Write your name here

Surname	Other names

Pearson Edexcel GCSE

Centre Number | | | | | |

Candidate Number | | | | |

2015 Predicted Paper 1(2)

Higher Tier

Time: 1 hour 45 minutes

Paper Reference **1MA0/1H**

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser. 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.
- 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 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.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed.

Advice

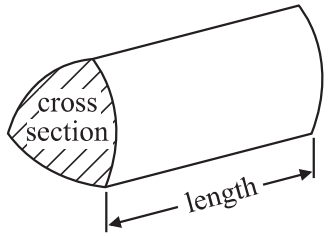
- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

GCSE Mathematics 1MA0

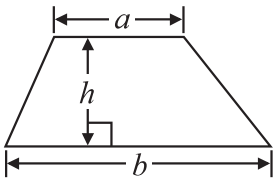
Formulae: Higher Tier

You must not write on this formulae page.
Anything you write on this formulae page will gain NO credit.

Volume of prism = area of cross section × length

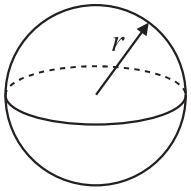


Area of trapezium = $\frac{1}{2}(a + b)h$



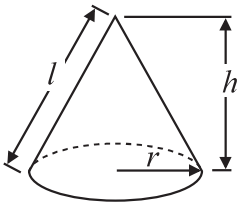
Volume of sphere = $\frac{4}{3}\pi r^3$

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

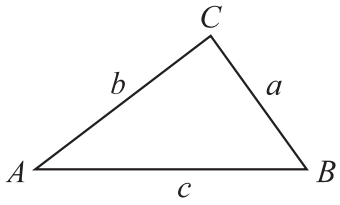


Volume of cone = $\frac{1}{3}\pi r^2 h$

Curved surface area of cone = πrl



In any triangle *ABC*



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

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

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 = $\frac{1}{2}ab \sin C$

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

1 Shemoly wants to find out how often people play sport.
She uses this question on a questionnaire.

"Exercise is good for you. How often do you play sport?"

A lot ☐ Sometimes ☐ Never ☐

Write down **two** things that are wrong with this question.

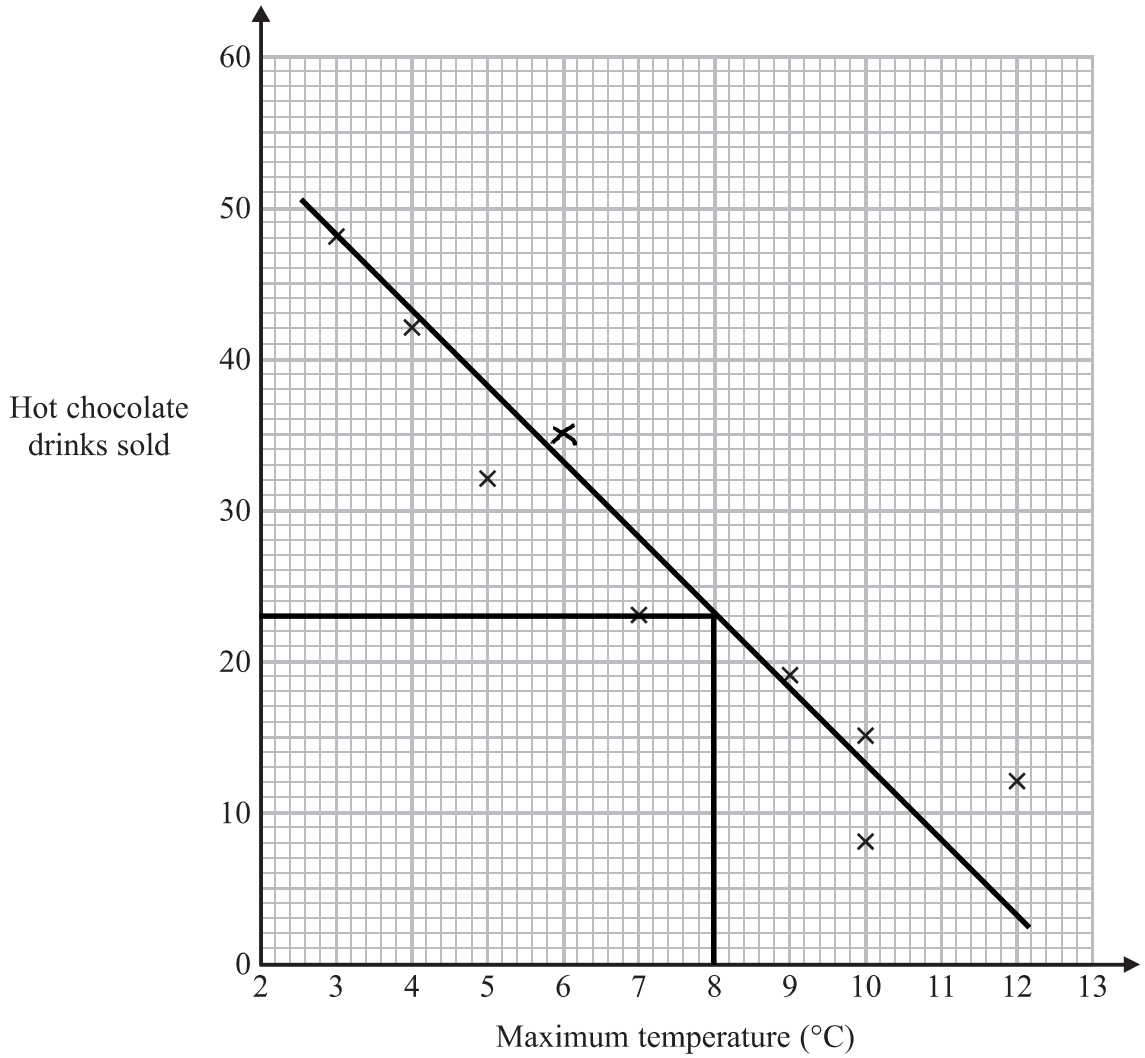
1 Saying 'exercise is good for you' leads the answerer.

2 She should use time scales. 'Sometimes' and 'A lot' mean different things to different people

(Total for Question 1 is 2 marks)

2 Carlos has a cafe in Clacton.
Each day, he records the maximum temperature in degrees Celsius (°C) in Clacton and the number of hot chocolate drinks sold.

The scatter graph shows this information.



On another day the maximum temperature was 6 °C and 35 hot chocolate drinks were sold.

(a) Show this information on the scatter graph.

(1)

(b) Describe the relationship between the maximum temperature and the number of hot chocolate drinks sold.

Negative correlation. (As temperature increases the number of hot drinks sold decreases)

(1)

(c) Draw a line of best fit on the scatter diagram.

(1)

One day the maximum temperature was 8 °C.

(d) Use your line of best fit to estimate how many hot chocolate drinks were sold.

23

(1)

(Total for Question 2 is 4 marks)

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3 On Monday, a shop sells 120 loaves of bread.

20% of the loaves are wholemeal bread. 10% = 12 20% = 24

$\frac{1}{3}$ of the loaves are granary bread. $\frac{1}{3}$ = 40

The rest of the loaves are white bread.

How many loaves of white bread does the shop sell on Monday?

64 W + G

120 − 64 = 56

56

(Total for Question 3 is 3 marks)

4 60 children go to a nursery.
The ratio of girls to boys is 3 : 2

The children go to the nursery either in the morning or in the afternoon.
$\frac{3}{4}$ of the children go to the nursery in the morning.

The rest of the children go to the nursery in the afternoon.

7 boys go to the nursery in the afternoon.

Work out how many girls go to the nursery in the morning.

5 parts $\frac{60}{5} = 12$

G : B
3x12 : 2x12
36 : 24

	Boys	Girls	Total
Morn	17	28	45
Afternoon	7	8	15
Total	24	36	60

28

(Total for Question 4 is 5 marks)

5 (a) Factorise $14x - 35$

$7(2x - 5)$

(1)

(b) Expand and simplify $3(2c - 5) - 2(c - 4)$

$6c - 15 - 2c + 8$

$4c - 7$

(2)

(c) Simplify $(4e^3)^2$

$16e^6$

(2)

(d) Expand and simplify $(a + 5)(2a - 1)$

$2a^2 - a + 10a - 5$

$2a^2 + 9a - 5$

(2)

(Total for Question 5 is 7 marks)

6 Here are the ingredients needed to make 20 cookies.

Cookies

Ingredients to make **20** cookies.

250 g butter
120 g caster sugar
300 g flour

Sam is going to make some cookies.

She has these ingredients.

625 g butter 360 g caster sugar 1000 g flour

Work out the greatest number of cookies that Sam can make with her ingredients.
You must show your working.

Butter
250g = 20 cookies
25g = 2 cookies
x25 ↳ 625g = 50 cookies

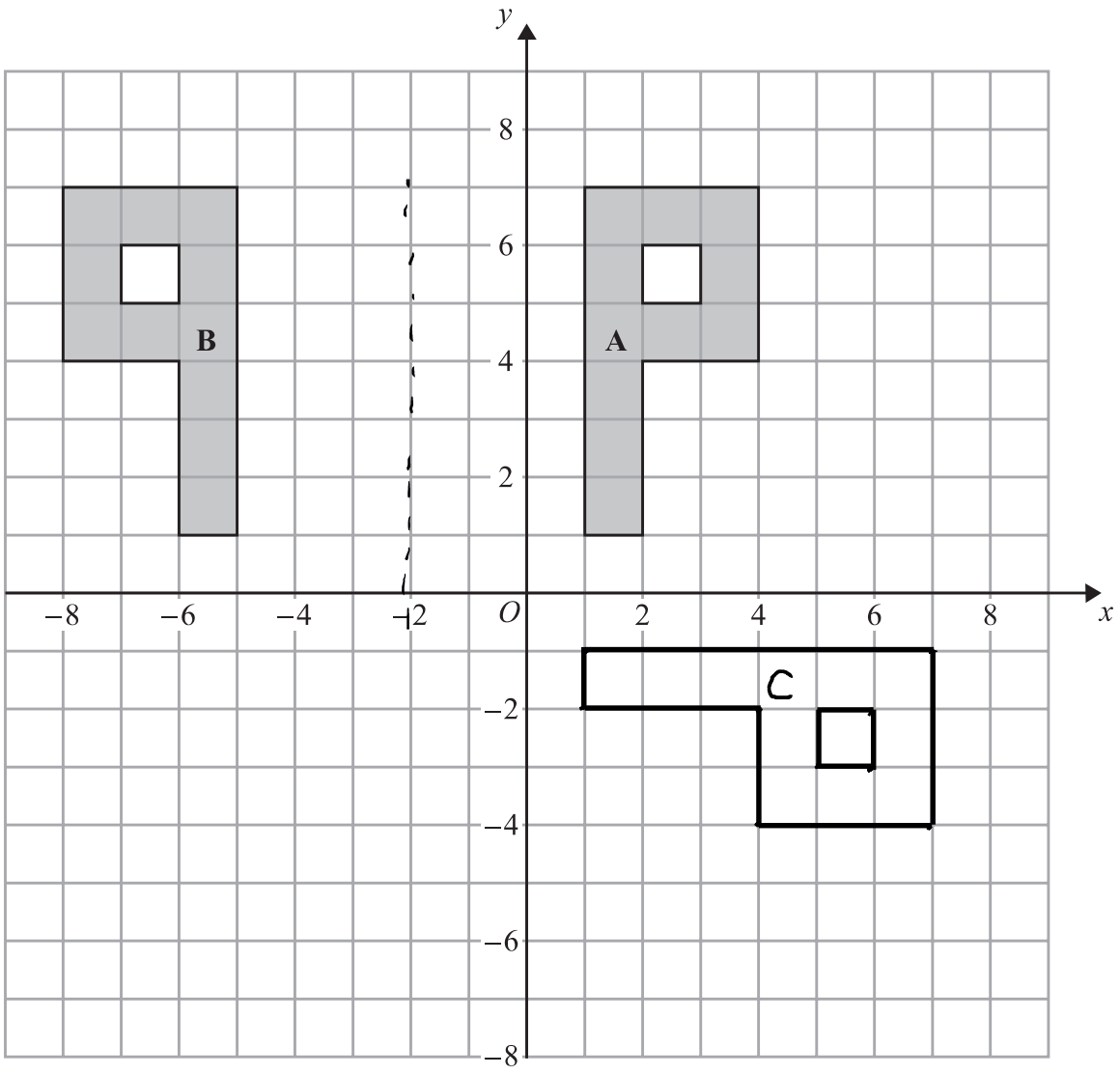
C. Sugar
120g = 20 cookies
360g = 60 cookies

Flour
300g = 20 cookies
900g = 60 cookies

50 cookies

(Total for Question 6 is 3 marks)

7



(a) Describe fully the single transformation that maps shape **A** onto shape **B**.

Reflection in the line $x = -2$

(2)

(b) On the grid, rotate shape **A** 90° clockwise about the origin O.
Label the new shape **C**.

(2)

(Total for Question 7 is 4 marks)

8 A pattern is made using four identical rectangular tiles.

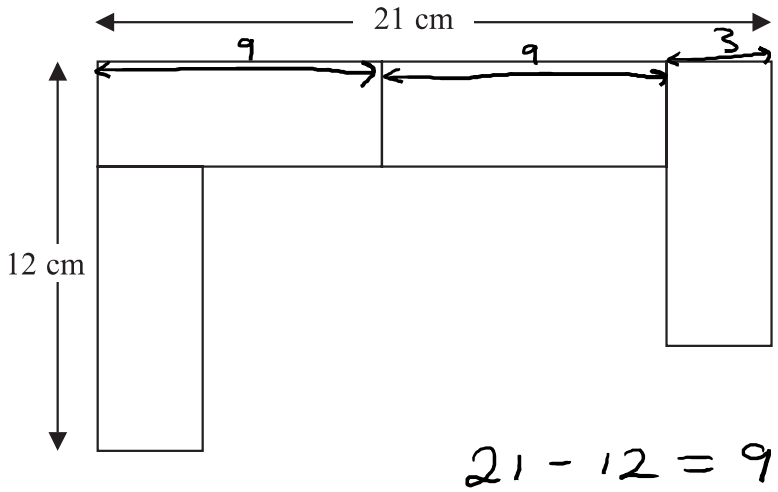


Diagram **NOT** accurately drawn

21 - 12 = 9

Find the total area of the pattern.

9 x 3 = 27 cm² (each rectangle)

27 x 4 = 108 cm²

108 cm²

(Total for Question 8 is 5 marks)

*9 The world speed record for a train is 360 mph.
It takes Malcolm 6 seconds to drive a train 1 kilometre.

Has the train broken the world speed record?
Use 5 miles = 8 km.

1 km in 6 seconds

10 km in 60 seconds (1 min)

600 km in 1 hour

$\frac{600}{8} \times 5$ miles per hour

$\frac{300}{4} \times 5$

$\frac{150}{2} \times 5$

$75 \times 5 = 375$ mph

Malcolm has broken the world speed record

(Total for Question 9 is 5 marks)

10 Work out $\frac{1}{3} \times 4\frac{2}{5}$

Give your answer as a mixed number in its simplest form.

$3\frac{1}{3} \times 4\frac{2}{5}$

$\frac{10}{3} \times \frac{22}{5} = \frac{220}{15} = \frac{440}{30} = \frac{44}{3} = 14\frac{2}{3}$

$14\frac{2}{3}$

(Total for Question 10 is 3 marks)

11 $-2 \leqslant n < 3$

n is an integer.

(a) Write down all the possible values of n.

$-2, -1, 0, 1, 2$

(2)

(b) Solve $4 - x < 2x - 5$

$4 < 3x - 5$

$9 < 3x$

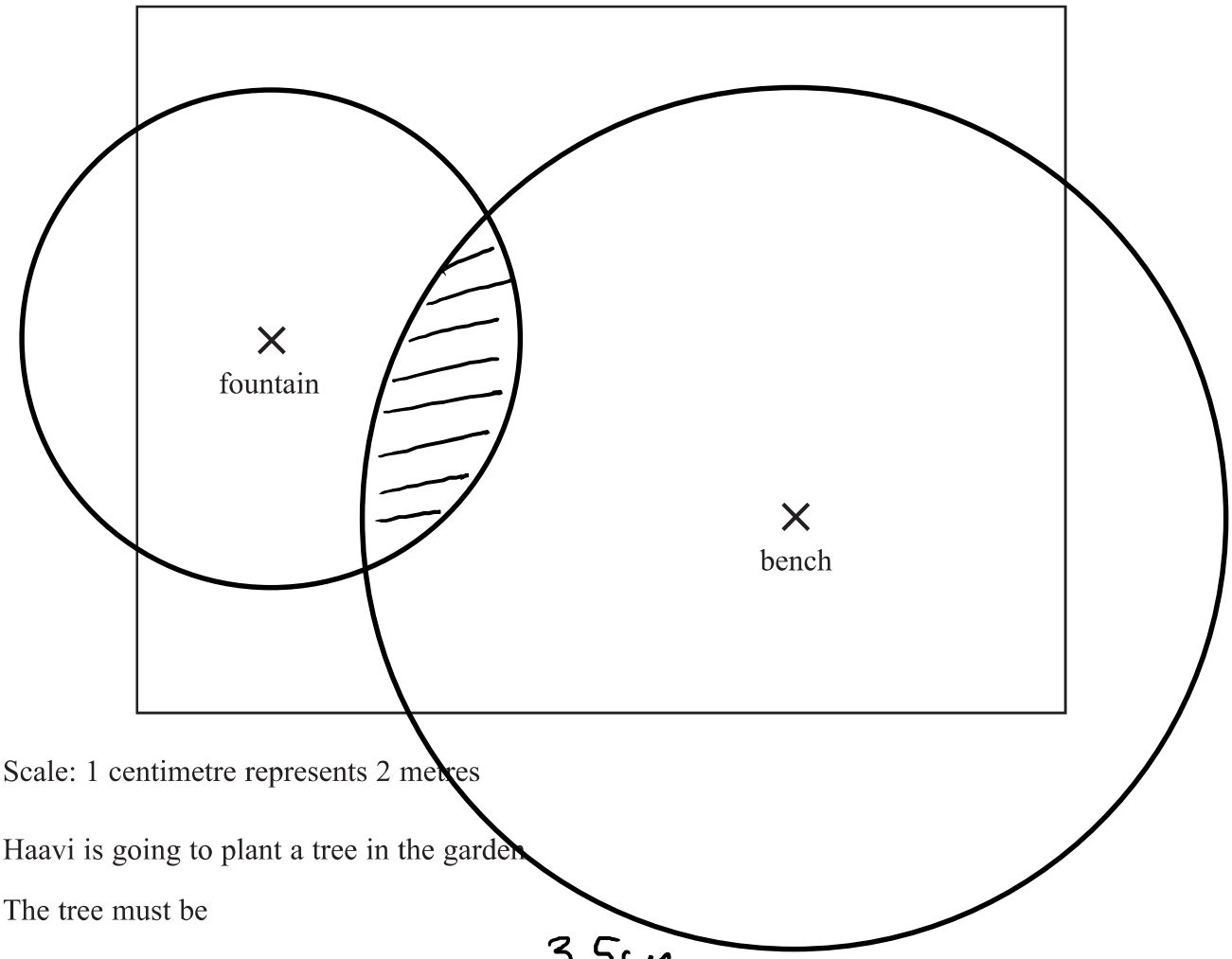
$3 < x$

$x > 3$

(2)

(Total for Question 11 is 4 marks)

12 The diagram shows a scale drawing of a garden.



Scale: 1 centimetre represents 2 metres

Haavi is going to plant a tree in the garden.

The tree must be

less than 7 metres from the fountain, 3.5cm
less than 12 metres from the bench. 6cm

On the diagram show, by shading, the region in which Haavi can plant the tree.

(Total for Question 12 is 3 marks)

13 Stephanie is x years old. x
Tobi is twice as old as Stephanie. $2x$
Ulrika is 3 years younger than Tobi. $2x - 3$

The sum of all their ages is 52 years.

(a) Show that $5x - 3 = 52$

$x + 2x + 2x - 3 = 52$

$5x - 3 = 52$

(3)

(b) Work out the value of x.

$5x - 3 = 52$

$5x = 55$

$x = 11$

$x =$ 11

(2)

(Total for Question 13 is 5 marks)

14 Ali has some packets.

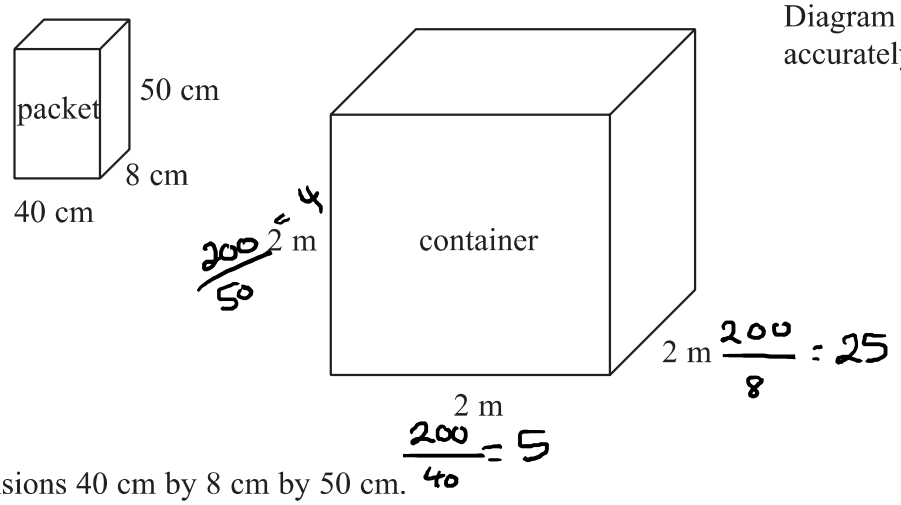


Diagram **NOT** accurately drawn

Each packet has dimensions 40 cm by 8 cm by 50 cm.

Ali fills a container with these packets.
The container is a cube of side 2 m.

Ali fills the container completely with these packets.

Work out the number of packets.

$5 \times 4 \times 25 = 500$

500

(Total for Question 14 is 4 marks)

15 Solve the simultaneous equations

$5y - 4x = 8$ ×1
$y + x = 7$ ×5

Show clear algebraic working.

$5y - 4x = 8$
$5y + 5x = 35$

$9x = 27$

$x = 3$

$y + (3) = 7$

$y = 4$

$x =$ 3

$y =$ 4

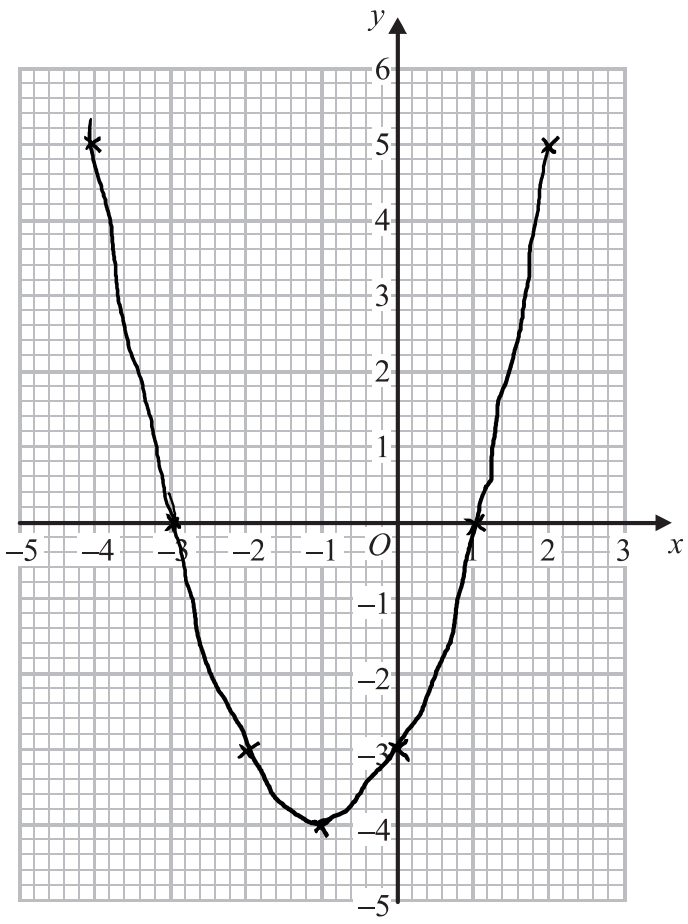
(Total for Question 15 is 3 marks)

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

x	−4	−3	−2	−1	0	1	2
y	5	0	−3	−4	−3	0	5

(2)

(b) On the grid, draw the graph of $y = x^2 + 2x - 3$ for values of x from −4 to 2



(2)

(Total for Question 16 is 4 marks)

Do NOT write in this space.

17 The table gives information about the speed, in km/h, of 180 vehicles passing a speed checkpoint.

Speed (v km/h)	**Frequency**
$40 < v \leqslant 50$	4
$50 < v \leqslant 60$	52
$60 < v \leqslant 70$	60
$70 < v \leqslant 80$	34
$80 < v \leqslant 90$	18
$90 < v \leqslant 100$	12

(a) Write down the modal class.

$60 < v \leqslant 70$

(1)

(b) Work out an estimate for the probability that the next vehicle passing the speed checkpoint will have a speed of 60 km/h or less.

$\frac{56}{180}$

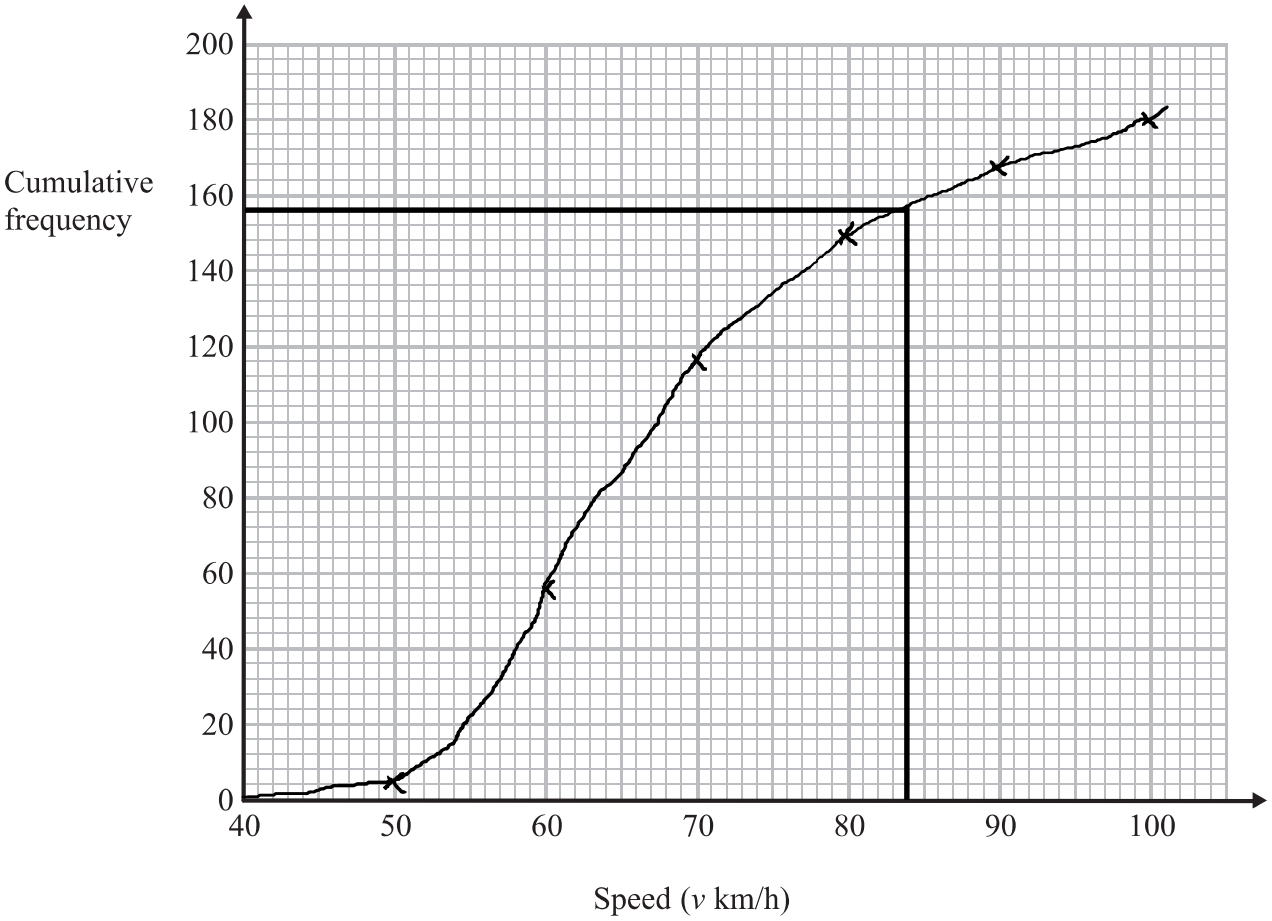
(2)

(c) Complete the cumulative frequency table.

Speed (v km/h)	**Cumulative frequency**
$40 < v \leqslant 50$	4
$40 < v \leqslant 60$	56
$40 < v \leqslant 70$	116
$40 < v \leqslant 80$	150
$40 < v \leqslant 90$	168
$40 < v \leqslant 100$	180

(1)

(d) On the grid, draw a cumulative frequency graph for your table.



(2)

(e) The police decide to fine the driver of any vehicle passing the speed checkpoint at a speed of more than 84 km/h.
Use your graph to find an estimate for the number of drivers the police decide to fine.
Show your method clearly.

180 - 156

24

(2)

(Total for Question 17 is 8 marks)

18 (a) Write 450 000 in standard form.

4.5×10^5

(1)

(b) Write 3.2×10^{-4} as an ordinary number.

0.00032

(1)

(c) Work out $\sqrt[3]{6.4 \times 10^{10}}$

$\sqrt[3]{64 \times 10^9}$

$= 4 \times 10^3$ or 4000

4000

(1)

(Total for Question 18 is 3 marks)

19

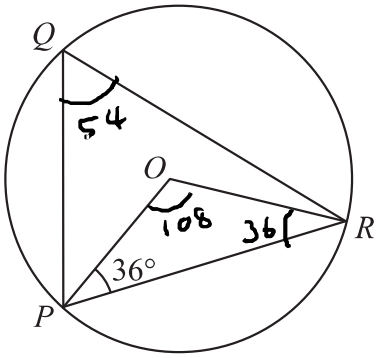


Diagram **NOT** accurately drawn

(a) *P*, *Q* and *R* are points on a circle, centre *O*.
Angle *OPR* = 36°

Work out the size of angle *PQR*.

54 °

(2)

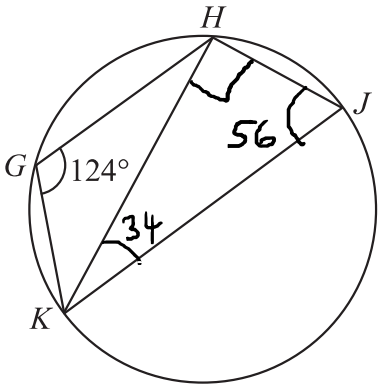


Diagram **NOT** accurately drawn

(b) *G*, *H*, *J* and *K* are points on a circle.
KJ is a diameter of the circle.
Angle *KGH* = 124°

Work out the size of angle *HKJ*.

34 °

(3)

(Total for Question 19 is 5 marks)

20 Express the recurring decimal $0.1\dot{5}$ as a fraction.

$0.1\dot{5} = x$

$1.\dot{5} = 10x$

$15.\dot{5} = 100x$

$14 = 90x$

$\frac{14}{90} = x$

$\frac{7}{45} = x$

$\frac{7}{45}$

(Total for Question 20 is 3 marks)

21 Write $(5 - \sqrt{5})^2$ in the form $a + b\sqrt{5}$, where a and b are integers.

$(5 - \sqrt{5})(5 - \sqrt{5})$

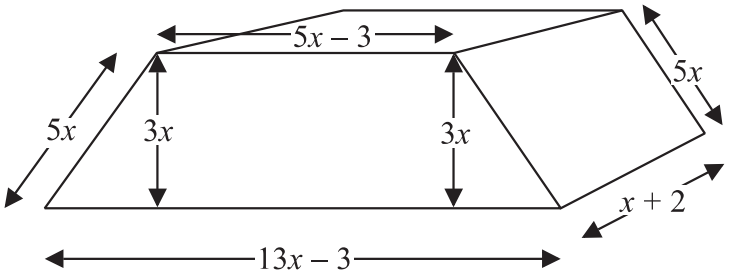
$25 - 5\sqrt{5} - 5\sqrt{5} + 5$

$30 - 10\sqrt{5}$

(Total for Question 21 is 2 marks)

***22** This shape is a solid prism.
The cross section of the prism is a trapezium.

Diagram **NOT** accurately drawn



Show that the total surface area of the prism is $82x^2 + 32x - 12$

Front $= \frac{1}{2}(5x-3+13x-3) \times 3x$

$= \frac{1}{2}(18x-6) \times 3x$

$= (9x-3)3x$

$= 27x^2 - 9x$ (and back)

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

$= 5x^2 + 10x - 3x - 6$

$= 5x^2 + 7x - 6$

Bottom $= (13x-3)(x+2)$

$= 13x^2 + 26x - 3x - 6$

$= 13x^2 + 23x - 6$

Side $= 5x(x+2)$

$= 5x^2 + 10x$ (and other side)

Total $= 2(27x^2 - 9x) + 5x^2 + 7x - 6 + 13x^2 + 23x - 6 + 2(5x^2 + 10x)$

$= 54x^2 - 18x + 5x^2 + 7x - 6 + 13x^2 + 23x - 6 + 10x^2 + 20x$

$= 82x^2 + 32x - 12$

(Total for Question 22 is 4 marks)

23 The straight line **L** has equation $y = 2x - 5$

Find an equation of the straight line perpendicular to **L** which passes through (–2, 3).

x y

perp gradient = $-\frac{1}{2}$

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

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

$3 = 1 + c$

$c = 2$

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

(Total for Question 23 is 3 marks)

24 The diagram shows a regular hexagon *OABCDE*.

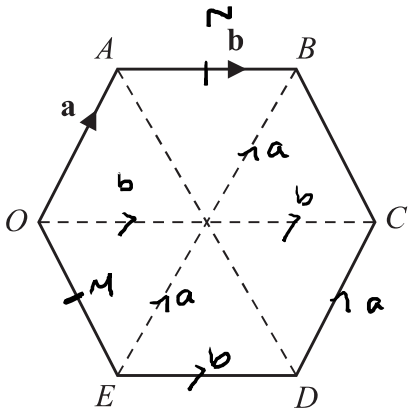


Diagram **NOT** accurately drawn

$\overrightarrow{OA} = \mathbf{a}$

$\overrightarrow{AB} = \mathbf{b}$

M is the midpoint of *OE*.
N is the midpoint of *AB*.

(a) Find $\overrightarrow{MN}$ in terms of **a** and/or **b**.

$\overrightarrow{ED} = a - b$

$\overrightarrow{MO} = \frac{1}{2}a - \frac{1}{2}b$

$\overrightarrow{MN} = \overrightarrow{MO} + \overrightarrow{OA} + \frac{1}{2}\overrightarrow{AB}$

$= \frac{1}{2}a - \frac{1}{2}b + a + \frac{1}{2}b$

$= \frac{3}{2}a$

$\overrightarrow{MN} = \frac{3}{2}a$

(3)

(b) Describe fully what your answer to part (a) shows about the lines *OA* and *MN*.

the lines are parallel because $\overrightarrow{MN}$ is a multiple of $\overrightarrow{OA}$

(2)

(Total for Question 24 is 5 marks)

25 Simplify fully $\dfrac{3x^2 - 6x}{x^2 + 2x - 8}$

$$\frac{3x(x-2)}{(x+4)(x-2)}$$

$$\frac{3x}{x+4}$$

$\dfrac{3x}{x+4}$

(Total for Question 25 is 3 marks)

TOTAL FOR PAPER IS 100 MARKS