

Write your name here

Surname

Other names

**Pearson**  
**Edexcel GCSE**

Centre Number

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Candidate Number

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# Mathematics B

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

**Higher Tier**

Friday 6 November 2015 – 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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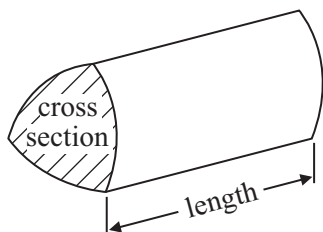
**PEARSON**

## GCSE Mathematics 2MB01

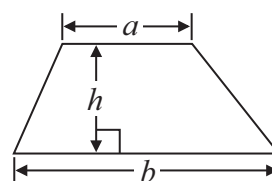
Formulae: Higher Tier

**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  $\times$  length

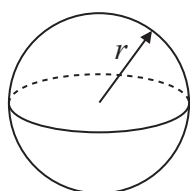


**Area of trapezium** =  $\frac{1}{2} (a + b)h$



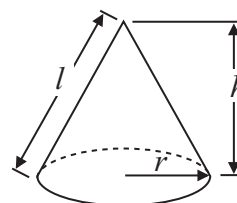
**Volume of sphere** =  $\frac{4}{3} \pi r^3$

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

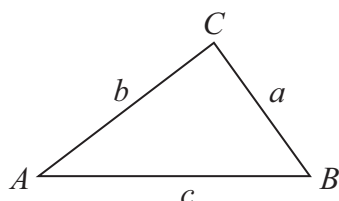


**Volume of cone** =  $\frac{1}{3} \pi r^2 h$

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



**In any triangle ABC**



**The Quadratic Equation**

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

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

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



**Answer ALL questions.**

**Write your answers in the spaces provided.**

**You must write down all stages in your working.**

**You must NOT use a calculator.**

- 1** Here are the ingredients needed to make leek and potato soup for 4 people.

<p style="text-align: center;"><b>Leek and potato soup</b></p> <p style="text-align: center;"><b>Serves 4</b></p> <p>4 leeks</p> <p>350 g potatoes</p> <p>600 ml vegetable stock</p> <p>300 ml milk</p>
---

Jenny wants to make soup for 6 people.

Work out the amount of each ingredient she needs.

..... leeks

..... g potatoes

..... ml vegetable stock

..... ml milk

**(Total for Question 1 is 3 marks)**



2 Here is an equilateral triangle.

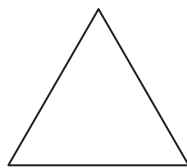
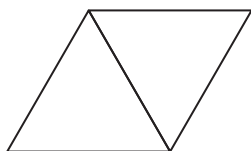


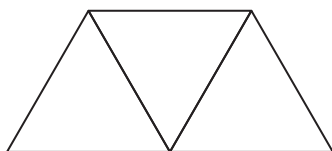
Diagram **NOT**  
accurately drawn

The equilateral triangle has a perimeter of 24 cm.

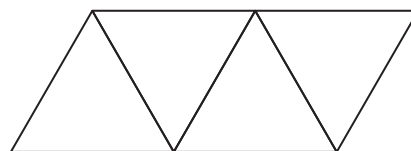
Some of these equilateral triangles are used to make this sequence of quadrilaterals.



quadrilateral 1



quadrilateral 2



quadrilateral 3

Find an expression for the perimeter, in centimetres, of quadrilateral  $n$ .

.....  
(Total for Question 2 is 3 marks)



- 3 The diagram shows the area of each of three faces of a cuboid.

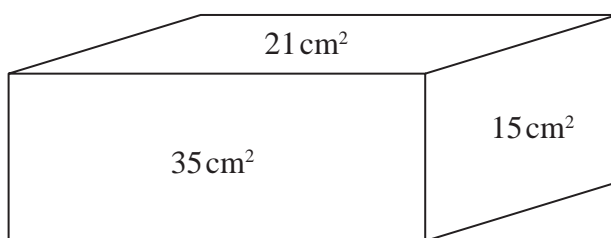


Diagram **NOT**  
accurately drawn

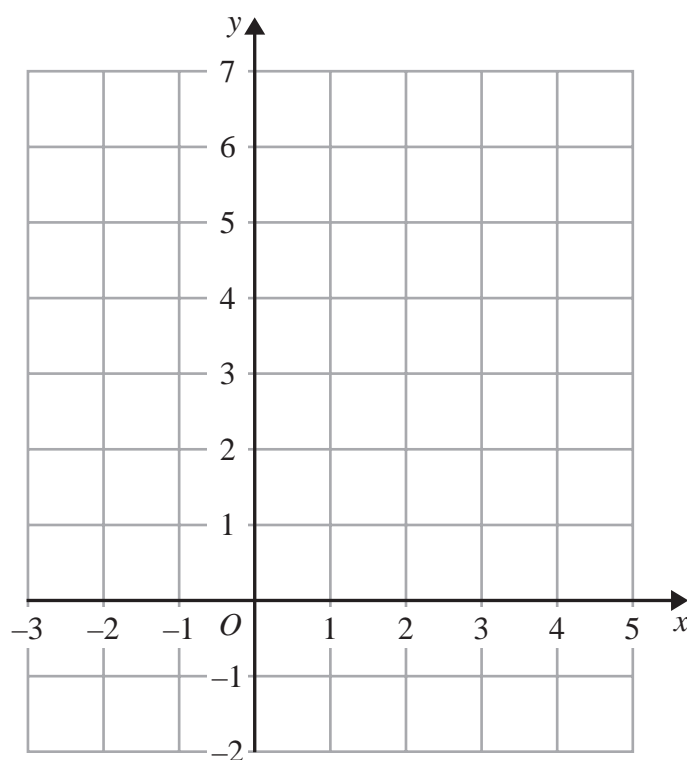
The length of each edge of the cuboid is a whole number of centimetres.

Work out the volume of the cuboid.

.....  
(Total for Question 3 is 4 marks)



- 4 On the grid, draw the graph of  $y = \frac{1}{2}x + 3$  for values of  $x$  from  $-2$  to  $4$



(Total for Question 4 is 3 marks)



5 Andy is going to cover a wall with tiles.

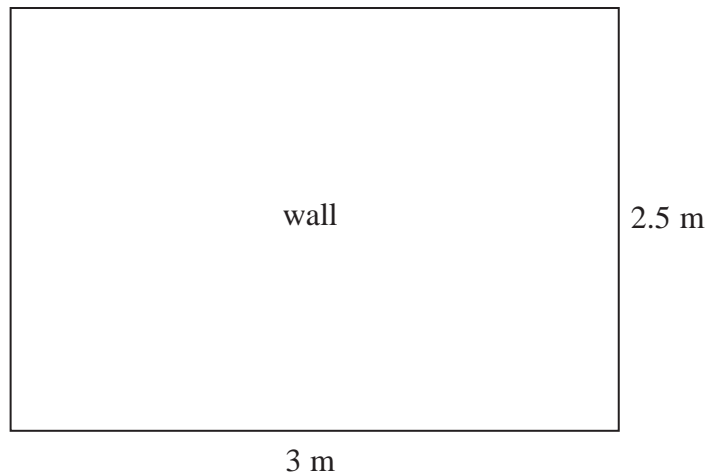


Diagram **NOT**  
accurately drawn

The wall is in the shape of a rectangle.  
The wall is 3 m wide and 2.5 m high.  
The tiles are rectangles 20 cm wide and 25 cm high.

The tiles are sold in boxes.  
There are 20 tiles in each box.  
Each box of tiles costs £8.50

Work out the total cost of the boxes of tiles Andy needs to buy.  
You must show all your working.

£ .....

(Total for Question 5 is 5 marks)



- \*6 The  $n$ th term of sequence A is  $3n - 2$   
The  $n$ th term of sequence B is  $10 - 2n$

Sally says there is only one number that is in both sequence A and sequence B.

Is Sally right?

You must explain your answer.

---

**(Total for Question 6 is 2 marks)**





7 Tom and Amy set the alarms on their phones to sound at 6.45 am.

Both alarms sound together at 6.45 am.

Tom's alarm then sounds every 9 minutes.

Amy's alarm then sounds every 12 minutes.

At what time will both alarms next sound together?

.....  
(Total for Question 7 is 3 marks)

---



8 (a) Factorise  $12e + 4$

.....  
(1)

(b) Expand  $5(3c - 2d)$

.....  
(1)

(c) Simplify  $7a^3b^{-2} \times 4ab^5$

.....  
(2)

(d) Factorise  $x^2 - 49$

.....  
(1)

(e) Expand and simplify  $(2y + 7)(y - 3)$

.....  
(2)

**(Total for Question 8 is 7 marks)**

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\*9 The diagram shows a pentagon  $ABCDE$ .

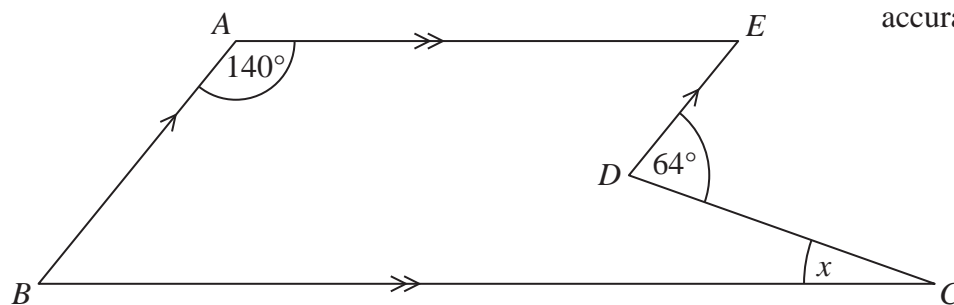


Diagram **NOT**  
accurately drawn

$AE$  is parallel to  $BC$ .

$BA$  is parallel to  $DE$ .

Angle  $EDC = 64^\circ$

Angle  $BAE = 140^\circ$

Work out the size of the angle marked  $x$ .

You must give reasons for your answer.

(Total for Question 9 is 4 marks)



10 Work out  $3\frac{4}{5} + \frac{3}{7}$

Give your answer as a mixed number in its simplest form.

.....  
(Total for Question 10 is 3 marks)

11 (a) Write 0.0078 in standard form.

.....  
(1)

(b) Write  $6.71 \times 10^6$  as an ordinary number.

.....  
(1)

(c) Write these numbers in order of size.

Start with the smallest number.

$$9^{\frac{1}{2}}$$

$$0.9$$

$$-9$$

$$9^0$$

.....  
(2)

(Total for Question 11 is 4 marks)



12 The diagram shows a cube drawn on a 3-D grid.

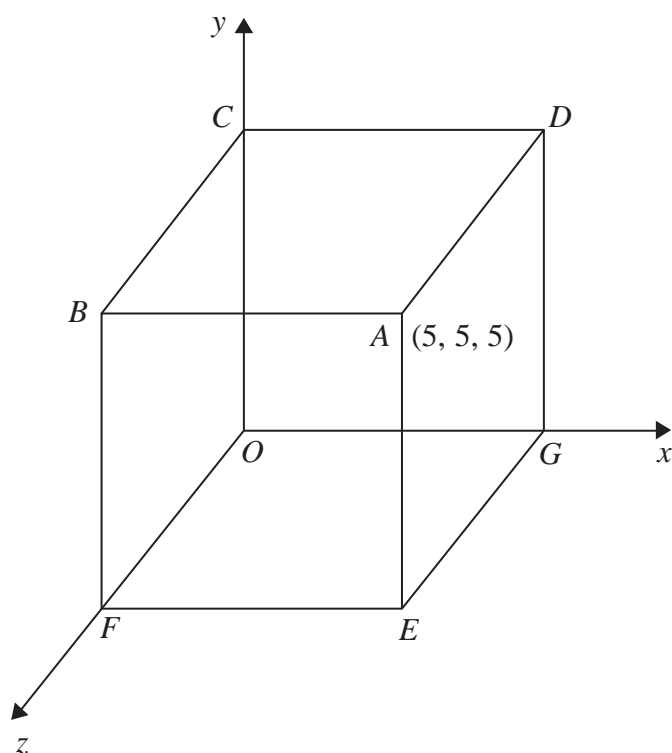


Diagram **NOT**  
accurately drawn

The coordinates of vertex  $A$  are  $(5, 5, 5)$ .

(a) Write down the coordinates of vertex  $B$ .

( ..... , ..... , ..... )  
(1)

(b) Work out the coordinates of the midpoint of  $AC$ .

( ..... , ..... , ..... )  
(1)

(Total for Question 12 is 2 marks)



**13** Kristen buys a laptop.

She gets a discount of 20% off the normal price.  
Kristen pays £480 for the laptop.

Work out the discount.  
Give your answer in pounds.

£ .....

**(Total for Question 13 is 3 marks)**

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14

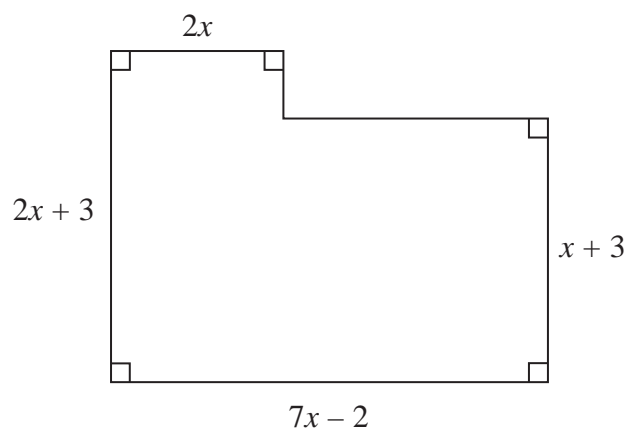


Diagram **NOT**  
accurately drawn

All the measurements in the diagram are in centimetres.

The area of the shape is  $A \text{ cm}^2$ .

Find a formula for  $A$  in terms of  $x$ .

You must write your formula as simply as possible.

.....  
(Total for Question 14 is 4 marks)



15

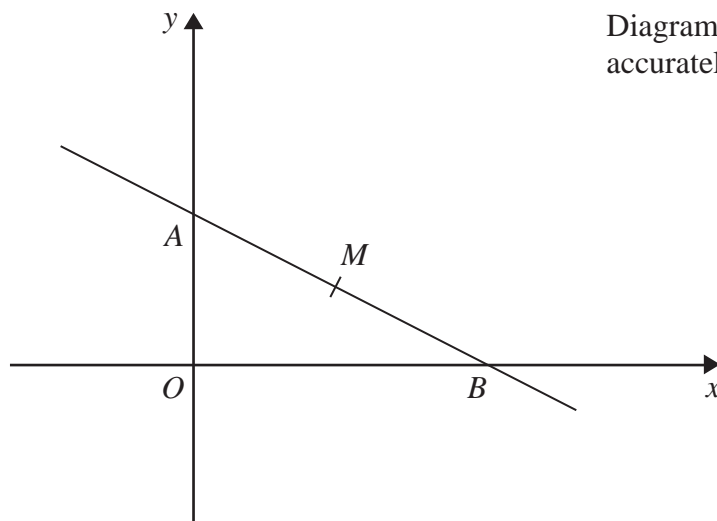


Diagram **NOT**  
accurately drawn

In the diagram  $A$  is the point  $(0, 4)$   
 $B$  is the point  $(6, 0)$

$M$  is the midpoint of  $AB$ .

Find an equation of the line that passes through  $M$  and is perpendicular to  $AB$ .

.....  
(Total for Question 15 is 4 marks)

16





16 Rationalise the denominator of  $\frac{(4 + \sqrt{2})(4 - \sqrt{2})}{\sqrt{7}}$

Give your answer in its simplest form.

.....  
(Total for Question 16 is 3 marks)

17 Simplify fully  $\frac{x^2 - 2x - 15}{2x^2 + 7x + 3}$

.....  
(Total for Question 17 is 3 marks)

**TOTAL FOR PAPER IS 60 MARKS**



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