



Rewarding Learning

General Certificate of Secondary Education
January 2014

Centre Number

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Candidate Number

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Mathematics

Unit T6 Paper 1

(Non-calculator)

Higher Tier



[GMT61]

GMT61

WEDNESDAY 15 JANUARY 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 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 sixteen** 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 **questions 14 and 16**.

You should have a ruler, compasses and a protractor.

The Formula Sheet is on page 2.

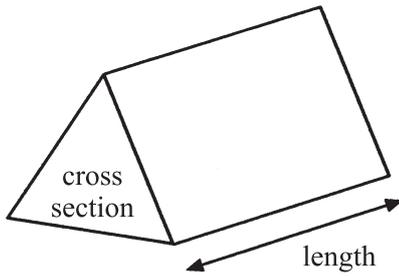
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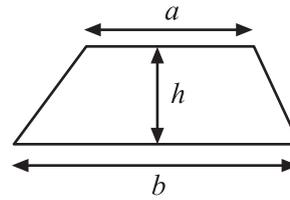
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Formula Sheet

Volume of prism = area of cross section \times length

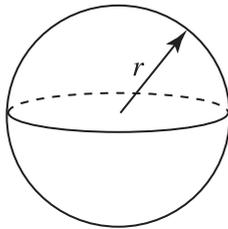


Area of trapezium = $\frac{1}{2}(a+b)h$



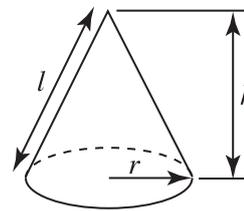
Volume of sphere = $\frac{4}{3}\pi r^3$

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

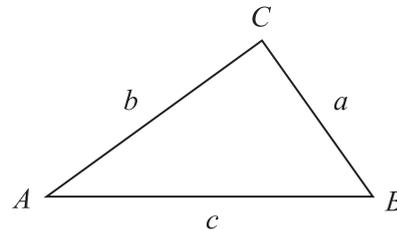


Volume of cone = $\frac{1}{3}\pi r^2 h$

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





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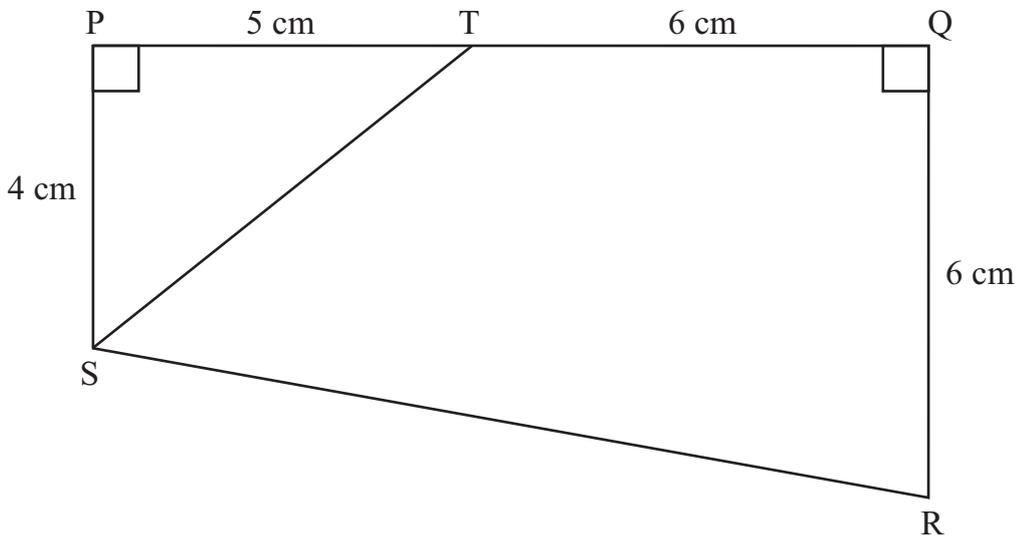


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3 PQRS is a trapezium. PS and QR are perpendicular to the line PQ.

PT = 5 cm, TQ = 6 cm, PS = 4 cm and QR = 6 cm.

Diagram not
drawn accurately



Find the area of the

(a) trapezium PQRS,

Answer _____ cm^2 [2]

(b) quadrilateral TQRS.

Answer _____ cm^2 [2]

Examiner Only	
Marks	Remark
Total Question 3	



4 Work out the value of $\frac{R(3S+T)}{5}$ when $R = -3, S = 4, T = -2$

Answer _____ [3]

Examiner Only

Marks	Remark
Total Question 4	
Total Question 5	

5 Which of the statements below describes the number $n^2 + 1$, where n represents any whole number?
Explain your answer.

“always even” “always odd” “could be even or odd”

Answer _____

because _____

_____ [2]

Total Question 5

[Turn over



6 A box contains pens.

There are 8 black, 6 blue, 4 green and the rest are red.

The probability of taking a red pen from the box is $\frac{1}{10}$

How many red pens are in the box?

Answer _____ [2]

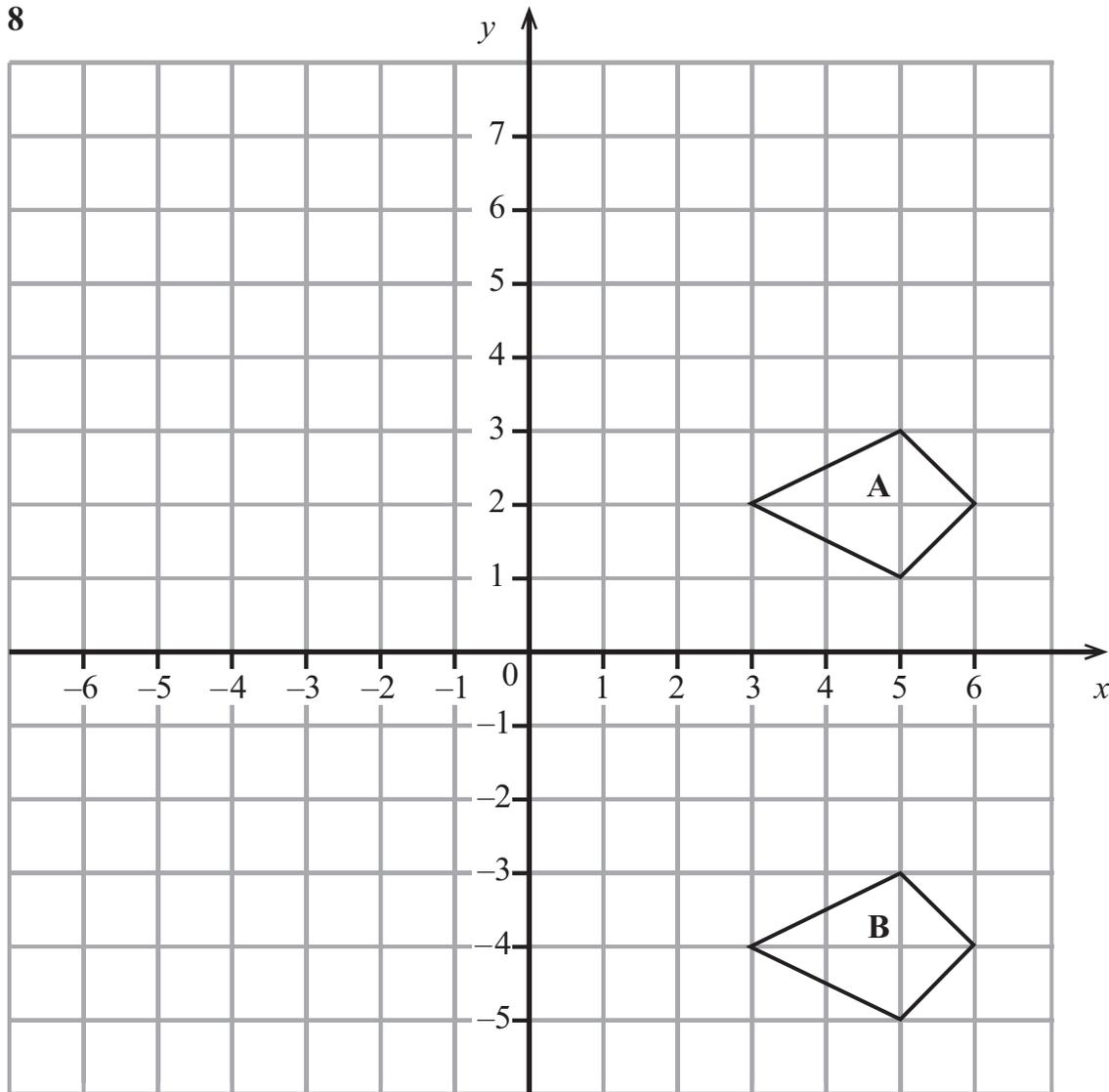
Examiner Only	
Marks	Remark
Total Question 6	
Total Question 7	

7 Find the reciprocal of 1.2

Answer _____ [2]



8



- (a) Describe fully a single transformation which maps shape A onto shape B.

Answer _____ [2]

- (b) Describe fully a different single transformation which maps shape A onto shape B.

Answer _____ [2]

- (c) Draw the image of shape A after a rotation of 90° anti-clockwise about the point $(-1, 0)$. [2]

Examiner Only

Marks	Remark
Total Question 8	

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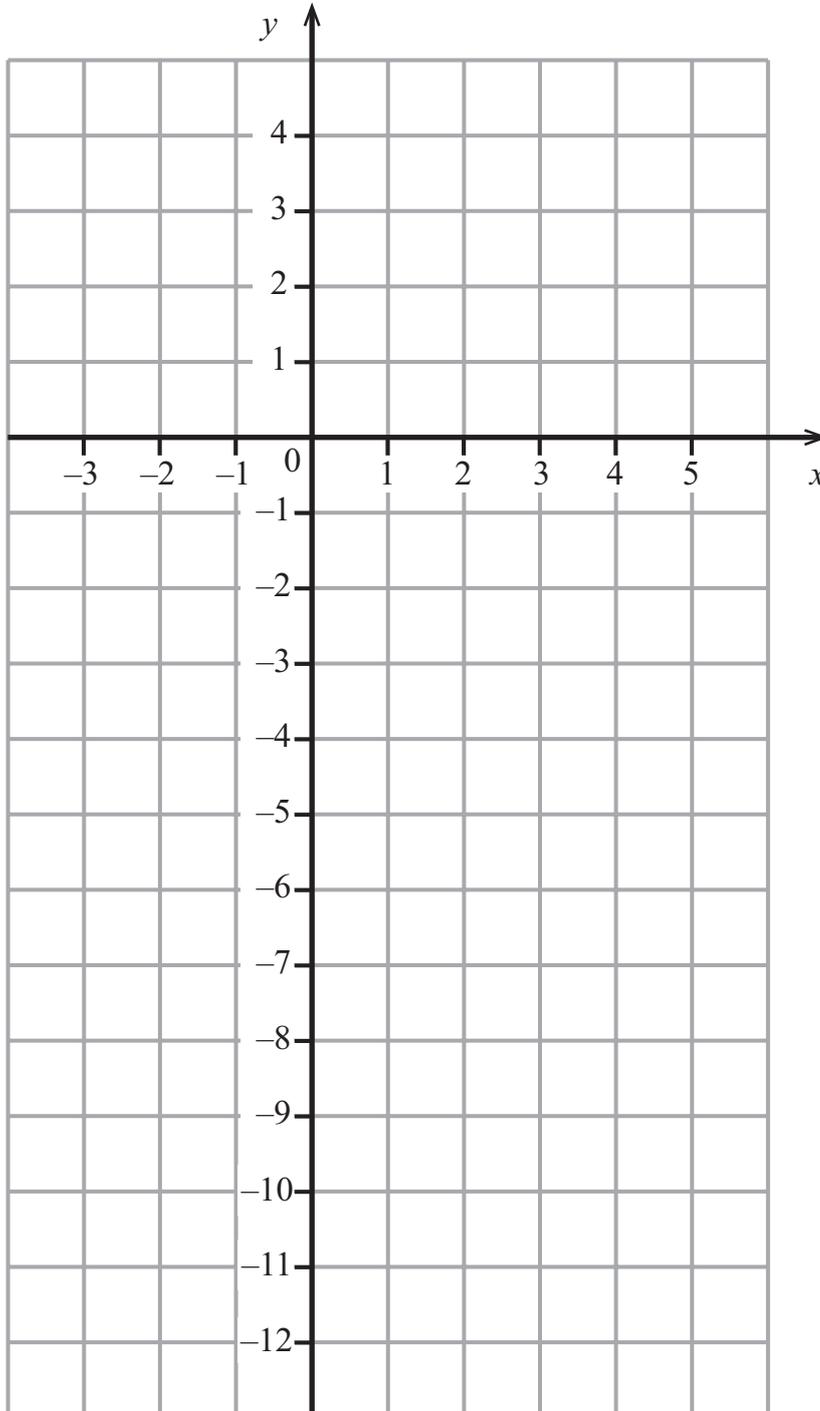


11 (a) Complete the table of values for $y = 3x - x^2 - 1$

x	-2	-1	0	1	2	3	4
y		-5	-1	1	1		-5

[2]

(b) On the grid below, draw the graph of $y = 3x - x^2 - 1$ between $x = -2$ and $x = 4$



[2]

Examiner Only	
Marks	Remark



(c) Use your graph to work out the values of x for which $y = -3$

Answer $x =$ _____ [2]

Examiner Only	
Marks	Remark
Total Question 11	

12 Simplify $(5y^3)^2$

Answer _____ [2]

13 A wooden spear of length 130 cm is made from a cylinder and a cone. The cylinder has radius 3 cm and length 120 cm. Calculate the volume of the spear, giving your answer in terms of π .

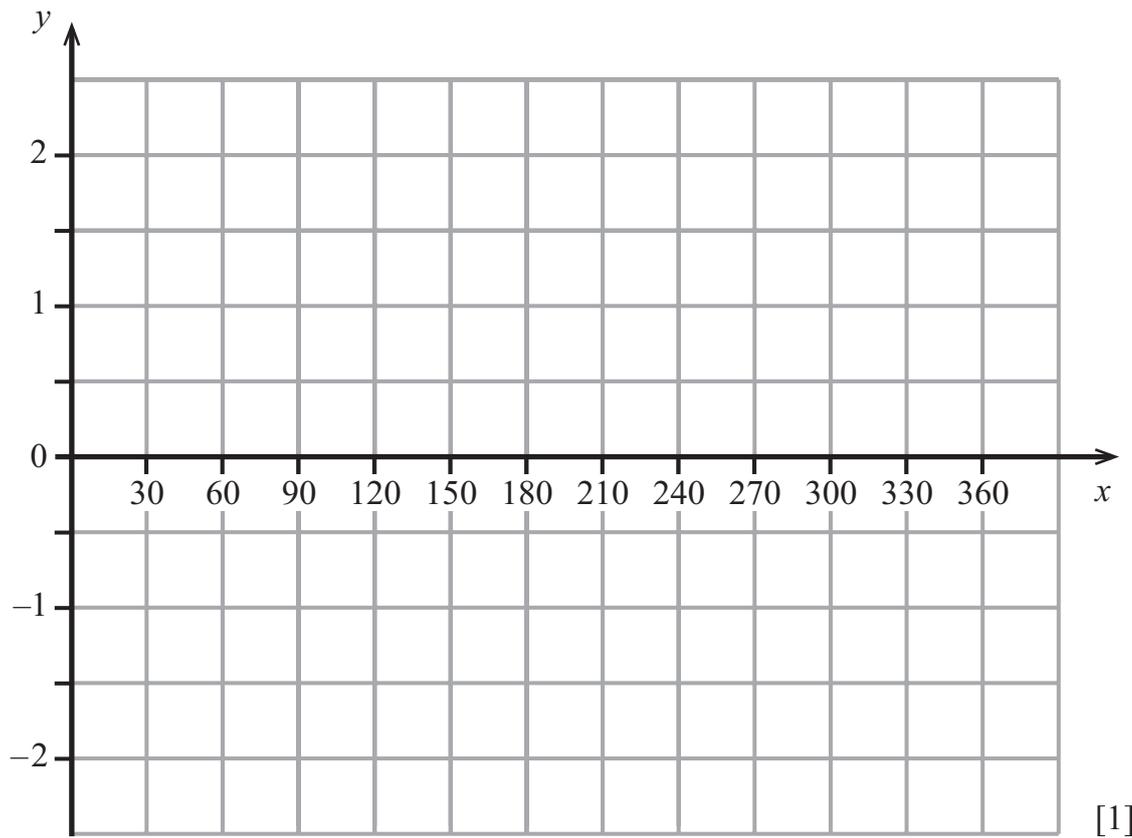


Answer _____ cm^3 [5]

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15 (a) Sketch the graph of $y = \cos x$ for $0^\circ \leq x \leq 360^\circ$ on the axes below.



(b) Use your graph from part (a) to solve the equation $\cos x = -0.75$

Answer $x =$ _____ [2]

Examiner Only

Marks Remark

Total Question 15

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For Examiner's use only	
Question Number	Marks
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16	

Total Marks	
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Examiner Number

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