Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2014

Mathematics

Unit T6 Paper 1

(Non-calculator)
Higher Tier

[GMT61]

GMT61

FRIDAY 30 MAY, 1.30 pm–2.45 pm

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.

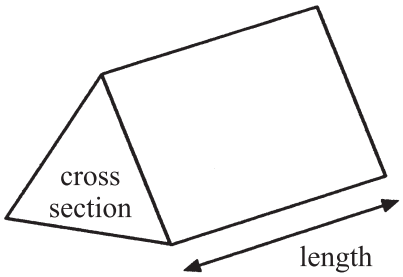
INFORMATION FOR CANDIDATES

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 **question 13**.
You should have a ruler, compasses and a protractor.
The Formula Sheet is on page 2.

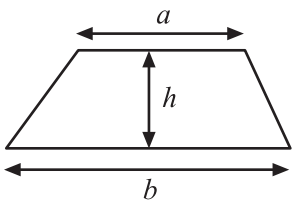
8803

Formula Sheet

Volume of prism = area of cross section × length

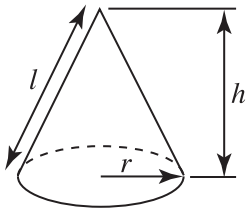


Area of trapezium = $\frac{1}{2}(a+b)h$



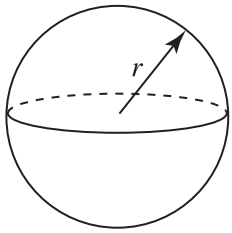
Volume of cone = $\frac{1}{3}\pi r^2 h$

Curved surface area of cone = πrl

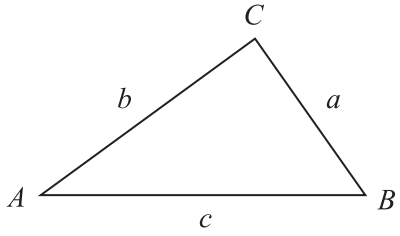


Volume of sphere = $\frac{4}{3}\pi r^3$

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

Examiner Only	
Marks	Remark

1 Work out the value of $\frac{Q^2(4-R)}{3}$ when $Q = -3$ and $R = 6$

Answer _____ [3]

Total Question 1

2 **(a)** Given that $24 \times 640 = 15360$

write down the answer only to 2.4×64

Answer _____ [1]

(b) Given that $\frac{25600}{80} = 320$

write down the answer only to $\frac{2560}{8}$

Answer _____ [1]

Total Question 2

Examiner Only	
Marks	Remark

3 **(a)** Calculate $600 \div 0.2$

Answer _____ [2]

(b) Without working out the answer to 40×0.752 write down whether it will be greater or less than 40
Explain your answer clearly.

_____ because _____

_____ [2]

Total Question 3

4 Find the area of the shape below.

All lengths are in centimetres.

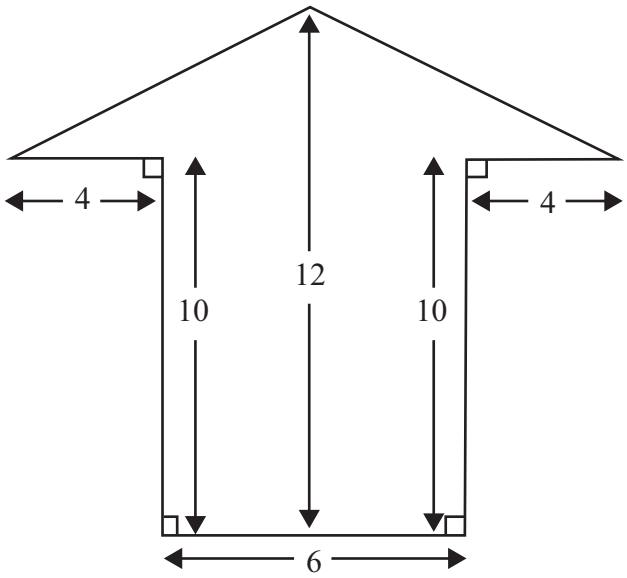
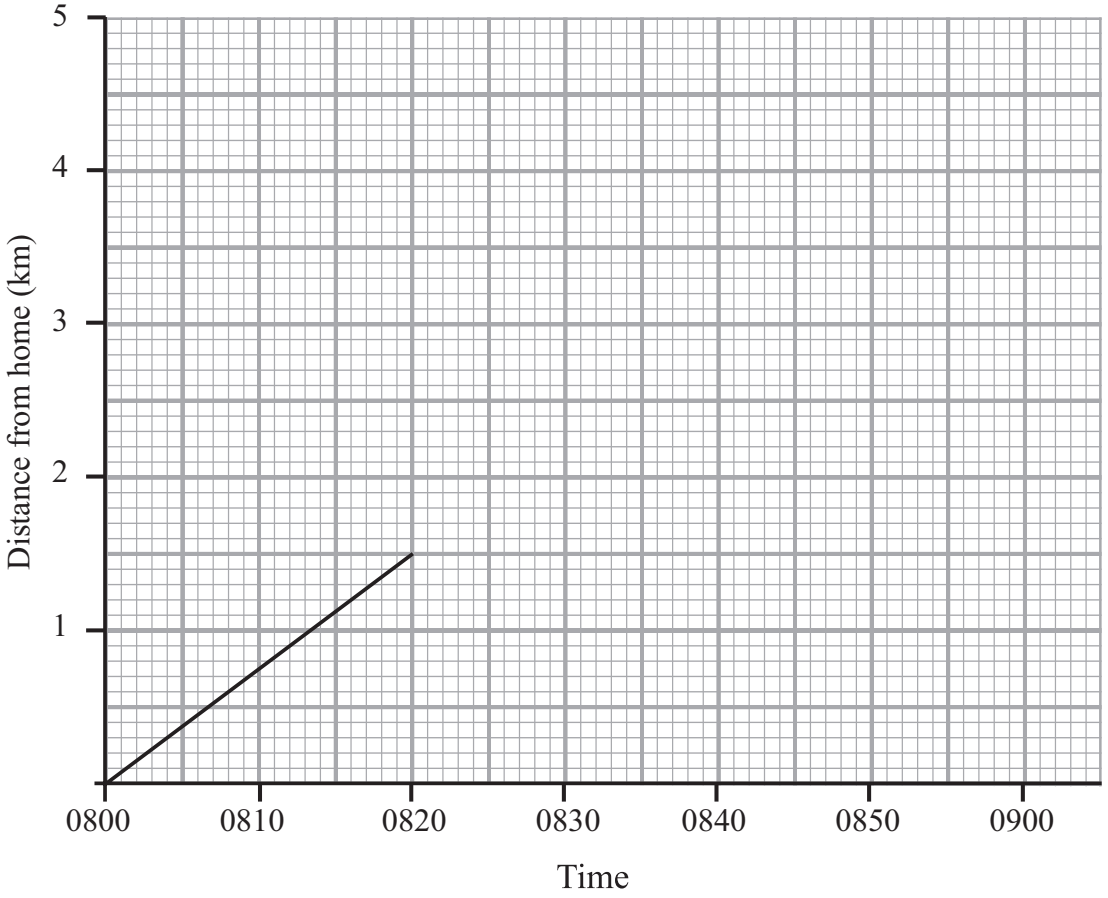


diagram not
drawn accurately

Answer _____ cm^2 [2]

Total Question 4

5 Marcus leaves home at 0800 to walk to school. School begins at 0900. The distance – time graph shows part of his journey.



(a) Work out his average speed for this part of the journey.
Give your answer in kilometres per hour.

Answer _____ km/hr [2]

(b) At 0820 he stops at a shop for 10 minutes. He then completes his journey to school at 6 km/hr. He arrives in school 2 minutes before the 0900 bell. Complete the travel graph to illustrate his journey. [3]

(c) Hence determine the distance from the shop to school.

Answer _____ km [2]

Examiner Only	
Marks	Remark
Total Question 5	

[Turn over

6 The table shows some of the probabilities of when patients arrive for dental appointments.

Patient arrives	Probability
Early	0.1
Exactly on time	0.58
Late	
Not at all	0.06

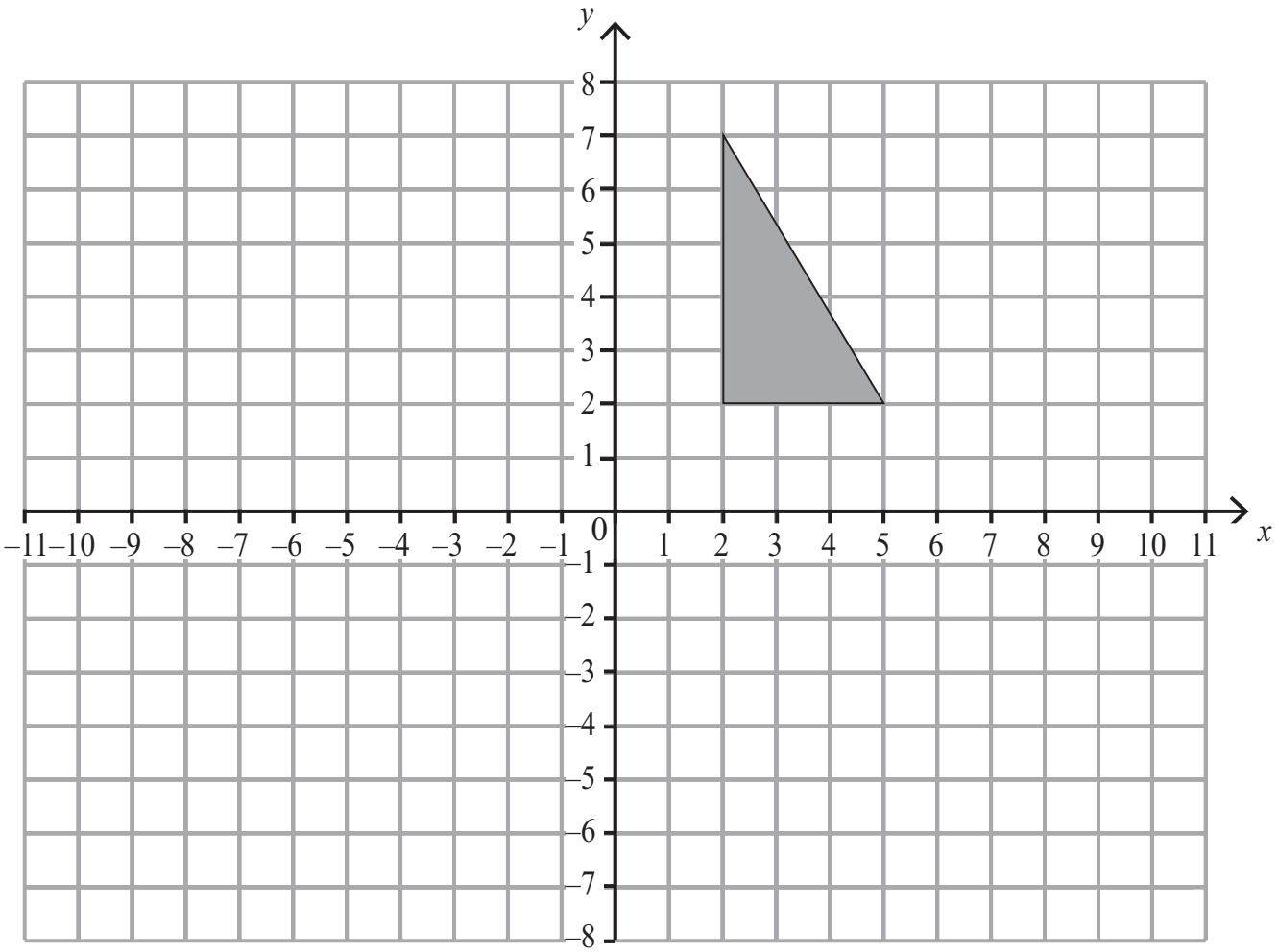
Calculate the probability that a patient

(a) is late, Answer _____ [2]

(b) arrives. Answer _____ [2]

Examiner Only	
Marks	Remark
Total Question 6	

7



Draw and shade the image of the triangle after a 90° anticlockwise rotation about the point (–1, 1). [2]

Examiner Only	
Marks	Remark
Total Question 7	

[Turn over

8 Niamh carries out an experiment dropping pieces of toast to see if they land jam up or jam down.
Here are her results.

Number of trials	10	50	100	500	1000
Jam Down	4	29	61	308	623
Relative Frequency	0.4		0.61	0.616	0.623

(a) Complete the missing relative frequency value in the table. [1]

(b) From the results of Niamh's experiment, would you say that a piece of toast is more likely to land jam up or jam down? Explain your answer.

_____

_____

_____ [1]

Examiner Only

Marks	Remark

Total Question 8

9 **(a)** Make x the subject in $y - kx = t$

Answer $x =$ _____ [2]

(b) Make r the subject in $t = \frac{r}{p} + 1$

Answer $r =$ _____ [2]

Total Question 9

10 Simplify

(a) $m^3 \times m^3$

Answer _____ [1]

(b) $\sqrt{\dfrac{\pi x^3}{9\pi x}}$

Answer _____ [2]

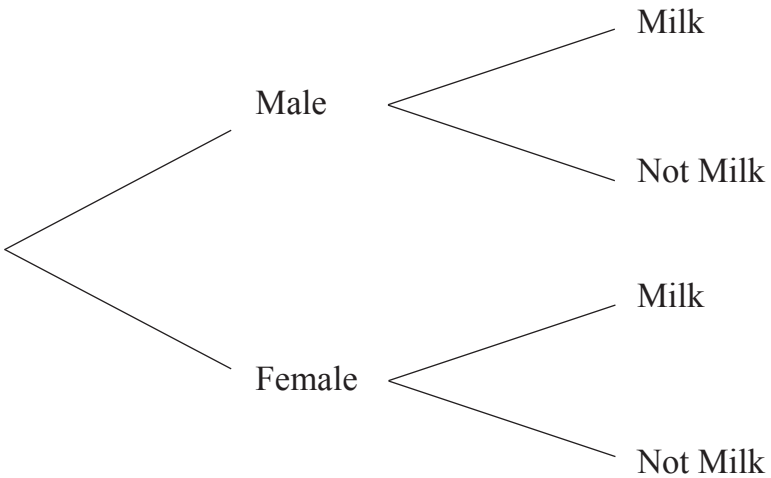
Examiner Only	
Marks	Remark

Total Question 10

11 Students in 6th Form were asked about the type of drink they chose most often at lunch.

	Water	Milk	Fizzy Drink	Total
Male	32	13	85	130
Female	16	30	74	120
Total	48	43	159	250

A student is selected at random from the 6th Form.
Use the information in the table to complete the probability tree diagram.



[3]

Total Question 11

12 Write the recurring decimal $0.1\dot{4}\dot{5}$ as a fraction.

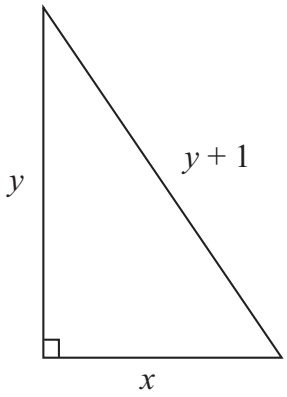
Answer _____ [2]

Examiner Only	
Marks	Remark
Total Question 12	

Quality of written communication will be assessed in this question.

Examiner Only	
Marks	Remark

13 The right-angled triangle has sides x, y and $y + 1$ as shown, where x and y are integers.

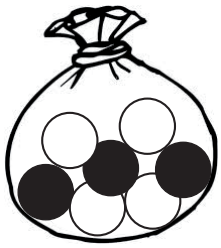


Prove that x must be odd. **Explain your working clearly**.

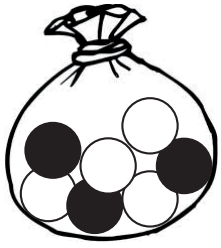
[4]

Total Question 13

14



A



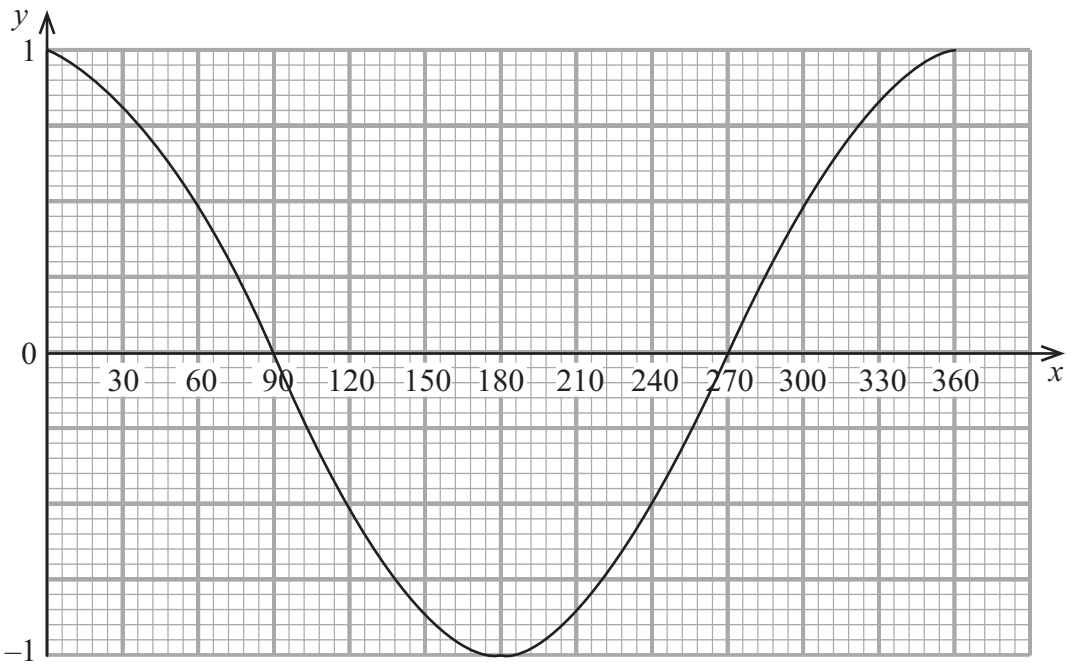
B

Two identical bags each contain seven balls. In each bag, four of the balls are white and three of the balls are black. Stephen takes at random one ball from each bag.
Calculate the probability that at least one ball is black.

Answer _____ [3]

Examiner Only	
Marks	Remark
Total Question 14	

15

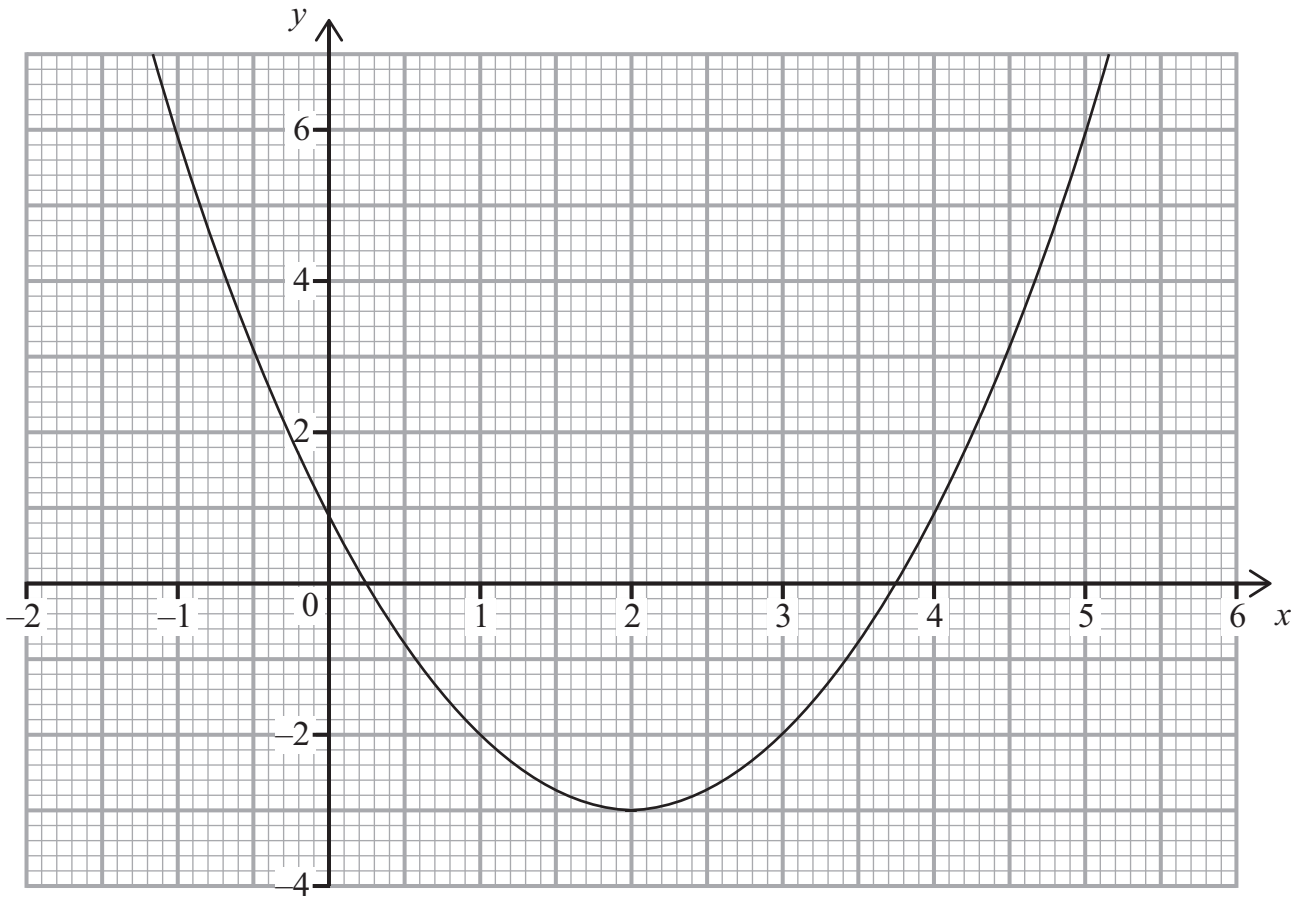


Use the graph of $y = \cos x$ to solve the equation $\cos x = -0.85$

Answer $x =$ _____ [2]

Examiner Only	
Marks	Remark
Total Question 15	

16 The graph of $y = x^2 - 4x + 1$ is drawn.



By drawing an appropriate straight line on the grid, solve the equation $x^2 - 3x - 2 = 0$

Answer $x =$ _____ [3]

Examiner Only	
Marks	Remark
Total Question 16	

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

Examiner Number