Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
January 2018

Mathematics

Unit T6 Paper 1
(Non-calculator)
Higher Tier

[GMT61] *GMT61*

WEDNESDAY 10 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 boxed area on each page, on blank pages or tracing paper.
Complete in black ink only. **Do not write with a gel pen.**
Answer **all fifteen** 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 Questions **9** and **15**.
You should have a ruler, compasses and a protractor.
The Formula Sheet is on page 2.

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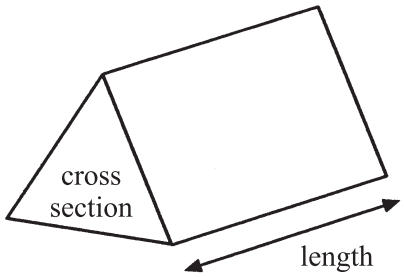
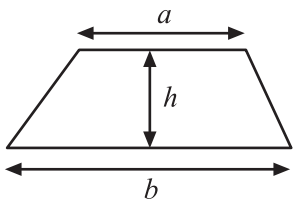
Formula Sheet

Volume of prism = area of cross section × length

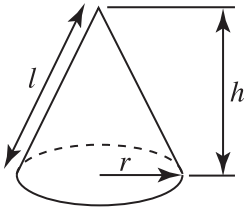


Area of trapezium $= \frac{1}{2}(a+b)h$



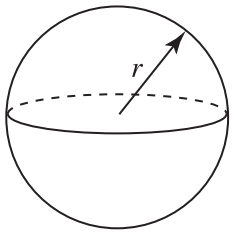
Volume of cone $= \frac{1}{3}\pi r^2 h$

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

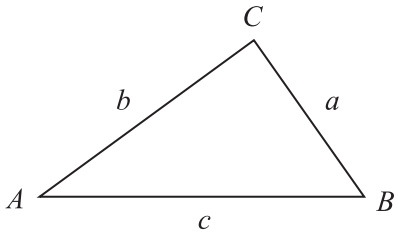


Volume of sphere $= \frac{4}{3}\pi r^3$

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

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

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

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1

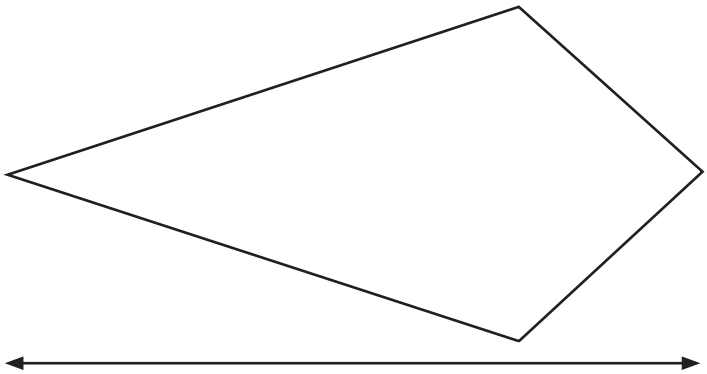


diagram not drawn accurately

Calculate the area of this kite.

Answer _____ cm^2 [2]

2

$$V = \frac{WX^2}{2}$$

Work out the value of V when $W = 4$ and $X = -3$

Answer $V =$ _____ [2]

[Turn over

3 **(a)**

Let 'S' stand for salary.

Write down an inequality which satisfies the salary figures given.

Answer _____ [1]

(b) List all the possible integer values for x which satisfy the inequality

$$-3 < x \leq 1$$

Answer $x =$ _____ [1]

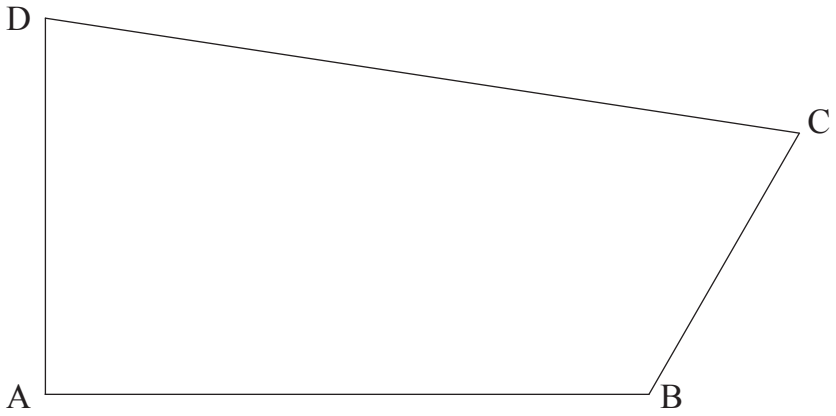
(c) Solve the inequality

$$2(2x - 4) > 28$$

Answer _____ [3]

4 A spider crawls inside the shape ABCD so that it is more than 4 cm from the point A and more than 4 cm from the point B.

Using a construction method, shade the area over which the spider can crawl.



[3]

5 Given that $524 \times 7.3 = 3825.2$ find the value of

(a) 52.4×0.73

Answer _____ [1]

(b) $\dfrac{38252}{0.73}$

Answer _____ [1]

[Turn over

6 **Estimate** the value of

$$\frac{6.2 + 30.4}{7.9 - 2.8}$$

You must show all your working.

Answer _____ [2]

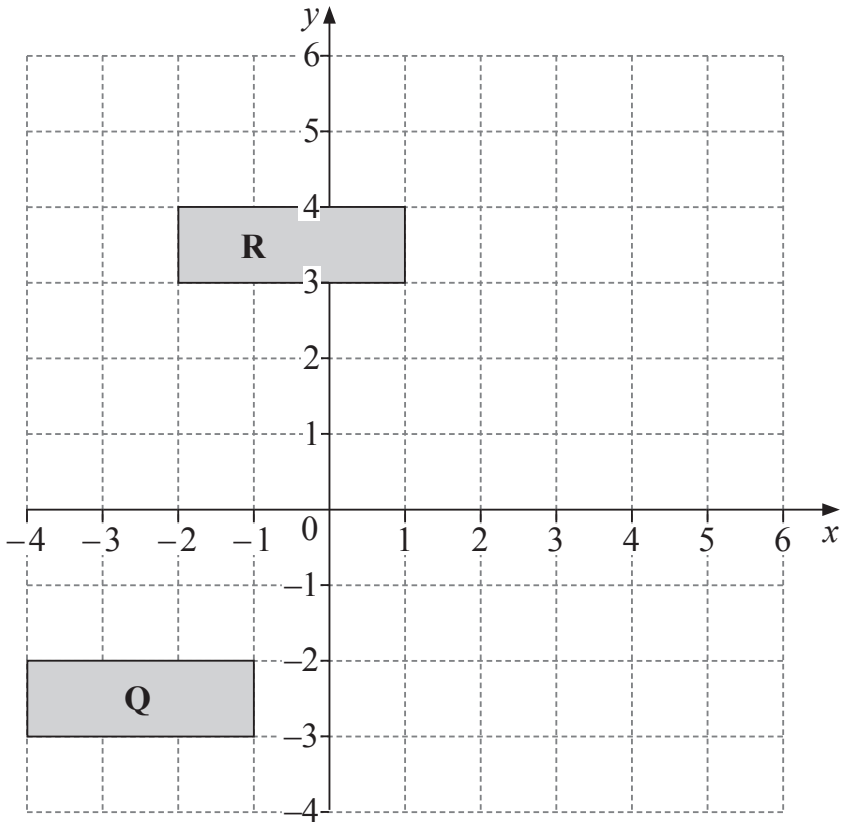
7 **(a)** Write down the reciprocal of $\frac{5}{2}$

Answer _____ [1]

(b) Write down the two numbers which are the square roots of $\frac{1}{25}$

Answer _____, _____ [1]

8



(a) Reflect the rectangle R in the line $y = x$.

Label your answer S. [2]

(b) Rotate the rectangle R, 90° anticlockwise, about the point (–1, 2).

Label your answer T. [2]

(c) Describe fully a single transformation which maps R onto Q.

Answer _____ [2]

[Turn over

Quality of written communication will be assessed in this question.

9 a is an odd number and b is an even number.

Which of the statements below describes the number $(a + b)^2$?

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

Explain your answer.

Answer _____

because _____

_____ [2]

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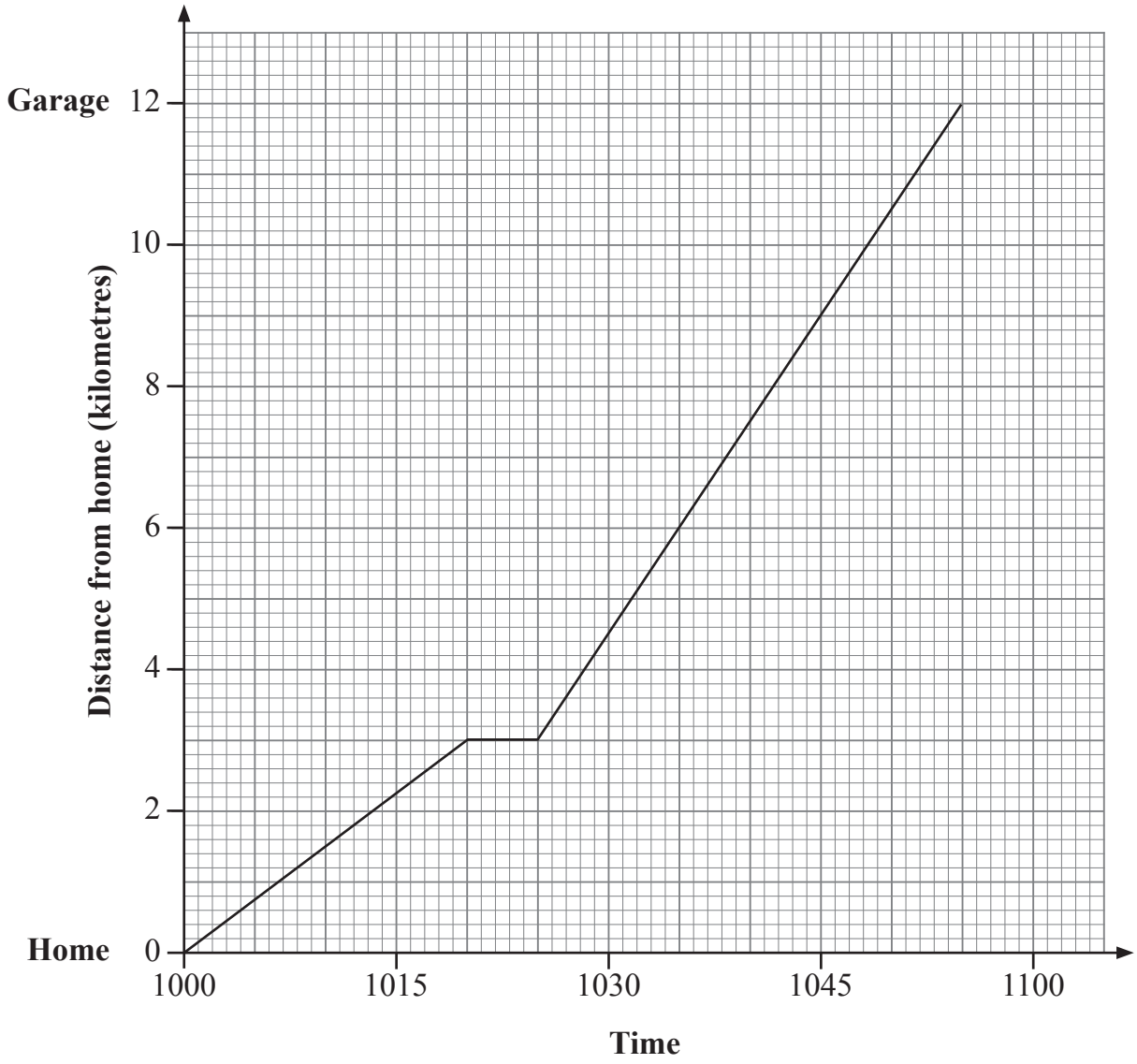
(Questions continue overleaf)

10 Adam jogs from home to a garage.

His journey is shown on the graph below.



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(a) What is Adam's average speed on the first part of his journey?

Answer _____ km/h [2]

(b) Adam's brother Ben leaves the garage at 1010 and cycles home at an average speed of 22 km/h.

Show Ben's journey on the graph opposite.

Hence find the time when Adam and Ben pass each other.

Answer _____ [4]

[Turn over

11 **(a)** Express $\frac{4}{11}$ as a recurring decimal.

Answer _____ [1]

(b) Work out $(4.1 \times 10^{-2}) - (2.8 \times 10^{-3})$

Give your answer in standard form.

Answer _____ [2]

(c) The area of a rectangle is $(5.6 \times 10^{-4})\,m^2$
The length of the rectangle is $(8 \times 10^{-2})\,m$
Work out the breadth of the rectangle.
Give your answer in standard form.

Answer _____ m [2]

12 Rationalise the denominator of $\frac{6+5\sqrt{3}}{\sqrt{3}}$

Give your answer in its simplest form.

Answer _____ [3]

13 Simplify the expression $\frac{(4x^2y^3)^3}{xy^2}$

Answer _____ [3]

[Turn over

14 Simplify $6\sqrt{2} + 3\sqrt{50} + 4\sqrt{8}$

Answer _____ [2]

Quality of written communication will be assessed in this question.

15 To win a prize in a lucky draw, you must **either** score a total of 6 or 7 when you throw 2 fair dice **or** you must get exactly two heads when you throw 4 fair coins.

Alice can't make up her mind whether to choose to throw 2 dice or 4 coins.

Which should she choose to give her the greatest chance of winning the prize?

Show clearly all your working.

Answer _____ because _____ [5]

THIS IS THE END OF THE QUESTION PAPER

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