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 5 March 2012 – Afternoon
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.
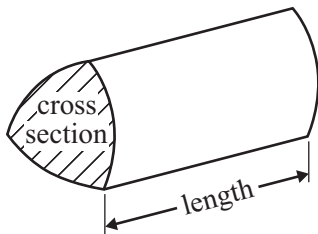
Turn over ▶

P 4 0 6 2 1 A 0 1 1 6

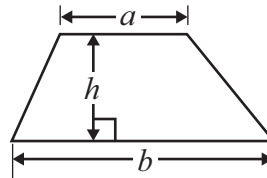**PEARSON**

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.

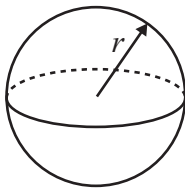**Volume of prism** = area of cross section × length

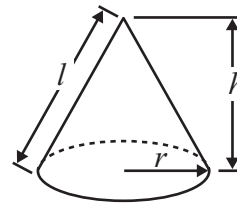**Area of trapezium** = $\frac{1}{2}(a + b)h$

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

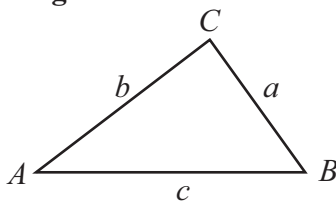**Surface area of sphere** = $4\pi r^2$

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

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

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

1   Here is a list of ingredients needed to make 12 scones.

> **Ingredients for 12 scones**
>
> 220 g self-raising flour
> 40 g butter
> 150 m*l* milk
> 2 tablespoons sugar

Viv is making scones for 15 people.
She is making 2 scones for each person.

Work out the amount of each ingredient she needs.

Self-raising flour .... g

Butter .... g

Milk .... m*l*

Tablespoons of sugar ....

(Total for Question 1 is 3 marks)

2 Here are the first five terms of an arithmetic sequence.

$$2 \quad 7 \quad 12 \quad 17 \quad 22$$

(a) Explain why the number 271 cannot be a term in this sequence.

....

....

(1)

(b) Write down an expression, in terms of *n*, for the *n*th term of the sequence.

....

(2)

(Total for Question 2 is 3 marks)

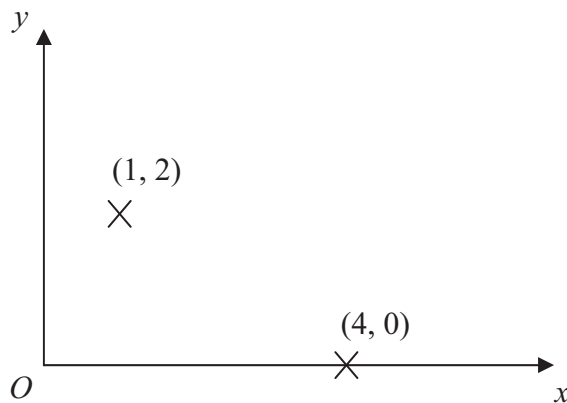**3** Find the coordinates of the midpoint of the line joining the points (1, 2) and (4, 0).
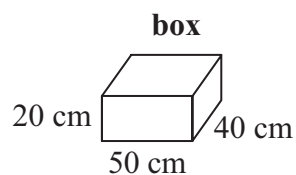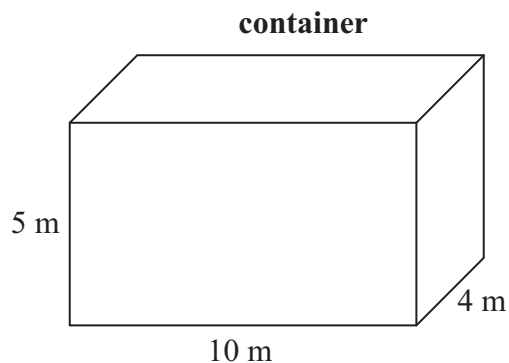

Diagram **NOT** accurately drawn

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

(Total for Question 3 is 2 marks)

P40621A0416

*4 Marc drives a truck.
    The truck pulls a container.
    The container is a cuboid 10 m by 4 m by 5 m.

Diagram **NOT**
accurately drawn

container

5 m

10 m

4 m

box

20 cm   40 cm

50 cm

Marc fills the container with boxes.
Each box is a cuboid 50 cm by 40 cm by 20 cm.

Show that Marc can put no more than 5000 boxes into the container.

(Total for Question 4 is 4 marks)

Turn over ▶

5 (a) Simplify $2e - 8f + 6e + 3f$

....

(2)

(b) Factorise $4t + 10$

....

(1)

(c) Expand and simplify $3 + 2(p - 1)$

....

(2)

(d) Factorise $ax + bx + ay + by$

....
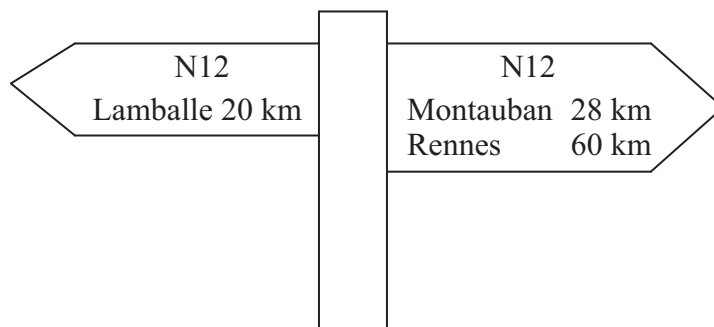
(2)

(Total for Question 5 is 7 marks)

6 John earns £30 000 each year.
He knows that 20% of his monthly pay is deducted each month.

Work out how much money John has left each month after this deduction.

£ ....

(Total for Question 6 is 3 marks)

7 Caroline is driving her car in France.
She sees this road sign.

N12
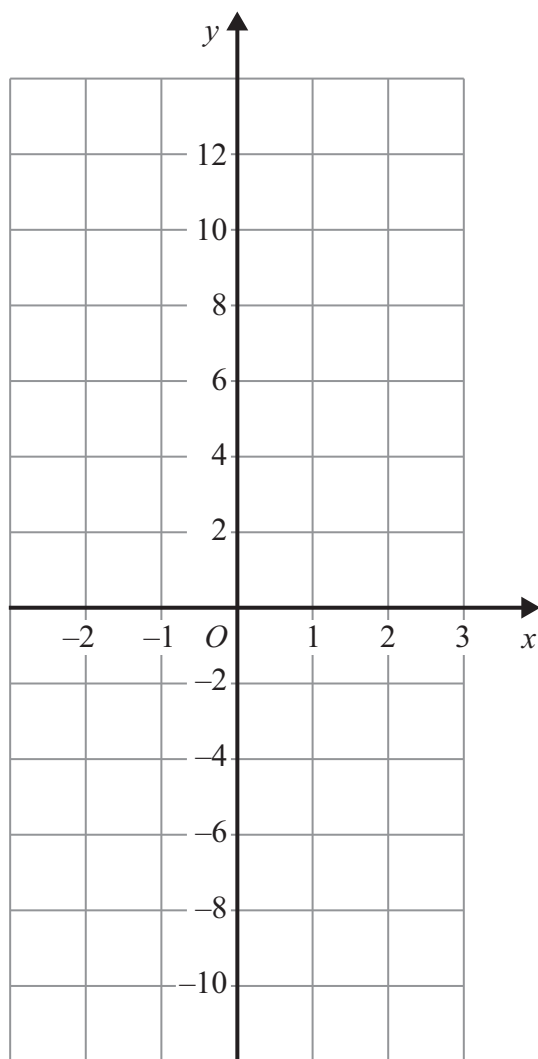Lamballe 20 km

N12
Montauban 28 km
Rennes   60 km

Caroline is going to Rennes on the N12
She stops driving 10 miles from the road sign.

Work out how much further Caroline has to drive to get to Rennes.

....

(Total for Question 7 is 3 marks)

Turn over ▶

8 On the grid, draw the graph of $y = 4x - 2$ for values of x from $x = -2$ to $x = 3$
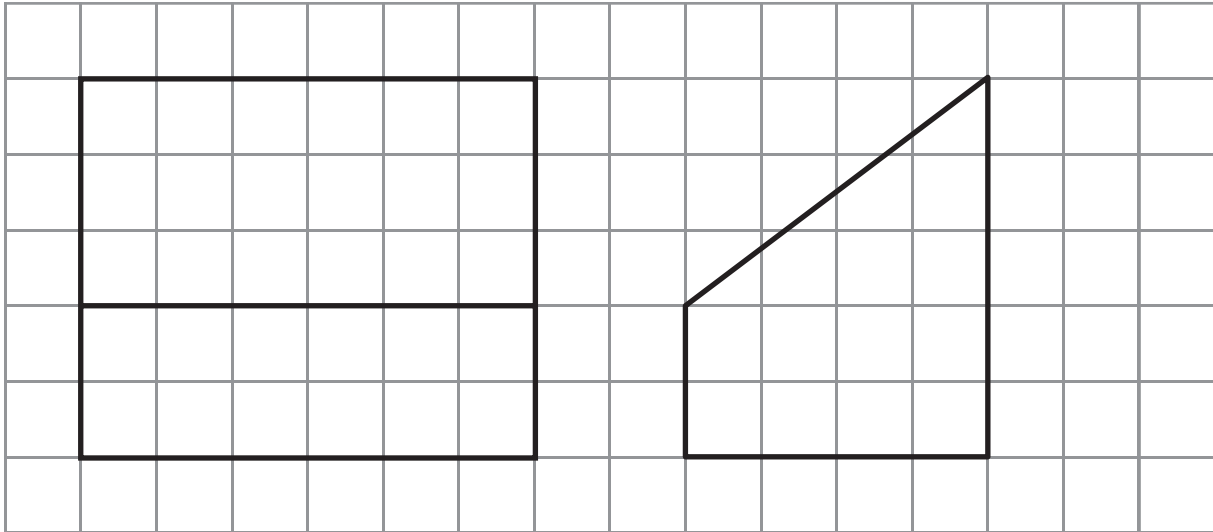

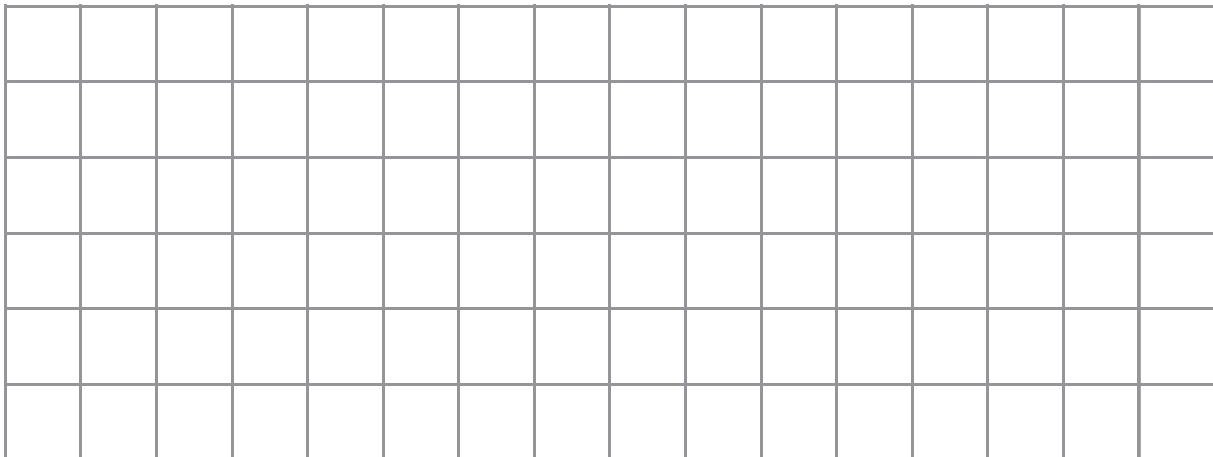**(Total for Question 8 is 3 marks)**

9 The diagram shows the front elevation and the side elevation of a prism.

Front elevation   Side elevation

(a) On the grid, draw a plan of this prism.

(2)

(b) In the space below, draw a sketch of this prism.

(2)

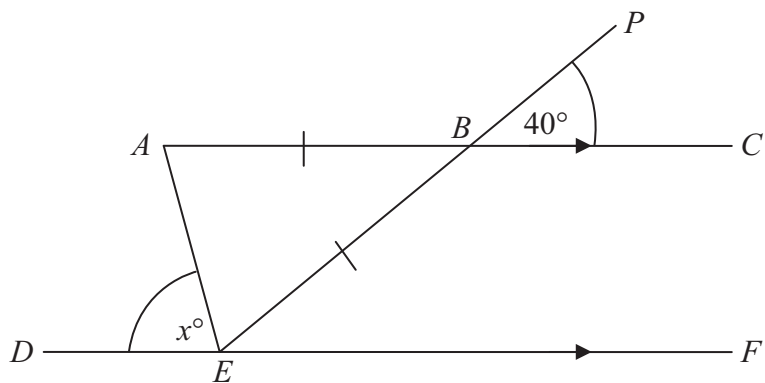**(Total for Question 9 is 4 marks)**

Diagram **NOT** accurately drawn

ABC is parallel to *DEF*.
EBP is a straight line.
AB = *EB*.
Angle *PBC* = 40°.
Angle *AED* = *x*°.

Work out the value of *x*.
Give a reason for each stage of your working.

(Total for Question 10 is 5 marks)

P 4 0 6 2 1 A 0 1 0 1 6

11 (a) Find the value of 5^0

....
(1)

(b) Find the value of $27^{\frac{1}{3}}$

....
(1)

(c) Find the value of 2^{-3}

....
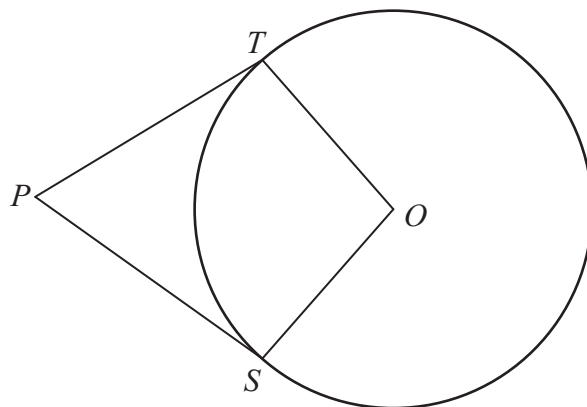**(1)**

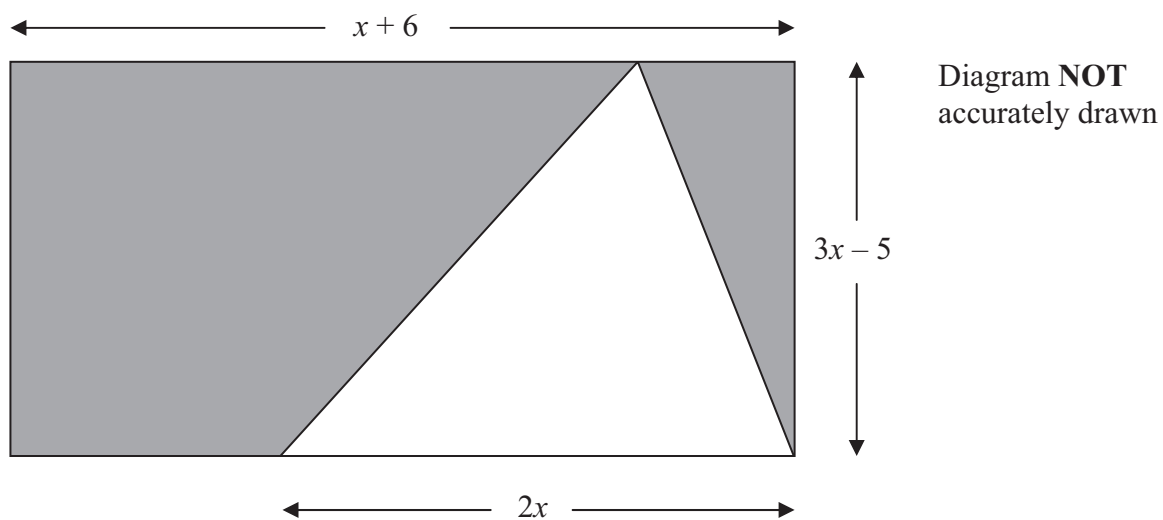**(Total for Question 11 is 3 marks)**

12

Diagram **NOT** accurately drawn

S and T are points on the circumference of a circle, centre O.
PT and PS are tangents.
Angle $TPO = 24°$.

Work out the size of angle SOT.

....°

(Total for Question 12 is 3 marks)

*13 The diagram shows a triangle inside a rectangle.

Diagram **NOT** accurately drawn

All measurements are given in centimetres.

Show that the total area, in cm^2, of the shaded regions is $18x - 30$

(Total for Question 13 is 4 marks)

14 Express $0.2\dot{5}$ as a fraction in its simplest form.

....

(Total for Question 14 is 3 marks)

15 A straight line, **L**, is perpendicular to the line with equation $y = 1 - 3x$.
The point with coordinates $(6, 3)$ is on the line **L**.

Find an equation of the line **L**.

....

(Total for Question 15 is 3 marks)

Turn over ▶

16 (a) Rationalise the denominator of $\dfrac{15}{\sqrt{5}}$

....
(2)

$(1 + \sqrt{3})^2$ can be written in the form $a + b\sqrt{3}$, where a and b are integers.

(b) Work out the value of a and the value of b.

$a = $ ....

$b = $ ....
(2)

(Total for Question 16 is 4 marks)

17 Write $\dfrac{3}{b} + \dfrac{2}{a-b}$ as a single fraction in its simplest form.

....

(Total for Question 17 is 3 marks)

TOTAL FOR PAPER IS 60 MARKS

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