Please check the examination details below before entering your candidate information

Candidate surname	Other names
Solved by Mr. Pabitra	

Centre Number | Candidate Number

Pearson Edexcel International GCSE

Wednesday 3 June 2026

Morning (Time: 2 hours)

Paper reference **4MA1/2HR**

Mathematics A

PAPER 2HR

Higher Tier



You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. 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.
- Without sufficient working, correct answers may be awarded no marks.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- **Calculators may be used.**
- You must **NOT** write anything on the formulae page.
- Anything you write on the formulae page will gain NO credit.

Information

- The total mark for this paper is 100.
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*

Advice

Solved by Mr. Pabitra | Math Tonic

- Read each question carefully before you start to answer it.
- Check your answers if you have time at the end.

Turn over ▶

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International GCSE Mathematics

Formulae sheet – Higher Tier

Arithmetic series

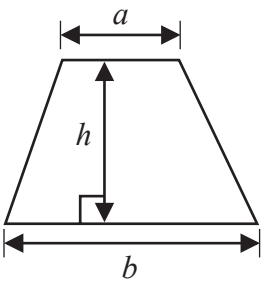
Sum to n terms, $S_n = \frac{n}{2}[2a + (n-1)d]$

The quadratic equation

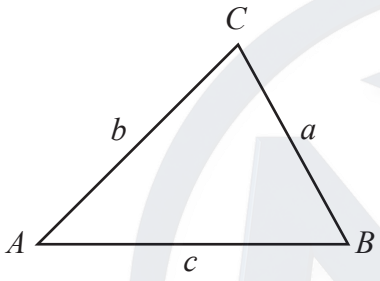
The solutions of $ax^2 + bx + c = 0$ where $a \neq 0$ are given by:

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

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



Trigonometry



In any triangle ABC

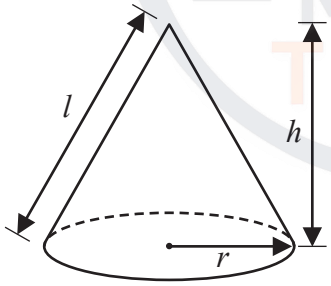
Sine Rule $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

Cosine Rule $a^2 = b^2 + c^2 - 2bc\cos A$

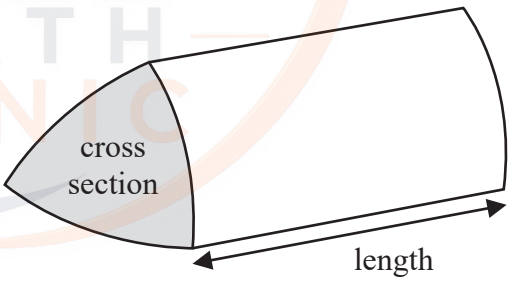
Area of triangle $= \frac{1}{2}ab\sin C$

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

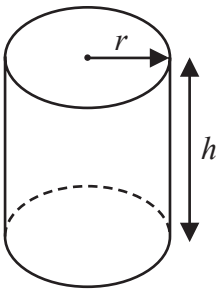
Curved surface area of cone $= \pi rl$



Volume of prism
= area of cross section × length

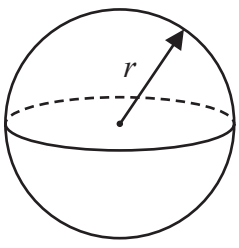


Volume of cylinder $= \pi r^2 h$
Curved surface area of cylinder $= 2\pi rh$



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

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



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Answer ALL TWENTY SEVEN questions.

Write your answers in the spaces provided.

You must write down all the stages in your working.

1 The diagram shows a right-angled triangle.

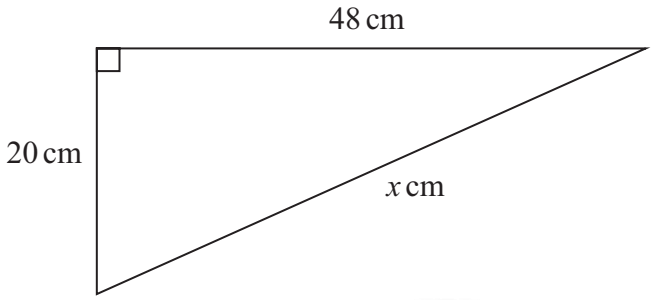


Diagram **NOT** accurately drawn

Work out the value of x

$x^2 = 48^2 + 20^2$ (Pythagoras: x is the hypotenuse)

$x^2 = 2304 + 400 = 2704$

$x = \sqrt{2704} = 52$

$x =$ 52

(Total for Question 1 is 3 marks)

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Solved by Mr. Pabitra

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

14 8 2 –4 –10

Find an expression, in terms of n, for the nth term of this sequence.

Common difference = 8 − 14 = −6, so the nth term is −6n + something

When n = 1: −6 × 1 = −6, and −6 + 20 = 14 (first term)

nth term = 20 − 6n

20 − 6n

(Total for Question 2 is 2 marks)

3 $\mathscr{E}$ = {integers from 1 to 12}
A = {factors of 12}

List the members of the set A'

A = {1, 2, 3, 4, 6, 12}

A′ = the numbers from 1 to 12 that are not in A

5, 7, 8, 9, 10, 11

(Total for Question 3 is 1 mark)

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MATH TONIC

Solved by Mr. Pabitra

4 (a) Solve $3(x + 2) = 1 - 5x$
Show clear algebraic working.

$3(x + 2) = 1 - 5x$

$3x + 6 = 1 - 5x$

$3x + 5x = 1 - 6$

$8x = -5$

$x = \frac{-5}{8} = -0.625$

$x =$ $\frac{-5}{8}$

(3)

$P = c^2 - 5d$

(b) Work out the value of P when $c = -7$ and $d = 3$

$P = (-7)^2 - 5 \times 3$

$= 49 - 15 = 34$

$P =$ 34

(2)

(c) Simplify m^0

$m^0 = 1$ (power 0 gives 1)

1

(1)

(d) Simplify $(4r^2t)^3$

$4^3 \times r^{2\times3} \times t^3$

$= 64r^6t^3$

$64r^6t^3$

(2)

(Total for Question 4 is 8 marks)

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Solved by Mr. Pabitra

5 Sarah and Dej each give some money to charity **A** and to charity **B**

Sarah shares \$400 between charity **A** and charity **B** in the ratio 2 : 3

Dej shares \$375 between the two charities.
He gives twice as much money to charity **B** as he gives to charity **A**

Dej gives more money to charity **B** than Sarah gives to charity **B**

How much more?

Sarah: $400 \div (2 + 3) = 80$, so charity B gets $3 \times 80 = \$240$

Dej: $A : B = 1 : 2$, $375 \div (1 + 2) = 125$

Dej gives A \$125 and B $2 \times 125 = \$250$

Difference $= 250 - 240 = \$10$

\$ 10

(Total for Question 5 is 5 marks)

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Solved by Mr. Pabitra

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6 Mika has six cards.
There is a number on each card.
The cards are arranged with the numbers in order of size.
Three of the numbers are hidden.



The mode of the six numbers is 8
The range of the six numbers is 7
The sum of the six numbers is 31

Work out the median of the six numbers.

Mode is 8, so there are two 8s: the 5th card is 8

Range is 7: smallest = 8 − 7 = 1, so the 1st card is 1

Sum is 31: 1 + 3 + ? + 7 + 8 + 8 = 31, 27 + ? = 31, ? = 4

The six numbers: 1, 3, 4, 7, 8, 8

Median = $\frac{4+7}{2}$ = 5.5

5.5

(Total for Question 6 is 4 marks)

Solved by Mr. Pabitra

7 (a) Write 4×10^{-5} as an ordinary number.

$4 \times 10^{-5} = 4 \div 100\,000 = 0.00004$

0.00004

(1)

(b) Work out $(6 \times 10^{158}) \times (2 \times 10^{72})$
Give your answer in standard form.

$(6 \times 2) \times (10^{158} \times 10^{72})$

$= 12 \times 10^{230}$

$= 1.2 \times 10 \times 10^{230} = 1.2 \times 10^{231}$

1.2×10^{231}

(2)

(Total for Question 7 is 3 marks)

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MATH TONIC

Solved by Mr. Pabitra

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8 Lauren's salary increased by 4%
After the increase, her salary was 36 400 euros.

Work out Lauren's salary before the increase.

After the increase: 100% + 4% = 104% = 1.04

Salary before = $\frac{36\,400}{1.04}$ = 35 000 euros

35 000 ..... euros

(Total for Question 8 is 3 marks)

9 Change a speed of 198 kilometres per hour to a speed in metres per second.
Show your working clearly.

198 km = 198 × 1000 = 198 000 m

1 hour = 60 × 60 = 3600 seconds

Speed = $\frac{198\,000}{3600}$ = 55 m/s

55 ..... m/s

(Total for Question 9 is 3 marks)

Solved by Mr. Pabitra

10 The diagram shows a solid cylinder.

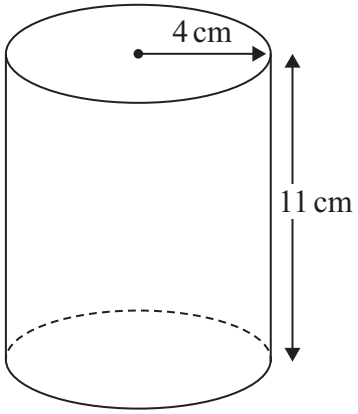


Diagram **NOT** accurately drawn

The cylinder has radius 4 cm and height 11 cm
The cylinder is made from wood with a density of 0.6 g/cm^3

Work out the mass of the cylinder.
Give your answer correct to 3 significant figures.

Volume = $\pi r^2 h = \pi \times 4^2 \times 11 = 176\pi = 552.92...$ cm^3

Mass = density × volume = $0.6 \times 552.92...$

$= 331.75... = 332$ g (3 s.f.)

332 ..... g

(Total for Question 10 is 3 marks)

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MATH TONIC

Solved by Mr. Pabitra

11 The diagram shows a square *ABCD* and a right-angled triangle *EFG*

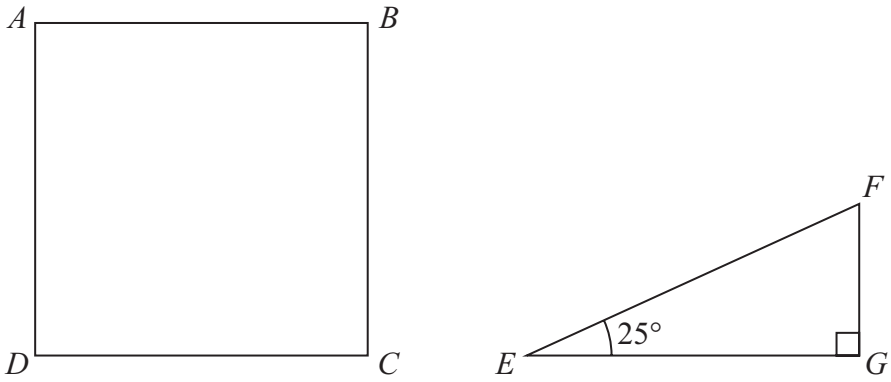


Diagram **NOT** accurately drawn

The area of square *ABCD* is 36 cm^2
DC = *EG*

Work out the area of triangle *EFG*
Give your answer correct to one decimal place.
Show your working clearly.

Side of the square = $\sqrt{36}$ = 6 cm, so EG = DC = 6 cm

$\tan 25° = \frac{FG}{EG} = \frac{FG}{6}$

FG = 6 × tan 25° = 2.797... cm

Area = $\frac{1}{2}$ × base × height = $\frac{1}{2}$ × 6 × 2.797...

= 8.392... = 8.4 cm^2 (1 d.p.)

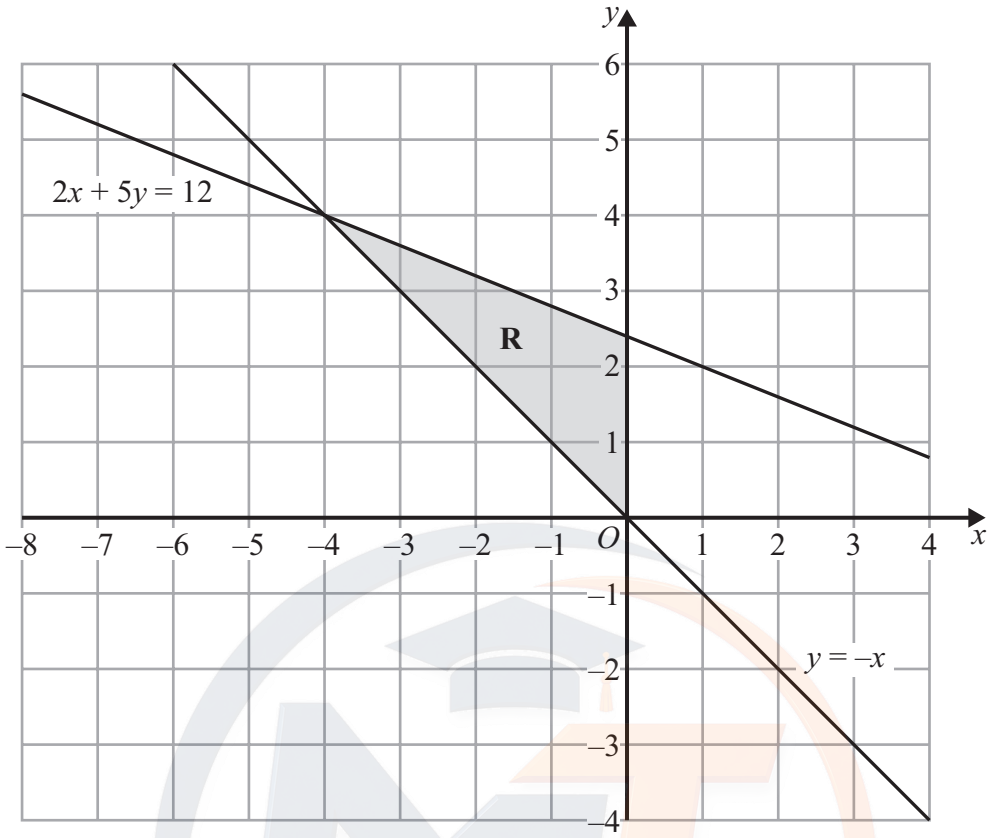
8.4 ..... cm^2

(Total for Question 11 is 5 marks)

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Solved by Mr. Pabitra

12



The region **R**, shown shaded in the diagram, is bounded by the y-axis and the straight lines with equations

$$y = -x$$

$$2x + 5y = 12$$

Write down the three inequalities that define **R**

R is to the left of the y-axis, above $y = -x$ and below $2x + 5y = 12$

$x \leq 0$

$y \geq -x$

$2x + 5y \leq 12$

(Total for Question 12 is 3 marks)

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Solved by Mr. Pabitra

13 (a) Complete the table of values for $y = x + \frac{1}{x}$

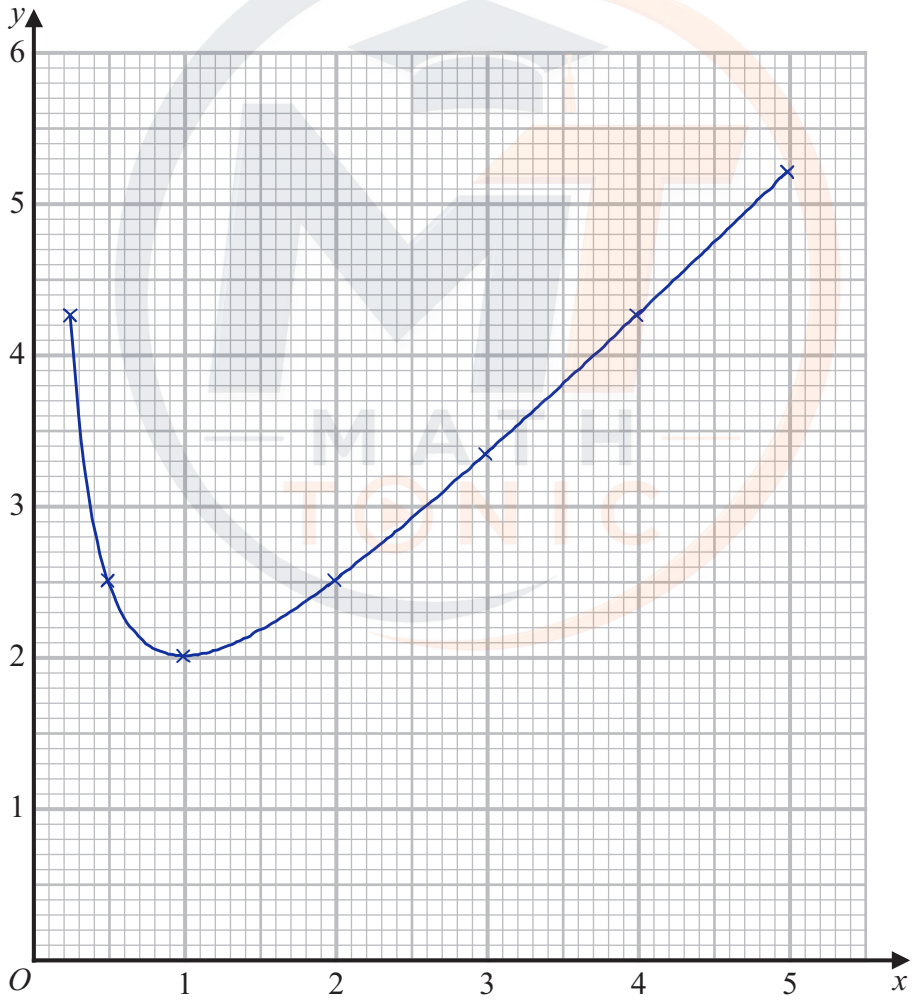
$x = 0.5$: $0.5 + 2 = 2.5$ $\quad$ $x = 1$: $1 + 1 = 2$

$x = 4$: $4 + 0.25 = 4.25$ $\quad$ $x = 5$: $5 + 0.2 = 5.2$

x	0.25	0.5	1	2	3	4	5
y	4.25	2.5	2	2.5	3.33	4.25	5.2

(2)

(b) On the grid, draw the graph of $y = x + \frac{1}{x}$ for $0.25 \leqslant x \leqslant 5$



(2)

(Total for Question 13 is 4 marks)

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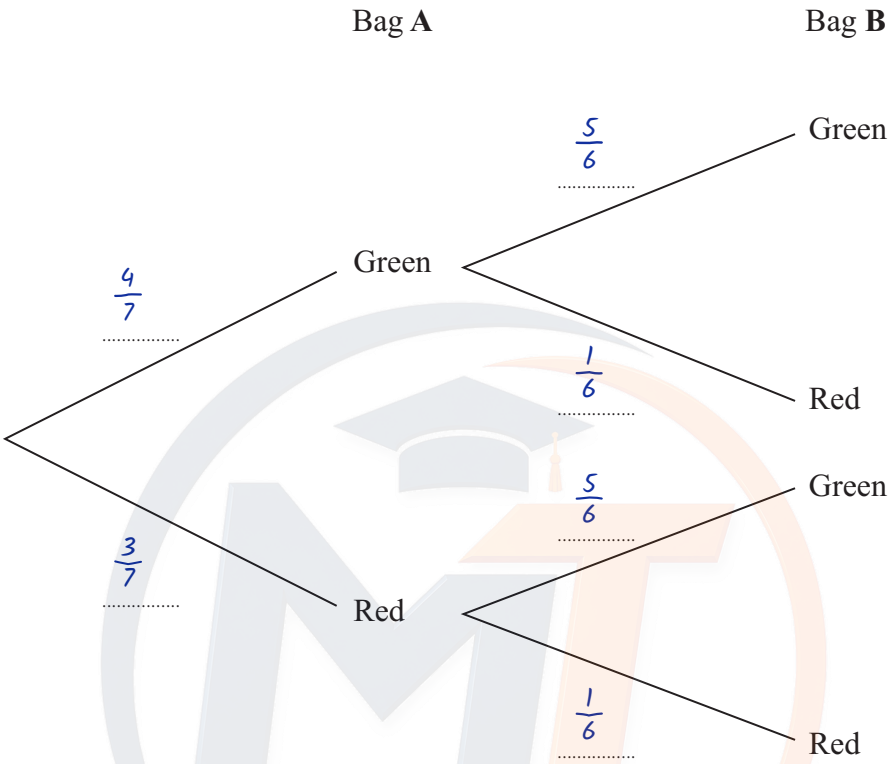
Solved by Mr. Pabitra

14 Pras has 2 bags of counters, bag **A** and bag **B**

In bag **A**, there are 4 green counters and 3 red counters.
In bag **B**, there are 5 green counters and 1 red counter.

Pras is going to take at random a counter from bag **A** and a counter from bag **B**

(a) Complete the probability tree diagram.



(2)

(b) Work out the probability that Pras will take two green counters.

$P(\text{green, green}) = \frac{4}{7} \times \frac{5}{6} = \frac{20}{42} = \frac{10}{21}$

$\frac{10}{21}$

(2)

DO NOT WRITE IN THIS AREA
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Solved by Mr. Pabitra

Pras also has a third bag of counters, bag **C**
In bag **C**, there are only green counters and red counters.
All the original counters are back in bag **A** and bag **B**

Pras is going to take at random a counter from bag **A**, a counter from bag **B** and a counter from bag **C**

The probability that Pras will take three red counters is $\frac{3}{70}$

(c) Work out the probability that Pras will take 1 green counter and 2 red counters.

$P(R, R, R) = \frac{3}{7} \times \frac{1}{6} \times P(\text{red from C}) = \frac{3}{70}$

$\frac{3}{42} \times P(\text{red from C}) = \frac{3}{70}$

$P(\text{red from C}) = \frac{3}{70} \div \frac{3}{42} = \frac{42}{70} = \frac{3}{5}$, $P(\text{green from C}) = \frac{2}{5}$

One green and two reds: GRR, RGR, RRG

$P(G, R, R) = \frac{4}{7} \times \frac{1}{6} \times \frac{3}{5} = \frac{12}{210}$

$P(R, G, R) = \frac{3}{7} \times \frac{5}{6} \times \frac{3}{5} = \frac{45}{210}$

$P(R, R, G) = \frac{3}{7} \times \frac{1}{6} \times \frac{2}{5} = \frac{6}{210}$

$\text{Total} = \frac{12 + 45 + 6}{210} = \frac{63}{210} = \frac{3}{10}$

$\frac{3}{10}$

(4)

(Total for Question 14 is 8 marks)

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Solved by Mr. Pabitra

15 Mina recorded the times taken, in minutes, by 11 people to complete a puzzle.
Here are her results.

2 2 3 6 7 9 9 12 13 17 20

Find the interquartile range of these times.

$n = 11$: $LQ = (11 + 1) \div 4 = 3$rd value $= 3$

$UQ = 3 \times (11 + 1) \div 4 = 9$th value $= 13$

$IQR = 13 - 3 = 10$

10 minutes

(Total for Question 15 is 2 marks)

16 $\left(\frac{1}{\sqrt{a}}\right)^6 = a^n$

Work out the value of n

$\frac{1}{\sqrt{a}} = a^{-1/2}$

$(a^{-1/2})^6 = a^{-1/2 \times 6} = a^{-3}$

so $n = -3$

$n = -3$

(Total for Question 16 is 2 marks)

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MATH TONIC

Solved by Mr. Pabitra

17 Use algebra to show that $0.\dot{8}1\dot{4} = \frac{22}{27}$

Let $x = 0.814814...$

$1000x = 814.814814...$

$1000x - x = 814.814... - 0.814...$

$999x = 814$

$x = \frac{814}{999} = \frac{22}{27}$ (divide top and bottom by 37)

so $0.814814... = \frac{22}{27}$ as required

(Total for Question 17 is 2 marks)

18 Here are two vectors.

$$\overrightarrow{AB} = \begin{pmatrix} 4 \\ 5 \end{pmatrix} \qquad \overrightarrow{CB} = \begin{pmatrix} -2 \\ 8 \end{pmatrix}$$

Find $\overrightarrow{AC}$ as a column vector.

$\overrightarrow{AC} = \overrightarrow{AB} + \overrightarrow{BC} = \overrightarrow{AB} - \overrightarrow{CB}$

$= \begin{pmatrix} 4 \\ 5 \end{pmatrix} - \begin{pmatrix} -2 \\ 8 \end{pmatrix} = \begin{pmatrix} 6 \\ -3 \end{pmatrix}$

$\overrightarrow{AC} = \begin{pmatrix} 6 \\ -3 \end{pmatrix}$

(Total for Question 18 is 2 marks)

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Solved by Mr. Pabitra

19 The table gives information about the times, in minutes, some people spent waiting to go on a rollercoaster.

Time (t minutes)	Frequency
$0 < t \leqslant 20$	14
$20 < t \leqslant 25$	12
$25 < t \leqslant 35$	32
$35 < t \leqslant 50$	30

Frequency density = f ÷ width

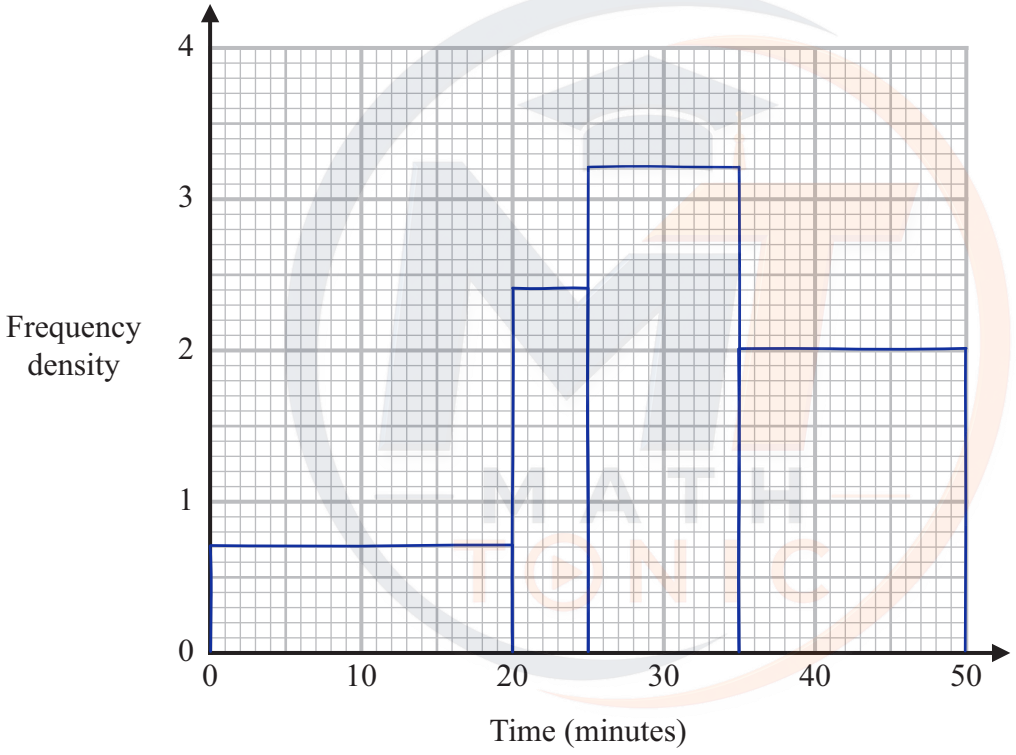
14 ÷ 20 = 0.7

12 ÷ 5 = 2.4

32 ÷ 10 = 3.2

30 ÷ 15 = 2

On the grid, draw a histogram for this information.



(Total for Question 19 is 3 marks)

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Solved by Mr. Pabitra

20 Make x the subject of $y = \dfrac{3x+5}{4-2x}$

$y(4 - 2x) = 3x + 5$

$4y - 2xy = 3x + 5$

$4y - 5 = 3x + 2xy$

$4y - 5 = x(3 + 2y)$

$x = \dfrac{4y - 5}{3 + 2y}$

$x = \dfrac{4y - 5}{3 + 2y}$

(Total for Question 20 is 3 marks)

21 $p = \dfrac{d-e}{f}$

$d = 6.6$ correct to 1 decimal place
$e = 2.8$ correct to 1 decimal place
$f = 0.47$ correct to 2 decimal places

Calculate the lower bound for the value of p
Give your answer correct to 3 significant figures.
Show your working clearly.

Lower bound of p: smallest d, largest e, largest f

$d = 6.55$, $e = 2.85$, $f = 0.475$

$LB = \dfrac{6.55 - 2.85}{0.475} = \dfrac{3.7}{0.475} = 7.789...$

$= 7.79$ (3 s.f.)

7.79

(Total for Question 21 is 3 marks)

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Solved by Mr. Pabitra

22 Solve the simultaneous equations

$$y^2 = x^2 + 7$$
$$y = 3x - 5$$

Show clear algebraic working.

Substitute $y = 3x - 5$: $(3x - 5)^2 = x^2 + 7$

$9x^2 - 30x + 25 = x^2 + 7$

$8x^2 - 30x + 18 = 0$

$4x^2 - 15x + 9 = 0$ (divide by 2)

$(4x - 3)(x - 3) = 0$

$x = \frac{3}{4} = 0.75$ or $x = 3$

When $x = 0.75$: $y = 3 \times 0.75 - 5 = -2.75$

When $x = 3$: $y = 3 \times 3 - 5 = 4$

$x = 0.75, y = -2.75$ and $x = 3, y = 4$

(Total for Question 22 is 5 marks)

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Solved by Mr. Pabitra

23 **K**, **L** and **M** are three similar solids.

volume of **K** : volume of **L** = 125 : 216

surface area of **K** : surface area of **M** = 4 : 9

The height of **M** is y% greater than the height of **L**

Work out the value of y
Show your working clearly.

Volumes K : L = 125 : 216, so lengths K : L = $\sqrt[3]{125} : \sqrt[3]{216} = 5 : 6$

Areas K : M = 4 : 9, so lengths K : M = $\sqrt{4} : \sqrt{9} = 2 : 3$

Make K the same: K : L = 10 : 12, K : M = 10 : 15

So L : M = 12 : 15

Height of M = $\frac{15}{12}$ × height of L = 1.25 × height of L

So M is 25% greater: $y = 25$

$y =$ 25

(Total for Question 23 is 5 marks)

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Solved by Mr. Pabitra

24

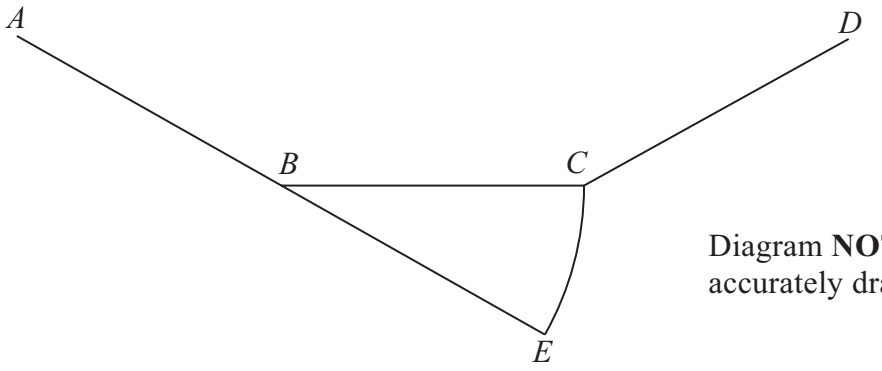


Diagram **NOT** accurately drawn

AB, *BC* and *CD* are three sides of a regular polygon.
ABE is a straight line.

BCE is a sector of a circle with centre *B* and radius 4.5 cm

The length of arc *CE* is $\frac{3}{10}\pi$ cm

Work out the sum of the interior angles of the regular polygon.

Arc CE = $\frac{\text{angle CBE}}{360} \times 2\pi \times 4.5 = \frac{3}{10}\pi$

angle CBE = $\frac{3}{10} \times \frac{360}{9} = 12°$

ABE is a straight line, so angle CBE is an exterior angle of the polygon

Number of sides = 360 ÷ 12 = 30

Sum of interior angles = (30 − 2) × 180 = 5040°

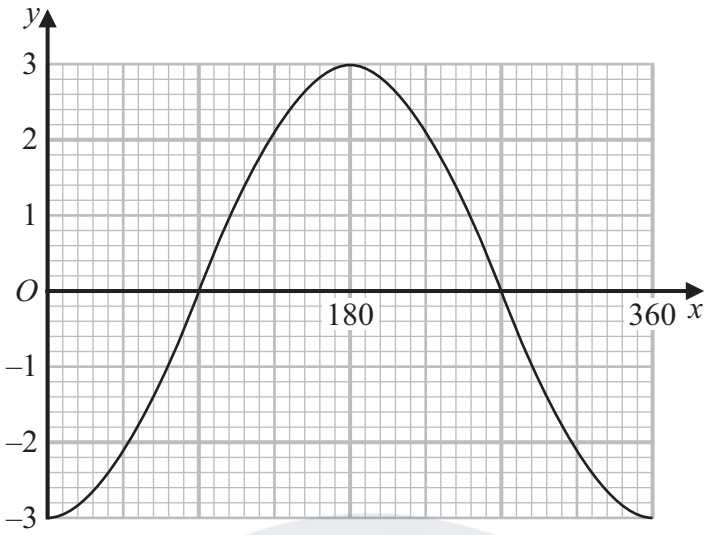
5040 °

(Total for Question 24 is 4 marks)

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Solved by Mr. Pabitra

25 The graph of $y = a\sin(x + b)°$ for $0 \leqslant x \leqslant 360$ is drawn on the grid below.



Given that $a < 0$ and that $0 < b < 360$

(a) find the value of a and the value of b

Max 3 and min −3, and $a < 0$, so $a = -3$

Max at $x = 180$: $\sin(180 + b) = -1$

$180 + b = 270$, $b = 90$

$a =$ −3

$b =$ 90

(2)

A curve has equation $y = f(x)$
The point T with coordinates (p, q) lies on the curve.

(b) Find the coordinates of the image of T on the curve with equation

$$y = f(2x) + 5$$

Give your coordinates in terms of p and q

$f(2x)$: x-coordinate is halved. $+5$: y-coordinate goes up 5

($\frac{1}{2}p$, $q + 5$)

(2)

(Total for Question 25 is 4 marks)

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Solved by Mr. Pabitra

26 Here are the first four terms of an arithmetic series.

$$(k+2) \qquad (k+5) \qquad (k+8) \qquad (k+11)$$

The sum of the first $2n$ terms of the series is 4 times the sum of the first n terms of the series.

Work out the numerical value of the 100th term of the series.
Show your working clearly.

$a = k + 2, \qquad d = 3$

$S_n = \frac{n}{2}[2(k+2) + 3(n-1)] = \frac{n}{2}(2k + 3n + 1)$

$S_{2n} = \frac{2n}{2}[2(k+2) + 3(2n-1)] = n(2k + 6n + 1)$

$S_{2n} = 4S_n: \qquad n(2k + 6n + 1) = 4 \times \frac{n}{2}(2k + 3n + 1)$

$2k + 6n + 1 = 4k + 6n + 2$

$-2k = 1, \qquad k = -0.5$

$U_{100} = a + 99d = (-0.5 + 2) + 99 \times 3 = 1.5 + 297 = 298.5$

298.5

(Total for Question 26 is 6 marks)

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27 Bryan owns a house.

During 2024, the value of Bryan's house increased by x%
During 2025, the value of Bryan's house increased by $2x$%

Overall, during 2024 and 2025, the value of Bryan's house increased by 38.88%

Work out the value of x
Show clear algebraic working.

$\left(1 + \frac{x}{100}\right)\left(1 + \frac{2x}{100}\right) = 1 + \frac{38.88}{100} = 1.3888$

$1 + \frac{3x}{100} + \frac{2x^2}{10\,000} = 1.3888$

Multiply by 10 000: $10\,000 + 300x + 2x^2 = 13\,888$

$2x^2 + 300x - 3888 = 0$

$x^2 + 150x - 1944 = 0$

$(x - 12)(x + 162) = 0$

$x = 12$ or $x = -162$ (x must be positive)

$x = 12$

$x =$ 12

(Total for Question 27 is 4 marks)

TOTAL FOR PAPER IS 100 MARKS

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