Write your name here

Surname	Other names

Edexcel GCSE

Centre Number	Candidate Number

Mathematics B

Unit 2: Number, Algebra, Geometry 1 (Non-Calculator)

Higher Tier

Monday 14 November 2011 – Morning
Time: 1 hour 15 minutes

Paper Reference
5MB2H/01

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser. Tracing paper may be used.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- **Calculators must not be used.**

Information

- The total mark for this paper is 60.
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed.

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

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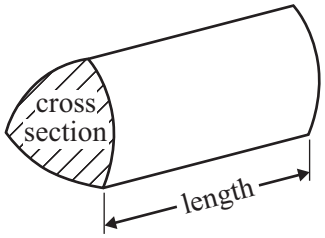
GCSE Mathematics 2MB01

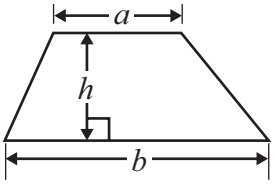
Formulae – Higher Tier

You must not write on this formulae page.
Anything you write on this formulae page will gain NO credit.

Volume of prism = area of cross section × length

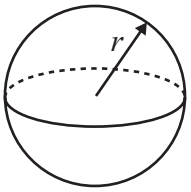


Area of trapezium $= \frac{1}{2}(a + b)h$



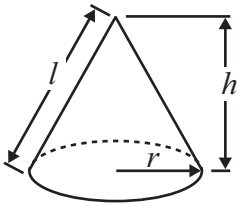
Volume of sphere $= \frac{4}{3}\pi r^3$

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

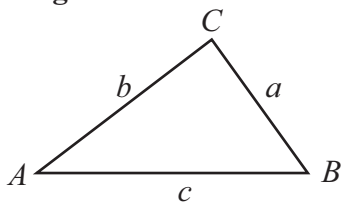


Volume of cone $= \frac{1}{3}\pi r^2 h$

Curved surface area of cone $= \pi rl$



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

The Quadratic Equation

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

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

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

1 Work out $\frac{1}{5} + \frac{3}{7}$

.....

(Total for Question 1 is 2 marks)

2 (a) Simplify $5f \times 4g$

.....

(1)

(b) Expand and simplify $9a + 3(8 - 2a)$

.....

(2)

(c) Simplify $c^2 \times c^6$

.....

(1)

(d) Simplify $(x^5)^3$

.....

(1)

(e) Factorise $7y + 21$

.....

(1)

(Total for Question 2 is 6 marks)

3 Priya is raising money for a charity by selling tomato plants that she has grown from seeds.

She sells 48 tomato plants for £1.35 each.

Priya keeps 15% of the money she gets to pay for the growbags and seeds that she used.
She sends the rest of the money to the charity.

How much money did she send to the charity?

£ .....

(Total for Question 3 is 6 marks)

4 Jake makes a picture frame from 4 identical pieces of card.
Each piece of card is in the shape of a trapezium.

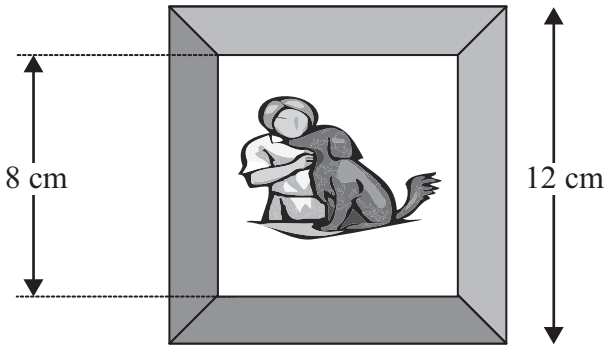


Diagram **NOT** accurately drawn

The outer edge of the frame is a square of side 12 cm.
The inner edge of the frame is a square of side 8 cm.

Work out the area of each piece of card.

..... cm^2

(Total for Question 4 is 4 marks)

5 Here are the first four terms of an arithmetic sequence.

10 16 22 28

(a) Find the 10th term of this sequence.

.....

(1)

(b) Find an expression, in terms of n, for the nth term of the sequence.

.....

(2)

(Total for Question 5 is 3 marks)

***6** This formula is used to work out the body mass index, B, for a person of mass M kg and height H metres.

$$B = \frac{M}{H^2}$$

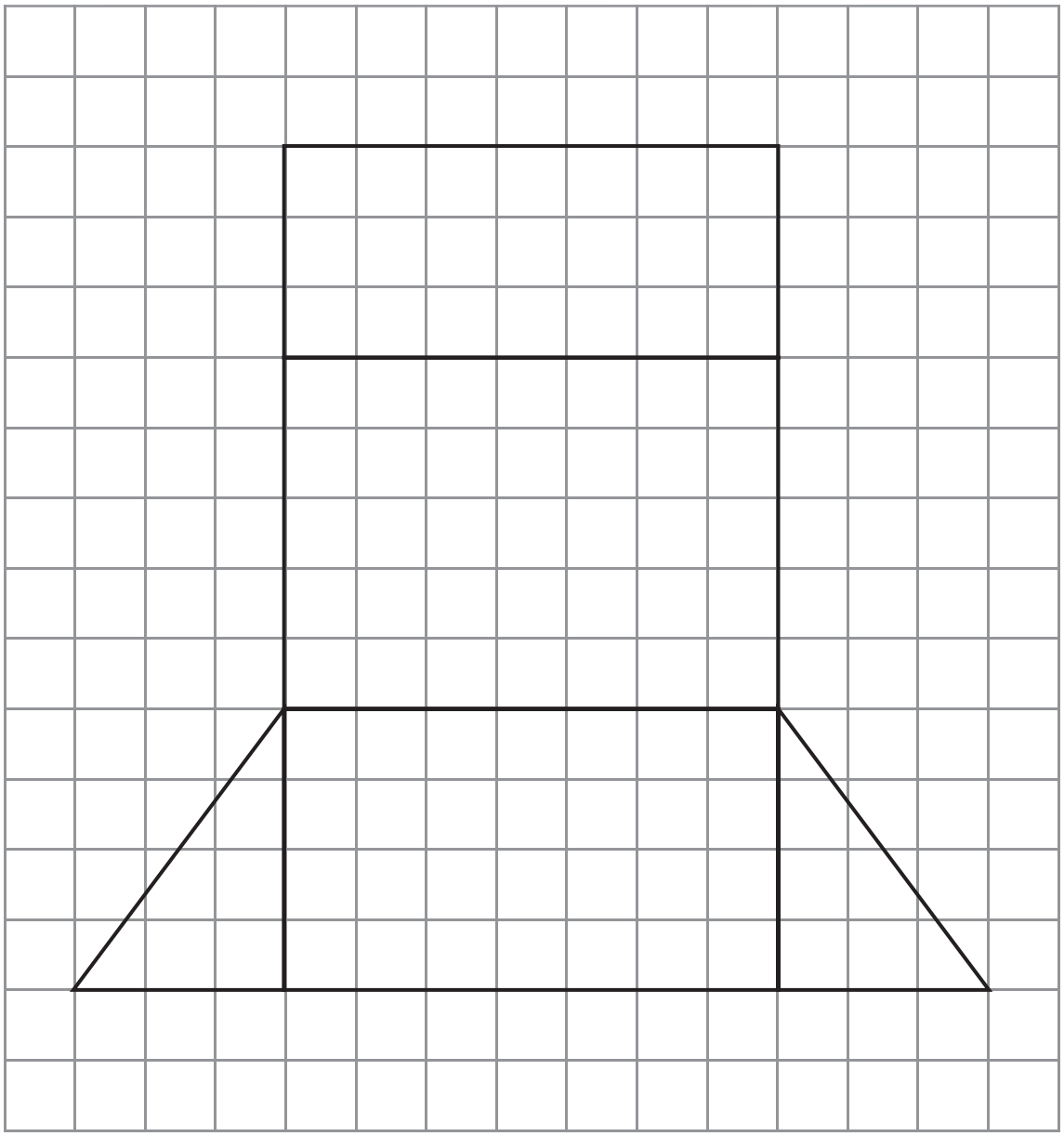
A person with a body mass index between 25 and 30 is overweight.

Arthur has a mass of 96 kg.
He has a height of 2 metres.

Is Arthur overweight?
You must show all your working.

(Total for Question 6 is 3 marks)

7 This diagram, drawn on a centimetre grid, is an accurate net of a triangular prism.



Work out the volume of the prism.

.....

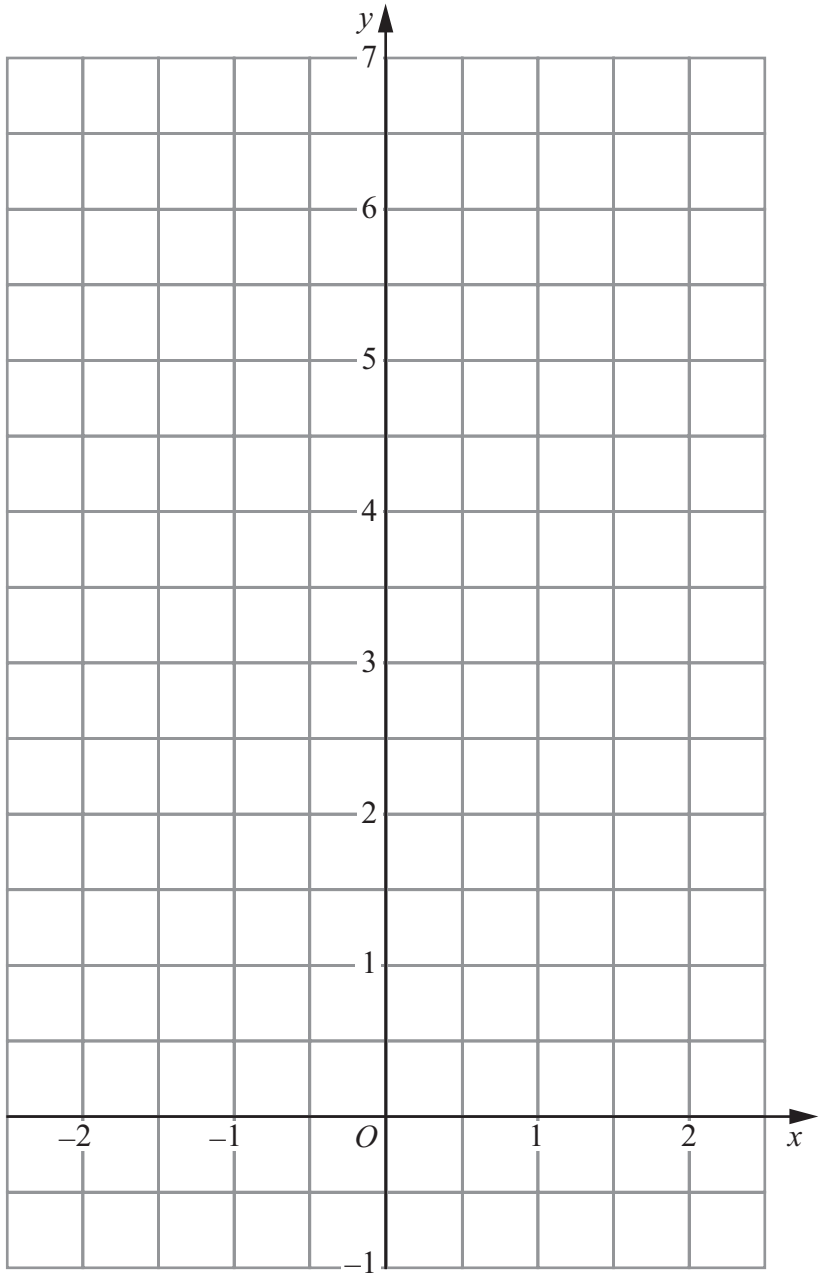
(Total for Question 7 is 4 marks)

8 (a) Complete the table of values for $y = \frac{1}{2}x + 4$

x	–2	–1	0	1	2
y	3		4		

(2)

(b) On the grid, draw the graph of $y = \frac{1}{2}x + 4$



(2)

(c) (i) On the grid, draw the line that is perpendicular to $y = \frac{1}{2}x + 4$ and passes through the point with coordinates (0, 4).

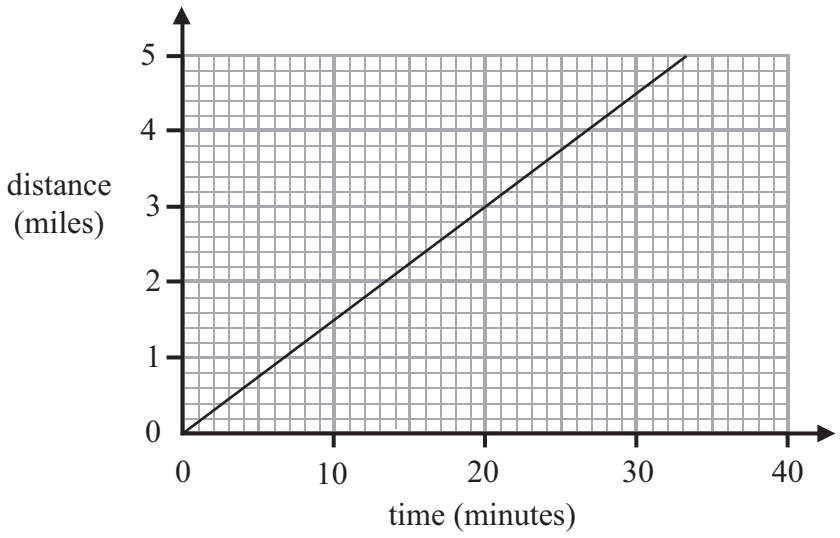
(ii) Find the equation of this line.

.....

(3)

(Total for Question 8 is 7 marks)

***9** Lisa cycles to work.
The travel graph shows information about her journey to work on Tuesday.



Martin also cycles to work.
On Tuesday his average speed was 16 km per hour.

Who has the greater average speed, Lisa or Martin?
You must show all your working.

(Total for Question 9 is 4 marks)

10 Mrs Jennings shares £770 between her two sons, Pete and Tim.
She shares the money in the ratio of her sons' ages.

The combined age of her two sons is 66 years.
Pete is 6 years younger than Tim.

Work out how much money each son gets.
You must show all your working.

Pete £ .....

Tim £ .....

(Total for Question 10 is 5 marks)

11 (a) Write 60 800 000 in standard form.

.....

(1)

(b) Write 1.7×10^{-4} as an ordinary number.

.....

(1)

(Total for Question 11 is 2 marks)

12 (a) Factorise $e^2 - 100$

.....

(1)

(b) Factorise $2x^2 - 7x - 15$

.....

(2)

(c) Simplify $\dfrac{(g-7)^9}{(g-7)^3}$

.....

(1)

(Total for Question 12 is 4 marks)

13 Rationalise the denominator $\dfrac{3}{\sqrt{7}}$

.....

(Total for Question 13 is 2 marks)

***14**

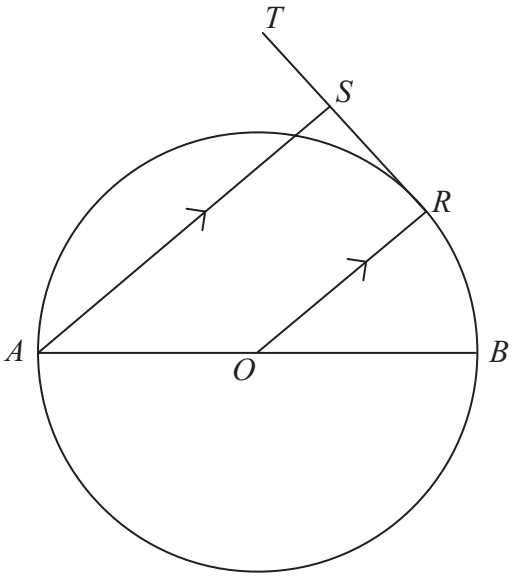


Diagram **NOT** accurately drawn

AB is a diameter of a circle centre *O*.
The point *R* is on the circumference of the circle.
RST is the tangent to the circle at *R*.
AS is parallel to *OR*.

Prove that the size of angle *AST* is 90°.

(Total for Question 14 is 3 marks)

15 The diagram shows shape **A**.
All the measurements are in centimetres.

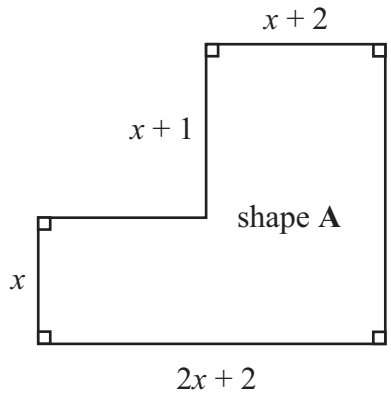


Diagram **NOT** accurately drawn

(a) Find an expression in terms of x for the area, in cm^2, of shape **A**.
You must simplify your answer.

.....

(4)

Shape **B** is a rectangle.
Shape **B** has the same area as shape **A**.
Shape **B** has a length of $(3x + 2)$ centimetres.

(b) Find an expression in terms of x for the width, in centimetres, of shape **B**.

.....

(1)

(Total for Question 15 is 5 marks)

TOTAL FOR PAPER IS 60 MARKS

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