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

Sample Assessment Material
Time: 1 hour 15 minutes

Paper Reference
5MB2/2H

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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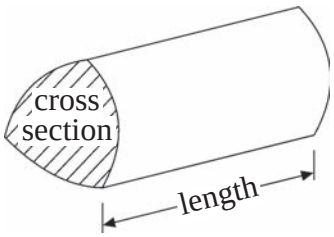
GCSE Mathematics 2MB01

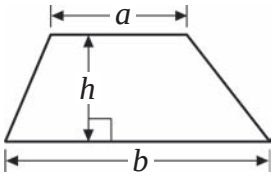
Formulae – Higher Tier

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

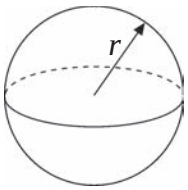


Area of trapezium = $\frac{1}{2}(a+b)h$



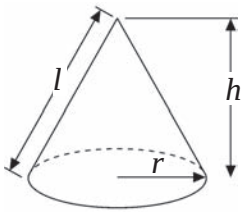
Volume of sphere = $\frac{4}{3}\pi r^3$

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

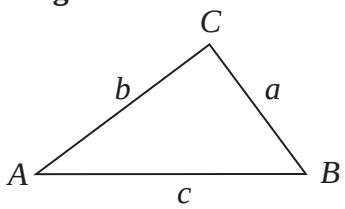


Volume of cone = $\frac{1}{3}\pi r^2 h$

Curved surface area of cone = πrl



In any triangle *ABC*



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

The Quadratic Equation

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

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

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

1 (a) Express 84 as a product of its prime factors.

(2)

.....

Sally is a patient in a hospital.
She has to take a red pill every 4 hours, a blue pill every 6 hours and a white pill every 8 hours.
She takes a pill of each colour at midday.

(b) When will she next take a pill of each colour at the same time?

(2)

.....

(Total for Question 1 = 4 marks)

2 Anwar, Bethany and Colin each earn the same weekly wage.

Each week, Anwar saves 12% of his wage and spends the rest.

Each week, Bethany spends $\frac{7}{8}$ of her wage and saves the rest.

The ratio of the money Colin saves each week to what he spends is 1 : 9

Which of Anwar, Bethany and Colin, saves the most money each week?
You must show each stage of your working.

.....

(Total for Question 2 = 4 marks)

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

5 8 11 14 17

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

(2)

.....

The expression $3n^2 + 2$ is the nth term of another sequence.

(b) Find the 4th term of this sequence.

(2)

.....

(Total for Question 3 = 4 marks)

4

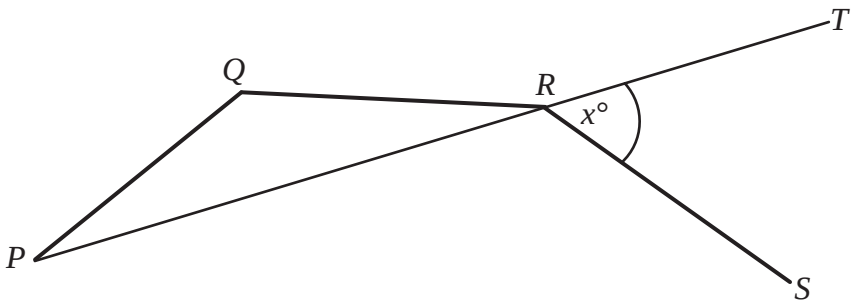


Diagram **NOT** accurately drawn

PQ, *QR* and *RS* are 3 sides of a regular decagon.
PRT is a straight line.
Angle *TRS* = *x*°

Work out the value of *x*

x = ...

(Total for Question 4 = 5 marks)

5 The diagram shows a wall in Jenny's kitchen.

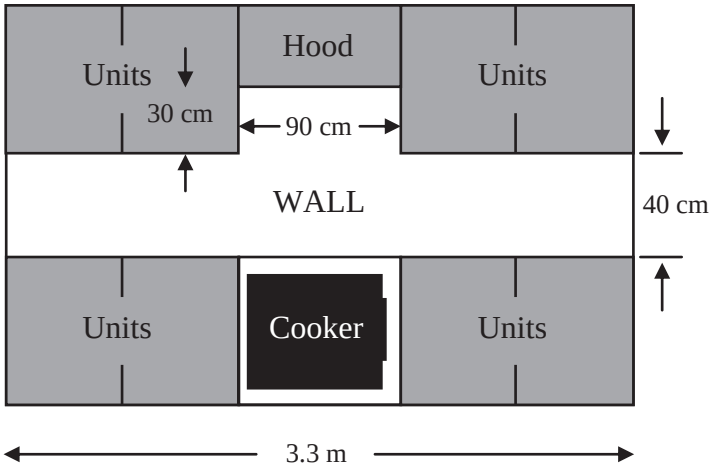
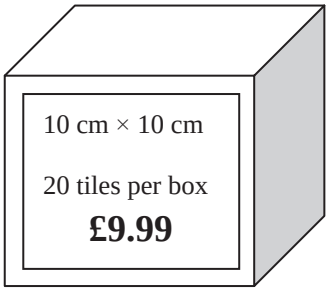


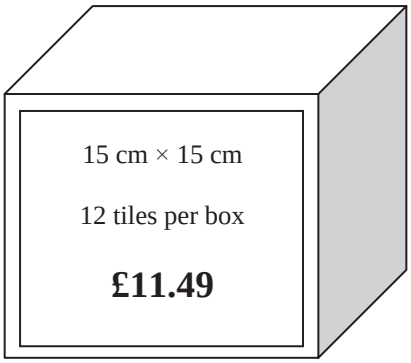
Diagram **NOT** accurately drawn

Jenny wishes to tile this wall in her kitchen.
She chooses between the two types of tile shown below.

Type A



Type B



***(a)** Which tiles should Jenny use to spend the least amount of money on tiling the wall?

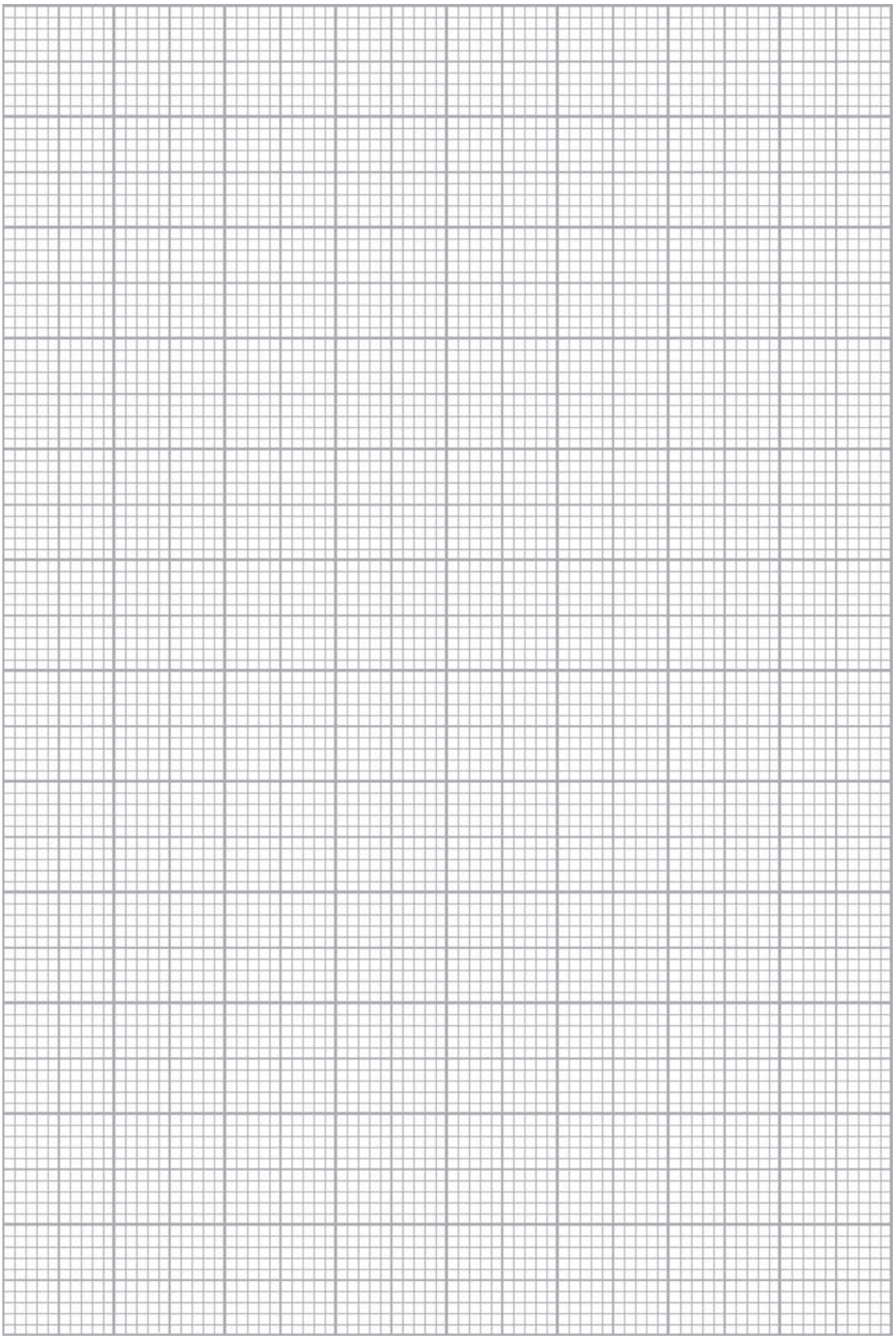
You must show all of your working.

(6)

A Box of Type A tiles has dimensions 10.5 cm × 10.5 cm × 21 cm.
Readypac wants to produce cartons which hold 12 boxes of Type A tiles, when full.

(b) On the grid below, design a net of a carton that Readypac could use.

(3)



(Total for Question 5 = 9 marks)

6 (a) Factorise fully $8p^2q + 12p$

(2)

.....

(b) Expand and simplify $5 - 2(m - 3)$

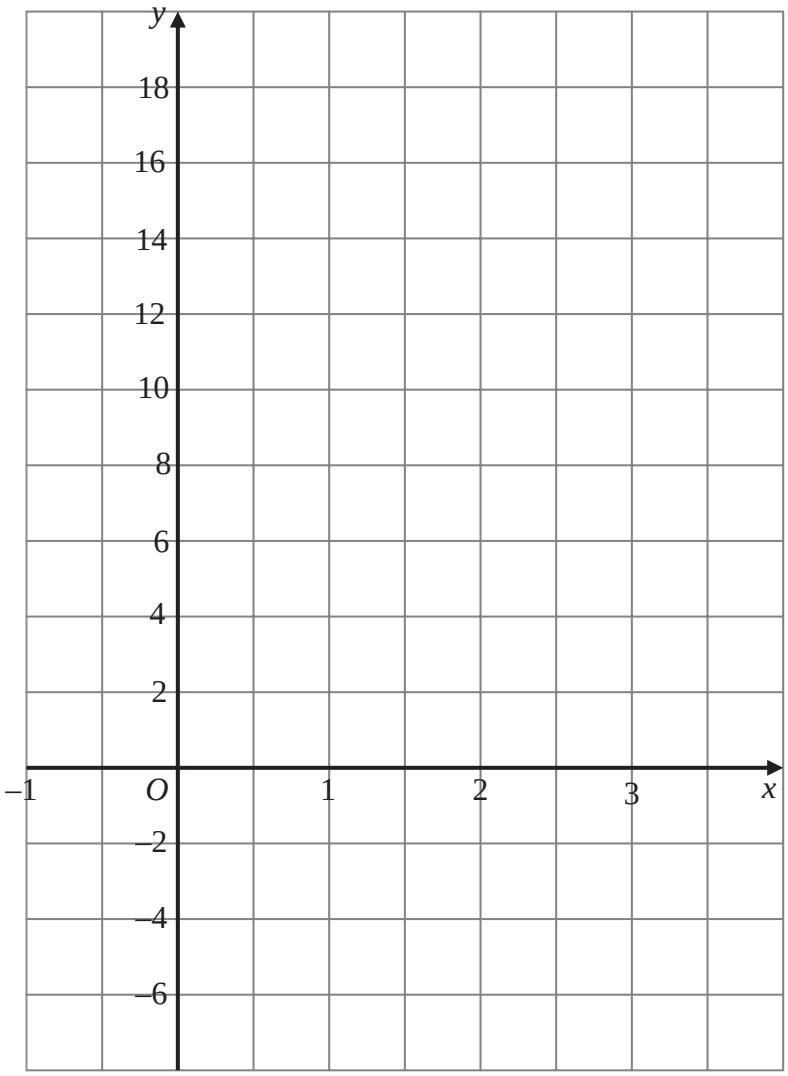
(2)

.....

(Total for Question 6 = 4 marks)

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

(3)



(b) Which of the following is the equation of a line parallel to $y = 5x + 1$?

(1)

A	**B**	**C**	**D**	**E**
$y = x + 1$	$5y = x + 1$	$y + 5x = 3$	$y - 5x + 1 = 0$	$y = -\frac{x}{5} + 1$

.....

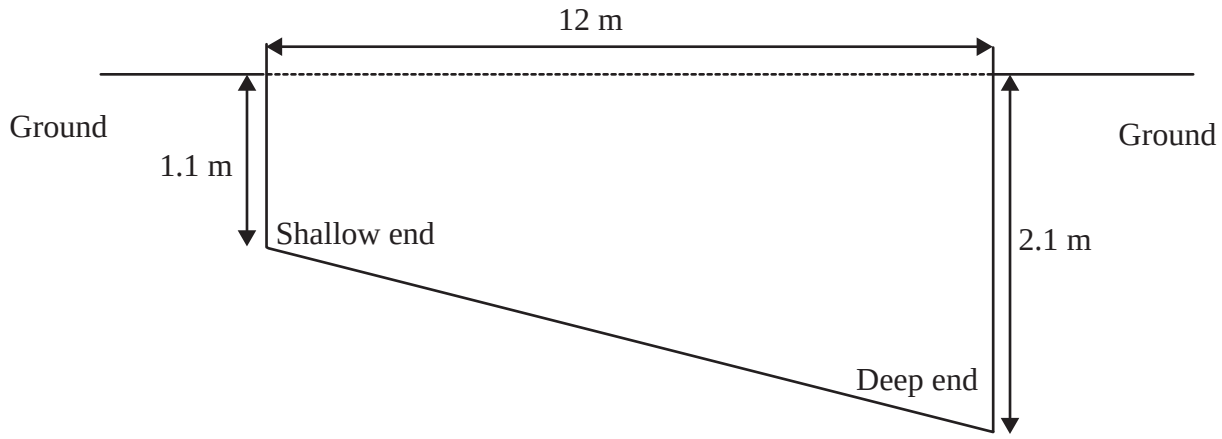
(c) Find the equation of line which is perpendicular to $y = 5x + 1$ and passes through the point (0, 0).

(2)

.....

(Total for Question 7 = 6 marks)

8 The diagram shows a cross-section of Rafa's new swimming pool.



The swimming pool has two identical sides in the shape of a trapezium.
All other sides are rectangular.
The length of the pool is 12 m.
The width of the pool is 4 m.
The depth of the pool is 2.1 m at the deep end and 1.1 m at the shallow end.

Rafa fills the pool up with water from a hosepipe.
The surface of the water is to be 10 cm from the top of the pool.

Rafa turns on the hosepipe at 09 00 on Monday and water fills at a rate of 200 ml per second.

When the pool is full, Rafa turns off the tap. At what time will this be?
Show your working.

.....

(Total for Question 8 = 6 marks)

9 Find the value of

(i) 8^0

.....

(ii) $\left(\frac{1}{3}\right)^{-2}$

.....

(iii) $\left(16^{-2}\right)^{-\frac{3}{4}}$

.....

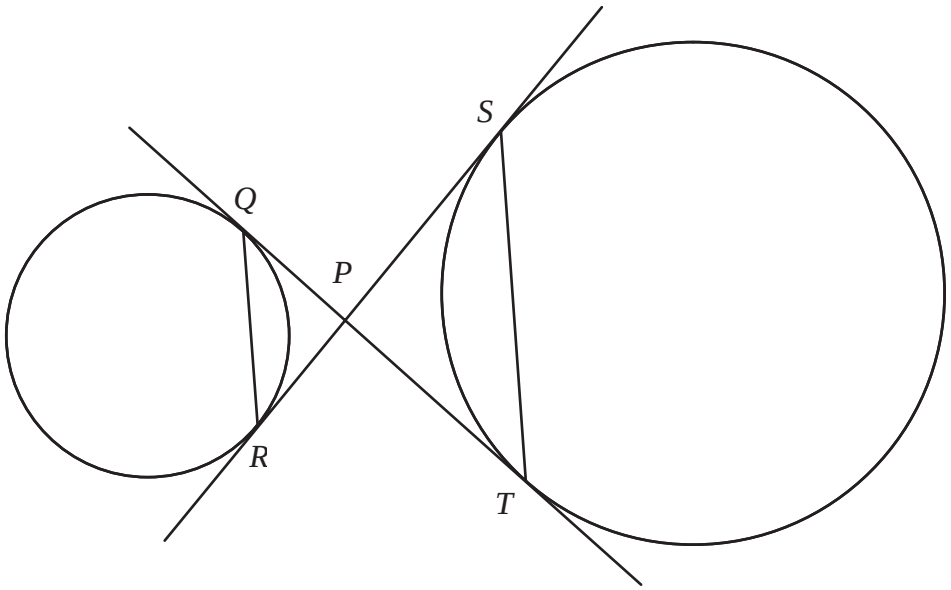
(Total for Question 9 = 4 marks)

10 Simplify fully $\frac{x+3}{4}+\frac{x-5}{3}$

.....

(Total for Question 10 = 3 marks)

***11**



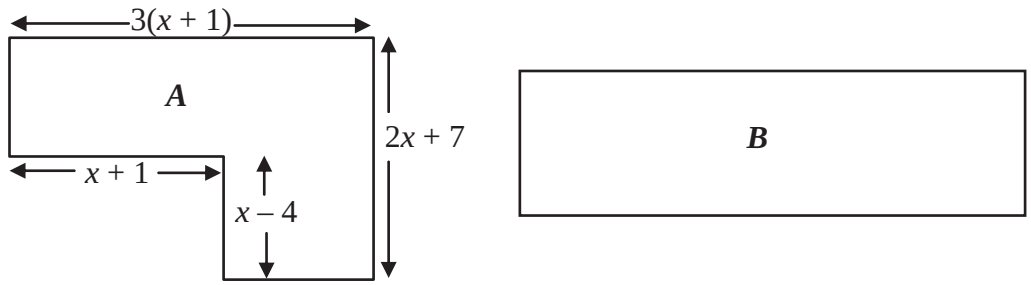
Q and *R* are two points on the circumference of a circle.
S and *T* are two points on the circumference of another circle.

QT and *SR* are tangents to both circles.
P is the point of intersection of the two tangents.

Prove that *QR* is parallel to *ST*.

(Total for Question 11 = 5 marks)

12 Diagrams **NOT** accurately drawn



The diagram shows two shapes.
In shape *A*, all of the angles are right angles.
Shape *B* is a rectangle.
All the measurements are in centimetres.

The area of shape *A* is equal to the area of shape *B*.

Find an expression, in terms of *x*, for the length and an expression, in terms of *x*, for the width of shape *B*.

.....

(Total for Question 12 = 6 marks)

TOTAL FOR PAPER = 60 MARKS