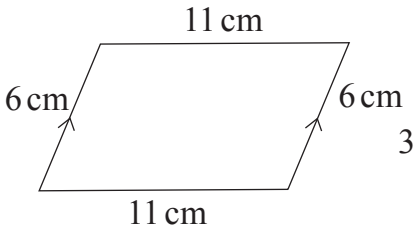
Work out the value of W for $X = 5$, $Y = -3$, $Z = 4$

Answer W = _____ [3]

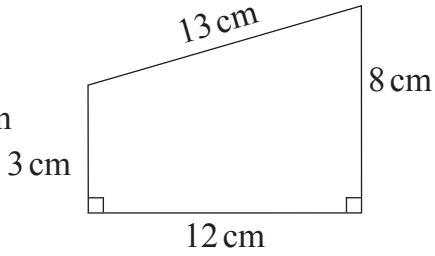
2 Two of the shapes below have an area of 66 cm^2 while the other shape does not. Explain why.



Shape A



Shape B

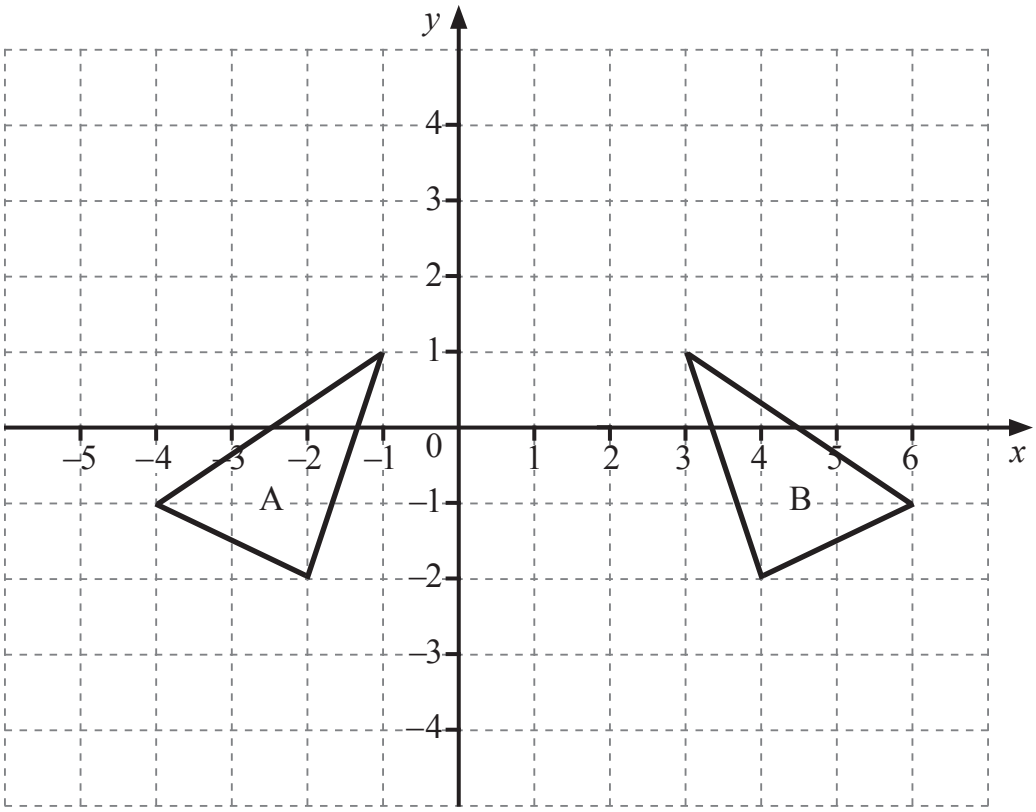


Shape C

[4]

[Turn over

3

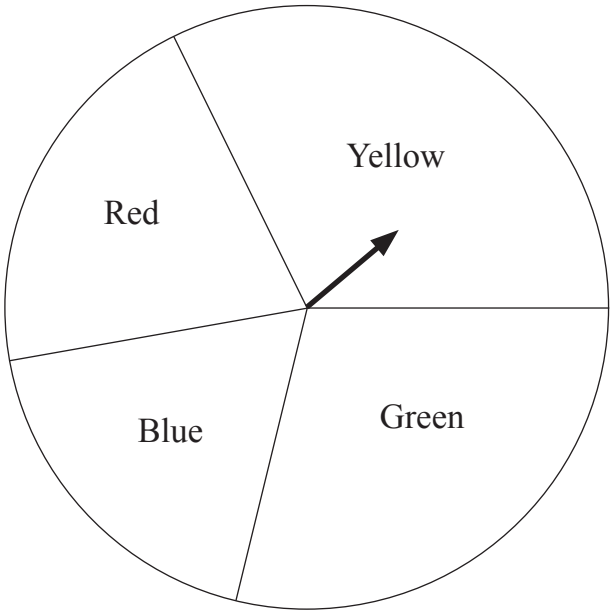


(a) Describe fully the single transformation which maps triangle A to triangle B.

Answer _____ [2]

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

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



The disc is divided into sectors which are labelled 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]

[Turn over

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

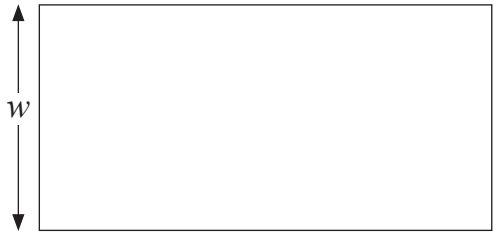
Mark's share is £48

What was the total amount shared?

Answer £ _____ [2]

6 The length of a rectangle is 3 times its width.

The width is w cm



(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 cm^2

Calculate the width of the rectangle.

Answer _____ cm [2]

7 Complete the boxes

$$\frac{2xy}{3y} \times \frac{\square}{\square} = \frac{4xy^2}{9xy}$$

[2]

[Turn over

8 Find the reciprocal of 2.5

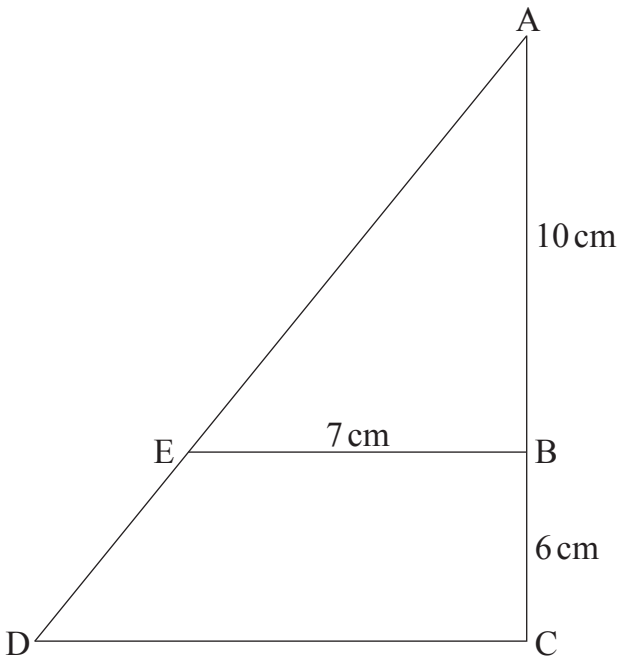
Answer _____ [2]

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

EB = 7 cm

Work out the length of DC.

Answer _____ cm [2]

[Turn over

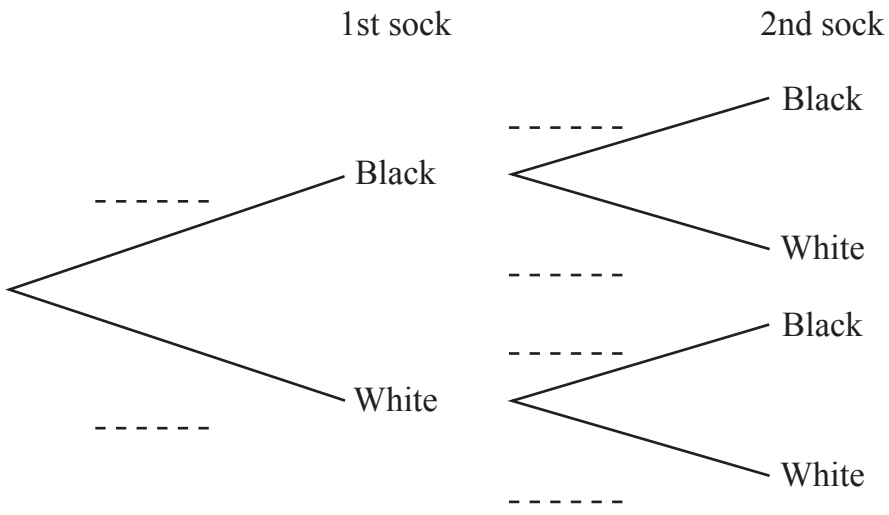
11 There are 12 socks in a drawer.

7 of the socks are black.

5 of the socks are white.

Stephen takes at random two socks from the drawer, one after another. He does not put socks back in the drawer.

(a) Complete the probability tree diagram below.



[3]

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

Answer _____ [3]

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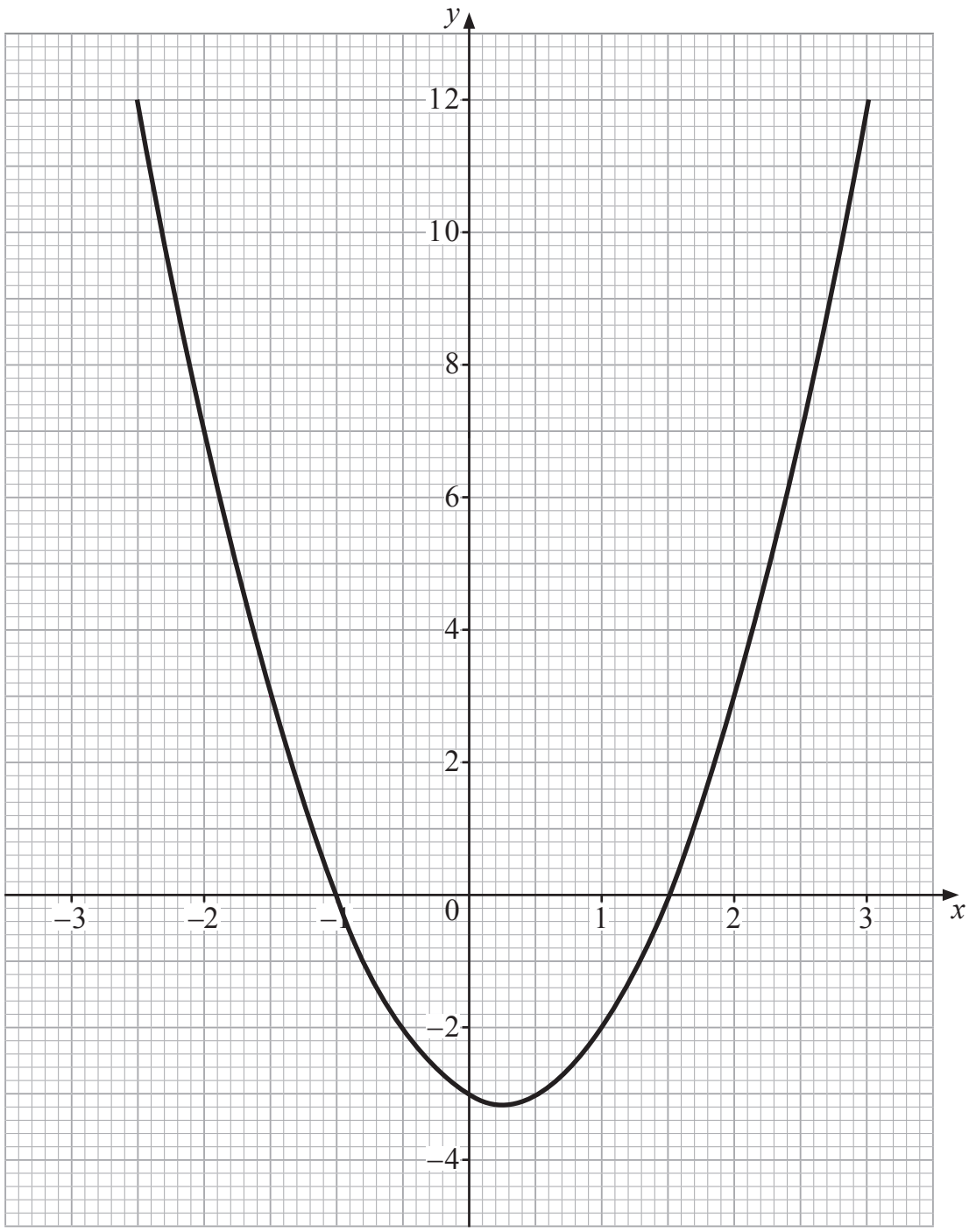
(Questions continue overleaf)

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



Use the graph to solve the equation

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

Answer $x =$ _____ [3]

[Turn over

13 **(a)** Work out and simplify

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

Answer _____ [2]

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

Find the values of a and c.

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

14 A solid metal cylinder has a base radius of $3x$ and a height of $32x$.

The cylinder is melted down and made into a sphere of radius r.

All lengths are in cm.

Find an expression for r in terms of x.

Answer $r =$ _____ [4]

THIS IS THE END OF THE QUESTION PAPER

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For Examiner's use only	
Question Number	**Marks**
1	
2	
3	
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5	
6	
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12	
13	
14	
Total Marks	

Examiner Number