

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**

Mock paper

**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

SOLUTIONS

- 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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Answer ALL questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

1 Using the information that

$$68 \times 39 = 2652$$

write down the value of

$$(i) 0.68 \times 39 = \frac{68 \times 39}{100} = 26.52$$

$$(ii) 6800 \times 3.9 = 68 \times 100 \times \frac{39}{10} = 26520$$

(Total for Question 1 is 2 marks)

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

$$7 \quad 10 \quad 13 \quad 16 \quad 19$$

↘ ↗  
+3 +3

Find, in terms of  $n$ , an expression for the  $n$ th term of the sequence.

if 3n  
OK.

$$3n + 4$$

(Total for Question 2 is 2 marks)

3 The diagram shows a garden with a pond.

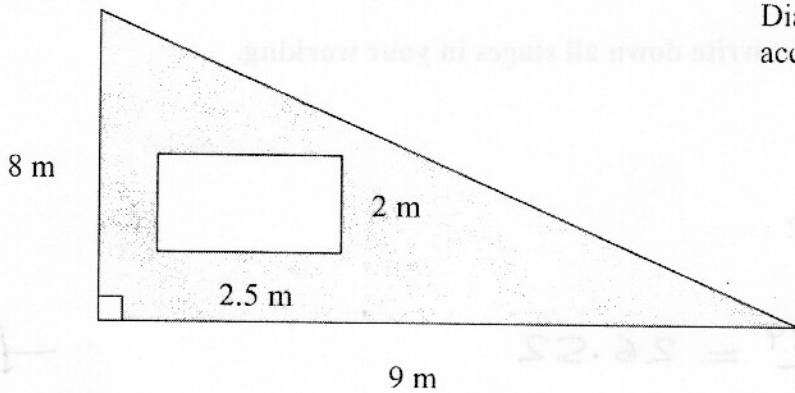


Diagram NOT accurately drawn

The garden is in the shape of a triangle.  
The pond is in the shape of a rectangle.

Jim is going to cover the shaded region with gravel.

45 kg of gravel is needed to cover 1 m<sup>2</sup>.

How much gravel does Jim need?

Shaded area = triangle - rectangle  
 $= \frac{1}{2} \times 8 \times 9 - 2 \times 2.5$   
 $= 36 - 5 = 31 \text{ m}^2$

	4	5	
1	1	2	15
3	0	4	0
	9	5	1

$45 \times 31 = 1395 \text{ kg.}$

1

1

..... kg

(Total for Question 3 is 4 marks)





4 The cash price of a washing machine is £470

Mrs Danvers buys the washing machine.

She pays  
a deposit of 30% of the cash price  
and £30.25 each month for 12 months.

Mrs Danvers pays, in total, more than £470

How much more?

$$30\% \text{ of } £470 = 3 \times £47 = £141 \quad \boxed{1}$$

$$£30.25 \times 12 = £363 \quad \boxed{1}$$

$$\text{Total } £141 + 363 = £504$$

$$£504 - £470 = £34$$

$\boxed{1}$

£ 34  $\boxed{1}$

(Total for Question 4 is 4 marks)

5 (a) Expand  $4(3m - 2)$

$\boxed{1}$   $\boxed{1}$

$$12m - 8$$

(2)

(b) Factorise  $5y^2 + 2y$

$$y(5y + 2)$$

(1)

(c) Simplify  $x^7 \times x^3$

$$x^{10}$$

(d) Expand and simplify  $(t + 8)(t - 5) = t^2 + 8t - 5t - 40$   $\boxed{1}$  even it sign wrong.

$$= t^2 + 3t - 40$$

(2)

(Total for Question 5 is 6 marks)



6 Dan has a solid metal cuboid.

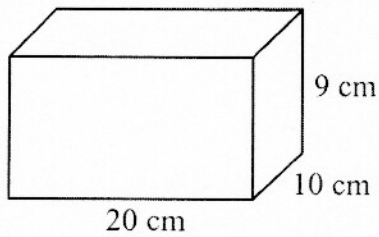


Diagram **NOT**  
accurately drawn

The cuboid is 20 cm by 10 cm by 9 cm.

Dan heats the cuboid and melts the metal.  
He uses the melted metal to make small solid dice.  
Each dice is in the shape of a cube of side 2 cm.

Dan uses all of the metal.

How many dice does Dan make?  
You must show all your working.

$$\text{Volume of cuboid} = 20 \times 10 \times 9 = 1800 \text{ cm}^3 \quad \boxed{1}$$

$$\text{Volume of 1 die} = 2 \text{ cm} \times 2 \text{ cm} \times 2 \text{ cm} = 8 \text{ cm}^3 \quad \boxed{1}$$

$$\text{Number of dice} = \frac{1800}{8} = \frac{900}{4} = 225$$



$\boxed{1}$  if all working seen.

(Total for Question 6 is 4 marks)



7  $v = -4$

$t = 5$

Work out the value of  $2v^2 + t^2 = 2 \times (-4)^2 + 5^2$

$= 2 \times 16 + 25$

$= 32 + 25$

$= 57$

(Total for Question 7 is 2 marks)

8 Milly is making an apple crumble.

For the crumble topping, she uses sugar, butter and flour in the ratio 1 : 2 : 3

Milly uses 500 g of apples for every 300 g of crumble topping.

Milly has 1 kg of apples.

She uses all of the apples.

Work out how much sugar, butter and flour she will need for the crumble topping.

$1 \text{ kg} = 1000 \text{ g}$  of apples   $= 2 \times 500 \text{ g}$ , so

she needs  $2 \times 300 \text{ g} = 600 \text{ g}$  of crumble.

$1 + 2 + 3 = 6$  parts,  $1 \text{ part} = \frac{600 \text{ g}}{6} = 100 \text{ g}$ .

1 part sugar = 100 g.

2 parts butter = 200 g

3 parts flour = 300 g

Sugar ..... 100 g

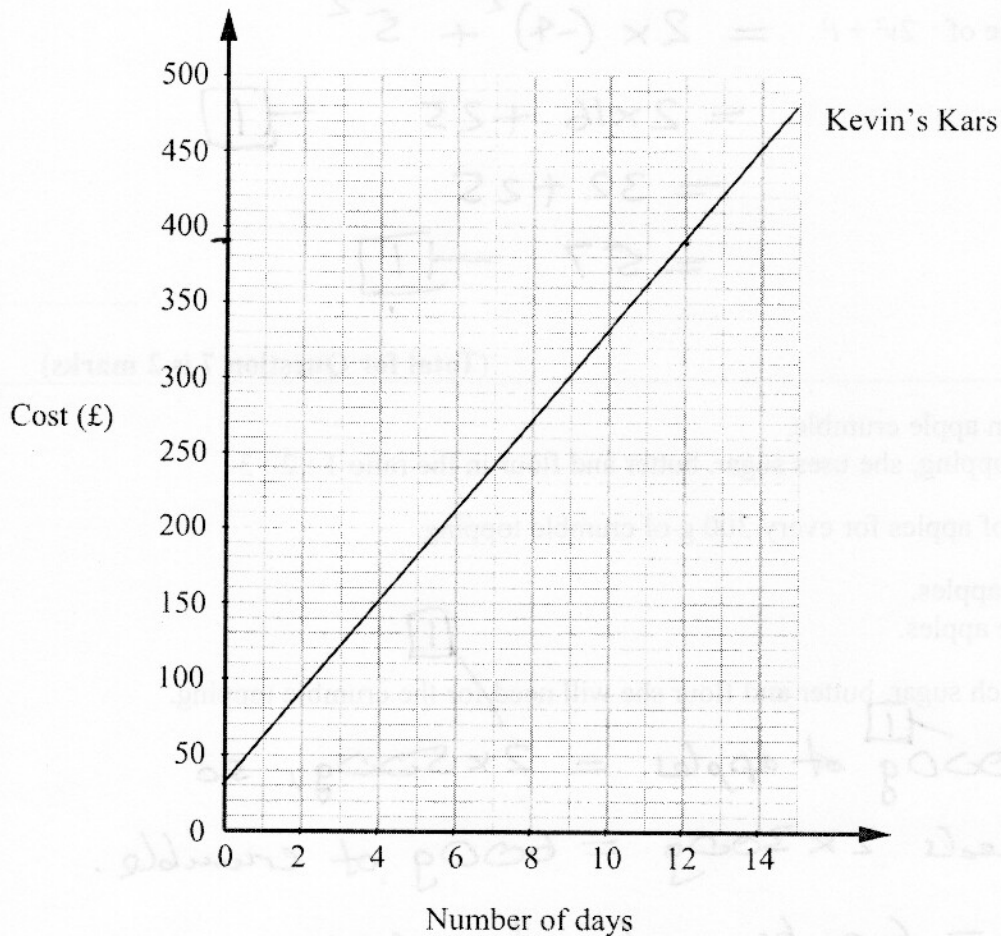
Butter ..... 200 g

Flour ..... 300 g

(Total for Question 8 is 5 marks)



- 9 Kevin's Kars and Mike's Motors are two car hire companies.  
The graph can be used to work out the cost of hiring a car from Kevin's Kars.



Kevin's Kars charges £30 plus £30 per day to hire a car.  
Mike's Motors charges £80 plus £25 per day to hire a car.

Jasmin wants to hire a car for 12 days.

Which company should she hire the car from?  
You must show all your working.

*or use graph, show clearly.*

Kevin's Kars  $30 + 30 \times 12 = 30 + 360 = \pounds 390$  - [1]  
(check on graph).

Mike's Motors:  $80 + 25 \times 12 = 80 + 300 = \pounds 380$  - [1]

Mike's Motors - [1]

(Total for Question 9 is 3 marks)





10 (a) Write the number 76 000 in standard form.

$$7.6 \times 10^4$$

(1)

(b) Write  $3.18 \times 10^{-4}$  as an ordinary number.

$$0.000318$$

(1)

(Total for Question 10 is 2 marks)

11 Factorise  $x^2 + 6x - 40$

$$\begin{array}{r} -1 \quad 40 \\ -2 \quad 20 \\ \hline -4 \quad 10 \\ -5 \quad 8 \end{array} \quad \underline{-4 + 10 = 6}$$

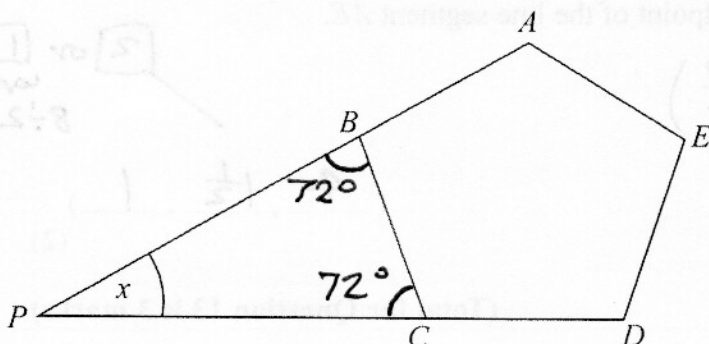
2 or 1 if  $\pm$  signs wrong.

$$(x-4)(x+10)$$

(Total for Question 11 is 2 marks)

12

Diagram NOT accurately drawn



$ABCDE$  is a regular pentagon.  
 $PBA$  and  $PCD$  are straight lines.

Work out the size of the angle marked  $x$ .

$$\text{Exterior angle of a pentagon} = \frac{360}{5} = 72^\circ$$

$$x + 72 + 72 = 180^\circ$$

$$x = 180 - 144 = 36^\circ$$

OR  $\text{Interior angles} = 108^\circ (= \frac{3 \times 180}{5})$

$360 - 3 \times 108 = 36^\circ$   
 quadrilateral angles add to  $360^\circ$ .

(Total for Question 12 is 3 marks)





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

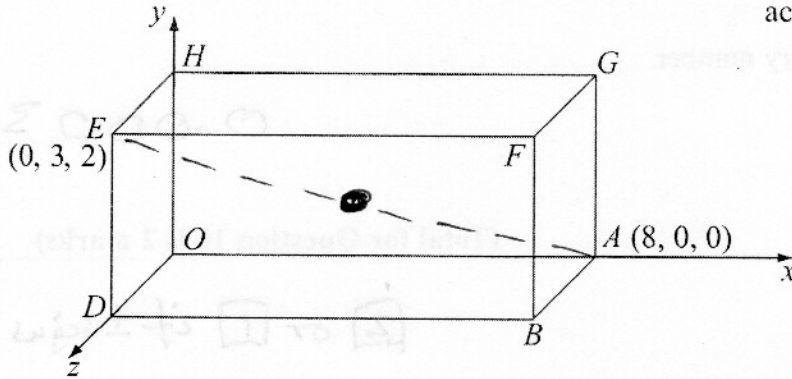


Diagram NOT accurately drawn

(a) Write down the coordinates of vertex  $F$ .

( 8 , 3 , 2 ) (1)

(b) Work out the coordinates of the midpoint of the line segment  $AE$ .

$$\left( \frac{8+0}{2}, \frac{0+3}{2}, \frac{0+2}{2} \right)$$

( 4 , 1½ , 1 ) (2)

*[2] or [1] if wrong but 8:2 etc seen.*

(Total for Question 13 is 3 marks)

14 (a) Write down the value of

(i)  $5^0$

1 - [1]

(ii)  $2^{-3} = \frac{1}{2^3} = \frac{1}{8}$

$\frac{1}{8}$  - [1]

(2)

(b) Expand and simplify  $(3 + \sqrt{2})^2$

Give your answer in the form  $a + b\sqrt{2}$  where  $a$  and  $b$  are integers.

$$\begin{aligned} (3 + \sqrt{2})(3 + \sqrt{2}) &= 9 + 3\sqrt{2} + 3\sqrt{2} + (\sqrt{2})^2 \\ &= 9 + 6\sqrt{2} + 2 = 11 + 6\sqrt{2} \end{aligned}$$

(Total for Question 14 is 4 marks)



15 A straight line has equation  $y = 5 - 2x$

(a) Write down an equation of a line parallel to  $y = 5 - 2x$

$$[y = (\text{any number}) - 2x]$$

$$y = -2x$$

(b) Find an equation of the straight line that is perpendicular to the line  $y = 5 - 2x$  and passes through the point (4, 1).

Gradient of  $y = 5 - 2x$   $m_1 = -2$

Perpendicular gradient  $m_2 = \frac{-1}{m_1} = \frac{-1}{-2} = \frac{1}{2}$

" $y = mx + c$ "  $\rightarrow y = \frac{1}{2}x + c$

At (4, 1),  $1 = \frac{1}{2} \times 4 + c$

$1 = 2 + c \rightarrow c = -1$

$$y = \frac{1}{2}x - 1$$

(Total for Question 15 is 4 marks)

16 (a) Write  $\frac{6}{x+3} - \frac{2}{x+1}$  as a single fraction in its simplest form.

$$= \frac{6(x+1)}{(x+3)(x+1)} - \frac{2(x+3)}{(x+1)(x+3)} = \frac{6x+6 - 2x-6}{(x+1)(x+3)}$$

common denominator

$$= \frac{4x}{(x+1)(x+3)}$$

(b) Simplify fully  $\frac{2x^2 - 9x - 5}{4x^2 - 1} = \frac{(2x+1)(x-5)}{(2x+1)(2x-1)}$

$$2x^2 - 9x - 5$$

$$ac = -10 = -1 \times 10$$

$$-2 \times 5$$

$$-5 \times 2$$

adds to -9.

$$(-10 \times 1)$$

$$(2x)^2$$

"difference of two squares"

$$(2x + \frac{1}{1})(1x - \frac{10}{2}) = (2x+1)(x-5)$$

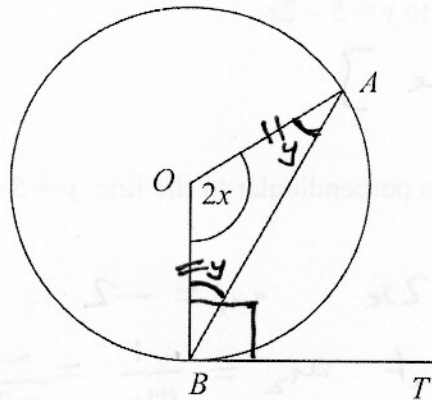
$$\frac{x-5}{2x-1}$$

(Total for Question 16 is 6 marks)



\*17

Diagram NOT  
accurately drawn



$A$  and  $B$  are points on the circumference of a circle, centre  $O$ .  
 $TB$  is a tangent to the circle.  
Angle  $BOA = 2x$ .

Prove that angle  $ABT = x$ .  
Give a reason for each stage in your working.

□  $\angle OBT = 90^\circ$  (radius perpendicular to tangent).

Triangle  $OAB$  is isosceles

$$y + y + 2x = 180^\circ \text{ (angle sum in a triangle).}$$

$$2y = 180^\circ - 2x \quad \square$$

$$y = 90 - x$$

$$\angle ABT + y = \angle OBT = 90^\circ \quad \square$$

$$\therefore \angle ABT = 90 - (90 - x) = x \quad \square$$

(Total for Question 17 is 4 marks)

TOTAL FOR PAPER IS 60 MARKS

