Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2014

Mathematics

Unit T6 Paper 2
(With calculator)
Higher Tier

ML

[GMT62]

FRIDAY 30 MAY, 3.00 pm–4.15 pm

TIME

1 hour 15 minutes, plus your additional time allowance.

INSTRUCTIONS TO CANDIDATES

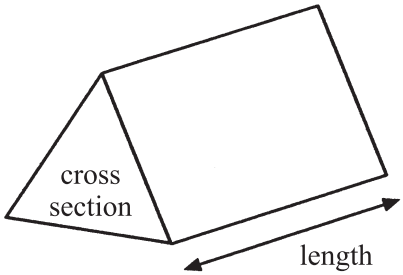
Write your Centre Number and Candidate Number in the spaces provided at the top of this page.
You must answer the questions in the spaces provided.
Complete in blue or black ink only.
Answer **all fifteen** questions.
Any working should be clearly shown in the spaces provided since marks may be awarded for partially correct solutions.
You **may** 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 15**.
You should have a calculator, ruler, compasses and a protractor.
The Formula Sheet is on page 2.

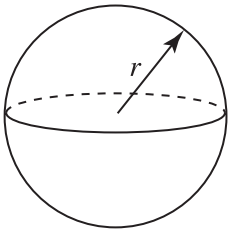
Formula Sheet

Volume of prism = area of cross section × length



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

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

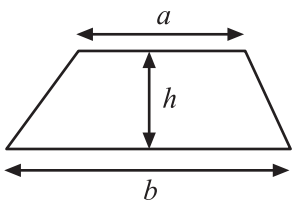


Quadratic Equation

The solutions of $ax^2 + bx + c = 0$ where $a \neq 0$, are given by

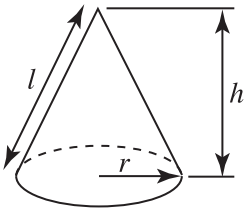
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

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

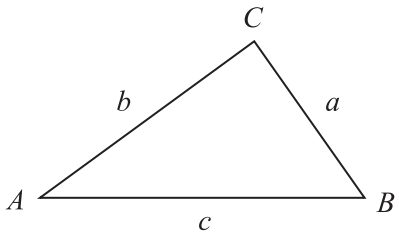


Volume of cone $= \frac{1}{3}\pi r^2 h$

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



In any triangle *ABC*



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

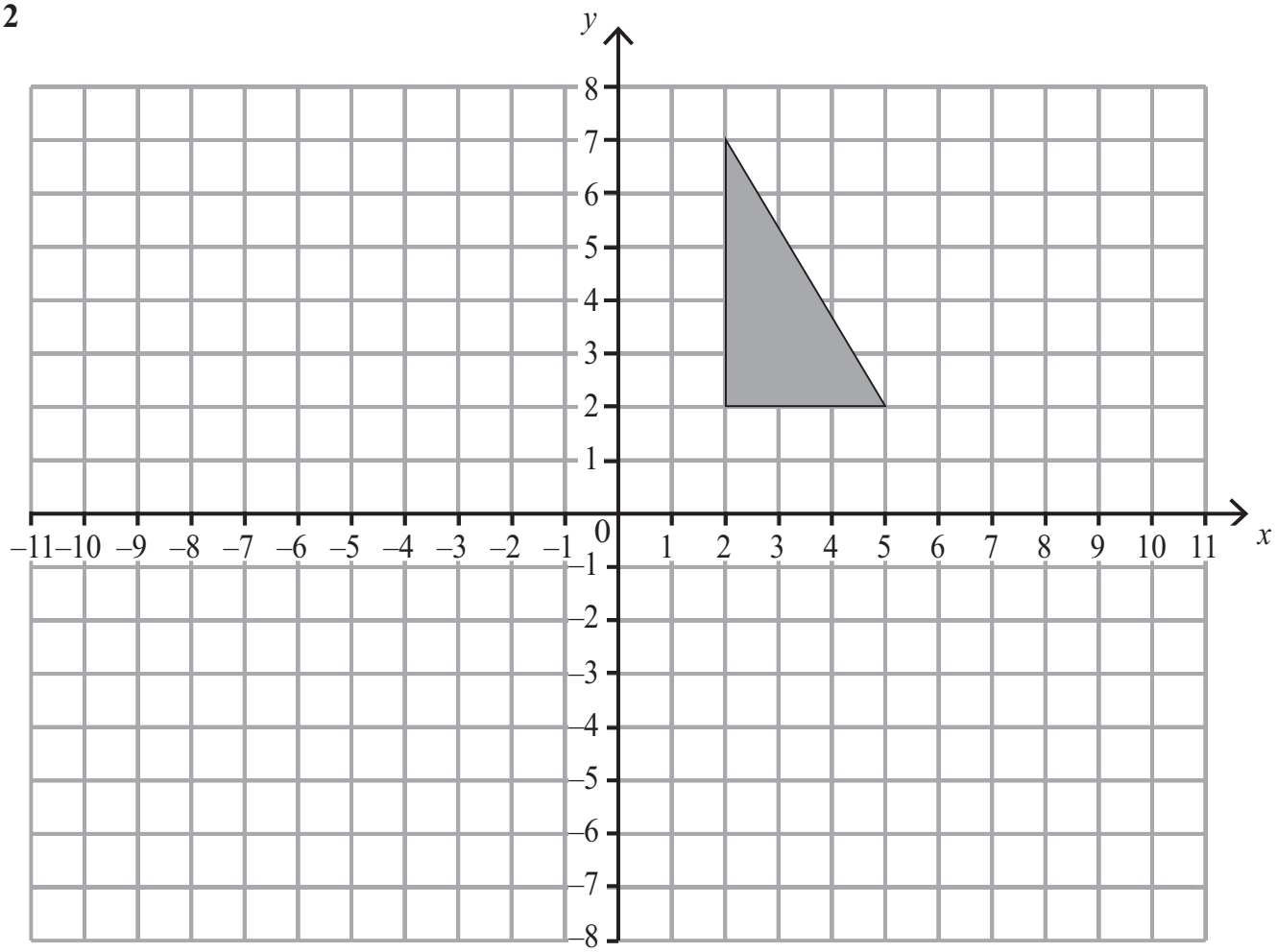
Examiner Only	
Marks	Remark

1 80 rail passengers bought tickets in a train station.
A survey of their ages was done.
In the survey 32 of these passengers were under the age of 30.
5000 passengers bought tickets at this station.
Estimate how many passengers were aged under 30.

Answer _____ [2]

Total Question 1	

2



Draw and shade the image of the triangle after a reflection in the line $y = 1$
[2]

Total Question 2	

[Turn over

Examiner Only	
Marks	Remark

3 A car travels 152 km in 2 hrs 25 mins.
It then travels a further 87 km in 1 hour 20 mins.

Find the average speed of the car for the whole journey **giving your answer in km/hr to a suitable degree of accuracy**.

Answer _____ km/hr [3]

Total Question 3

4 "When an odd number is multiplied by A and then B is subtracted, the answer is an even number."
Find a value for A and a value for B to make this a true statement.

Answer A = _____ B = _____ [2]

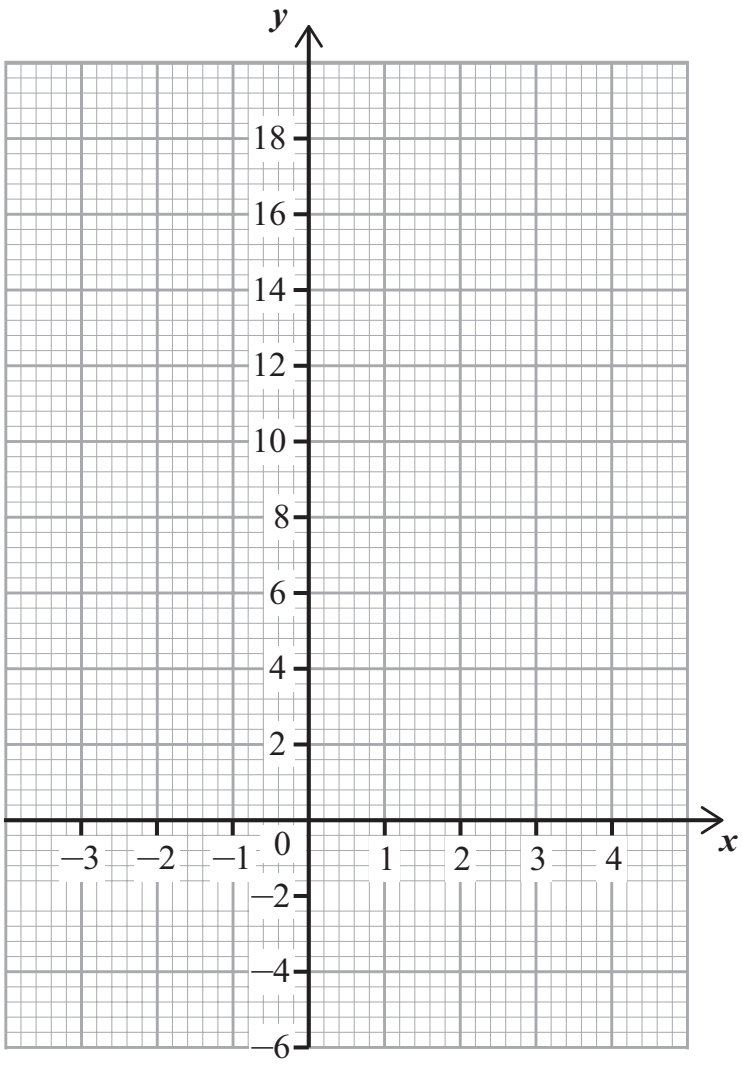
Total Question 4

5 **(a)** Complete the table for $y = x^2 - 3x$

x	–2	–1	0	1	2	3	4
y		4	0	–2		0	4

[1]

(b) On the grid draw the graph of $y = x^2 - 3x$



[2]

(c) From your graph estimate the minimum value of y

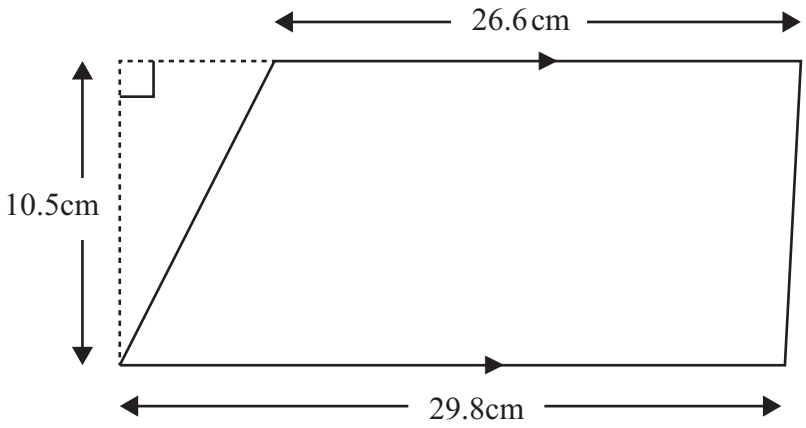
Answer $y =$ _____ [1]

Examiner Only	
Marks	Remark
Total Question 5	

[Turn over

Examiner Only	
Marks	Remark

6 **(a)** Find the area of this trapezium.



Answer _____ cm^2 [2]

(b) The trapezium in part **(a)** is the cross section of a prism of rock that measures 78 cm from front to back. The density of this rock is 20 g/cm^3.

Calculate the mass of the prism of rock.

Answer _____ g [3]

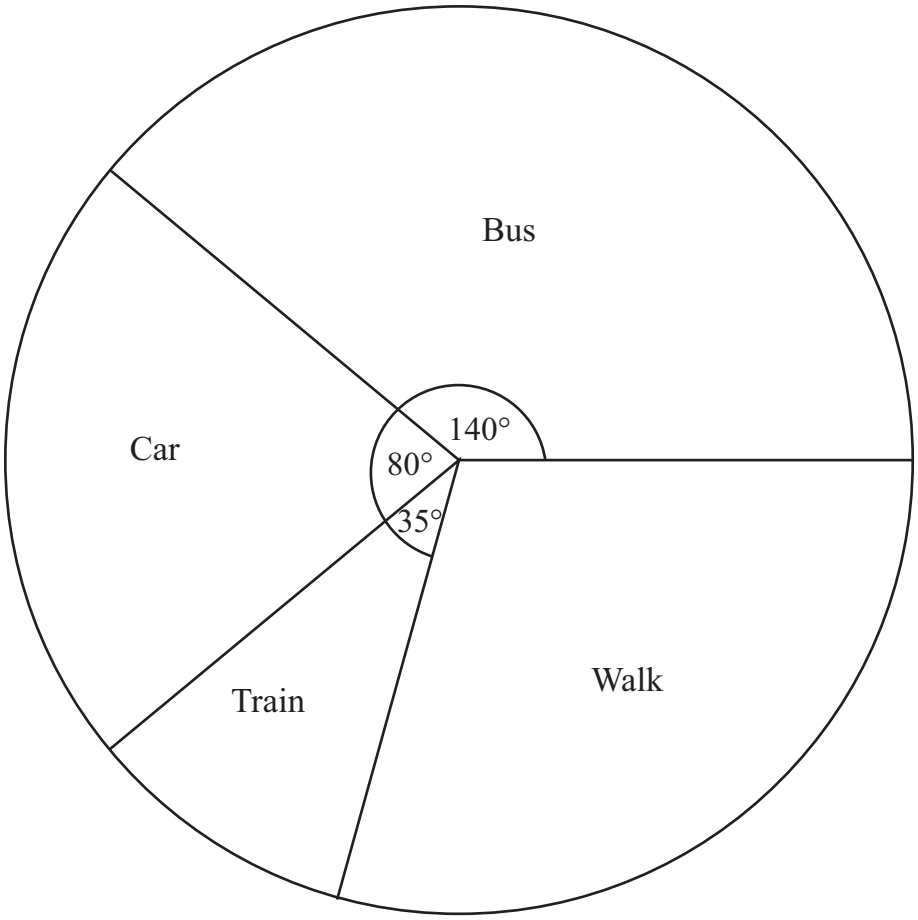
Total Question 6

7 Alex and Bethany share £840 in the ratio 2 : 5
How much more money does Bethany get than Alex?

Answer £ _____ [2]

Total Question 7

8 In a college survey, all 1800 students were asked how they travelled to college on their first day of term.
The pie chart below represents their responses.



(a) What is the probability of a student having walked to college?

Answer _____ [2]

(b) Calculate the number of students who travelled by bus to college.

Answer _____ [2]

Examiner Only	
Marks	Remark
Total Question 8	

[Turn over

9 Construct the bisector of the obtuse angle shown.
You must show all your construction lines.

[2]

Examiner Only	
Marks	Remark
Total Question 9	

Examiner Only	
Marks	Remark

10 $a, b, c, x, y, p, q, r, s$ all represent lengths.
By considering dimensions find out which two of the following expressions could represent area.

A $4\sqrt{abc^2}$

B $2(xy + a)^2$

C $(3pq + 0.2rs)^3$

D $\dfrac{a^3 + b^3 + c^3}{2\pi r}$

Answer _____ and _____ [2]

Total Question 10

11 **(a)** Which of these numbers is smallest?
Show working to justify your answer.

1.3×10^{-2} 0.13 13×10^{-1} 31×10^{-3} $31 \div 100$

Answer _____ [2]

(b) Oil flows through a pipe at a rate of $40\,m^3$/sec. How many seconds will it take to fill a tank of volume $1.08 \times 10^5 m^3$?

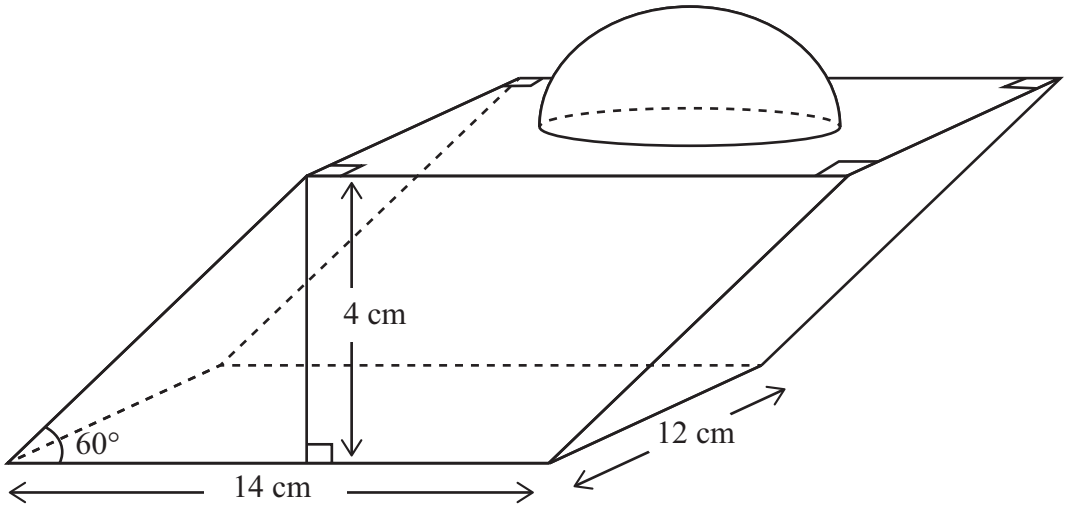
Answer _____ seconds [1]

Total Question 11

[Turn over

Examiner Only	
Marks	Remark

12 A trophy is made up of a wooden plinth surmounted by a solid hemisphere.



The plinth is a prism whose cross-section is a parallelogram. The length of the parallelogram is 14 cm and its perpendicular height is 4 cm.
The depth of the plinth is 12 cm.

(a) Find the volume of the plinth.

Answer _____ cm^3 [3]

The hemisphere has a radius of 4.5 cm.

(b) Find the volume of the hemisphere.

Answer _____ cm^3 [2]

(c) The **top** surface of the plinth including the curved surface area of the hemisphere is sprayed with gold paint.
Find the total surface area sprayed.

Area _____ cm^2 [3]

Examiner Only	
Marks	Remark
Total Question 12	

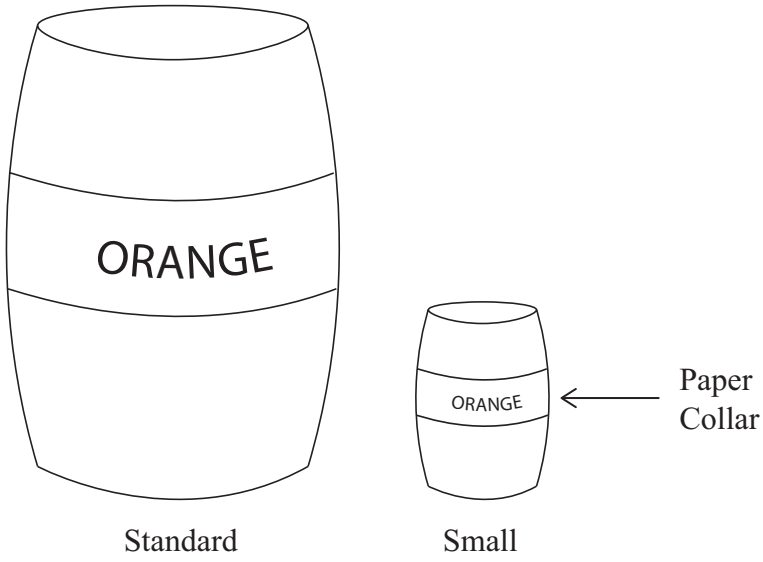
13 The probability of a telephone salesperson being female is 0.7
The probability of a female telephone salesperson using a mobile phone is 0.2
The probability of a male telephone salesperson using a mobile phone is 0.15
What is the probability that a telephone sales call is made on a mobile phone?

Answer _____ [3]

Total Question 13	

[Turn over

14 Barrels of orange juice come in two sizes that are similar to each other, with similar paper collars.



The diameter of the base of the standard size is $2\frac{1}{2}$ times larger than the diameter of the base of the small size. The small size has a paper collar of area 32 cm^2.

(a) Calculate the area of the paper collar on the standard size.

Answer _____ cm^2 [2]

(b) The company decides to build a large barrel with a paper collar of area 2450 cm^2. This barrel is similar to the standard and small barrels.

Find how many times bigger the diameter of the large size is compared to the diameter of the small size.

Answer _____ [3]

Examiner Only	
Marks	Remark
Total Question 14	

Quality of written communication will be assessed in this question.

Examiner Only	
Marks	Remark

15 Find an irrational number between 3.14 and π
Explain your reasoning clearly.

Answer _____ because _____

_____

_____

_____ [3]

THIS IS THE END OF THE QUESTION PAPER

Total Question 15	

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For Examiner's use only	
Question Number	**Marks**
1	
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