Elite Mathematics
Pearson Edexcel International GCSE

IGCSE LINEAR · 4MA1

4MA1/1H June 2025 Worked Solutions

June 2025 paper rebuilt with the worked solution after each question.

25	2020–2026	Single-paper solutions
paper questions	52 past papers	checked by Dr Eslam



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PAST PAPER

4MA1/1H June 2025

June 2025

25	100	2 h
questions	marks	exam time

Each question is followed by its worked solution and final answer.

4MA1/1H JUNE 2025

Question 1

5 marks | Averages from Frequency Tables

1 The table gives information about the distances 100 adults travel to work.

Distance (d km)	Frequency
$0 < d \leqslant 5$	26
$5 < d \leqslant 10$	40
$10 < d \leqslant 15$	16
$15 < d \leqslant 20$	10
$20 < d \leqslant 25$	8

(a) Write down the modal class.

.....

(1)

(b) Work out an estimate for the mean distance.

..... km

(4)

(Total for Question 1 is 5 marks)

WORKED SOLUTION

Question 1 · 4MA1/1H June 2025

1 The modal class is the

The modal class is the class with the greatest frequency.

2 Modal class

Modal class: $5 < d \leq 10$.

3 Use midpoints

Use midpoints $2.5, 7.5, 12.5, 17.5, 22.5$.

$$2.5(26) + 7.5(40) + 12.5(16) + 17.5(10) + 22.5(8) = 920$$

$$\text{estimated mean} = \frac{920}{100} = 9.2$$

FINAL ANSWER

modal class $5 < d \leq 10$, estimated mean $9.2\ \text{km}$.

4MA1/1H JUNE 2025

Question 2

6 marks | Reverse Percentages

2 Anna makes cups.
Each cup costs 6 Swiss francs to make.

Anna puts the cups into boxes to sell.
Each box contains 4 cups.

Anna sells 80 boxes of cups for a total of 2160 Swiss francs.

(a) Work out the percentage profit Anna makes.
Show your working clearly.

.....%
(4)

The height of each cup is 9 cm, correct to the nearest cm

(b) Write down the lower bound of the height.

.....cm
(1)

The weight of each cup is 120 g, correct to the nearest 10 g

(c) Write down the upper bound of the weight.

.....g
(1)

(Total for Question 2 is 6 marks)

WORKED SOLUTION

Question 2 · 4MA1/1H June 2025

1 Number of cups

Number of cups:

$$80 \times 4 = 320$$

2 Cost to make the cups

Cost to make the cups:

$$320 \times 6 = 1920$$

3 Profit

Profit:

$$2160 - 1920 = 240$$

4 Percentage profit

Percentage profit:

$$\frac{240}{1920} \times 100 = 12.5$$

5 Find lower bound

The height 9 cm correct to the nearest cm has lower bound

$$8.5 \text{ cm}$$

6 Find upper bound

The weight 120 g correct to the nearest 10 g has upper bound

$$125 \text{ g}$$

FINAL ANSWER

(a) 12.5%, (b) 8.5 cm, (c) 125 g

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Question 3

4 marks | Angles in Polygons & Parallel Lines

3

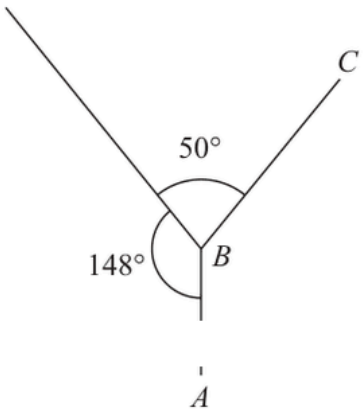


Diagram **NOT** accurately drawn

AB and BC are two sides of a regular polygon with n sides.

Work out the value of n
Show your working clearly.

$n =$ .....

(Total for Question 3 is 4 marks)

WORKED SOLUTION

Question 3 · 4MA1/1H June 2025

1 Find the gradient

Angles around point B add to $360°$.

2 The interior angle of the

The interior angle of the regular polygon is

$$360° - 140° - 50° = 170°$$

3 Find the gradient

So the exterior angle is

$$180° - 170° = 10°$$

4 Find the gradient

For a regular polygon,

$$n = \frac{360}{10} = 36$$

FINAL ANSWER

$n = 36$.

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Question 4

4 marks | Algebraic Roots & Indices

4 $x^5 \times x^7 = x^m$

(a) Find the value of m

$m =$ .....

(1)

$y^8 \div y^3 = y^n$

(b) Find the value of n

$n =$ .....

(1)

(c) Simplify fully $(5a^4r^2)^3$

.....

(2)

(Total for Question 4 is 4 marks)

WORKED SOLUTION

Question 4 · 4MA1/1H June 2025

1 **Use index laws**

For part (a),

$$x^5 \times x^7 = x^{12}$$

2 **Use index laws**

So $m = 12$.

3 **Use index laws**

For part (b),

$$y^8 \div y^3 = y^{8-3} = y^5$$

4 **Use index laws**

So $n = 5$.

5 **Use index laws**

For part (c),

$$(5a^4r^2)^3 = 5^3a^{4\times3}r^{2\times3}$$

$$= 125a^{12}r^6$$

✓ **FINAL ANSWER**

(a) $m = 12$, (b) $n = 5$, (c) $125a^{12}r^6$.

4MA1/1H JUNE 2025

Question 5

3 marks | Reverse Percentages

5 In a sale, normal prices are reduced by 28%
The sale price of a watch is 198 euros.

Work out the normal price of the watch.

..... euros

(Total for Question 5 is 3 marks)

WORKED SOLUTION

Question 5 · 4MA1/1H June 2025

1 The watch is reduced by

The watch is reduced by 28%, so the sale price is

$$100\% - 28\% = 72\%$$

2 of the normal price

of the normal price.

$$0.72 \times \text{normal price} = 198$$

$$\text{normal price} = 198 \div 0.72 = 275$$

FINAL ANSWER

275 euros.

4MA1/1H JUNE 2025

Question 6

6 marks | Factorising

6 (a) Solve $x - 4 = \frac{3 + 2x}{6}$

Show clear algebraic working.

$x =$ .....

(3)

(b) (i) Factorise $y^2 - 11y + 30$

.....

(2)

(ii) Hence solve $y^2 - 11y + 30 = 0$

.....

(1)

(Total for Question 6 is 6 marks)

WORKED SOLUTION

Question 6 · 4MA1/1H June 2025

1 **(a)**

(a)

$$x - 4 = \frac{3 + 2x}{6}$$

$$6x - 24 = 3 + 2x$$

$$4x = 27$$

$$x = \frac{27}{4}$$

2 **(b)(i)**

(b)(i)

$$y^2 - 11y + 30 = (y - 5)(y - 6)$$

3 **(b)(ii)**

(b)(ii)

$$y = 5 \quad \text{or} \quad y = 6$$

FINAL ANSWER

$x = \frac{27}{4}$, $(y-5)(y-6)$, $y = 5$ or $y = 6$

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Question 7

3 marks | Volume & Surface Area

7 Here is a solid cylinder.

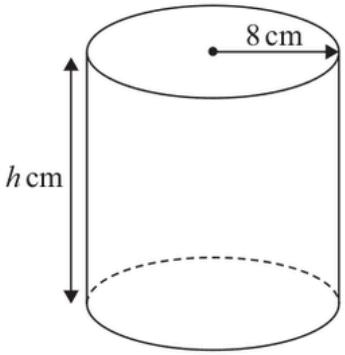


Diagram **NOT** accurately drawn

The radius of the cylinder is 8 cm
The height of the cylinder is h cm

The volume of the cylinder is $3892\,\text{cm}^3$

Work out the value of h
Give your answer correct to one decimal place.

$h =$ .....

(Total for Question 7 is 3 marks)

WORKED SOLUTION

Question 7 · 4MA1/1H June 2025

1 Calculate area

For a cylinder,

$$V = \pi r^2 h$$

$$3892 = \pi(8)^2 h$$

$$h = \frac{3892}{64\pi} = 19.357\ldots$$

FINAL ANSWER

$19.4\ \text{cm}$.

4MA1/1H JUNE 2025

Question 8

4 marks | Standard Form

8 (a) Write 520 million in standard form.

.....

(1)

(b) Write 8.79×10^{-5} as an ordinary number.

.....

(1)

(c) Work out $(5 \times 10^{42}) \times (7 \times 10^{-180})$
Give your answer in standard form.

.....

(2)

(Total for Question 8 is 4 marks)

WORKED SOLUTION

Question 8 · 4MA1/1H June 2025

1 Convert standard form

$$520 \text{ million} = 520000000 = 5.2 \times 10^{8}$$

$$8.79 \times 10^{-5} = 0.0000879$$

2 Convert standard form

For part (c),

$$(5 \times 10^{42})(7 \times 10^{-180}) = 35 \times 10^{-138}$$

3 Write this in standard form

Write this in standard form:

$$35 \times 10^{-138} = 3.5 \times 10^{-137}$$

FINAL ANSWER

(a) 5.2×10^{8}, (b) 0.0000879, (c) 3.5×10^{-137}

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Question 9

5 marks | Perimeter & Area

9

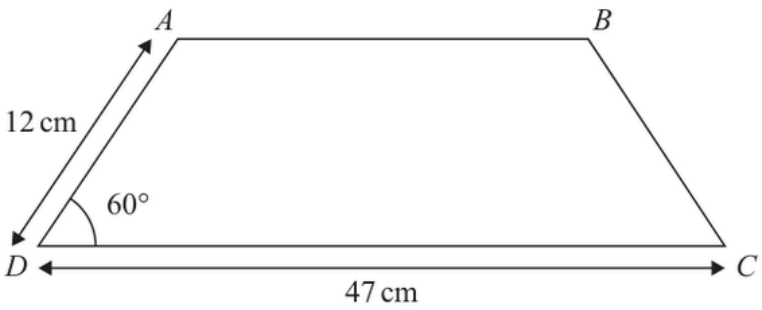


Diagram **NOT** accurately drawn

$ABCD$ is a trapezium with one line of symmetry.

angle $ADC = 60°$ $AD = 12\,\text{cm}$ $DC = 47\,\text{cm}$

Work out the area of the trapezium.
Give your answer correct to 3 significant figures.
Show your working clearly.

..... cm^2

(Total for Question 9 is 5 marks)

WORKED SOLUTION

Question 9 · 4MA1/1H June 2025

1 Use trigonometry

Because the trapezium has one line of symmetry, each sloping side makes the same $60°$ angle with the base.

2 Height

Height:

$$12\sin 60° = 10.392\ldots$$

3 The top parallel side is

The top parallel side is

$$47 - 2(12\cos 60°) = 35$$

4 **Area**

Area:

$$\frac{1}{2}(47+35)(10.392\ldots) = 426.084\ldots$$

✓ **FINAL ANSWER**

$426\ \text{cm}^2$.

Question 10

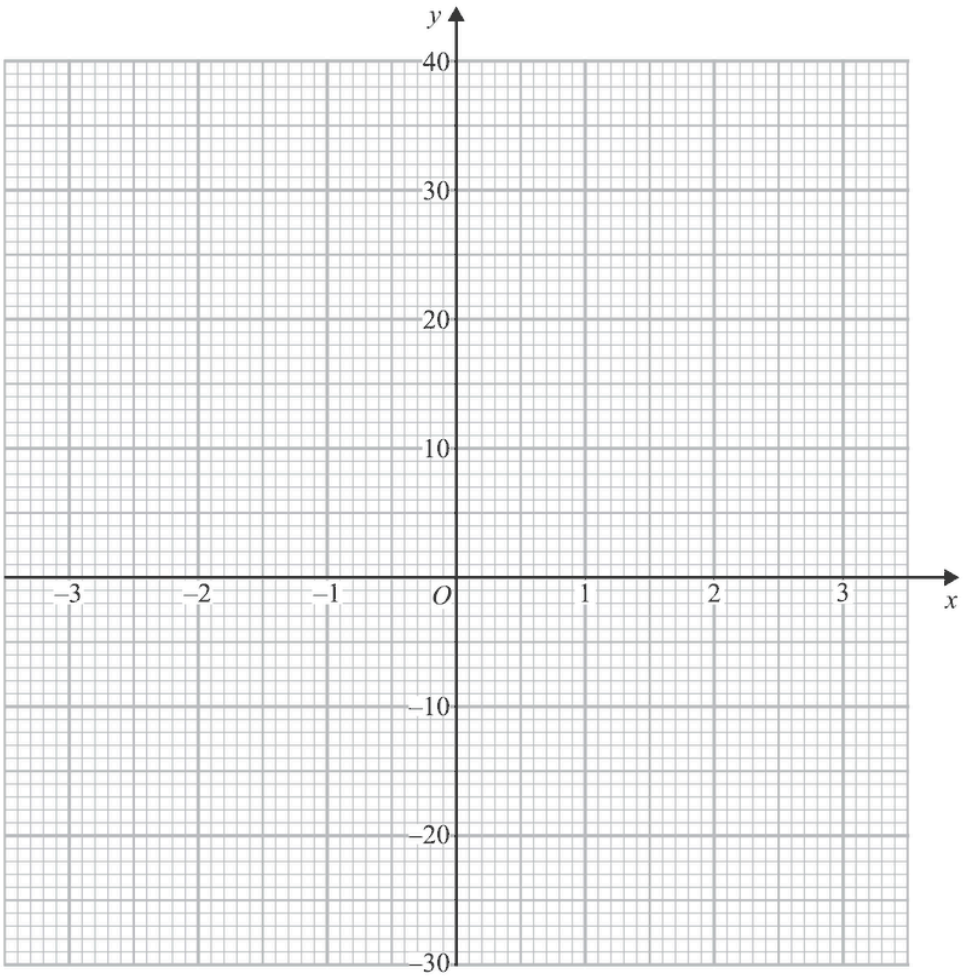
3 marks | Graphs of Functions

10 (a) Complete the table of values for $y = x^3 + 2x + 3$

x	–3	–2	–1	0	1	2	3
y		–9	0	3	6		36

(1)

(b) On the grid, draw the graph of $y = x^3 + 2x + 3$ for $-3 \leqslant x \leqslant 3$



(2)

(Total for Question 10 is 3 marks)

1 Read the graph

$$y = x^3 + 2x + 3$$

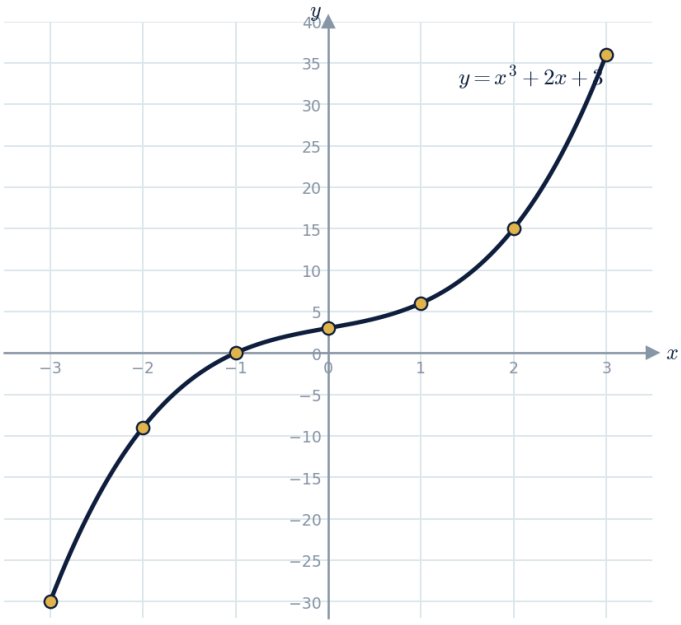
2 The completed table is

The completed table is:

x	-3	-2	-1	0	1	2	3
y	-30	-9	0	3	6	15	36

3 Plot the points and join

Plot the points and join them with a smooth cubic curve.



FINAL ANSWER

Missing values are $-30, 15$.

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Question 11

2 marks | Circles, Arcs & Sectors

11 $OABC$ is a sector of a circle, centre O

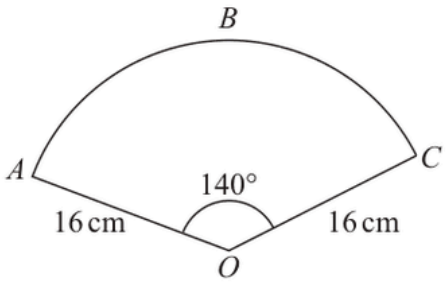


Diagram **NOT** accurately drawn

angle $AOC = 140°$
$OA = OC = 16\,\text{cm}$

Calculate the area of the sector.
Give your answer correct to 3 significant figures.

..... cm^2

(Total for Question 11 is 2 marks)

WORKED SOLUTION

Question 11 · 4MA1/1H June 2025

1 Calculate area

$$\text{area} = \frac{140}{360} \times \pi(16)^2$$

$$= 312.763\ldots$$

FINAL ANSWER

$313\ \text{cm}^2$.

4MA1/1H JUNE 2025

Question 12

3 marks | Algebraic Fractions

12 Express $\frac{5}{4} + \frac{x-3}{6x}$ as a single fraction in its simplest form.

(Total for Question 12 is 3 marks)

WORKED SOLUTION

Question 12 · 4MA1/1H June 2025

1 Simplify fraction

$$\frac{5}{4} + \frac{x-3}{6x}$$

2 The common denominator is

The common denominator is $12x$:

$$\frac{5}{4} = \frac{15x}{12x}$$

$$\frac{x-3}{6x} = \frac{2x-6}{12x}$$

$$\frac{15x}{12x} + \frac{2x-6}{12x} = \frac{17x-6}{12x}$$

FINAL ANSWER

$\frac{17x-6}{12x}$.

4MA1/1H JUNE 2025

Question 13

3 marks | Compound Interest & Depreciation

13 Charlotte bought an apartment for \$750 000

In the first year, the value of the apartment decreased by 4%
In the second year, the value of the apartment decreased by 6.5%

In the third year, the value of the apartment increased by x%

At the end of the third year, the value of Charlotte's apartment was \$698 445

Work out the value of x

$x =$ .....

(Total for Question 13 is 3 marks)

WORKED SOLUTION

Question 13 · 4MA1/1H June 2025

1 **Use compound interest**

After the first two years, the value is

$$750000(0.96)(0.935) = 673200$$

2 **Use compound interest**

Then the value increases by $x\%$ to 698445, so

$$673200\left(1+\frac{x}{100}\right) = 698445$$

$$1+\frac{x}{100} = \frac{698445}{673200} = 1.0375$$

$$x = 3.75$$

✓ **FINAL ANSWER**

$x = 3.75$

4MA1/1H JUNE 2025

Question 14

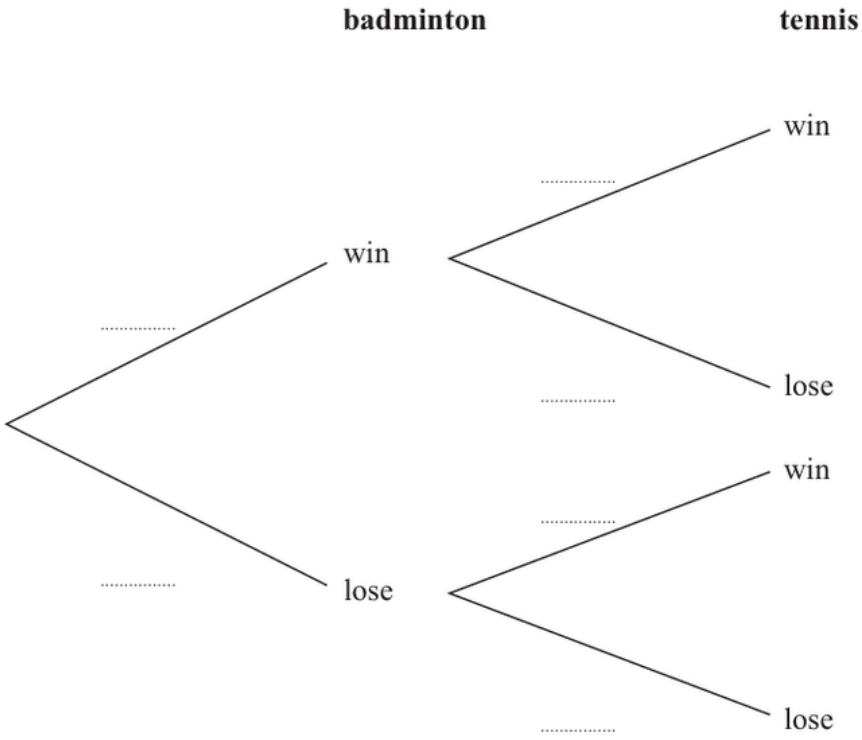
4 marks | Tree Diagrams & Conditional Probability

14 Ricardo is going to play one game of badminton and one game of tennis.

He can either win or lose each game.

The probability that he will win the game of badminton is 0.7
The probability that he will win the game of tennis is 0.4

(a) Complete the probability tree diagram.



(2)

(b) Work out the probability that Ricardo loses both games.

.....

(2)

(Total for Question 14 is 4 marks)

WORKED SOLUTION

Question 14 · 4MA1/1H June 2025

1 **(a) Complete the tree**

Badminton: win 0.7, lose 0.3.

Tennis (on both branches): win 0.4, lose 0.6.

2 **(b) Lose both**

$$0.3 \times 0.6 = 0.18$$

✓ **FINAL ANSWER**

(a) $0.7, 0.3$; $0.4, 0.6$ on both branches (b) 0.18

Question 15

4 marks | Algebraic Proof

15 $(\sqrt{3})^5 = k\sqrt{3}$ where k is an integer.

(a) Find the value of k

$k =$ .....

(1)

(b) Show that $\dfrac{21}{3-\sqrt{2}}$ can be written in the form $c + \sqrt{d}$

where c and d are integers.
Show each stage of your working clearly.

(3)

(Total for Question 15 is 4 marks)

1 **(a)**

(a)

$$(\sqrt{3})^5 = (\sqrt{3})^4\sqrt{3} = 9\sqrt{3}$$

2 **Calculate value**

So $k = 9$.

3 **(b)**

(b)

$$\frac{21}{3-\sqrt{2}} \times \frac{3+\sqrt{2}}{3+\sqrt{2}} = \frac{21(3+\sqrt{2})}{9-2}$$

$$= 3(3+\sqrt{2}) = 9+3\sqrt{2}$$

4 **Simplify surd**

Since $3\sqrt{2} = \sqrt{18}$,

$$9+3\sqrt{2} = 9+\sqrt{18}$$

✓ **FINAL ANSWER**

$k = 9$, and $\frac{21}{3-\sqrt{2}} = 9+\sqrt{18}$.

4MA1/1H JUNE 2025

Question 16

4 marks | Functions

16 $f(x) = 9 - \sqrt{x}$ where $x \geqslant 0$

$g(x) = 4x^2$

(a) Find $f(9)$

.....

(1)

(b) Solve $fg(x) < 0$

Show clear algebraic working.

.....

(3)

(Total for Question 16 is 4 marks)

WORKED SOLUTION

Question 16 · 4MA1/1H June 2025

1 **Solve quadratic equation**

$$f(x) = 9 - \sqrt{x}, \qquad g(x) = 4x^2$$

2 **(a)**

(a)

$$f(9) = 9 - \sqrt{9} = 6$$

3 **(b)**

(b)

$$fg(x) = f(g(x)) = 9 - \sqrt{4x^2}$$

$$= 9 - 2|x|$$

4 **Solve**

Solve

$$9 - 2|x| < 0$$

$$2|x| > 9$$

$$|x| > \frac{9}{2}$$

---

5 **Solve quadratic equation**

So

$$x < -\frac{9}{2} \quad \text{or} \quad x > \frac{9}{2}$$

---

6 **Solve quadratic equation**

If the input is restricted to $x \geq 0$, this becomes $x > \frac{9}{2}$.

✓ **FINAL ANSWER**

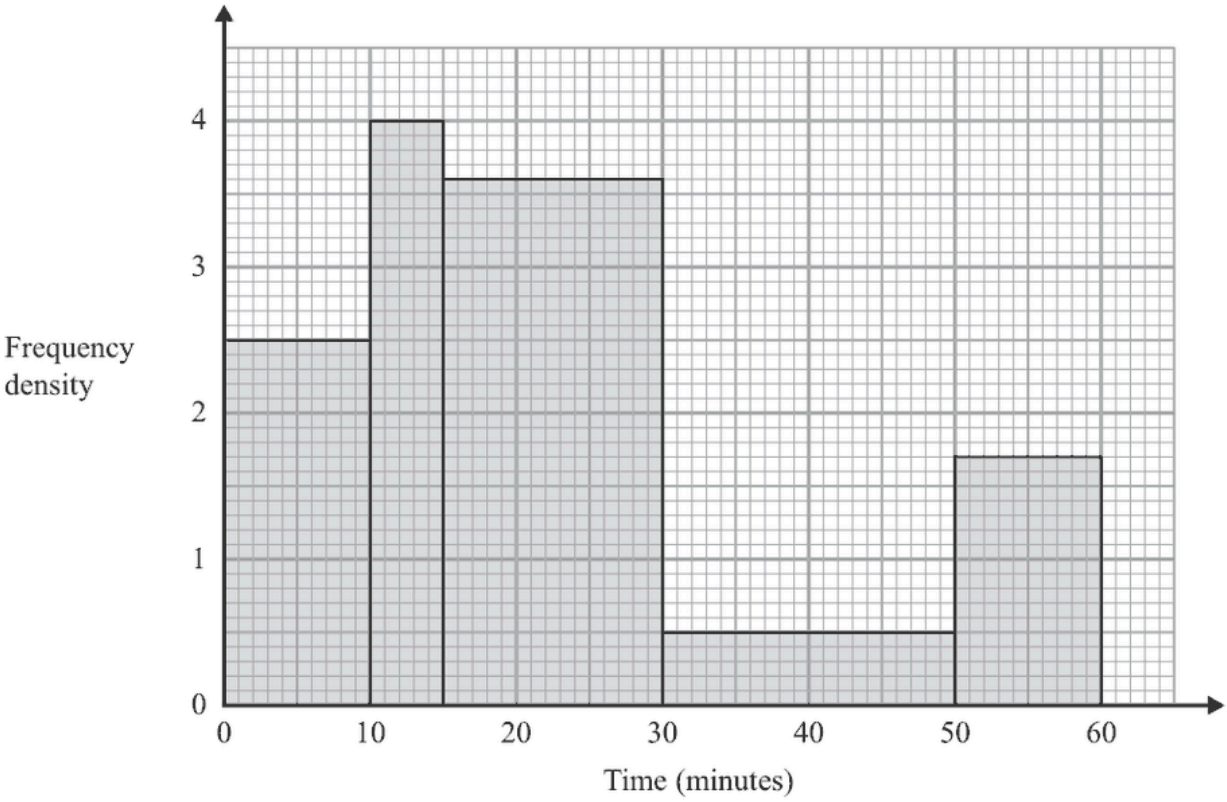
$f(9) = 6$, and $x < -\frac{9}{2}$ or $x > \frac{9}{2}$.

4MA1/1H JUNE 2025

Question 17

3 marks | Histograms

17 The histogram shows information about the times, in minutes, that some people were in a shop.



Work out an estimate for the proportion of these people who were in the shop for more than 40 minutes.

(Total for Question 17 is 3 marks)

WORKED SOLUTION

Question 17 · 4MA1/1H June 2025

1 Total estimated frequency

Total estimated frequency:

$$10(2.5) + 5(4) + 15(3.6) + 20(0.5) + 10(1.7) = 126$$

2 More than minutes

More than 40 minutes:

$$10(0.5) + 10(1.7) = 22$$

3 Use histogram

So the proportion is

$$\frac{22}{126} = \frac{11}{63}$$

FINAL ANSWER

$\frac{11}{63}$.

4MA1/1H JUNE 2025

Question 18

4 marks | Direct & Inverse Proportion

18 y is inversely proportional to x^3

$y = 4$ when $x = 3$

Work out the value of x when $y = 864$

$x =$ .....

(Total for Question 18 is 4 marks)

WORKED SOLUTION

Question 18 · 4MA1/1H June 2025

1 Find inverse function

y is inversely proportional to x^3, so

$$y = \frac{k}{x^3}$$

2 Use when

Use $y = 4$ when $x = 3$:

$$4 = \frac{k}{3^3}$$

$$k = 4 \times 27 = 108$$

3 Find inverse function

So

$$y = \frac{108}{x^3}$$

4 **Find inverse function**

When $y = 864$,

$$864 = \frac{108}{x^3}$$

$$x^3 = \frac{108}{864} = \frac{1}{8}$$

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

FINAL ANSWER

$x = \frac{1}{2}$.

4MA1/1H JUNE 2025

Question 19

2 marks | Transformations of Graphs

19 The equation of a curve is $y = f(x)$

There is only one minimum point on the curve.
The coordinates of this minimum point are $(8, -12)$

Write down the coordinates of the minimum point on the curve with equation

(i) $y = f(x) + 3$

(..... , ...)

(1)

(ii) $y = f(2x)$

(..... , ...)

(1)

(Total for Question 19 is 2 marks)

WORKED SOLUTION

Question 19 · 4MA1/1H June 2025

1 **The minimum point of is**

The minimum point of $y = f(x)$ is

$$(8, 12)$$

2 **Read the graph**

For

$$y = f(x) + 5$$

the graph moves up by 5:

$$(8, 12) \rightarrow (8, 17)$$

3 **Read the graph**

For

$$y = f(2x)$$

the graph is horizontally compressed by scale factor $\frac{1}{2}$, so the x-coordinate is halved:

$$(8, 12) \to (4, 12)$$

✓ **FINAL ANSWER**

(i) $(8, 17)$ and (ii) $(4, 12)$.

Question 20

5 marks | Sine & Cosine Rules

20

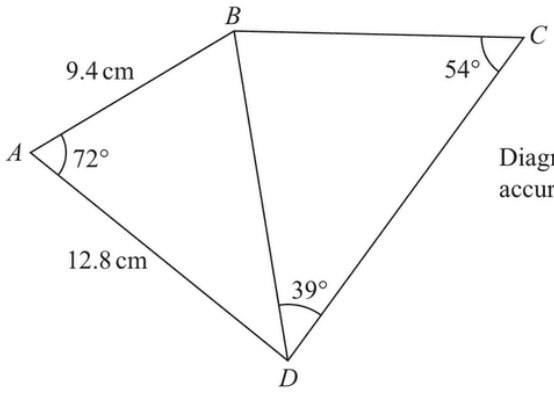


Diagram **NOT** accurately drawn

Work out the length of BC
Give your answer correct to 3 significant figures.

..... cm

(Total for Question 20 is 5 marks)

1 **Use trigonometry**

First use triangle ABD.

$$AB = 9.4, \quad AD = 12.8, \quad \angle BAD = 72°$$

2 **Use cosine rule**

Use the cosine rule to find BD:

$$BD^2 = 9.4^2 + 12.8^2 - 2(9.4)(12.8)\cos 72°$$

$$BD = 13.3356\ldots$$

3 **Use trigonometry**

In triangle BCD,

$$\angle BDC = 39°, \quad \angle BCD = 54°$$

4 **Use the sine rule**

Use the sine rule:

$$\frac{BC}{\sin 39°} = \frac{BD}{\sin 54°}$$

$$BC = \frac{13.3356\ldots \sin 39°}{\sin 54°}$$

$$BC = 10.3735\ldots$$

5 **Use trigonometry**

Correct to 3 significant figures,

$$BC = 10.4$$

✓ **FINAL ANSWER**

10.4 cm

4MA1/1H JUNE 2025

Question 21

3 marks | Probability Toolkit

21 A box contains 20 counters.

9 of the counters are red
7 of the counters are yellow
4 of the counters are green

Alex takes at random three counters from the box.

Work out the probability that exactly two of the three counters are the same colour.

(Total for Question 21 is 3 marks)

WORKED SOLUTION

Question 21 · 4MA1/1H June 2025

1 There are

There are

$$\binom{20}{3} = 1140$$

2 ways to choose 3 counters

ways to choose 3 counters.

3 Exactly two counters are the

Exactly two counters are the same colour:

$$\binom{9}{2}(11) + \binom{7}{2}(13) + \binom{4}{2}(16)$$

$$= 36(11) + 21(13) + 6(16)$$

$$= 396 + 273 + 96 = 765$$

4 Calculate probability

So the probability is

$$\frac{765}{1140} = \frac{51}{76}$$

FINAL ANSWER

$$\frac{51}{76}$$

4MA1/1H JUNE 2025

Question 22

5 marks | Simultaneous Equations

22 Solve the simultaneous equations

$$x^2 + 3y + y^2 = 7$$
$$y = x + 2$$

Show clear algebraic working.

(Total for Question 22 is 5 marks)

WORKED SOLUTION

Question 22 · 4MA1/1H June 2025

1 Calculate value

$$x^2 + y^2 + 3y = 7$$

$$y = x + 2$$

2 Substitute

Substitute:

$$x^2 + (x+2)^2 + 3(x+2) = 7$$

$$x^2 + x^2 + 4x + 4 + 3x + 6 = 7$$

$$2x^2 + 7x + 3 = 0$$

$$(2x+1)(x+3) = 0$$

3 Evaluate fraction

So

$$x = -\frac{1}{2} \quad \text{or} \quad x = -3$$

4 **Find**

Find y:

$$x = -\frac{1}{2} \Rightarrow y = \frac{3}{2}$$

$$x = -3 \Rightarrow y = -1$$

✓ **FINAL ANSWER**

$(x, y) = \left(-\frac{1}{2}, \frac{3}{2}\right)$ or $(-3, -1)$

Question 23

5 marks | Vectors

23

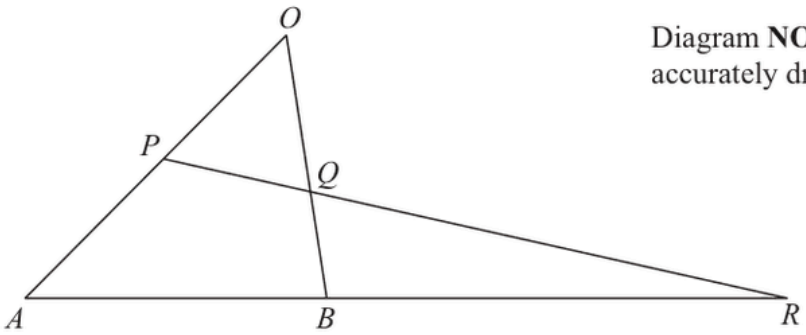


Diagram **NOT** accurately drawn

OAB is a triangle.
P is the midpoint of OA
Q is a point on OB

ABR and PQR are straight lines.

$\overrightarrow{OA} = 12\mathbf{a}$ $\overrightarrow{OB} = 8\mathbf{b}$

(a) Express $\overrightarrow{AB}$ in terms of **a** and **b**

.....

(1)

$AB : BR = 1 : 2$ $\overrightarrow{OQ} = n\mathbf{b}$

(b) Use a vector method to find the value of n

$n =$ .....

(4)

(Total for Question 23 is 5 marks)

1 **Use vectors**

For part (a),

$$\vec{OA} = 12\mathbf{a}, \qquad \vec{OB} = 8\mathbf{b}$$

$$\vec{AB} = \vec{OB} - \vec{OA}$$

$$\vec{AB} = 8\mathbf{b} - 12\mathbf{a}$$

2 **Find the midpoint**

For part (b), P is the midpoint of OA, so

$$\vec{OP} = 6\mathbf{a}$$

3 **Given**

Given

$$AB : BR = 1 : 2$$

$$\vec{BR} = 2\vec{AB}$$

$$\vec{BR} = 16\mathbf{b} - 24\mathbf{a}$$

4 **Use vectors**

Therefore

$$\vec{OR} = \vec{OB} + \vec{BR}$$

$$\vec{OR} = 8\mathbf{b} + 16\mathbf{b} - 24\mathbf{a}$$

$$\vec{OR} = -24\mathbf{a} + 24\mathbf{b}$$

5 **Use vectors**

Since P, Q, R are collinear, write Q on PR:

$$\vec{OQ} = \vec{OP} + t(\vec{OR} - \vec{OP})$$

$$\vec{OQ} = 6\mathbf{a} + t(-30\mathbf{a} + 24\mathbf{b})$$

$$\vec{OQ} = (6 - 30t)\mathbf{a} + 24t\mathbf{b}$$

---

6 **Use vectors**

But Q lies on OB, so there is no $\mathbf{a}$ component:

$$6 - 30t = 0$$

$$t = \frac{1}{5}$$

---

7 **Use vectors**

Then

$$\vec{OQ} = 24\left(\frac{1}{5}\right)\mathbf{b}$$

$$\vec{OQ} = \frac{24}{5}\mathbf{b}$$

---

8 **Use vectors**

Since $\vec{OQ} = n\mathbf{b}$,

$$n = \frac{24}{5}$$

✓ **FINAL ANSWER**

$\vec{AB} = 8\mathbf{b} - 12\mathbf{a}, \quad n = \frac{24}{5}$

4MA1/1H JUNE 2025

Question 24

5 marks | Sequences

24 An arithmetic series has 30 terms.

The first term is a
The common difference is d

The 20th term is 123
The sum of the 30 terms is 2880

Work out the value of a and the value of d
Show clear algebraic working.

$a =$ .....

$d =$ .....

(Total for Question 24 is 5 marks)

WORKED SOLUTION

Question 24 · 4MA1/1H June 2025

1 Evaluate fraction

$$u_{20} = a + 19d = 123$$

$$S_{30} = \frac{30}{2}(2a + 29d) = 2880$$

$$2a + 29d = 192$$

2 Double the first equation

Double the first equation:

$$2a + 38d = 246$$

3 **Subtract**

Subtract:

$$9d = 54$$

$$d = 6$$

$$a + 19(6) = 123$$

$$a = 9$$

✓ **FINAL ANSWER**

$a = 9,\ d = 6$

4MA1/1H JUNE 2025

Question 25

5 marks | Linear Graphs

25 $PQRS$ is a square.

PR is a diagonal of the square.

P is the point with coordinates $(4, 7)$
R is the point with coordinates $(8, -5)$

Find an equation of the straight line that passes through the points Q and S
Give your answer in the form $ay = bx + c$ where a, b and c are integers.

(Total for Question 25 is 5 marks)

WORKED SOLUTION

Question 25 · 4MA1/1H June 2025

1 Calculate value

$$P = (4, 7), \qquad R = (8, -5)$$

2 The gradient of diagonal is

The gradient of diagonal PR is

$$\frac{-5 - 7}{8 - 4} = -3$$

3 The other diagonal is perpendicular

The other diagonal QS is perpendicular to PR, so its gradient is

$$\frac{1}{3}$$

4 The diagonals of a square

The diagonals of a square bisect each other.

5 The midpoint of is

The midpoint of PR is

$$\left(\frac{4 + 8}{2}, \frac{7 + (-5)}{2}\right) = (6, 1)$$

6 **Find the gradient**

So QS passes through $(6, 1)$ with gradient $\frac{1}{3}$.

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

$$y = \frac{1}{3}x - 1$$

---

7 **Multiply by 3**

Multiply by 3:

$$3y = x - 3$$

✓ **FINAL ANSWER**

$3y = x - 3$