SOLUTIONS

5MB2H/01

Edexcel GCSE

Mathematics B (Modular) – 2MB01

Paper 2H (Non-Calculator)

Higher Tier

Practice Paper C

Time: 1 hour 15 minutes

You must have:
Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser. Tracing paper may be used.

Instructions

- Use **black** ink or ball-point pen.
- 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.

Answer ALL questions.
Write your answers in the spaces provided.
You must write down all stages in your working.

1. Here are the first 4 terms in a number sequence

98 94 90 86 82 78 74 (70)

(a) Write down the 8th term in this number sequence.

70

(1)

23 cannot be a member in this number sequence.

(b) Explain why.

Sequence terms are even, 23 is odd.

(1)

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

[1] [1]

$-4n + 102$

(or, $102 - 4n$).

(2)

(Total for Question 1 is 4 marks)

2.

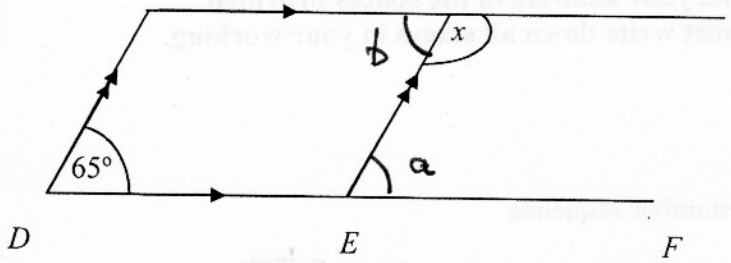


Diagram **NOT** accurately drawn

ABCD is a parallelogram.
ABC and *DEF* are straight lines.

Find the value of the angle marked *x*.
You **must** give reasons to explain your answer.

$a = 65°$, corresponding angle (// parallel).

$b = a = 65°$, alternate angles ($\rightrightarrows$ parallel).

$x + b = 180°$, angles on a straight line.

$x = 180 - 65 = 115°$

$x =$ 115 °

(Total for Question 2 is 4 marks)

3. Tom buys 54 calculators at £2.56 each.

Work out the total cost.

		2	5	6	
	1	0	2	3	0	5
1	0	2	2	4	
3,	8	0	4		
	8	2	4		

(Check: $54 \times 2.56 \approx 54 \times 2.5$
$= 27 \times 5$
$= 135$, ok.).

£ 138.24

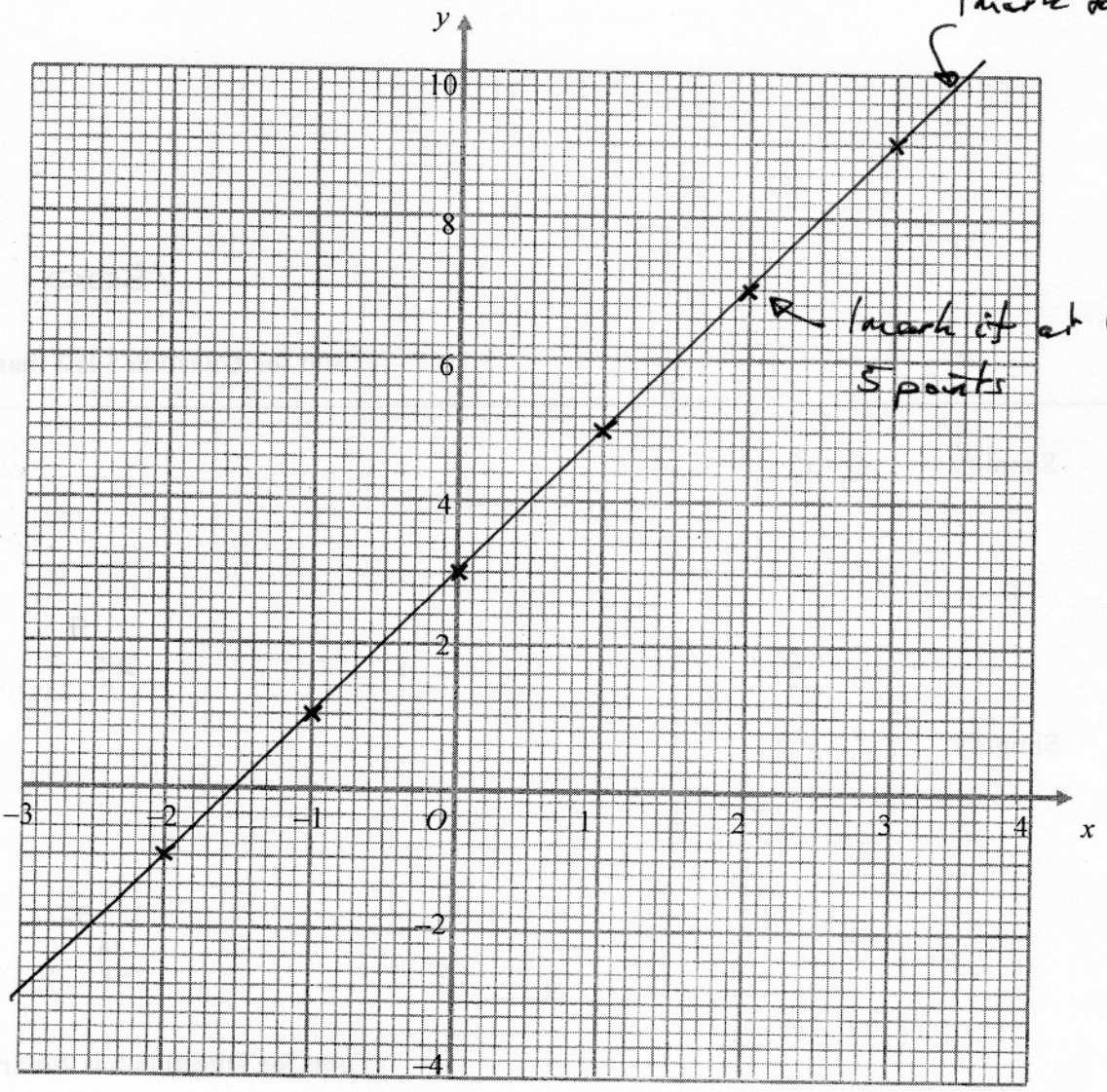
(Total for Question 3 is 3 marks)

4. (a) Complete this table of values for $y = 2x + 3$

x	−2	−1	0	1	2	3
y	−1	1	3	5	7	9

(2)

(b) On the grid, draw the graph of $y = 2x + 3$



1 mark for line

1 mark if at least 5 points

(2)

(Total for Question 4 is 4 marks)

5. Work out an estimate for $\dfrac{3.92 \times 89.9}{0.209}$

$$\frac{3.92 \times 89.9}{0.209} \approx \frac{4 \times 90}{0.2} = \frac{360}{0.2} = \frac{3600}{2}$$

$$= 1800$$

1800

(Total for Question 5 is 3 marks)

6. (a) Simplify $x^4 \times x^5$

x^9

(1)

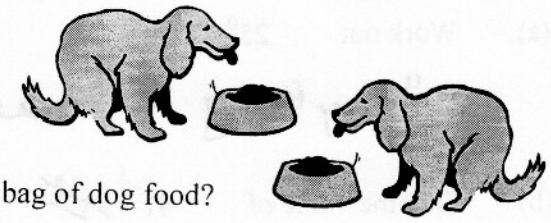
(b) Simplify $y^7 \div y^3$

y^4

(1)

(Total for Question 6 is 2 marks)

*7. Susan has 2 dogs



Each dog is fed $\frac{3}{8}$ kg of dog food each day.
Susan buys dog food in bags that each weigh 14kg.

For how many days can Susan feed the dogs from 1 bag of dog food?
You must show **all** your working.

[1]

Two dogs eat $2 \times 3/8 = 3/4$ kg food per day. [1]

A bag will last $14 \div 3/4$ days [1]

$= 14 \times \frac{4}{3} = \frac{56}{3} = \frac{54+2}{3}$

$= 18\ 2/3$ days [1]

Round down, the dogs can be fed for 18 days [1]

18 days

(Total for Question 7 is 5 marks)

8. (a) Work out 25^0

"Anything to power 0 = 1" 1

(1)

(b) Find the value of $81^{-\frac{3}{2}}$

$81^{-3/2} = \frac{1}{81^{3/2}} = \frac{1}{(\sqrt{81})^3}$

$= \frac{1}{9^3} = \frac{1}{81 \times 9} = \frac{1}{729}$ $\frac{1}{729}$

(2)

(Total for Question 8 is 5 marks)

9. A solid cube has sides of length 5 cm.

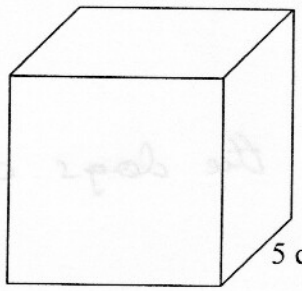


Diagram **NOT** accurately drawn

(a) Work out the total surface area of the cube.

[1] or

Area of each face = $5\text{cm} \times 5\text{cm} = 25\text{cm}^2$

Total for 6 faces = $6 \times 25\text{cm}^2 = 150\text{cm}^2$

[1] [1]

150cm^2

(4)

units [1]

The volume of the cube is 125 cm³

(b) Change 125 cm³ into mm³

$1\text{cm}^3 = 10\text{mm} \times 10\text{mm} \times 10\text{mm} = 1000\text{mm}^3$ [1]

$125\text{cm}^3 = 125 \times 1000\text{mm}^3$

125000 mm³

[1]

(2)

(Total for Question 9 is 6 marks)

10. A cuboid is shown on a 3-D grid.

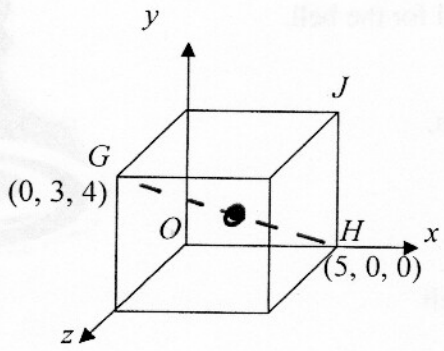


Diagram **NOT** accurately drawn

The point G has coordinates (0, 3, 4)
The point H has coordinates (5, 0, 6)

(a) Write down the coordinates of the point J.

(5, 3, 0)

(2)

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

$\left(\frac{5+0}{2}, \frac{0+3}{2}, \frac{0+4}{2}\right)$

$(2\frac{1}{2}, 1\frac{1}{2}, 2)$

(2)

1 if 2 out of 3 correct.

(Total for Question 10 is 4 marks)

11. (a) Expand and simplify $(p-6)(p-4)$

$= p^2 - 4p - 6p + 24$ — 1 if 3 of 4 correct.

$p^2 - 10p + 24$ — 1

(2)

(b) Factorise $x^2 - 7x + 12$

Factors of 12 are:
1×12
2×6
3×4
-1×-12
-2×-6
-3×-4 ✓ These add to -7

$(x-3)(x-4)$

(2)

(1 if had + not −).

(Total for Question 11 is 4 marks)

12. Matt decides to make a bell.

He mixes copper and tin to make the metal for the bell.
No metal is gained or lost in the process.

He has 270 kg of copper and 0.01 m^3 of tin.

The density of copper is 9000 kg per m^3.
The density of tin is 7300 kg per m^3.

Work out the density of the metal in the bell.

Density = $\frac{\text{total mass}}{\text{total volume}}$.

Mass of tin = $0.01 m^3 \times 7300 kg/m^3 = 73 kg$. [1]

Volume of copper = $\frac{270 kg}{9000 kg/m^3} = \frac{27}{900} m^3$

[1] (top or bottom)

$= \frac{3}{100} = 0.03 m^3$ [1]

Density = $\frac{(270+73) kg}{(0.03+0.01) m^3} = \frac{343}{0.04} kg/m^3$ [1]

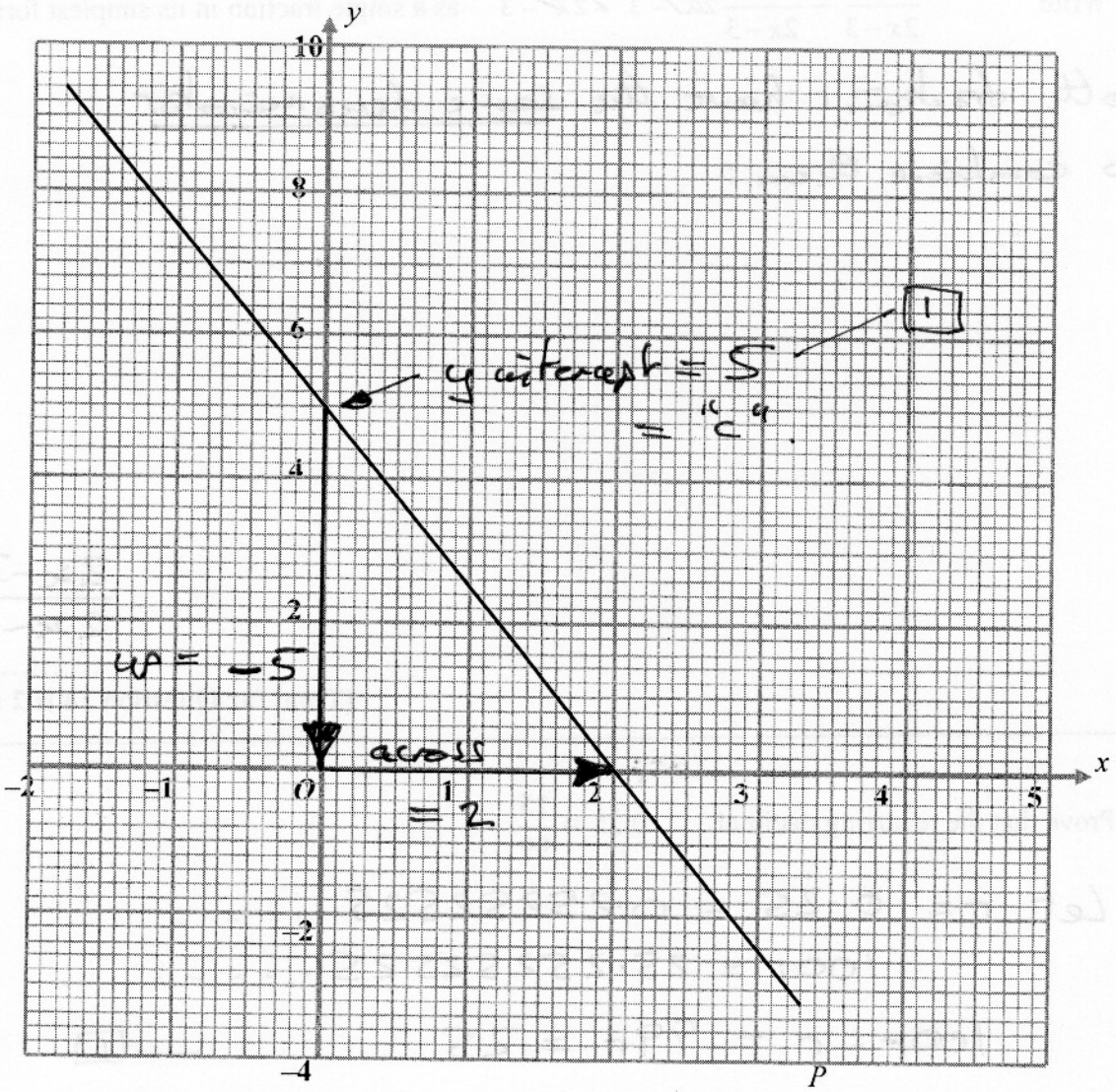
$343 \div \frac{4}{100} = 343 \times \frac{100}{4} = 343 \times 25 = 8575 kg/m^3$

[1] [1]

	3	4	3
8	5	7	5

(Total for Question 12 is 6 marks)

13. The straight line P is drawn on the coordinate grid.



(a) Find an equation for the straight line P.

[1] even if not "c".

Gradient $m = \frac{\text{up}}{\text{across}} = \frac{-5}{2}$

$y = -2.5x + 5$ [1]

(3)

(b) Write down an equation for a straight line that is parallel to the line P.

(Anything containing $y = -2.5x$, such as $y = -2.5x + 10$) ✓

$y = -2.5x$

(1)

(Total for Question 13 is 4 marks)

14. Write $\frac{2x}{2x-3} - \frac{7}{2x-3}$ as a single fraction in its simplest form.

Both fractions have the same denominator so combine them:

$\frac{2x-7}{2x-3}$ — 1 — 1

.....

(Total for Question 14 is 2 marks)

***15.** Prove that the recurring decimal $0.\dot{2}\dot{5} = \frac{25}{99}$

Let $r = 0.\dot{2}\dot{5} = 0.25252525....$

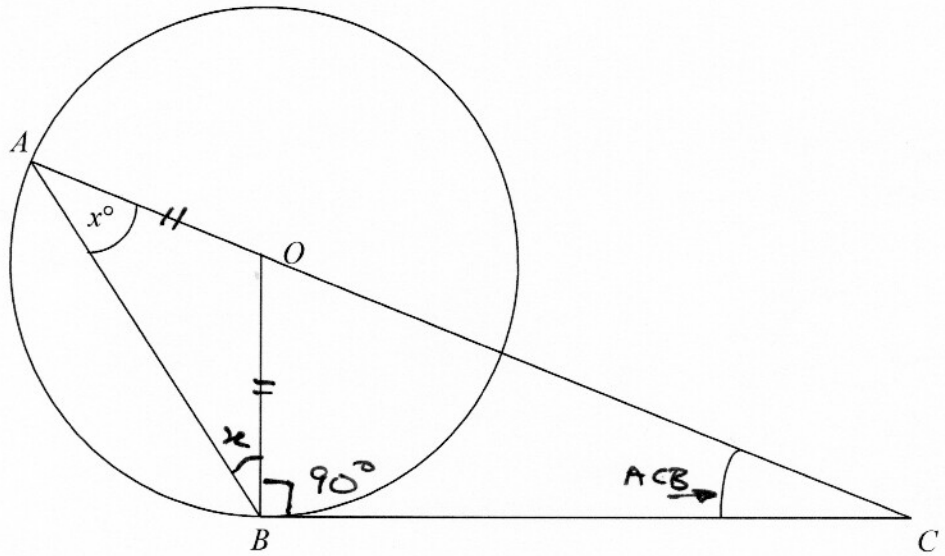
$100r = 25.25252525....$

$100r - r = 99r = 25$ — 1

$\therefore r = \frac{25}{99}$ — 1

(Total for Question 15 is 2 marks)

16.



A and *B* are points on a circle, centre *O*.
BC is a tangent to the circle.
AOC is a straight line.

(a) (i) What is the size of angle *OBC*?

90 °

(ii) Give a reason for your answer.

Tangent BC is perpendicular to radius OB

(2)

Angle $BAO = x°$

(b) Find the size of angle *ACB*, in terms of *x*.

Triangle AOB is isosceles.
Angles in triangle ABC add to 180°.
$x + (x + 90) + ACB = 180$ — II
$ACB = 90 - 2x$ — II

$90 - 2x$ °

(2)

(Total for Question 16 is 4 marks)

TOTAL FOR PAPER is 60 MARKS