Elite Mathematics
Pearson Edexcel International GCSE

IGCSE LINEAR · 4MA1

4MA1/1HR May 2024 Worked Solutions

May 2024 paper rebuilt with the worked solution after each question.

23	2020–2026	Single-paper solutions
paper questions	52 past papers	checked by Dr Eslam



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PAST PAPER

4MA1/1HR May 2024

May 2024

23	100	2 h
questions	marks	exam time

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

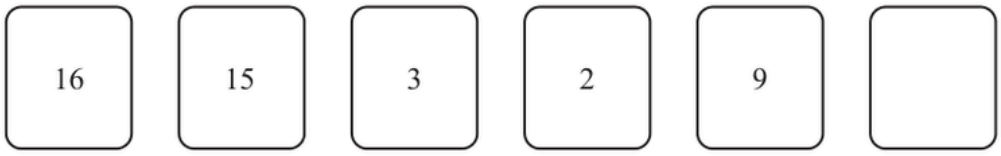
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Question 1

3 marks | Statistics Toolkit

1 Here are six cards.

Five of the cards have a number written on them.



Work out the number that should be written on the last card so that the mean of the six numbers will be 11

(Total for Question 1 is 3 marks)

WORKED SOLUTION

Question 1 · 4MA1/1HR May 2024

1 The total of the 6

The total of the 6 cards is

$$6 \times 11 = 66$$

2 The known total is

The known total is

$$16 + 15 + 3 + 2 + 9 = 45$$

$$x = 66 - 45 = 21$$

FINAL ANSWER

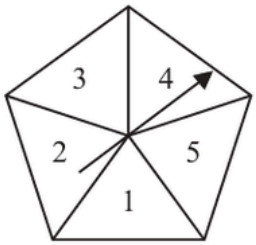
$x = 21$.

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Question 2

4 marks | Probability Toolkit

2 Here is a biased spinner.



The table gives information about the probability that, when the spinner is spun once, it will land on each number.

Number	1	2	3	4	5
Probability	$2x$	0.27	0.04	x	0.12

Alexis is going to spin the spinner 400 times.

Work out an estimate for the number of times the spinner will land on an odd number.

(Total for Question 2 is 4 marks)

WORKED SOLUTION

Question 2 · 4MA1/1HR May 2024

1 Find x

$$2x + 0.27 + 0.04 + x + 0.12 = 1 \Rightarrow 3x = 0.57 \Rightarrow x = 0.19$$

2 Probability of an odd number (1, 3 or 5)

$$2x + 0.04 + 0.12 = 0.38 + 0.04 + 0.12 = 0.54$$

3 Estimate for 400 spins

$$400 \times 0.54 = 216$$

✓ **FINAL ANSWER**

216

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Question 3

5 marks | Reverse Percentages

3 Norberto sells white loaves of bread and brown loaves of bread.

He sells a total of 200 loaves such that

the number of white loaves sold : the number of brown loaves sold = 3 : 2

Norberto sells the white loaves for £1.50 each.
He sells the brown loaves for £1.75 each.

40% of the price of a white loaf is profit.
60% of the price of a brown loaf is profit.

Work out Norberto's total profit when he sells all 200 loaves.

£.....

(Total for Question 3 is 5 marks)

WORKED SOLUTION

Question 3 · 4MA1/1HR May 2024

1 The ratio parts are

The ratio parts are

$$3 + 2 = 5$$

2 White loaves

White loaves:

$$200 \times \frac{3}{5} = 120$$

3 Brown loaves

Brown loaves:

$$200 \times \frac{2}{5} = 80$$

4 Profit on each white loaf

Profit on each white loaf:

$$40\% \times 1.50 = 0.60$$

5 **Profit on each brown loaf**

Profit on each brown loaf:

$$60\% \times 1.75 = 1.05$$

---

6 **Total profit**

Total profit:

$$120 \times 0.60 + 80 \times 1.05 = 72 + 84 = 156$$

✓ **FINAL ANSWER**

156 pounds

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Question 4

3 marks | Algebraic Proof

4 Show that $2\frac{1}{3} \div 5\frac{1}{4} = \frac{4}{9}$

(Total for Question 4 is 3 marks)

WORKED SOLUTION

Question 4 · 4MA1/1HR May 2024

1 Evaluate fraction

$$2\frac{1}{3} = \frac{7}{3}, \qquad 5\frac{1}{4} = \frac{21}{4}$$

$$2\frac{1}{3} \div 5\frac{1}{4} = \frac{7}{3} \div \frac{21}{4}$$

$$= \frac{7}{3} \times \frac{4}{21} = \frac{28}{63} = \frac{4}{9}$$

✓ **FINAL ANSWER**

$\frac{4}{9}$.

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Question 5

3 marks | Compound Interest & Depreciation

5 Slavomir invests 5200 euros in a savings account for 4 years.
He gets 2.5% per year compound interest.

Work out how much money Slavomir will have in the savings account at the end of 4 years.
Give your answer correct to the nearest euro.

..... euros

(Total for Question 5 is 3 marks)

WORKED SOLUTION

Question 5 · 4MA1/1HR May 2024

1 The multiplier for compound interest

The multiplier for 2.5% compound interest is

$$1.025$$

2 Use compound interest

After 4 years,

$$5200(1.025)^4 = 5739.827\ldots$$

3 Use compound interest

Correct to the nearest euro,

$$5739.827\ldots \approx 5740$$

FINAL ANSWER

5740 euros

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Question 6

4 marks | Standard & Compound Units

6 The diagram shows a solid wooden cylinder.

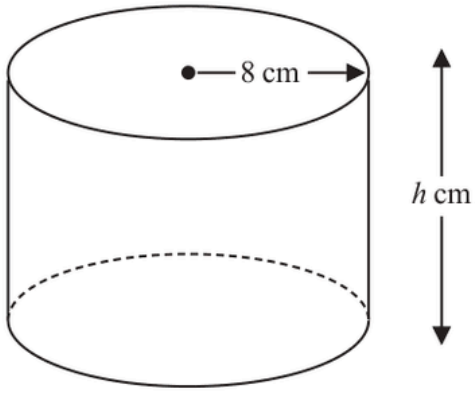


Diagram **NOT** accurately drawn

The cylinder has radius 8 cm and height h cm.
The volume of the cylinder is 1208 cm^3

(a) Work out the value of h
Give your answer correct to the nearest whole number.

$h =$ .....

(2)

The density of the wood is 1.25 g/cm^3

(b) Work out the mass of the cylinder.
Give your answer in kilograms.

..... kilograms

(2)

(Total for Question 6 is 4 marks)

WORKED SOLUTION

Question 6 · 4MA1/1HR May 2024

1 **Evaluate fraction**

For the cylinder,

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

$$1208 = \pi(8)^2 h$$

$$h = \frac{1208}{64\pi} = 6.006\ldots$$

2 Calculate value

So, to the nearest whole number,

$$h = 6$$

3 Calculate volume

For the mass, use the given volume:

$$\text{mass} = \text{density} \times \text{volume}$$

$$1.25 \times 1208 = 1510 \text{ g}$$

$$1510 \text{ g} = 1.51 \text{ kg}$$

FINAL ANSWER

$h = 6$ cm, and the mass is 1.51 kg.

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Question 7

9 marks | Inequalities (Solving & Graphing)

7 (a) Simplify $g^9 \div g^2$

.....

(1)

(b) Expand $5k^2(k^3 + 4)$

.....

(2)

(c) (i) Factorise $x^2 - 2x - 63$

.....

(2)

(ii) Hence, solve $x^2 - 2x - 63 = 0$

.....

(1)

(d) Solve the inequality $7 - 2y < 3y - 12$

.....

(3)

(Total for Question 7 is 9 marks)

WORKED SOLUTION

Question 7 · 4MA1/1HR May 2024

1 **(a)**

(a) $g^9 \div g^2 = g^7$.

2 **(b)**

(b) $5k^2(k^3 + 4) = 5k^5 + 20k^2$.

3 **(c)(i)**

(c)(i)

$$x^2 - 2x - 63 = (x - 9)(x + 7)$$

4 **Solve quadratic equation**

(c)(ii) $x = 9$ or $x = -7$.

5 **(d)**

(d)

$$7 - 2y < 3y - 12$$

$$19 < 5y$$

FINAL ANSWER

(a) g^7, (b) $5k^5 + 20k^2$, (c) $(x - 9)(x + 7)$, $x = 9$ or $x = -7$, (d) $y > \frac{19}{5}$

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Question 8

6 marks | Perimeter & Area

8 The diagram shows a trapezium, $ABCD$

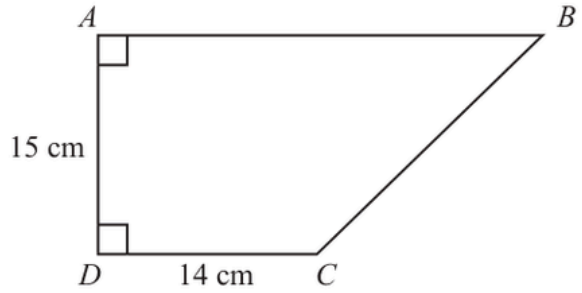


Diagram **NOT** accurately drawn

DAB and ADC are right angles.

$AD = 15$ cm $DC = 14$ cm

The area of the trapezium is 360 cm²

Work out the perimeter of the trapezium.

..... cm

(Total for Question 8 is 6 marks)

WORKED SOLUTION

Question 8 · 4MA1/1HR May 2024

1 **Use the trapezium area formula**

Use the trapezium area formula:

$$360 = \frac{1}{2}(AB + 14)(15)$$

$$AB + 14 = 48$$

$$AB = 34$$

2 **Use trigonometry**

Triangle ABC is right-angled with horizontal length

$$34 - 14 = 20$$

3 Calculate area

So

$$BC = \sqrt{20^2 + 15^2} = 25$$

4 Perimeter

Perimeter:

$$15 + 14 + 25 + 34 = 88$$

FINAL ANSWER

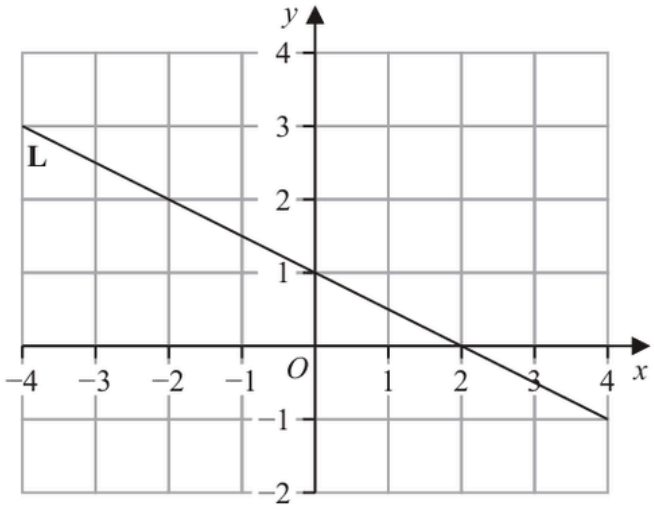
$88\ \text{cm}$.

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Question 9

3 marks | Linear Graphs

9 Line **L** is drawn on the grid.



Find an equation for **L**
Give your answer in the form $y = mx + c$

(Total for Question 9 is 3 marks)

WORKED SOLUTION

Question 9 · 4MA1/1HR May 2024

1 Solve equation

From the graph, the line crosses the y-axis at 1, so

$$c = 1$$

2 It also crosses the x

It also crosses the x-axis at 2, so using $(0, 1)$ and $(2, 0)$,

$$m = \frac{0 - 1}{2 - 0} = -\frac{1}{2}$$

3 Solve equation

Therefore

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

FINAL ANSWER

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

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Question 10

2 marks | Statistics Toolkit

10 Here are the numbers of goals scored by a hockey team in its 11 games this season.

0 1 2 2 3 4 4 6 7 9 11

Work out the interquartile range of the numbers of goals.

(Total for Question 10 is 2 marks)

WORKED SOLUTION

Question 10 · 4MA1/1HR May 2024

1 The goals in order are

The goals in order are

$$0,\ 1,\ 2,\ 2,\ 3,\ 4,\ 4,\ 6,\ 7,\ 9,\ 11$$

$$Q_1 = 2, \qquad Q_3 = 7$$

$$\text{IQR} = 7 - 2 = 5$$

FINAL ANSWER

5.

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Question 11

4 marks | Prime Factors, HCF & LCM

11 $A = 2^5 \times 5 \times 7^2$

$B = 2^3 \times 5^3 \times 7^4$

(a) Write down the highest common factor (HCF) of $5A$ and $2B$
Give your answer as a product of prime factors.

.....

(2)

$A = 2^5 \times 5 \times 7^2$

$B = 2^3 \times 5^3 \times 7^4$

(b) Work out the value of $(AB)^2$
Give your answer as a product of prime factors.

.....

(2)

(Total for Question 11 is 4 marks)

WORKED SOLUTION

Question 11 · 4MA1/1HR May 2024

1 Find the LCM

$$A = 2^5 \times 5 \times 7^2$$

$$B = 2^3 \times 5^3 \times 7^4$$

2 Find the LCM

For part (a),

$$5A = 2^5 \times 5^2 \times 7^2$$

$$2B = 2^4 \times 5^3 \times 7^4$$

3 The HCF takes the smaller

The HCF takes the smaller powers:

$$\text{HCF} = 2^4 \times 5^2 \times 7^2$$

4 **Find the LCM**

For part (b),

$$AB = 2^{5+3} \times 5^{1+3} \times 7^{2+4}$$

$$AB = 2^{8} \times 5^{4} \times 7^{6}$$

---

5 **Find the LCM**

Therefore

$$(AB)^2 = 2^{16} \times 5^{8} \times 7^{12}$$

✓ **FINAL ANSWER**

(a) $2^4 \times 5^2 \times 7^2$, (b) $2^{16} \times 5^8 \times 7^{12}$

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Question 12

4 marks | Simultaneous Equations

12 Solve the simultaneous equations

$$4x + 3y = 9.6$$
$$6x + 5y = 16.8$$

Show clear algebraic working.

$x =$ .....

$y =$ .....

(Total for Question 12 is 4 marks)

WORKED SOLUTION

Question 12 · 4MA1/1HR May 2024

1 Solve simultaneous equations

$$4x + 3y = 9.6$$

$$6x + 5y = 16.8$$

2 Multiply the first equation by

Multiply the first equation by 5:

$$20x + 15y = 48$$

3 Multiply the second equation by

Multiply the second equation by 3:

$$18x + 15y = 50.4$$

4 Subtract

Subtract:

$$2x = -2.4$$

$$x = -1.2$$

5 **Solve simultaneous equations**

Substitute into $4x + 3y = 9.6$:

$$4(-1.2) + 3y = 9.6$$

$$3y = 14.4$$

$$y = 4.8$$

✓ **FINAL ANSWER**

$x = -1.2$, $y = 4.8$.

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Question 13

5 marks | Circle Theorems

13

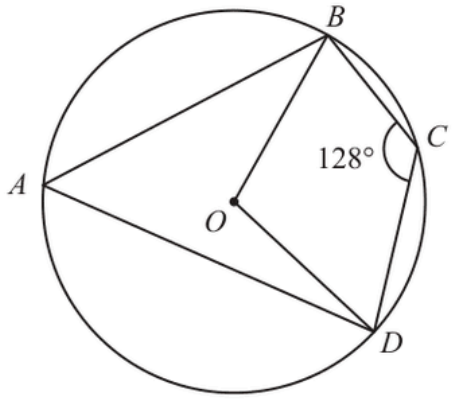


Diagram **NOT** accurately drawn

A, B, C and D are points on a circle, centre O

Angle $BCD = 128°$

Work out the size of angle OBD
Give a reason for each stage of your working.

angle OBD = ... °

(Total for Question 13 is 5 marks)

WORKED SOLUTION

Question 13 · 4MA1/1HR May 2024

1 Opposite angles in cyclic quadrilateral

Opposite angles in cyclic quadrilateral $ABCD$ add to $180°$:

$$\angle BAD = 180° - 128° = 52°$$

2 The angle at the centre

The angle at the centre is twice the angle at the circumference standing on the same arc BD:

$$\angle BOD = 2 \times 52° = 104°$$

3 Use trigonometry

Since $OB = OD$, triangle OBD is isosceles:

$$\angle OBD = \frac{180° - 104°}{2} = 38°$$

FINAL ANSWER

$38°$.

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Question 14

6 marks | Expanding Brackets

14 (a) Expand and simplify $(3x+1)(2-x)(4+x)$

.....

(3)

(b) Simplify fully $\left(\frac{a^3b}{a^9b^5}\right)^{-\frac{1}{2}}$

.....

(3)

(Total for Question 14 is 6 marks)

WORKED SOLUTION

Question 14 · 4MA1/1HR May 2024

1 **(a)**

(a)

$$(2-x)(4+x) = 8 - 2x - x^2$$

$$(3x+1)(8-2x-x^2) = -3x^3 - 7x^2 + 22x + 8$$

2 **(b)**

(b)

$$\left(\frac{a^3b}{a^9b^5}\right)^{-1/2} = \left(\frac{1}{a^6b^4}\right)^{-1/2} = a^3b^2$$

✓ **FINAL ANSWER**

(a) $-3x^3 - 7x^2 + 22x + 8$, (b) a^3b^2

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Question 15

3 marks | Sine & Cosine Rules

15 The diagram shows isosceles triangle EFG

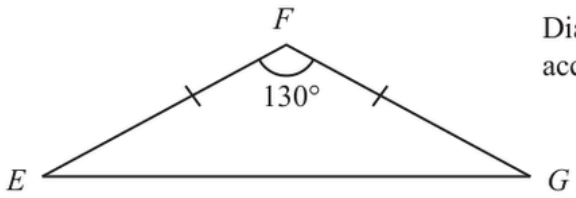


Diagram **NOT** accurately drawn

$EF = GF$
Angle $EFG = 130°$
The area of triangle EFG is 74 cm²

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

..... cm

(Total for Question 15 is 3 marks)

WORKED SOLUTION

Question 15 · 4MA1/1HR May 2024

1 Let

Let

$$EF = FG = x$$

2 Use the area formula

Use the area formula:

$$74 = \frac{1}{2}x^2 \sin 130°$$

$$x^2 = \frac{148}{\sin 130°}$$

$$x = 13.899\ldots$$

FINAL ANSWER

13.9 cm.

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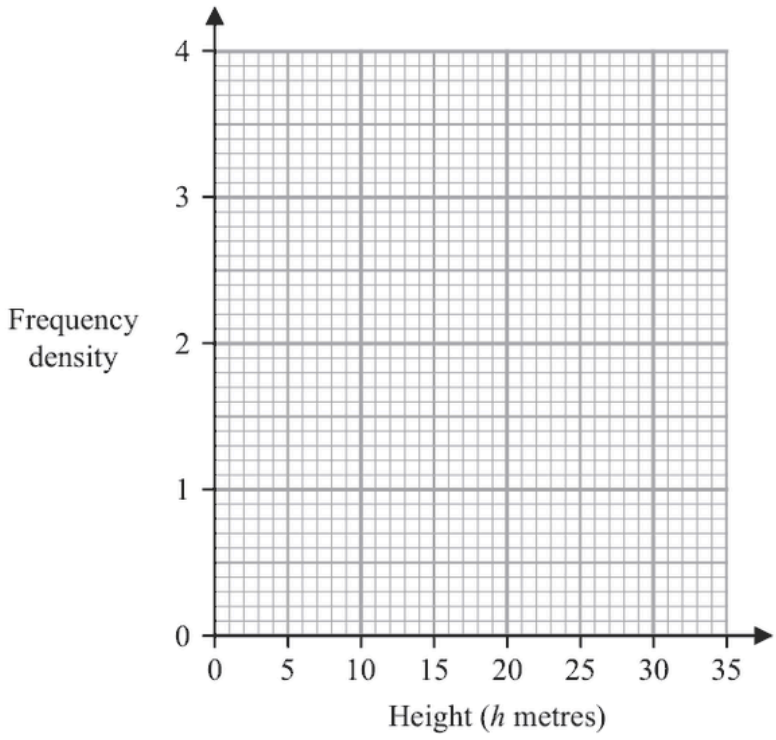
Question 16

3 marks | Histograms

16 The table gives information about the heights, in metres, of the trees in a park.

Height (h metres)	Frequency
$0 < h \leqslant 2$	5
$2 < h \leqslant 5$	12
$5 < h \leqslant 10$	18
$10 < h \leqslant 20$	14
$20 < h \leqslant 35$	9

On the grid, draw a histogram for this information.



(Total for Question 16 is 3 marks)

WORKED SOLUTION

Question 16 · 4MA1/1HR May 2024

1 **Use histogram**

For a histogram,

$$\text{frequency density} = \frac{\text{frequency}}{\text{class width}}$$

2 **The bar heights are**

The bar heights are:

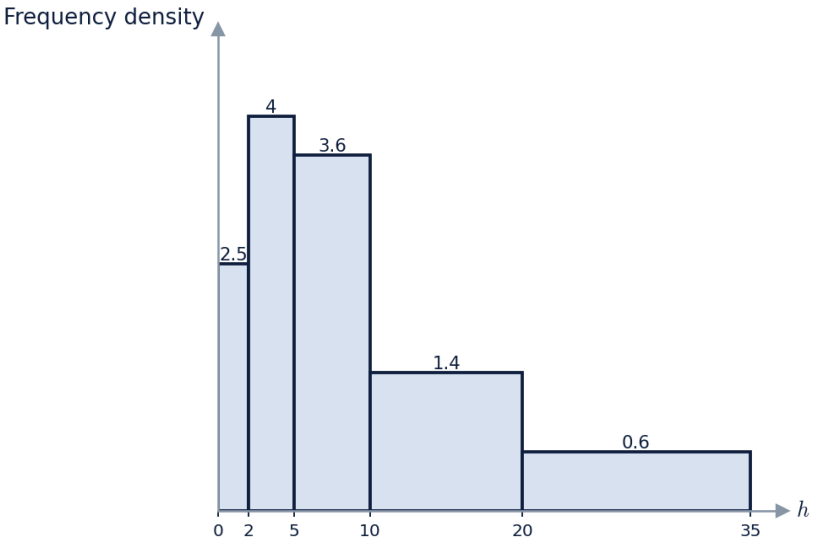
$$0 < h \leq 2 : \frac{5}{2} = 2.5$$

$$2 < h \leq 5 : \frac{12}{3} = 4$$

$$5 < h \leq 10 : \frac{18}{5} = 3.6$$

$$10 < h \leq 20 : \frac{14}{10} = 1.4$$

$$20 < h \leq 35 : \frac{9}{15} = 0.6$$



FINAL ANSWER

draw bars with heights $2.5, 4, 3.6, 1.4, 0.6$.

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Question 17

4 marks | Algebraic Roots & Indices

17 (a) $\left(\sqrt[4]{k^{12}}\right)^5 = k^n$

Find the value of n

$n =$ .....

(1)

(b) Express $\dfrac{7}{2-\sqrt{3}}$ in the form $\sqrt{c} + d$ where c and d are integers.

Show your working clearly.

.....

(3)

(Total for Question 17 is 4 marks)

WORKED SOLUTION

Question 17 · 4MA1/1HR May 2024

1 **(a) so**

(a)

$$\left(\sqrt[4]{k^{12}}\right)^5 = (k^3)^5 = k^{15}$$

so $n = 15$.

2 **(b)**

(b)

$$\frac{7}{2-\sqrt{3}} \times \frac{2+\sqrt{3}}{2+\sqrt{3}} = \frac{7(2+\sqrt{3})}{4-3} = 14+7\sqrt{3}$$

$$7\sqrt{3} = \sqrt{49 \times 3} = \sqrt{147}$$

FINAL ANSWER

(a) 15, (b) $\sqrt{147} + 14$

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Question 18

4 marks | Area & Volume of Similar Shapes

18 The diagram shows two similar vases, **A** and **B**

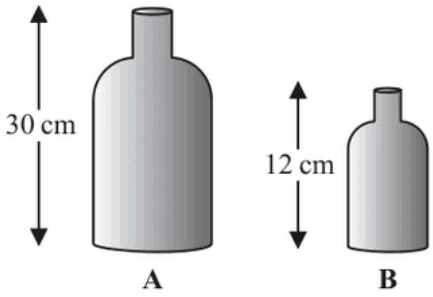


Diagram **NOT** accurately drawn

The height of vase **A** is 30 cm
The height of vase **B** is 12 cm

Given that

surface area of vase **A** – surface area of vase **B** = 178.5 cm²

find the surface area of vase **A**

..... cm²

(Total for Question 18 is 4 marks)

WORKED SOLUTION

Question 18 · 4MA1/1HR May 2024

1 **Calculate area**

The linear scale factor from vase B to vase A is

$$\frac{30}{12} = 2.5$$

2 **Calculate area**

So the surface area scale factor is

$$2.5^2 = 6.25$$

3 Calculate surface area

Let the surface area of vase B be S.

$$6.25S - S = 178.5$$

$$5.25S = 178.5$$

$$S = 34$$

4 Calculate area

Therefore the surface area of vase A is

$$6.25 \times 34 = 212.5$$

FINAL ANSWER

$212.5\ \text{cm}^2$.

4MA1/1HR MAY 2024

Question 19

5 marks | Differentiation & Turning Points

19 A curve C has equation $y = x^3 - 8x^2 - 12x + 5$

Curve C has exactly two stationary points, one at point A and one at point B such that

x coordinate of point $A > x$ coordinate of point B

Find the coordinates of point A
Show clear algebraic working.

(..... , ...)

(Total for Question 19 is 5 marks)

WORKED SOLUTION

Question 19 · 4MA1/1HR May 2024

1 Differentiate

$$y = x^3 - 8x^2 - 12x + 5$$

$$\frac{dy}{dx} = 3x^2 - 16x - 12$$

2 Stationary points have

Stationary points have

$$3x^2 - 16x - 12 = 0$$

$$x = \frac{16 \pm \sqrt{(-16)^2 - 4(3)(-12)}}{6}$$

$$x = \frac{16 \pm 20}{6}$$

$$x = 6 \quad \text{or} \quad x = -\frac{2}{3}$$

3 **Differentiate**

Point A has the greater x-coordinate, so $x = 6$.

$$y = 6^3 - 8(6^2) - 12(6) + 5$$

$$y = 216 - 288 - 72 + 5 = -139$$

✓ **FINAL ANSWER**

$A = (6, -139)$.

Question 20

5 marks | Completing the Square

20 (a) Express $2x^2 - 11x + 9$ in the form $a(x - b)^2 - c$ where a, b and c are numbers to be found.

.....

(3)

The curve **C** has equation $y = 2(x - 3)^2 - 11(x - 3) + 9$

The point P is the minimum point on **C**

(b) Find the coordinates of P

(..... , ...)

(2)

(Total for Question 20 is 5 marks)

1 **Use Moved Coordinate Geometry Completing**

For part (a),

$$2x^2 - 11x + 9$$

2 **Factor out 2 from the**

Factor out 2 from the quadratic terms:

$$2\left(x^2 - \frac{11}{2}x\right) + 9$$

3 **Complete the square**

Complete the square:

$$2\left[\left(x - \frac{11}{4}\right)^2 - \frac{121}{16}\right] + 9$$

$$2\left(x - \frac{11}{4}\right)^2 - \frac{121}{8} + 9$$

$$2\left(x - \frac{11}{4}\right)^2 - \frac{121}{8} + \frac{72}{8}$$

$$2\left(x - \frac{11}{4}\right)^2 - \frac{49}{8}$$

4 **Evaluate fraction**

So

$$2x^2 - 11x + 9 = 2\left(x - \frac{11}{4}\right)^2 - \frac{49}{8}$$

5 **Calculate value**

For part (b),

$$y = 2(x-3)^2 - 11(x-3) + 9$$

6 **Let**

Let

$$u = x - 3$$

7 **Evaluate fraction**

From part (a), the minimum occurs when

$$u = \frac{11}{4}$$

8 **Evaluate fraction**

So

$$x - 3 = \frac{11}{4}$$

$$x = \frac{23}{4}$$

9 **The minimum value of is**

The minimum value of y is

$$-\frac{49}{8}$$

✓ **FINAL ANSWER**

$$2\left(x - \frac{11}{4}\right)^2 - \frac{49}{8},\ P = \left(\frac{23}{4}, -\frac{49}{8}\right)$$

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Question 21

5 marks | Probability Toolkit

21 There are 25 counters in a bag such that

6 counters are blue
x counters are orange, where $x > 9$
the rest of the counters are pink

Maalam takes at random two of the counters from the bag.

The probability that Maalam takes one orange counter and one pink counter is $\frac{22}{75}$

Calculate the probability that Maalam takes 2 pink counters from the bag.
Show clear algebraic working.

(Total for Question 21 is 5 marks)

WORKED SOLUTION

Question 21 · 4MA1/1HR May 2024

1 **There are 25 counters**

There are 25 counters.

2 **Blue counters**

Blue counters:

$$6$$

3 **Orange counters**

Orange counters:

$$x$$

4 **Pink counters**

Pink counters:

$$25 - 6 - x = 19 - x$$

5 **The probability of taking one**

The probability of taking one orange and one pink in either order is

$$\frac{x}{25} \cdot \frac{19-x}{24} + \frac{19-x}{25} \cdot \frac{x}{24}$$

$$= \frac{2x(19-x)}{25 \cdot 24}$$

6 **Evaluate fraction**

This is equal to $\frac{22}{75}$, so

$$\frac{2x(19-x)}{600} = \frac{22}{75}$$

$$\frac{x(19-x)}{300} = \frac{22}{75}$$

$$x(19-x) = 88$$

$$19x - x^2 = 88$$

$$x^2 - 19x + 88 = 0$$

$$(x-8)(x-11) = 0$$

7 **Solve inequality**

Since $x > 9$,

$$x = 11$$

8 **Calculate value**

So the number of pink counters is

$$19 - 11 = 8$$

9 **The probability of taking 2**

The probability of taking 2 pink counters is

$$\frac{8}{25} \cdot \frac{7}{24} = \frac{56}{600}$$

$$= \frac{7}{75}$$

FINAL ANSWER

$$\frac{7}{75}$$

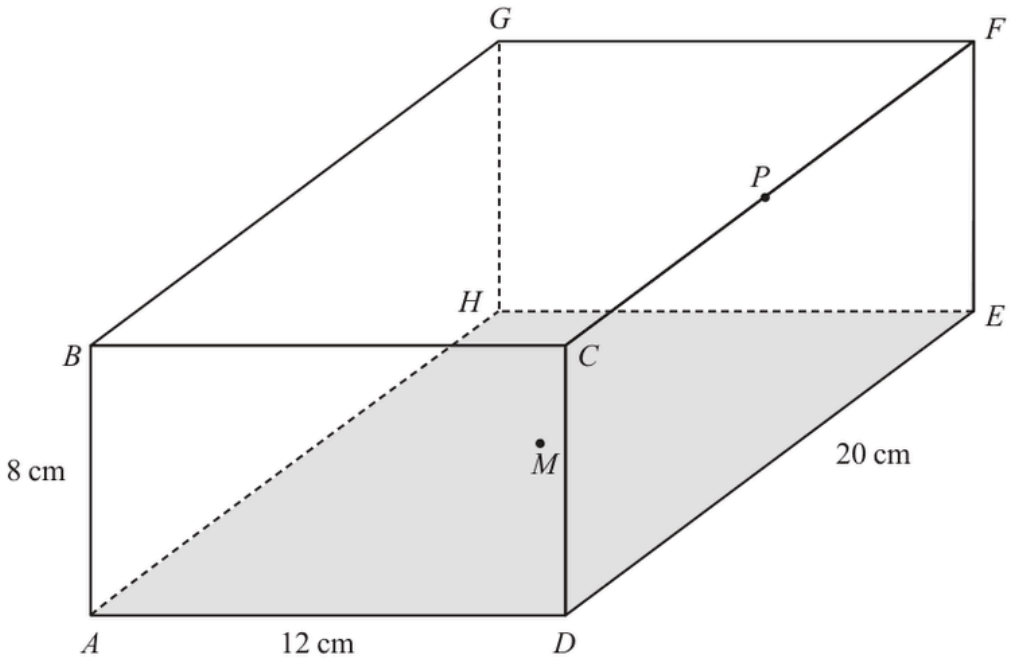
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Question 22

6 marks | 3D Pythagoras & Trigonometry

22 The diagram shows a cuboid $ABCDEFGH$ with horizontal base $ADEH$

Diagram **NOT** accurately drawn



$AB = 8$ cm $\quad AD = 12$ cm $\quad DE = 20$ cm

M is the midpoint of the base $ADEH$ and P is the midpoint of the edge CF

Work out the size of angle BMP
Give your answer correct to one decimal place.

.....°

(Total for Question 22 is 6 marks)

WORKED SOLUTION

Question 22 · 4MA1/1HR May 2024

1 **Use trigonometry**

Use coordinates with

$$A = (0, 0, 0)$$

2 **Use trigonometry**

Since

$$AD = 12, \qquad DE = 20, \qquad AB = 8$$

3 **take**

take

$$B = (0, 0, 8)$$

4 **The centre of the rectangular**

The centre of the rectangular base $ADEH$ is

$$M = (6, 10, 0)$$

5 **Find the midpoint**

Point P is the midpoint of CF.

$$C = (12, 0, 8), \qquad F = (12, 20, 8)$$

$$P = (12, 10, 8)$$

6 **Use trigonometry**

Now

$$\vec{MB} = B - M = (-6, -10, 8)$$

$$\vec{MP} = P - M = (6, 0, 8)$$

7 Use the scalar product formula

Use the scalar product formula:

$$\vec{MB} \cdot \vec{MP} = (-6)(6) + (-10)(0) + (8)(8)$$

$$\vec{MB} \cdot \vec{MP} = 28$$

$$|\vec{MB}| = \sqrt{(-6)^2 + (-10)^2 + 8^2} = \sqrt{200}$$

$$|\vec{MP}| = \sqrt{6^2 + 0^2 + 8^2} = 10$$

$$\cos \angle BMP = \frac{28}{10\sqrt{200}}$$

$$\angle BMP = 78.6°$$

FINAL ANSWER

$78.6°$

4MA1/1HR MAY 2024

Question 23

4 marks | Sequences

23 Here are the first three terms of an arithmetic sequence.

$$(4x-14) \quad , \quad (x+2) \quad , \quad (7x-9)$$

Find, as an integer, the sum of the first 40 terms of the sequence.
Show clear algebraic working.

(Total for Question 23 is 4 marks)

WORKED SOLUTION

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1 **The first three terms are**

The first three terms are

$$4x - 14, \quad x + 2, \quad 7x - 9$$

2 **Equal differences give**

Equal differences give

$$(x + 2) - (4x - 14) = (7x - 9) - (x + 2)$$

$$-3x + 16 = 6x - 11$$

$$9x = 27$$

$$x = 3$$

3 **Find the nth term**

So the sequence is

$$-2,\ 5,\ 12, \ldots$$

4 **with common difference**

with common difference 7.

$$S_{40} = \frac{40}{2}(2(-2) + 39(7))$$

$$S_{40} = 20(-4 + 273) = 5380$$

✓ **FINAL ANSWER**

5380