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

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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6/6/6/6

P 3 8 9 8 1 A 0 1 1 6

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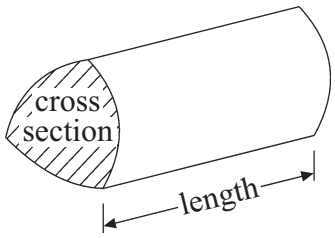
GCSE Mathematics 2MB01

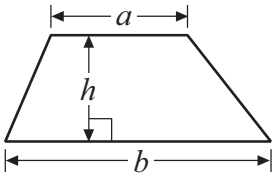
Formulae – Higher Tier

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

Volume of a prism = area of cross section × length

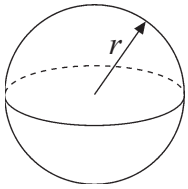


Area of trapezium $= \frac{1}{2}(a+b)h$



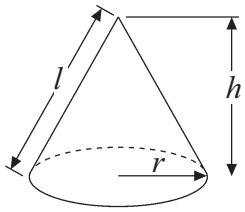
Volume of sphere $= \frac{4}{3}\pi r^3$

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

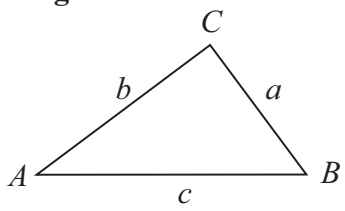


Volume of cone $= \frac{1}{3}\pi r^2 h$

Curved surface area of cone $= \pi rl$



In any triangle *ABC*



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

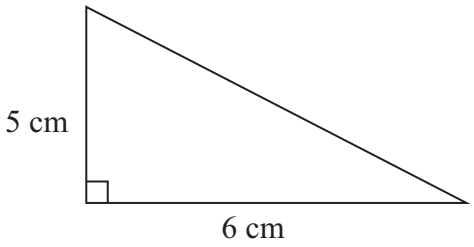


Diagram **NOT** accurately drawn

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)

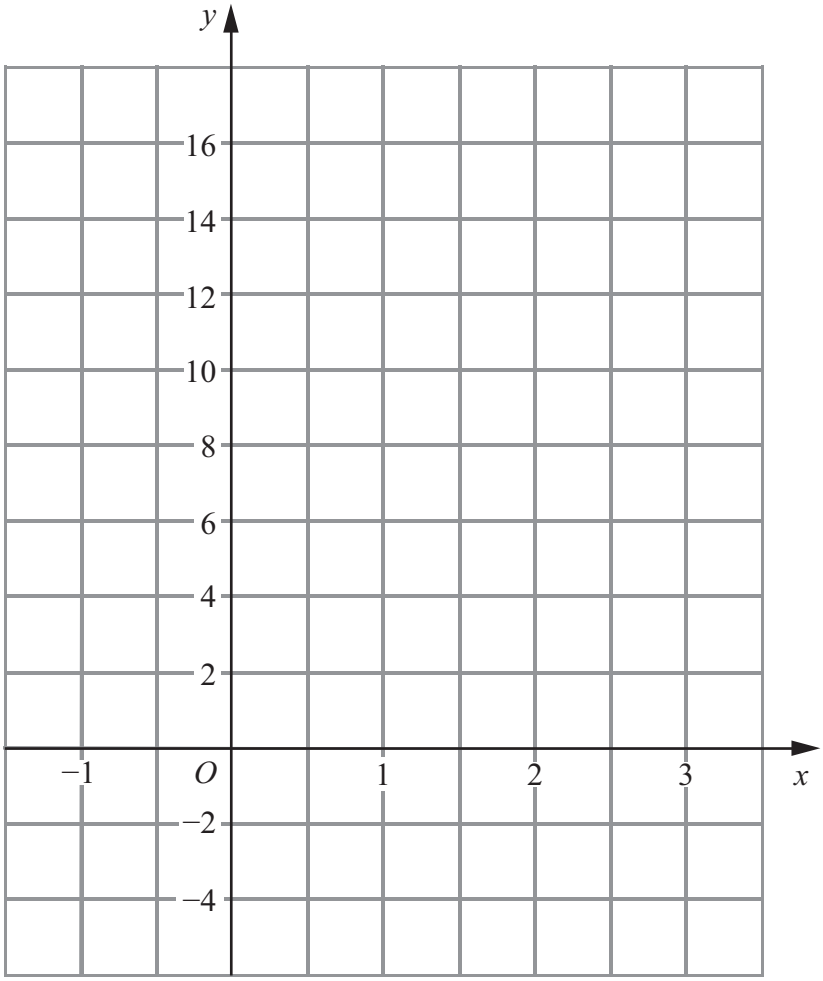
4 Lydia is buying a ring.
The ring costs £60
She pays a deposit of 40%.

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.

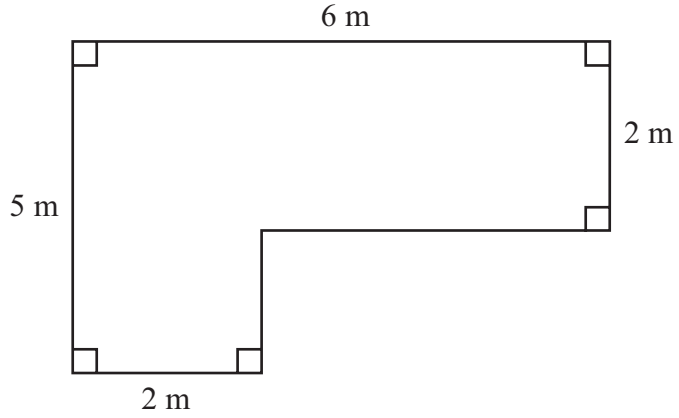


Diagram **NOT** accurately drawn

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.

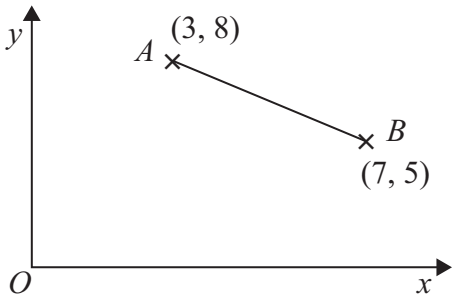


Diagram **NOT** accurately drawn

.....

(Total for Question 7 is 2 marks)

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

.....

(1)

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

.....

(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 nth term of this sequence.

.....

(2)

The nth 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

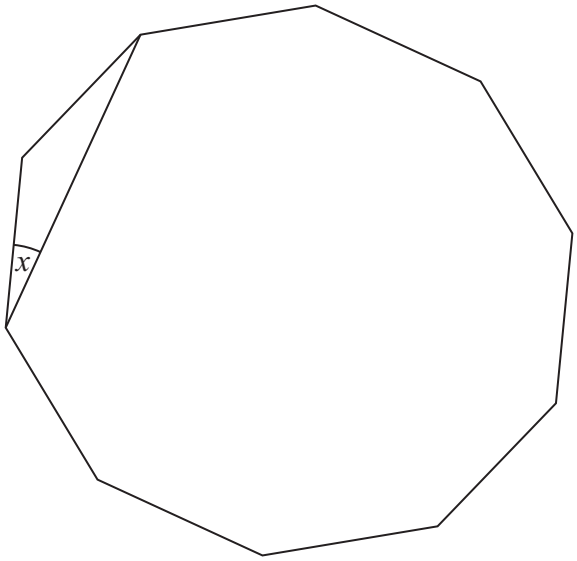


Diagram **NOT** accurately drawn

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**

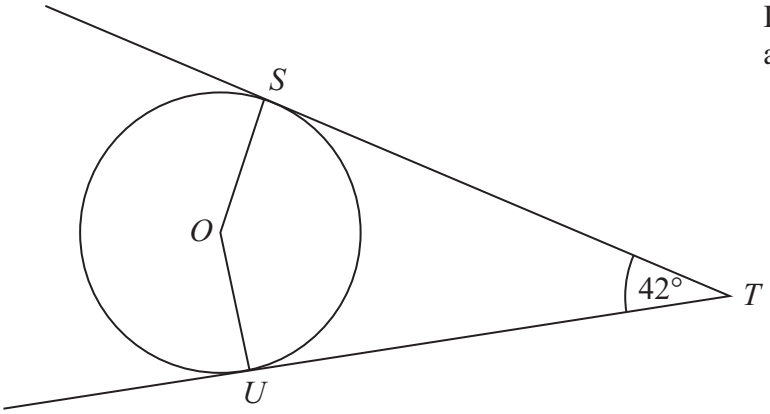


Diagram **NOT** accurately drawn

S and *U* are points on the circumference of a circle, centre *O*.
ST and *UT* are tangents to the circle.
Angle *STU* = 42°

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 $\dfrac{2y-12}{y^2-8y+12}$

.....

(3)

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

.....

(2)

(Total for Question 16 is 5 marks)

TOTAL FOR PAPER IS 60 MARKS

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