Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
2016

Mathematics

Unit T6 Paper 2
(With calculator)
Higher Tier

[GMT62]

GMT62

THURSDAY 2 JUNE, 10.45am–12.00 noon

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 blue or black ink only. **Do not write with a gel pen.**
Answer **all fifteen** questions.
All 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 Questions **2** and **15**.
You should have a calculator, ruler, compasses and a protractor.
The Formula Sheet is on page 2.

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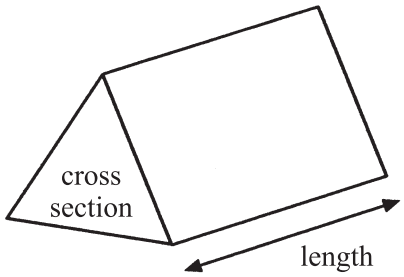
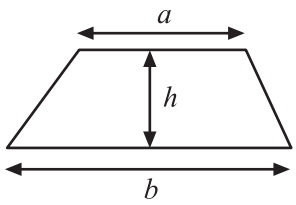
Formula Sheet

Volume of prism = area of cross section × length

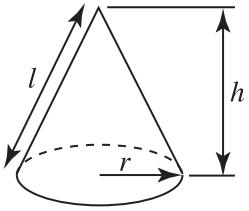


Area of trapezium = $\frac{1}{2}(a+b)h$



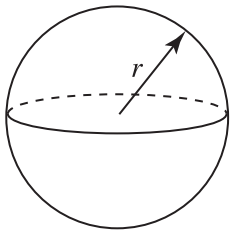
Volume of cone = $\frac{1}{3}\pi r^2 h$

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

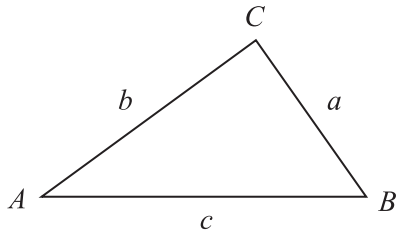


Volume of sphere = $\frac{4}{3}\pi r^3$

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

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

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

1 Here is a recipe for making some scones.

Self-raising flour	340 g
Caster sugar	55 g
Butter	85 g
Milk	125 ml
Natural yoghurt	60 ml

Linda has only 100 ml of milk.

Complete the table to show how much of the other ingredients she needs.

Self-raising flour	_____ g
Caster sugar	_____ g
Butter	_____ g
Milk	100 ml
Natural yoghurt	_____ ml

[3]

Quality of written communication will be assessed in this question.

2 p is a prime number greater than 2 and q is an even number.

Which of the statements below describes the number $p(q + 1)$?

"always even" **"always odd"** **"could be even or odd"**

Explain your answer.

Answer _____

because _____

_____ [2]

3 Marie is booking a cruise holiday. She is offered a discount of €140 or she can have $200 to spend on board her cruise.

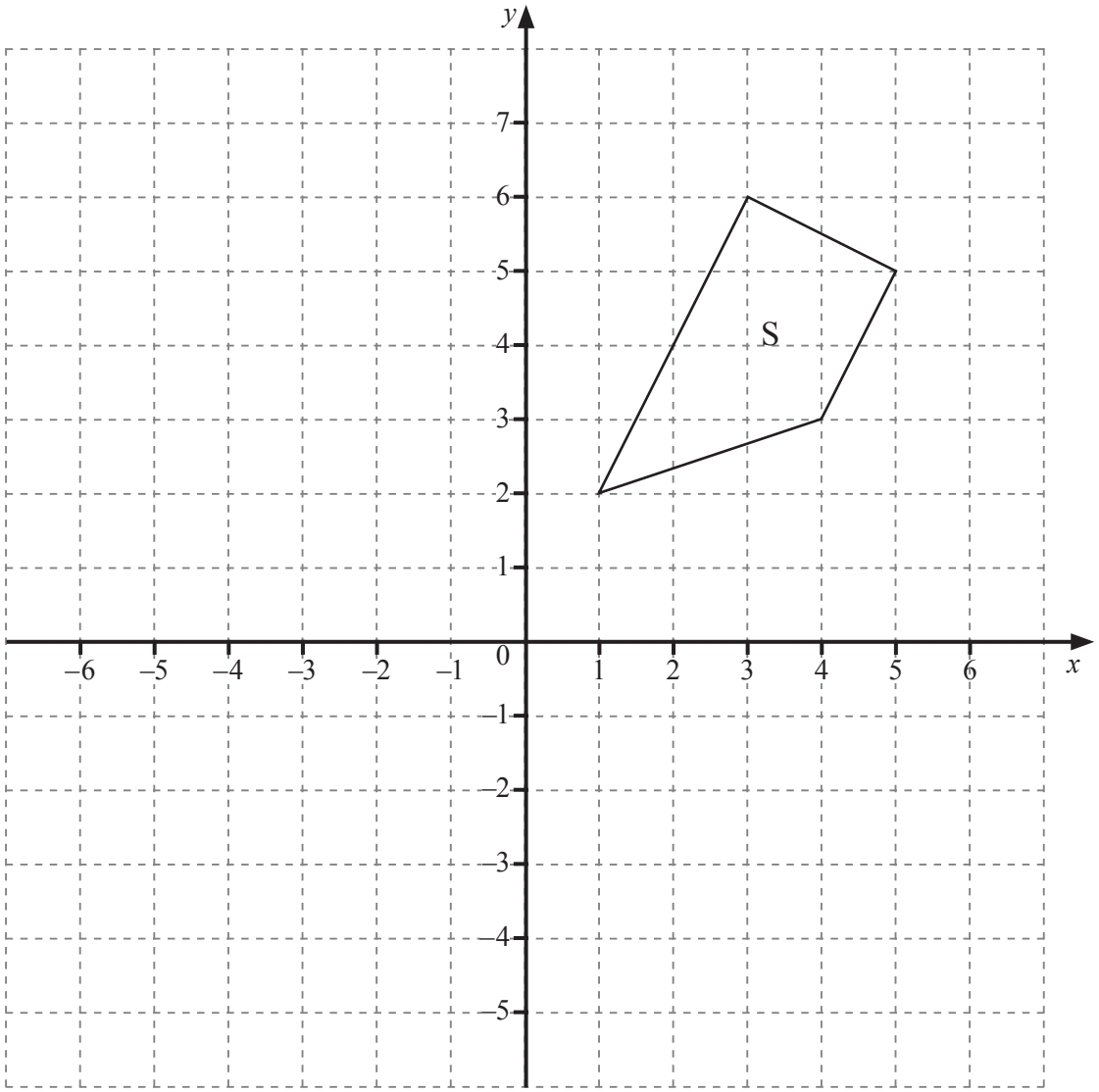
Use the exchange rates below to work out which is the better offer, €140 or $200

£1 = €1.19
£1 = $1.67

You must show working to justify your answer.

Answer _____ [3]

4



(a) Reflect the shape S in the line $y = 1$ [2]

(b) Draw the image of shape S after a translation 6 left and 3 down. [1]

[Turn over

5 Andrew, Karan and Caroline share £33.60 in the ratio 5 : 4 : 3

Work out how much money they each receive.

Answer Andrew £ _____

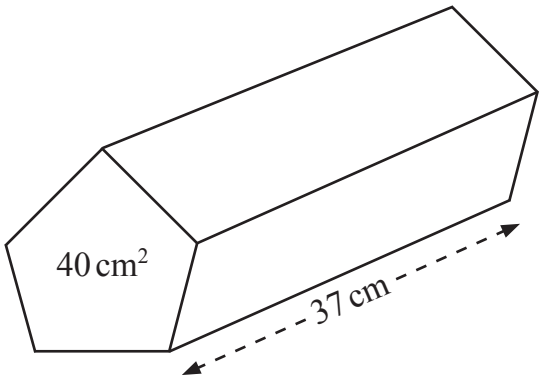
Karan £ _____

Caroline £ _____ [3]

6 Make v the subject of $2s = (u + v)t$

Answer v = _____ [2]

7 A solid pentagonal prism has mass 5300 g. The cross-sectional area is 40 cm^2 and the length is 37 cm.



Calculate the density of the prism in g/cm^3.

Give your answer to an appropriate degree of accuracy.

Answer _____ g/cm^3 [4]

[Turn over

8 Solve $-9 \leqslant 3y < 6$ where y is an integer.

Answer _____ [2]

9 Simplify

(a) $m^3 \times m^4$

Answer _____ [1]

(b) $\frac{n^6}{n^3}$

Answer _____ [1]

(c) $\frac{r \times r^3}{r^6}$

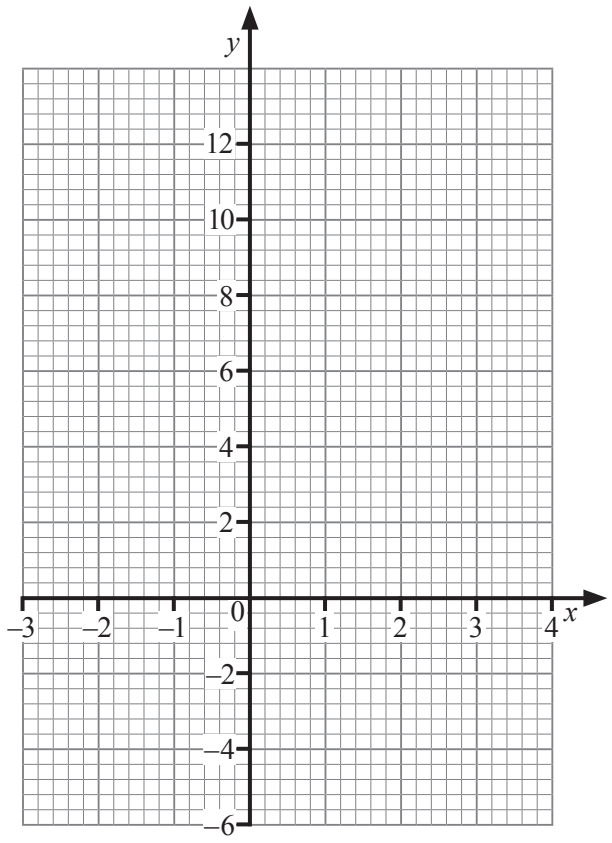
Answer _____ [1]

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

x	–2	–1	0	1	2	3
y		0	–3	–2	3	12

[1]

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



[2]

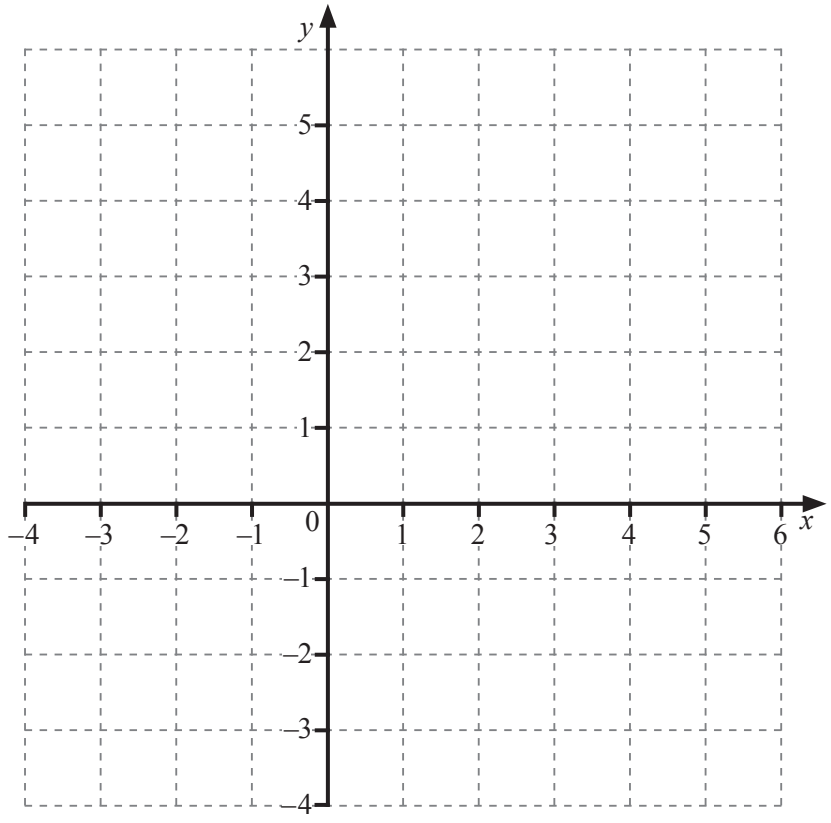
[Turn over

11 (a) On the grid below use suitable shading and the letter R to show the region represented by the inequalities

$y \geqslant 4 - 2x$

$y \geqslant 2x$

$y \leqslant 4$



[3]

(b) In the region R, what is the maximum value of $x + y$?

Answer _____ [1]

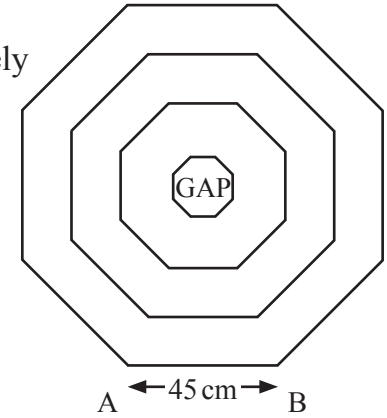
12 Make b the subject of $3(b + 4) = a(5 - 2b)$

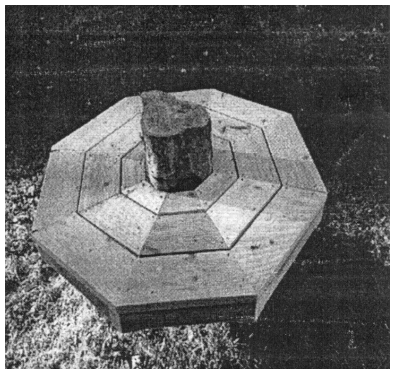
Answer $b =$ _____ [4]

[Turn over

13 Ann's garden seat is in the shape of an octagon with a gap (also in the shape of an octagon) in the middle for the tree stump as shown below. The octagons are all regular.

Diagram not drawn accurately





The ratio of the sides of the smallest octagon to the largest octagon is 5:24

AB = 45 cm.

(a) Calculate the perimeter of the smallest octagon.

Answer _____ cm [3]

The top surface of the wooden seat is to be stained.

The area of the gap is 424 cm^2.

(b) Calculate the area to be stained.

Answer _____ cm^2 [3]

[Turn over

14 Philip takes 3 footballs at random without replacement from a bag containing 5 red, 3 green and 4 white footballs.

What is the probability that the first two footballs are the same colour as each other but the third is a different colour?

Answer _____ [4]

Quality of written communication will be assessed in this question.

15 A solid cone has a base radius of $4x$ and a height of $3x$.

The total surface area of the cone is the same as the surface area of a sphere with a radius of y.

Show that $y = 3x$.

[4]

THIS IS THE END OF THE QUESTION PAPER

DO NOT WRITE ON THIS PAGE

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

Examiner Number