

Write your name here

Surname

Other names

Centre Number

Candidate Number

Edexcel GCSE

Mathematics B

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

Higher Tier

Tuesday 21 June 2011 – Morning

Time: 1 hour 15 minutes

Paper Reference

5MB2H/01

You must have:

Ruler graduated in centimetres and millimetres, protractor, 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 – *you should take particular care on these questions with your spelling, punctuation and grammar, as well as the clarity of expression.*

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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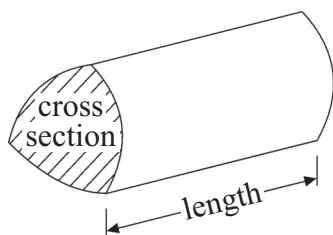
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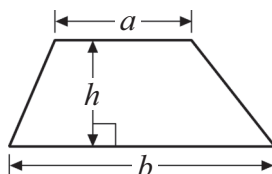
Formulae – Higher Tier

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

Volume of a prism = area of cross section $\times$ length

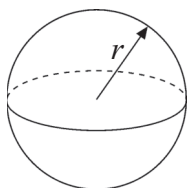


Area of trapezium = $\frac{1}{2}(a + b)h$



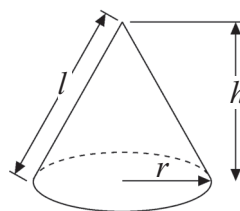
Volume of sphere = $\frac{4}{3}\pi r^3$

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

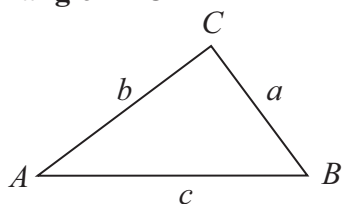


Volume of cone = $\frac{1}{3}\pi r^2 h$

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

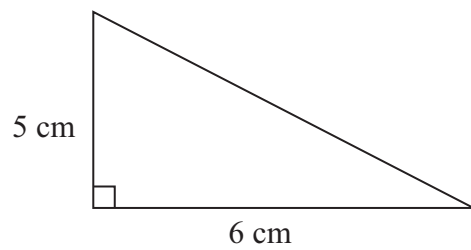


Diagram **NOT**
accurately drawn

Work out the area of this triangle.

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



2 (a) Simplify $3y + 2x - 4 + 5x + 7$

.....
(1)

(b) Factorise $2x^2 - 4x$

.....
(2)

(c) Expand and simplify $11 - 3(x+2)$

.....
(2)

(d) Expand and simplify $(x-6)(3x+7)$

.....
(2)

.....
(Total for Question 2 is 7 marks)



- 3 (a) Express 48 as a product of its prime factors.

.....
(2)

Buses to Exeter leave a bus station every 20 minutes.

Buses to Plymouth leave the bus station every 16 minutes.

A bus to Exeter and a bus to Plymouth both leave the bus station at 8am.

- (b) When will buses to Exeter and to Plymouth next leave the bus station at the same time?

.....
(3)

(Total for Question 3 is 5 marks)



- 4 Lydia is buying a ring.
The ring costs £60
She pays a deposit of 40%.

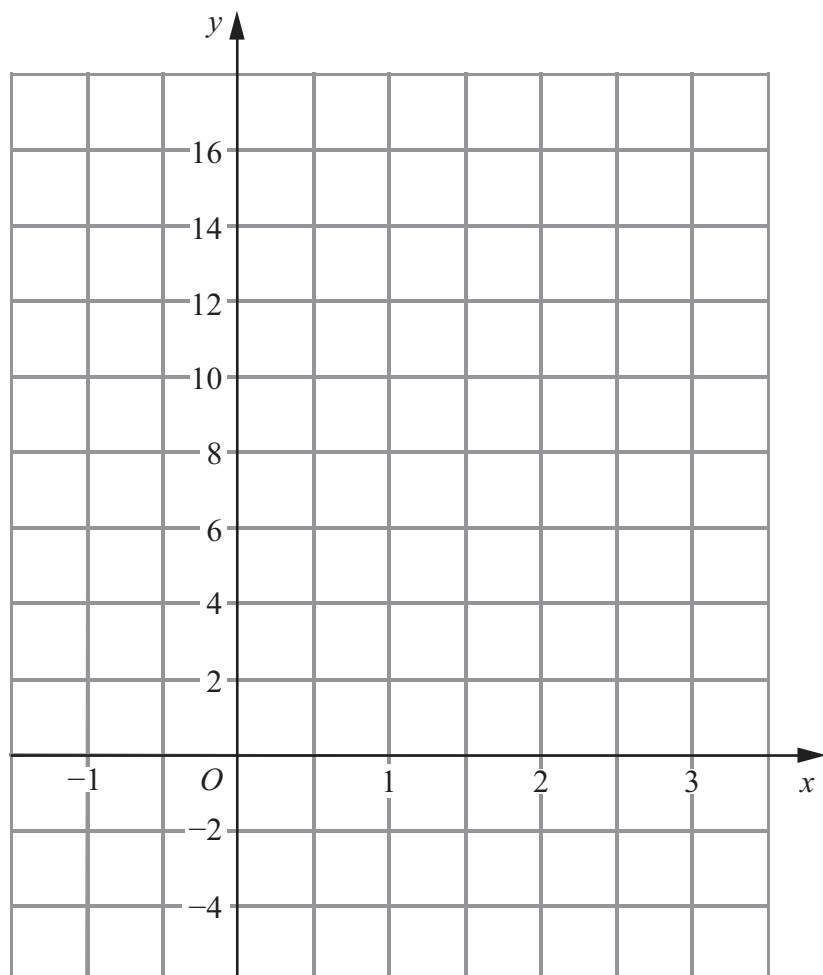
Work out how much she pays as the deposit.

£

(Total for Question 4 is 2 marks)



- 5 (a) On the grid, draw the graph of $y = 4x + 2$ from $x = -1$ to $x = 3$



(3)

- (b) (i) Write down the equation of a straight line that is parallel to $y = 4x + 2$

.....

- (ii) Write down the gradient of a straight line that is perpendicular to $y = 4x + 2$

.....

(2)

(Total for Question 5 is 5 marks)



*6 The diagram shows the plan of Mrs Phillips' living room.

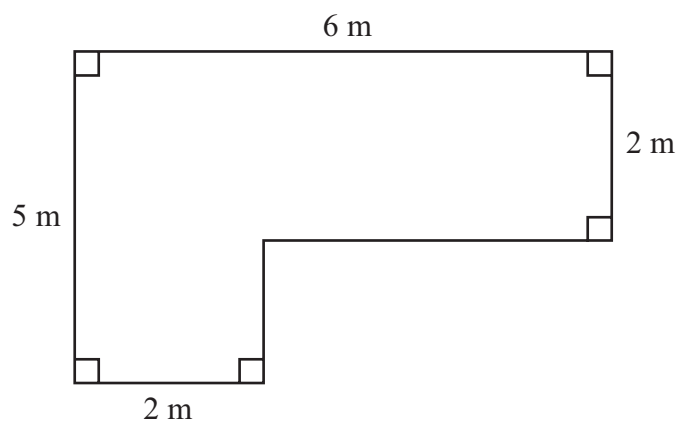


Diagram **NOT**
accurately drawn

Mrs Phillips is going to cover the floor with floor boards.
One pack of floor boards will cover 2.5 m^2 .

How many packs of floor boards does she need?
You must show your working.

(Total for Question 6 is 4 marks)



- 7 The point A has coordinates $(3, 8)$.
The point B has coordinates $(7, 5)$.
 M is the midpoint of the line segment AB .

Find the coordinates of M .

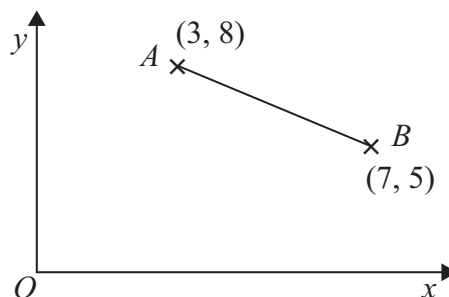


Diagram **NOT**
accurately drawn

(Total for Question 7 is 2 marks)

- 8 (a) Simplify $p^3 \times p^5$

(1)

- (b) Simplify $\frac{h^7}{h^2}$

(1)

- (c) Simplify $(x^2)^3$

(1)

(Total for Question 8 is 3 marks)



***9** Mr Smith drives 24 miles to work.

On Monday his journey to work takes 30 minutes.

On Tuesday the average speed of his journey to work is 56 km/h.

Did Mr Smith drive more quickly to work on Monday or on Tuesday?

You must show all your working.

(Total for Question 9 is 4 marks)



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

6 10 14 18 22

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

.....
(2)

The n th term of a different sequence is $2n^2 - 4$

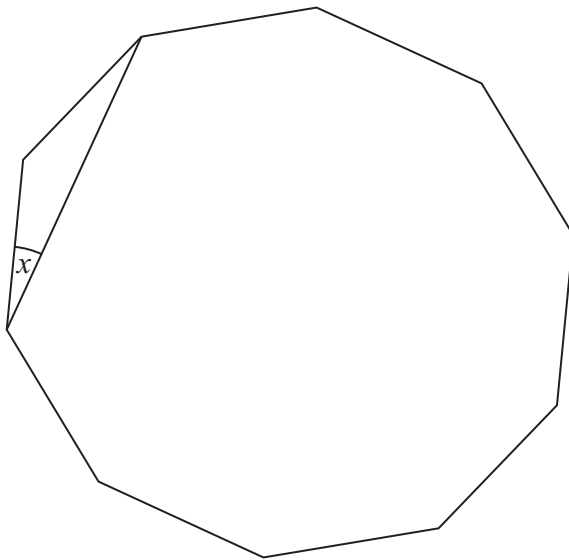
(b) Find the 3rd term of this sequence.

.....
(2)

(Total for Question 10 is 4 marks)



11

Diagram **NOT**
accurately drawn

The diagram shows a regular decagon.

Work out the size of angle x .

○

(Total for Question 11 is 4 marks)

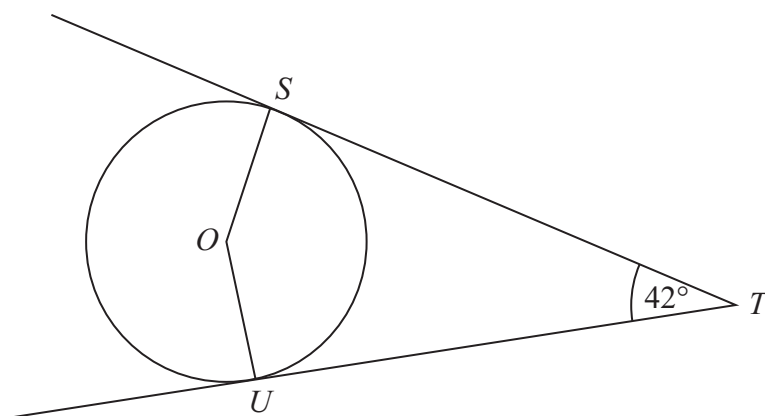
12 Prove that $(n-1)^2 + n^2 + (n+1)^2 = 3n^2 + 2$

(Total for Question 12 is 2 marks)



*13

Diagram **NOT**
accurately drawn



S and U are points on the circumference of a circle, centre O .

ST and UT are tangents to the circle.

Angle $STU = 42^\circ$

Work out the size of angle SOU .

Give reasons for your answer.

(Total for Question 13 is 3 marks)



14 (a) Express $5\sqrt{27}$ in the form $n\sqrt{3}$, where n is a positive integer.

.....
(2)

(b) Rationalise the denominator of $\frac{21}{\sqrt{3}}$

.....
(2)

(Total for Question 14 is 4 marks)

15 (a) Write down the value of $27^{\frac{1}{3}}$

.....
(1)

(b) Find the value of $25^{-\frac{1}{2}}$

.....
(2)

(Total for Question 15 is 3 marks)



16 (a) Simplify $\frac{2y-12}{y^2-8y+12}$

.....
(3)

(b) Write as a single fraction $\frac{3}{x-4} - \frac{1}{x+5}$

.....
(2)

(Total for Question 16 is 5 marks)

TOTAL FOR PAPER IS 60 MARKS



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