Centre Number   Candidate Number

Edexcel GCSE

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

Higher Tier

Friday 14 June 2013 – 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.
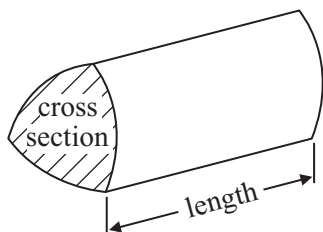- Try to answer every question.
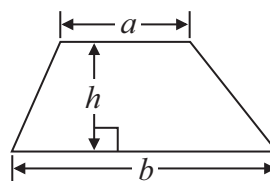- Check your answers if you have time at the end.

Turn over ▶

Formulae: Higher Tier

**You must not write on this formulae page.
Anything you write on this formulae page will gain NO credit.**
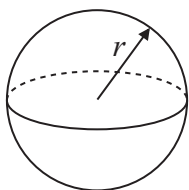
Volume of prism = area of cross section × length

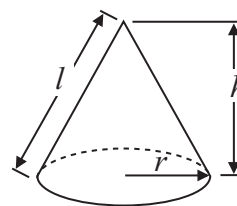**Area of trapezium** = $\dfrac{1}{2}(a + b)h$

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

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

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

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

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   A ticket to a theme park costs £35 plus 20% VAT.

Work out the total cost of the ticket.

£...

(Total for Question 1 is 3 marks)

2   (a) Simplify $2a + 4b + 3a - b$

....

(2)

(b) Expand $5(m + 2)$

....

(1)

(c) Simplify $a^5 \times a^4$

....

(1)

(Total for Question 2 is 4 marks)

3 There are 200 counters in a bag.
The counters are blue or red or yellow.

35% of the counters are blue.

$\frac{1}{5}$ of the counters are red.

Work out the number of yellow counters in the bag.

....

(Total for Question 3 is 4 marks)

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

$$1 \qquad 5 \qquad 9 \qquad 13 \qquad 17$$

(a) Write down an expression, in terms of n, for the nth term of this sequence.

....

(2)

The nth term of a different number sequence is $\quad 3n^2 + 7$

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

....

(2)

(Total for Question 4 is 4 marks)

4

5 Here are the ingredients needed to make 16 chocolate biscuits.

Chocolate biscuits
Makes **16** chocolate biscuits
100 g   of butter
50 g   of caster sugar
120 g   of flour
15 g   of cocoa

Sabrina has   250 g of butter
            300 g of caster sugar
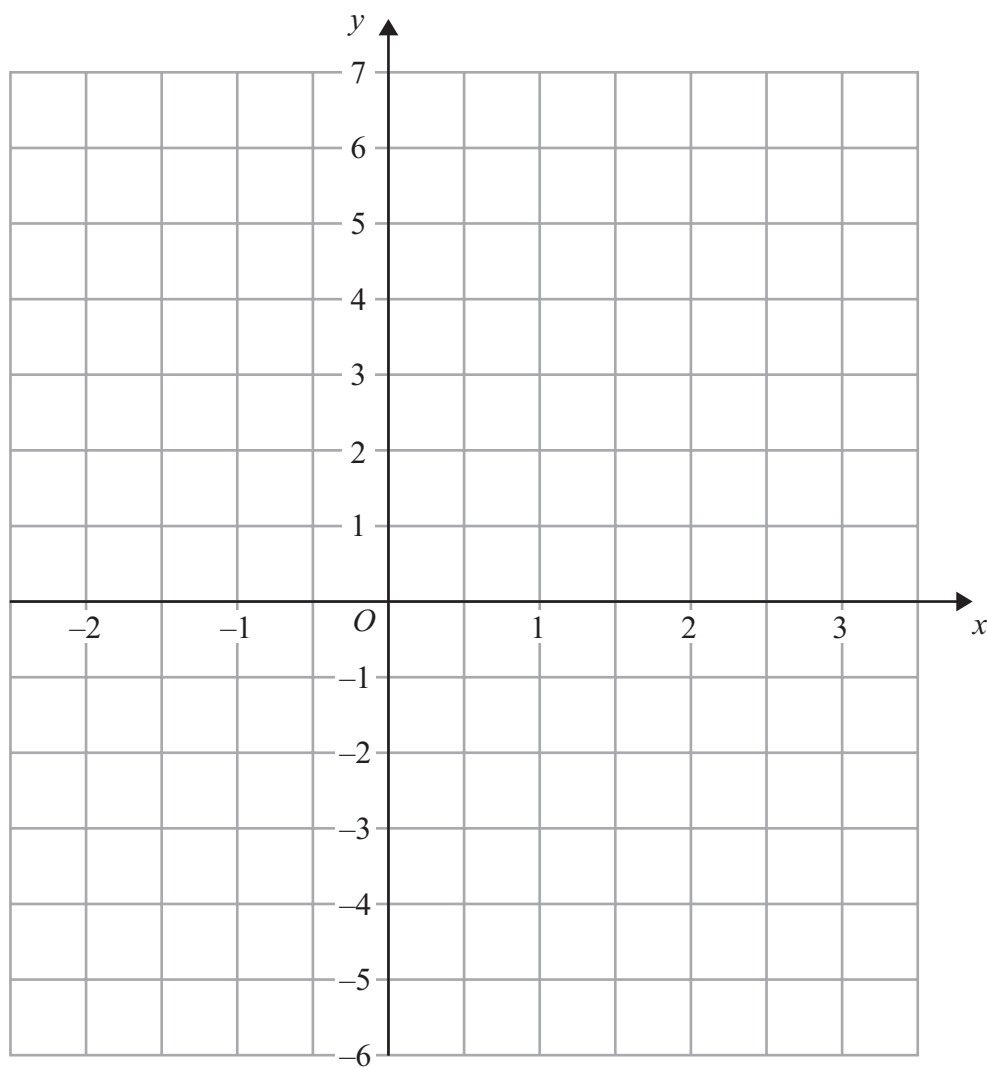   600 g of flour
      and   60 g of cocoa

Work out the greatest number of chocolate biscuits Sabrina can make.
You must show your working.

....
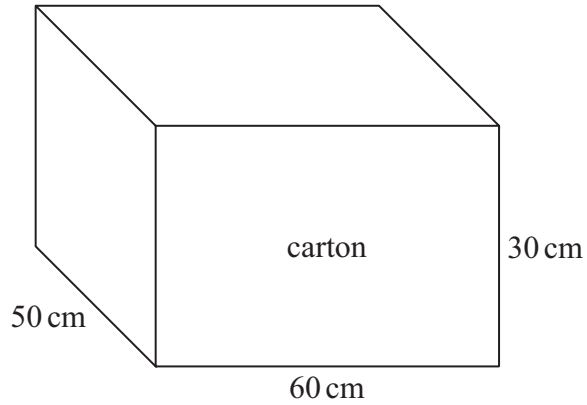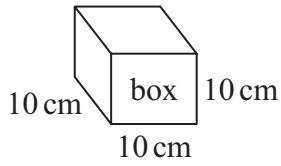
(Total for Question 5 is 3 marks)

Turn over ▶

6 On the grid, draw the graph of $y = 2x - 1$ for values of x from -2 to 3

(Total for Question 6 is 3 marks)

7

10 cm   box   10 cm
10 cm

carton   30 cm

50 cm

60 cm

Diagrams **NOT** accurately drawn

Terry fills a carton with boxes.
Each box is a cube of side 10 cm.

The carton is a cuboid with

length	60 cm
width	50 cm
height	30 cm

Work out the number of boxes Terry needs to fill one carton completely.

....

(Total for Question 7 is 3 marks)

*8 The diagram shows the floor plan of Jill's dining room.
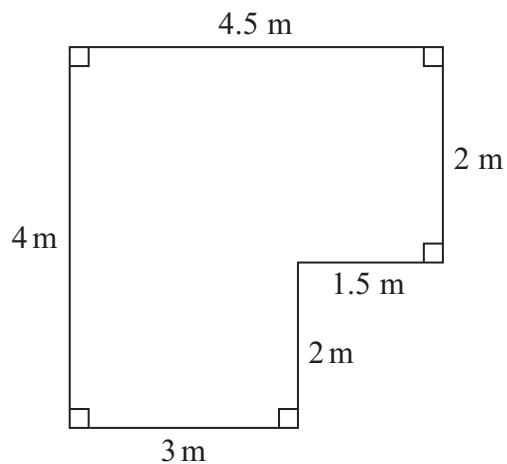
4.5 m

2 m

Diagram **NOT**
accurately drawn

4 m

1.5 m

2 m

3 m

Jill is going to cover the floor with wooden floorboards.

The floorboards are sold in packs.
One pack of floorboards will cover 2.25 m².

Work out how many packs Jill needs.
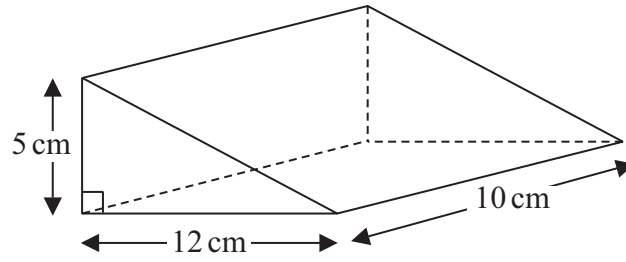You must show all your working.

(Total for Question 8 is 4 marks)

9

Diagram **NOT**
accurately drawn

Work out the volume of the triangular prism.

.... cm^3

(Total for Question 9 is 2 marks)
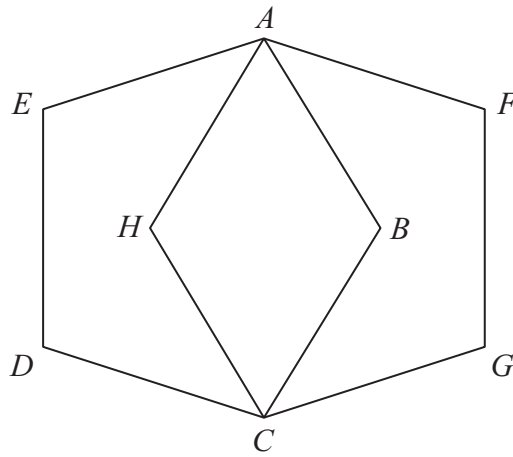
10

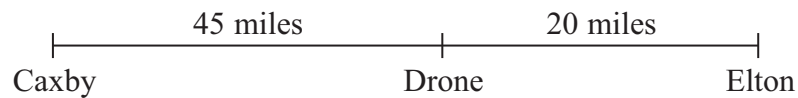Diagram **NOT** accurately drawn

ABCDE and *AFGCH* are regular pentagons.
The two pentagons are the same size.

Work out the size of angle *EAH*.
You must show how you got your answer.

.... °

(Total for Question 10 is 4 marks)

11 The distance from Caxby to Drone is 45 miles.
The distance from Drone to Elton is 20 miles.

|←——— 45 miles ———→|←——— 20 miles ———→|

Caxby   Drone   Elton

Colin drives from Caxby to Drone.
Then he drives from Drone to Elton.

Colin drives from Caxby to Drone at an average speed of 30 mph.
He drives from Drone to Elton at an average speed of 40 mph.

Work out Colin's average speed for the whole journey from Caxby to Elton.

.... mph

(Total for Question 11 is 3 marks)

12 Simplify fully $(x + 5)^2 - (x - 5)^2$

....

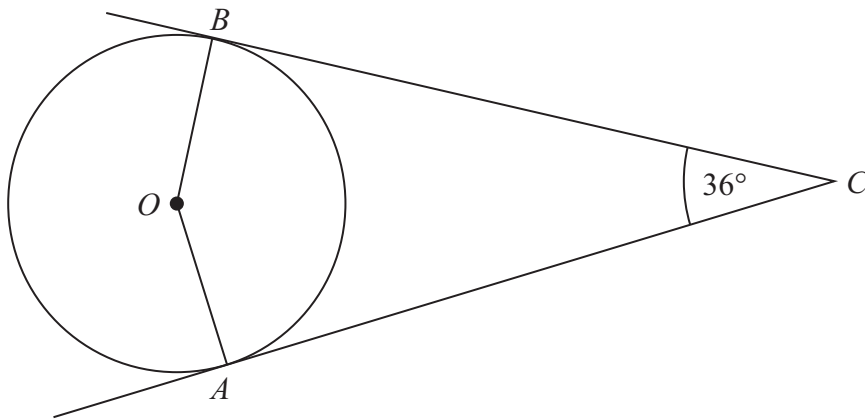**(Total for Question 12 is 2 marks)**

Diagram **NOT** accurately drawn

A and B are points on the circumference of a circle, centre O.
AC and BC are tangents to the circle.

Angle $ACB = 36°$.

Find the size of angle OBA.
Give reasons for your answer.

(Total for Question 13 is 4 marks)

14 The diagram shows a cuboid on a 3-D grid.

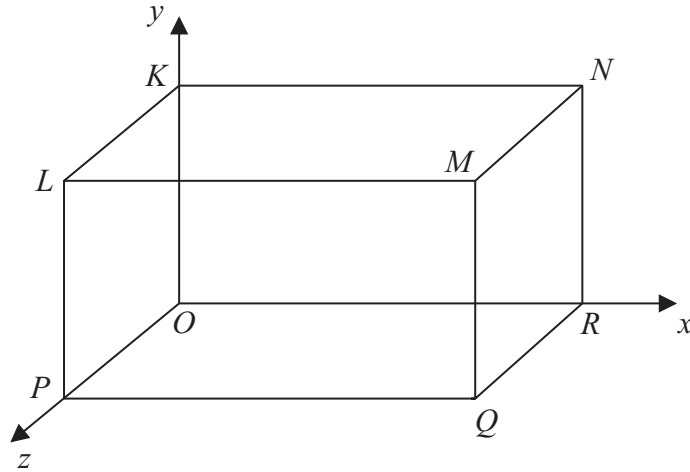Diagram **NOT** accurately drawn

The coordinates of the vertex *M* are (5, 3, 2).

Work out the coordinates of the midpoint of *LN*.

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

(Total for Question 14 is 2 marks)

15 Express the recurring decimal $0.7\dot{5}\dot{0}$ as a fraction.

....

(Total for Question 15 is 3 marks)

16 (a) Write down an equation of a straight line that is parallel to the straight line $y = 3x - 5$

....
(1)

A straight line, L, is perpendicular to the straight line $y = 3x - 5$ and passes through the point (6, 5)

(b) Find an equation of L.

....
(3)

(Total for Question 16 is 4 marks)

17 (a) Write down the value of 10^{-1}

....

(1)

(b) Find the value of $27^{\frac{2}{3}}$

....

(2)

(c) Write $\sqrt{75}$ in the form $k\sqrt{3}$, where k is an integer.

....

(2)

(Total for Question 17 is 5 marks)

18 Simplify fully $\dfrac{2x^2 + 6x}{x^2 - 2x - 15}$

....

(Total for Question 18 is 3 marks)

TOTAL FOR PAPER IS 60 MARKS

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