Write your name here

Surname	Other names

Pearson Edexcel GCSE

Centre Number | | | | | |

Candidate Number | | | | |

May/June 2017 Predicted Paper 1

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

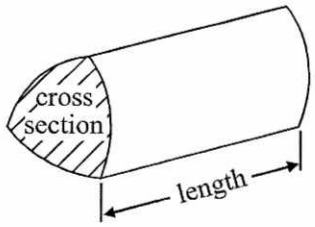
- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

GCSE Mathematics 1MA0

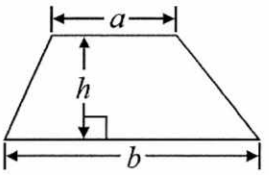
Formulae: Higher Tier

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

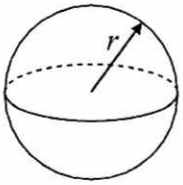


Area of trapezium $= \frac{1}{2}(a+b)h$



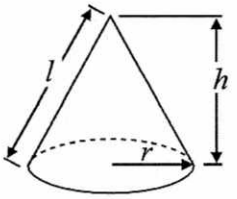
Volume of sphere $= \frac{4}{3}\pi r^3$

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

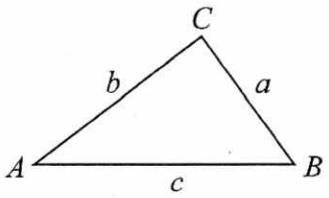


Volume of cone $= \frac{1}{3}\pi r^2 h$

Curved surface area of cone $= \pi rl$



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 Zack is doing a survey to find out how much time students spend listening to music.
He is going to ask 10 of the boys who play in a school band.

This may **not** be a good sample for Zack's survey.

(a) Give a reason why.

- Sample size too small

or - they play in a band so they are not a good sample (may listen to music more) (1)

Zack is going to use a questionnaire to find out how much time students spend listening to music.

(b) Design a suitable question for Zack to use on his questionnaire.

How much time do you spend listening to music a week?

☐ 0 ☐ 1-2 hours ☐ 3-4 hours ☐ 5 or more hours

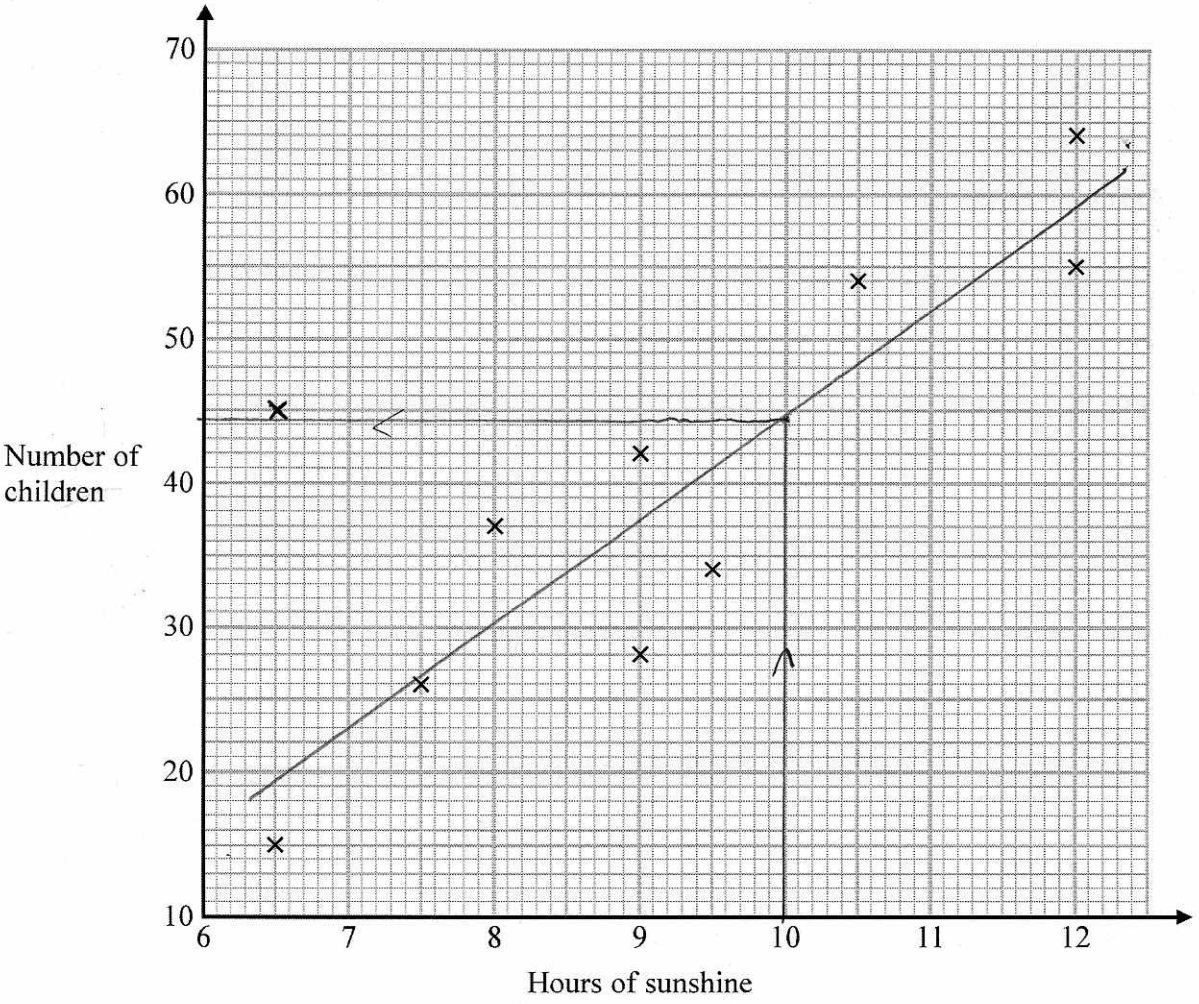
(2)

(Total for Question 1 is 3 marks)

2 Sally looks after a children's paddling pool in a park.

Each day, Sally records the number of hours of sunshine and the number of children who use the paddling pool.

The scatter graph shows this information.



(a) Describe the correlation between the number of children who use the paddling pool and the number of hours of sunshine.

As the number of hours of sunshine increases the number of children using the pool increases

positive

(1)

One day there were 10 hours of sunshine.

(b) Estimate how many children used the paddling pool.

45

(2)

On another day, there were 6.5 hours of sunshine and 45 children used the pool.

(c) (i) Show this information on the scatter graph.

This point is isolated on the scatter graph.

(ii) Explain what may have happened on this day.

There may have been a special event on that day.

(2)

(Total for Question 2 is 5 marks)

3 Alex is x cm tall. x

Bob is 10 cm taller than Alex. $x + 10$

Cath is 4 cm shorter than Alex. $x - 4$

Write an expression, in terms of x, for the mean of their heights in centimetres.

$$\frac{x + x + 10 + x - 4}{3}$$

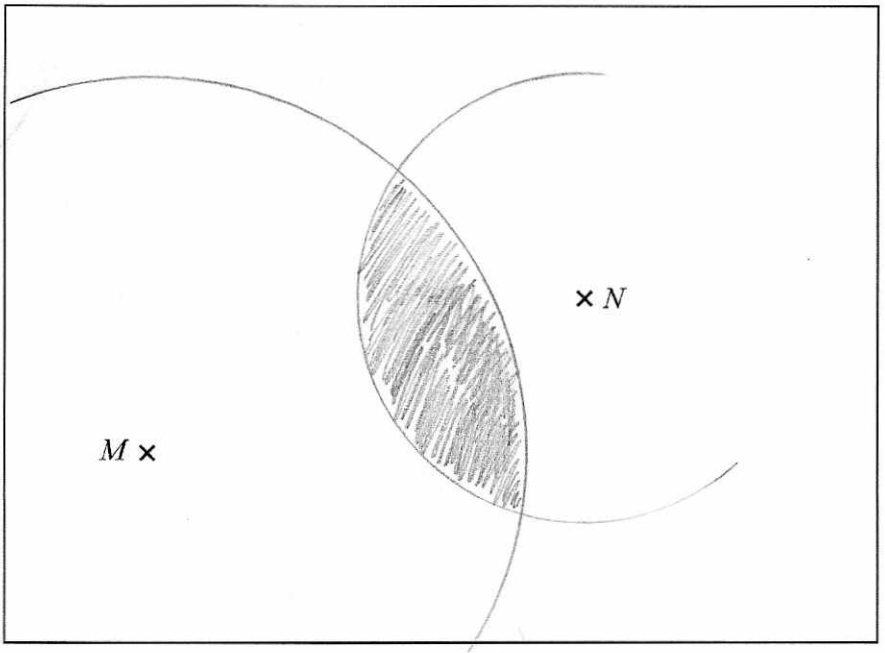
$$\frac{3x + 6}{3}$$

$x + 2$

(Total for Question 3 is 3 marks)

4 Here is a map.
The map shows two towns Marlford (M) and Newborough (N).

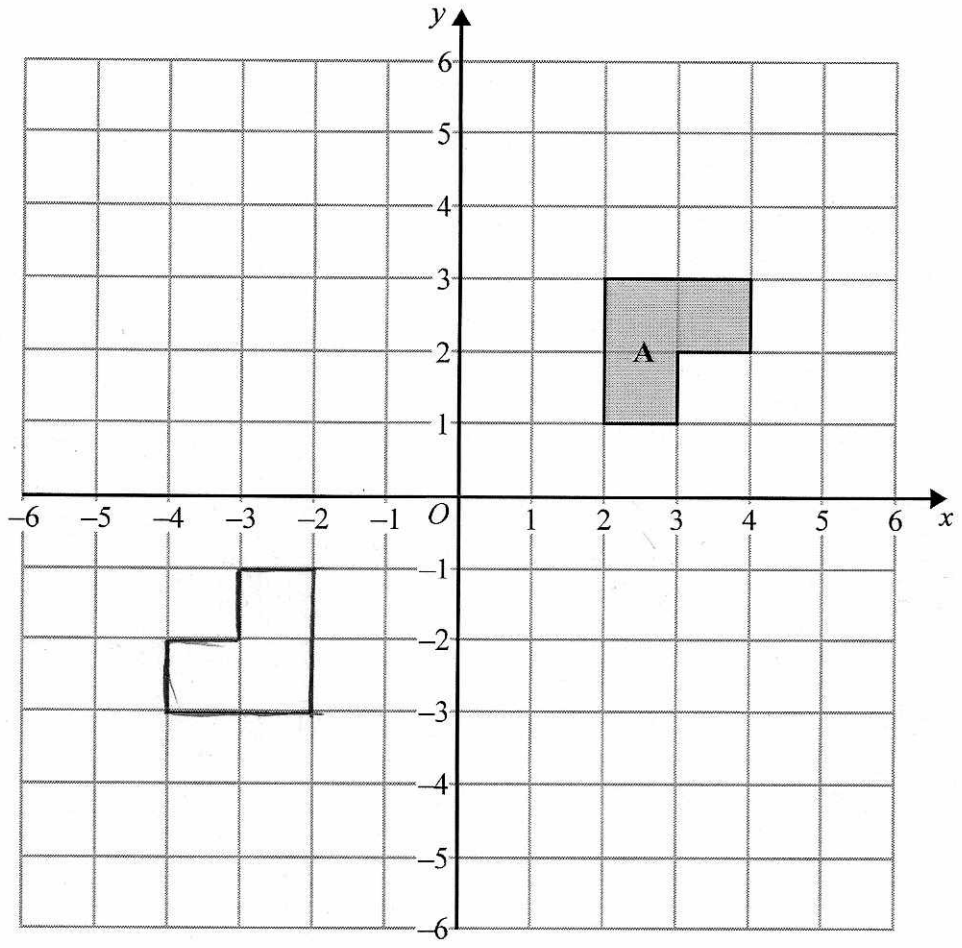
A company is going to build a supermarket.
The supermarket will be more than 10 km from Marlford and less than 6 km from Newborough.
5cm 3cm
Find and shade the region on the map where the company can build the supermarket.



Scale: 1 cm represents 2 km.

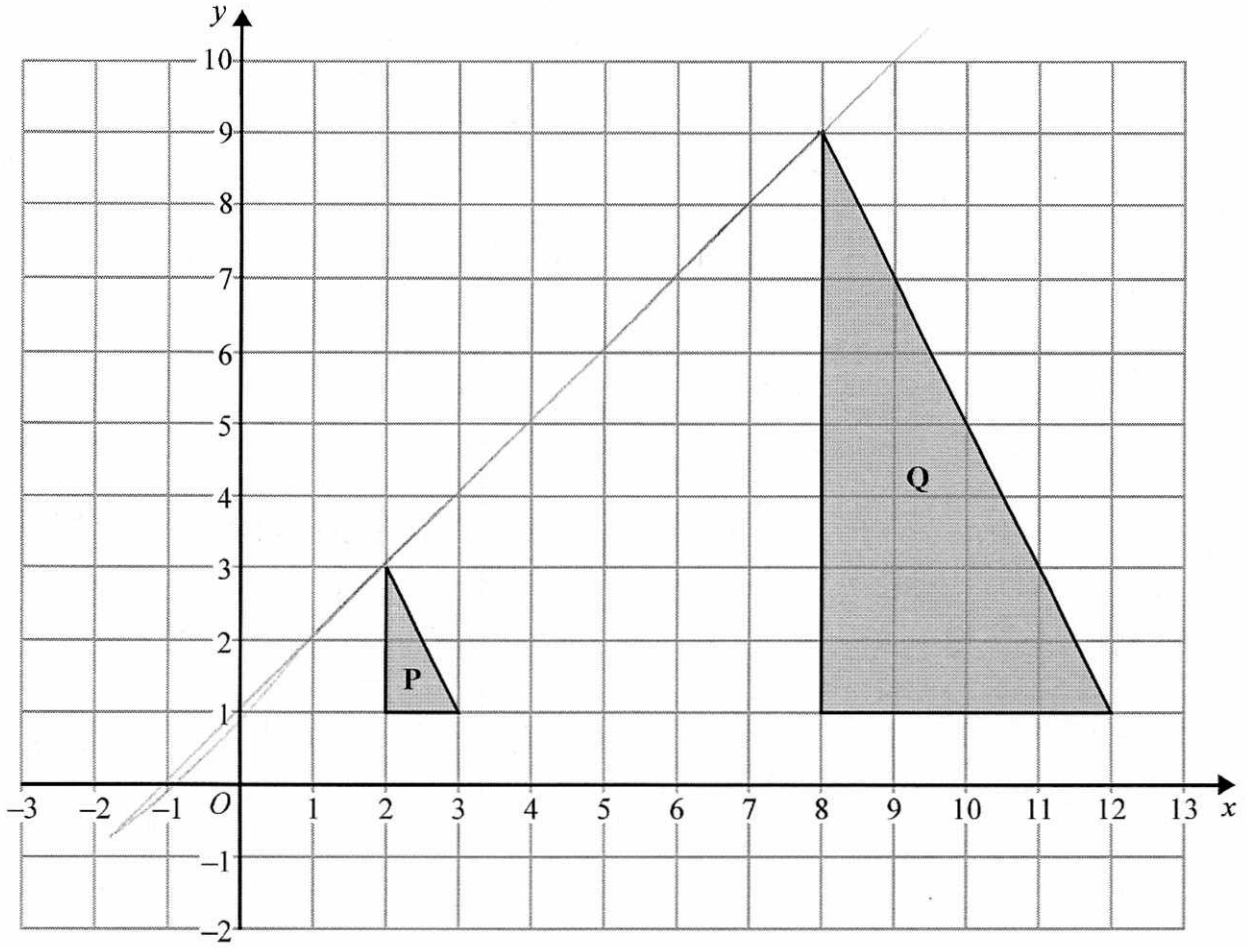
(Total for Question 4 is 3 marks)

5



(a) Rotate shape **A** 180° about the point (0, 0).

(2)



(b) Describe fully the single transformation which maps triangle **P** onto triangle **Q**.

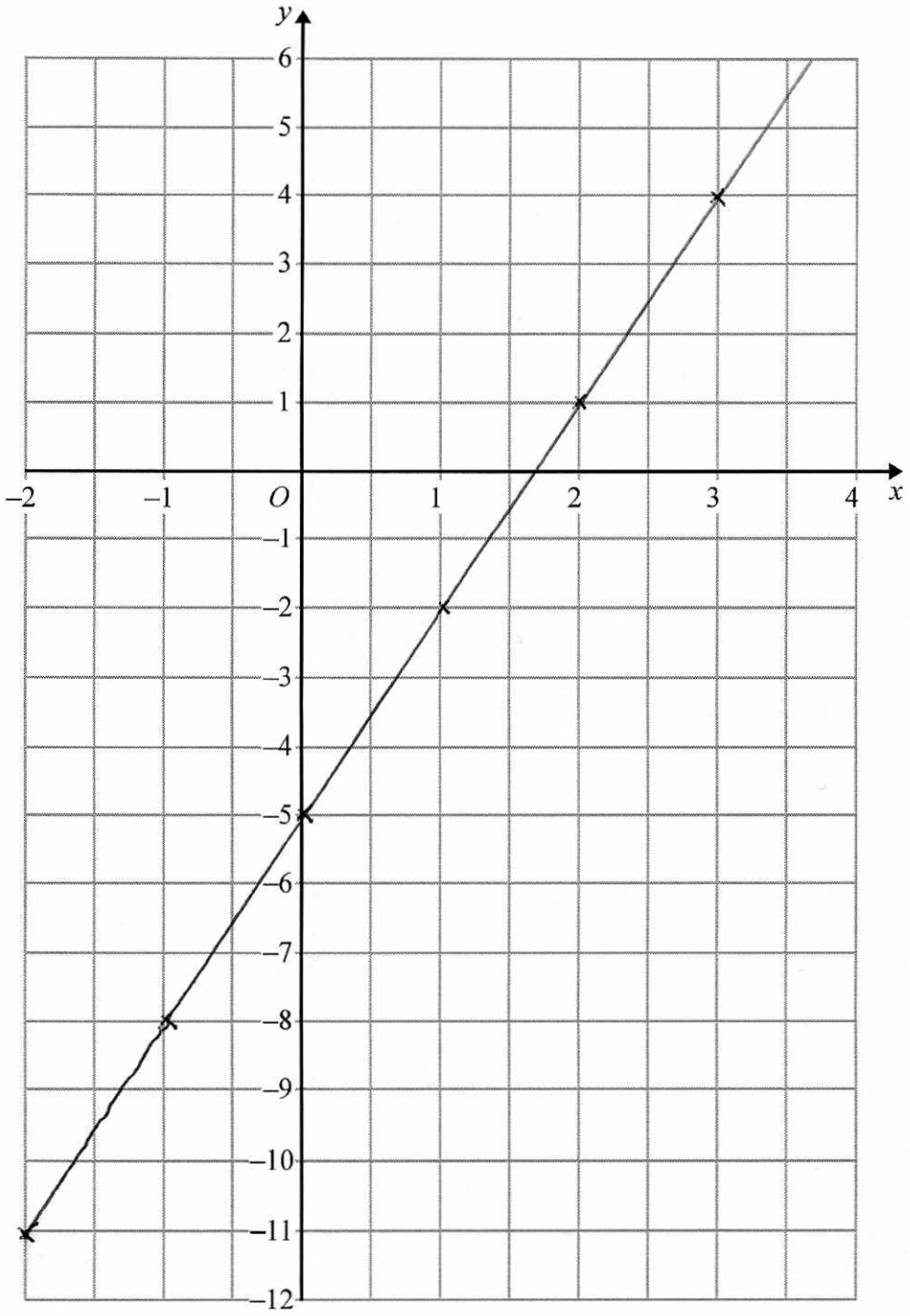
enlargement, scale factor 4, centre (-1, 0)

(3)

(Total for Question 5 is 5 marks)

6 On the grid, draw the graph of $y = 3x - 5$ for values of x from -2 to 3

x	-2	-1	0	1	2	3
y	-11	-8	-5	-2	1	4



(Total for Question 6 is 4 marks)

7 Sally has £520
Katie has £360

Sally and Katie are each going to give 15% of their money to charity.

Work out the total amount of money they give to charity.

Sally

520 ÷ 10 = 52 (10%)

÷2 26 (5%)

52 + 26 £78 (15%)

Katie

360 ÷ 10 = 36 (10%)

÷2 18 (5%)

36 + 18 £54 (15%)

78
+ 54
132

£ 132

(Total for Question 7 is 3 marks)

8 $p = n^3 - 5$
$n = 2$

Work out the value of p.

$(2)^3 - 5$

$8 - 5$

3

(Total for Question 8 is 2 marks)

9 Stephanie uses her grandmother's recipe to make apple amber.
Here is the list of ingredients to make 8 portions.

Apple amber (makes 8 portions)
$2\frac{1}{2}$ pounds apples
10 ounces sugar
4 eggs

4 PORTIONS

$1\frac{1}{4}$

5

2

Stephanie wants to make 12 portions of apple amber.

(a) Work out how much sugar she needs.

15 ounces

(2)

Stephanie has 2kg of apples. 1kg = 2.2 pounds

(b) Show that she has enough apples to make 12 portions of apple amber.
You must show your working.

$2\frac{1}{2} + 1\frac{1}{4}$

$\frac{5}{2} + \frac{5}{4}$

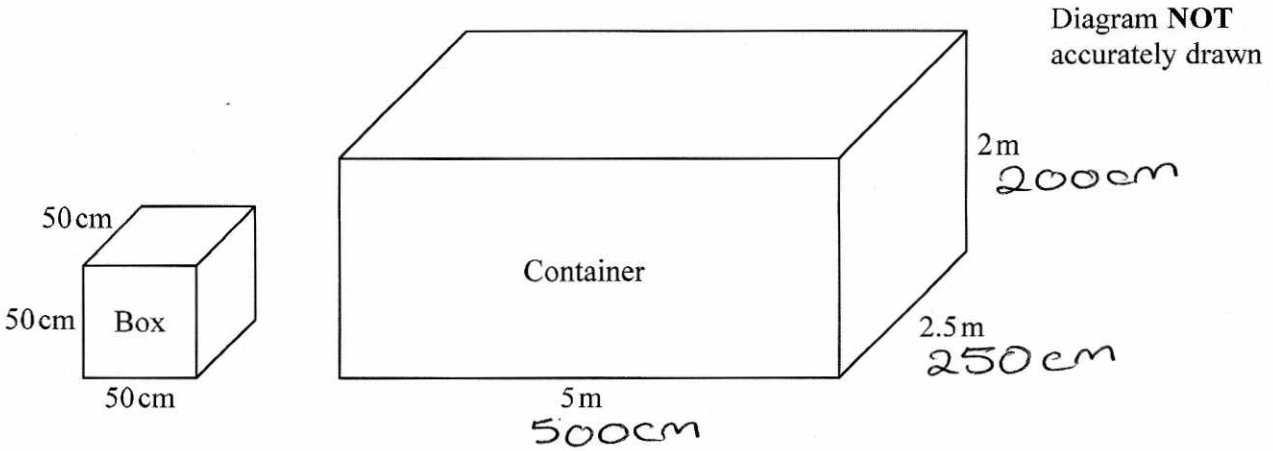
$\frac{10}{4} + \frac{5}{4} = \frac{15}{4} = 3\frac{3}{4}$ pounds

2kg ≈ 4.4 pounds She has enough.

(3)

(Total for Question 9 is 5 marks)

10



Chao transports microwave ovens from China to the UK.

He puts each microwave oven in a box.
Each box is a cube of side 50cm.

He then puts each box in a container.
Each container is a cuboid of size 5m by 2.5m by 2m.

Chao has 500 boxes.
He has 3 containers.

Will the 500 boxes fit into these 3 containers?

$\frac{500}{50} = 10$ (across)

$\frac{250}{50} = 5$ (back)

$\frac{200}{50} = 4$ (up)

$10 \times 5 \times 4 = 200$ boxes per container

$200 \times 3 = 600$ (in 3 containers)

Yes

(Total for Question 10 is 4 marks)

11

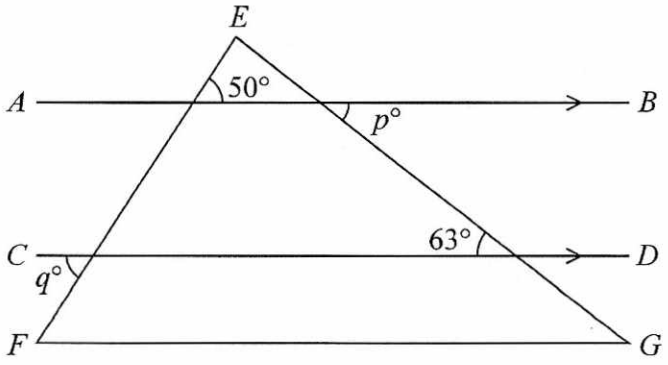


Diagram **NOT** accurately drawn

EFG is a triangle.
AB is parallel to *CD*.

(a) Write down the value of p

$p =$ 63

(1)

(b) Write down the value of q

$q =$ 50

(1)

Here is a hexagon.

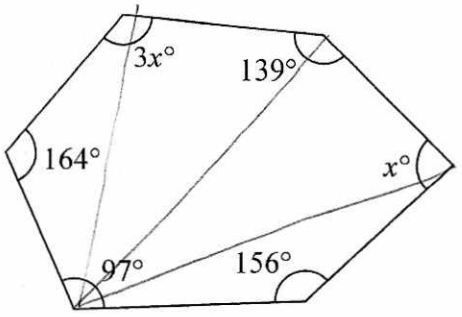


Diagram **NOT** accurately drawn

(c) Work out the value of x

$4 \times 180 = 720°$

164
97
156
139
556

$556 + 4x = 720$
$-556 \quad -556$
$4x = 164$
$x = 41$

$x =$ 41

(3)

(Total for Question 11 is 5 marks)

12 Shelley sells books.

On Saturday she is going to give a free book mark and a free dust cover with each book she sells.
All the books are the same size.

Shelley needs to buy the book marks and the dust covers.

Book marks come in boxes.
Each box contains 24 book marks.

Dust covers come in packs.
Each pack contains 36 dust covers.

Shelley wants to have enough book marks and dust covers for 250 books.
She buys exactly the same number of book marks and dust covers.

Work out the number of boxes of book marks and the number of packs of dust covers she buys.
You must show all your working.

LCM of 24 and 36

24 48 (72)

36 (72)

72 (3 Book Marks, 2 Dust Covers)

144 (6 BM, 4 DC)

216 (9 BM, 6 DC)

(288) (12 BM, 8 DC)

12 boxes of book marks

8 packs of dust covers

(Total for Question 12 is 4 marks)

13 (a) Simplify $a^4 \times a^3$

a^7

(1)

(b) Simplify $(b^2)^7$

b^{14}

(1)

(c) Write down the value of 3^0

1

(1)

(d) Write down the value of 4^{-1}

$\frac{1}{4}$

(1)

(Total for Question 13 is 4 marks)

14 (a) Write 0.000 59 in standard form.

5.9×10^{-4}

(1)

(b) Write 3.8×10^5 as an ordinary number.

380000

(1)

(Total for Question 14 is 2 marks)

15 The frequency table shows information about the weights of 80 adults.

Weight (w kg)	Frequency
$40 < w \leqslant 50$	4
$50 < w \leqslant 60$	7
$60 < w \leqslant 70$	21
$70 < w \leqslant 80$	21
$80 < w \leqslant 90$	18
$90 < w \leqslant 100$	7
$100 < w \leqslant 110$	2

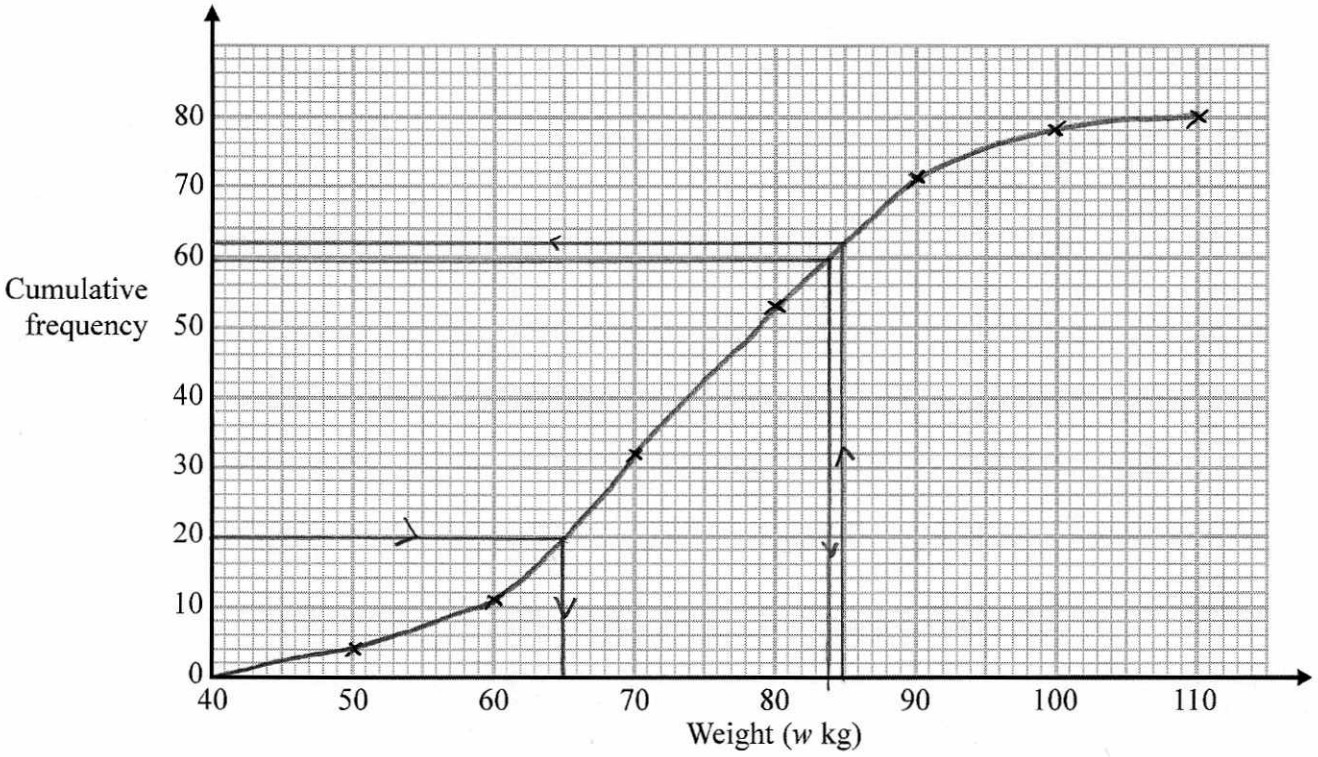
(a) Complete the cumulative frequency table.

Weight (w kg)	Cumulative frequency
$40 < w \leqslant 50$	4
$40 < w \leqslant 60$	11
$40 < w \leqslant 70$	32
$40 < w \leqslant 80$	53
$40 < w \leqslant 90$	71
$40 < w \leqslant 100$	78
$40 < w \leqslant 110$	80

(1)

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

(2)



(c) Use your graph to find an estimate for the number of adults with weight more than 85 kg.

80 - 62

18

(2)

(d) Use your graph to find an estimate for the interquartile range of the weights of the adults.

84 - 65

19 kg

(2)

(Total for Question 15 is 7 marks)

16 (a) Factorise $2ax - 2ay + bx - by$

$(2a + b)(x - y)$

(2)

(b) Expand and simplify $(n + 2)^2 + (n - 3)^2$

$(n+2)(n+2) + (n-3)(n-3)$

$n^2 + 2n + 2n + 4 + n^2 - 3n - 3n + 9$

$2n^2 - 2n + 13$

(3)

(Total for Question 16 is 5 marks)

17 In a sale, all normal prices are reduced by 20%

(a) The normal price of a television set is 485 euros.
Work out the sale price of the television set.

485 ÷ 10 = 48.5

10% = 48.5

20% = €97

$$\begin{array}{r} 485 \\ -\ 97 \\ \hline 388 \end{array}$$

388 euros

(3)

(b) In the sale, the normal price of a tablet computer is reduced by 79 euros.
Work out the normal price of the tablet computer.

79 = 20%

×5 ×5

395 = 100%

	70	9
5	350	45

395 euros

(3)

(Total for Question 17 is 6 marks)

18 Solve the simultaneous equations

$4x + 2y = 7$ $\times 3$
$3x - 5y = -24$ $\times 4$

$12x + 6y = 21$
$12x - 20y = -96$

$26y = 117$

$y = \frac{117}{26} \overset{\div 13}{=} \frac{9}{2}$

$4x + 2\left(\frac{9}{2}\right) = 7$

$4x + 9 = 7$

$4x = -2$

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

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

$y =$ $\frac{9}{2}$

(Total for Question 18 is 4 marks)

19 PQR is an isosceles triangle.

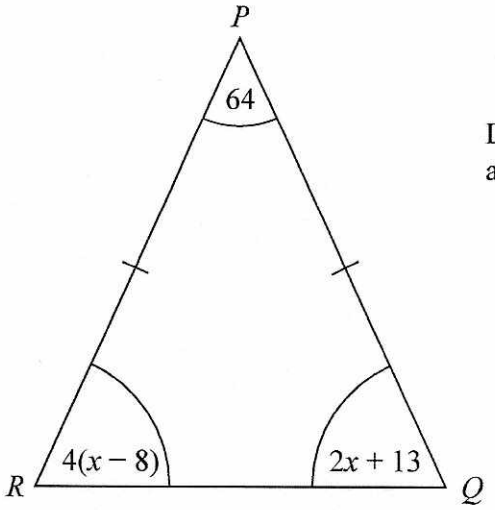


Diagram **NOT** accurately drawn

$PQ = PR$
All the angles are in degrees.

Work out the value of x.

$4(x - 8) = 2x + 13$

$4x - 32 = 2x + 13$

$2x - 32 = 13$

$2x = 45$

$x = 22.5$

$x =$ 22.5

(Total for Question 19 is 4 marks)

20 (a) Write $\frac{x+3}{5} + \frac{x-2}{3}$ as a single fraction in its simplest form.

×3 ×5
×3 ×5

$$\frac{3(x+3)}{15} + \frac{5(x-2)}{15}$$

$$\frac{3x+9+5x-10}{15}$$

$$\frac{8x-1}{15}$$

$\frac{8x-1}{15}$

(3)

(b) Simplify $(8a^9e^6)^{\frac{1}{3}}$

$2a^3e^2$

(2)

(c) Solve $\frac{2}{3}y + \frac{3}{8}y = 5$

Show clear algebraic working.

×24 ×24 ×24

$$\frac{2}{3}y + \frac{3}{8}y = 5$$

$$\frac{48}{3}y + \frac{72}{8}y = 120$$

$$16y + 9y = 120$$

$$25y = 120$$

$$y = \frac{120}{25} = \frac{24}{5}$$

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

(3)

(Total for Question 20 is 8 marks)

21

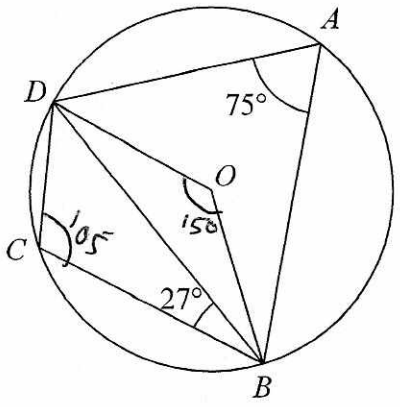


Diagram **NOT** accurately drawn

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

Angle *DAB* = 75°
Angle *DBC* = 27°

Work out the size of angle *ODC*.

$D\hat{C}B = 105^\circ$ (opposite angles in a cyclic quadrilateral)

$D\hat{O}B = 150^\circ$ (angle at centre double angle at circumference

$C\hat{D}B = 180 - 105 - 27$

$180 - 132 = 48^\circ$

$O\hat{D}B = \frac{180 - 150}{2} = 15^\circ$

$48 + 15 = 63^\circ$

63 °

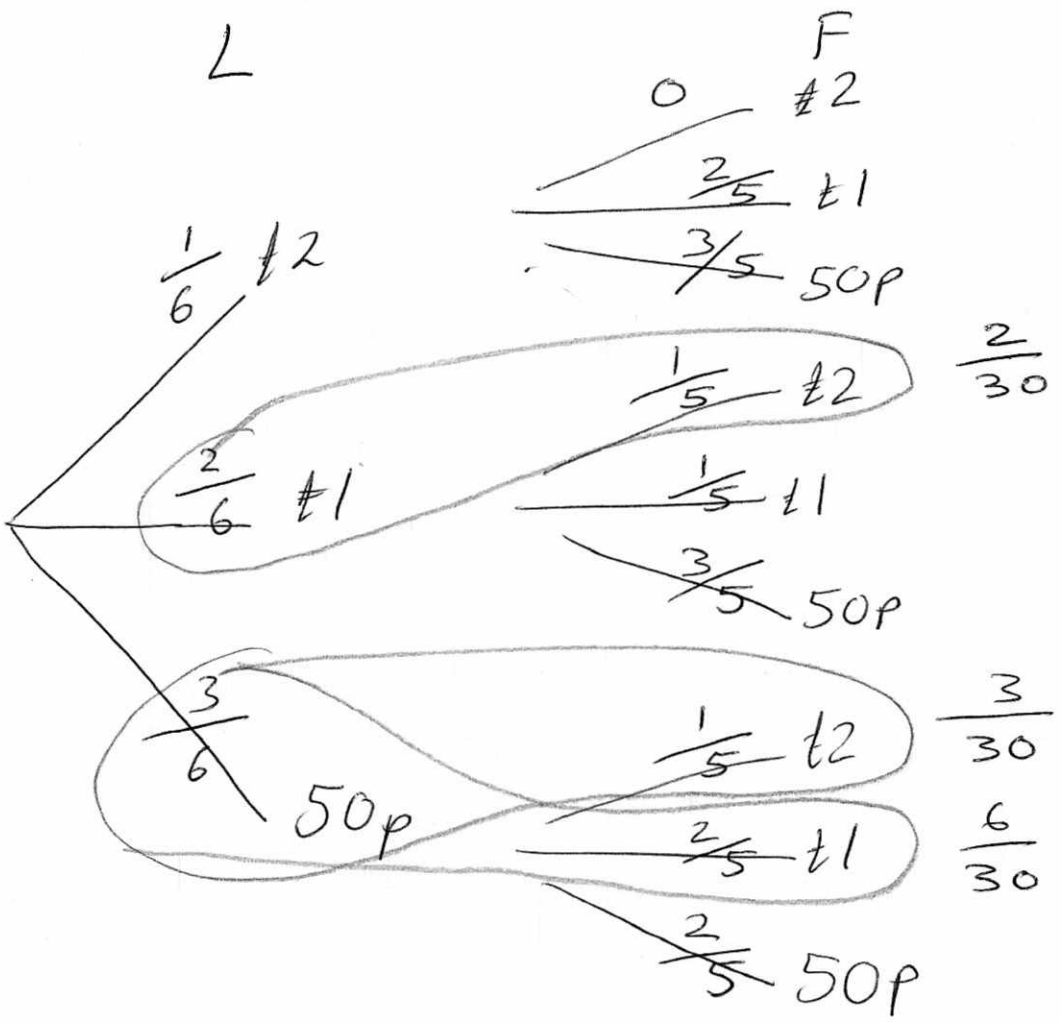
(Total for Question 21 is 4 marks)

22 There are six coins in a bag.
The value of each coin is shown below.

£2 £1 £1 50p 50p 50p

Laura takes at random a coin from the bag and keeps it.
Fahmida then takes at random a coin from the bag and keeps it.

Calculate the probability that Fahmida's coin has a greater value than Laura's coin.

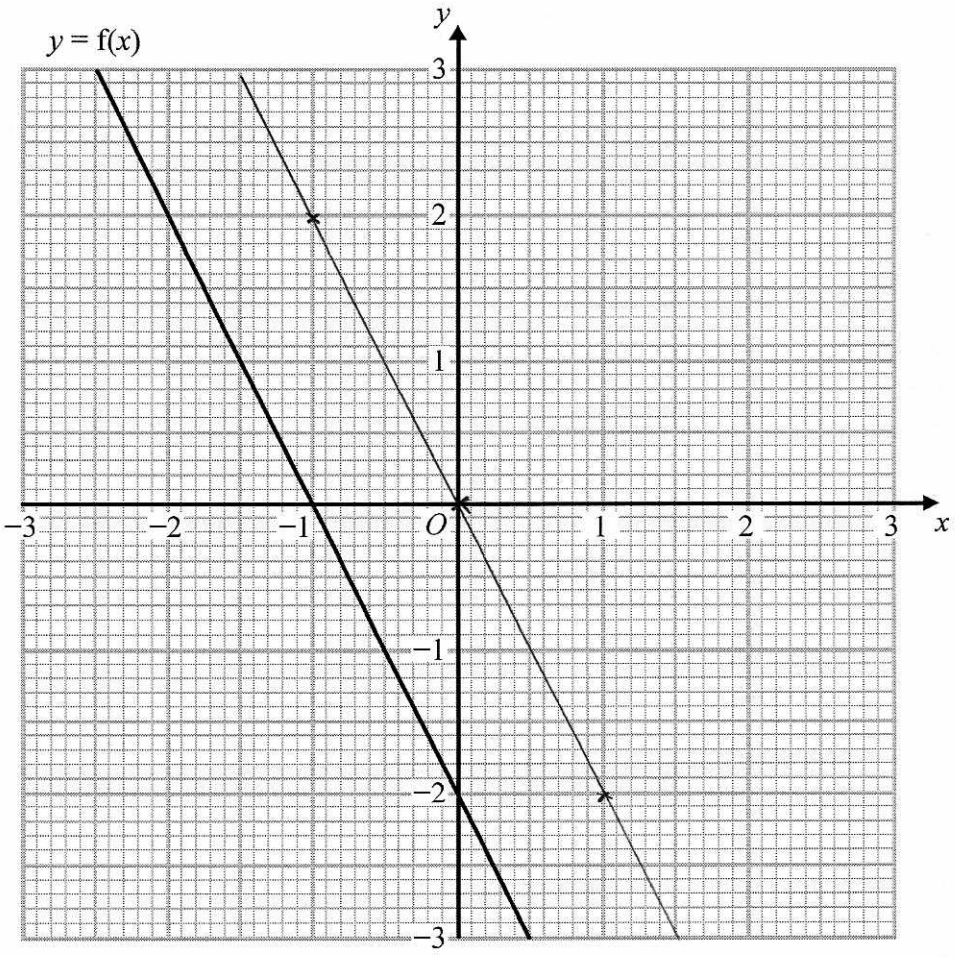


$\frac{2}{30} + \frac{3}{30} + \frac{6}{30}$

$\frac{11}{30}$

(Total for Question 22 is 3 marks)

23 Here is the graph of $y = f(x)$.



(a) Write down the coordinates of the point where the graph of $y = \frac{1}{2}f(x)$ meets the y-axis.

(0 , −1)

(1)

(b) On the grid, draw the graph of $y = f(x - 1)$.

(2)

(Total for Question 23 is 3 marks)

***24**

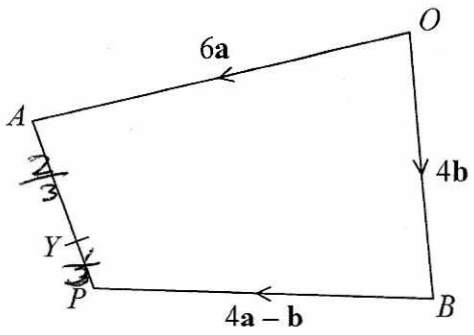


Diagram **NOT** accurately drawn

OBPA is a quadrilateral.

$\overrightarrow{OA} = \mathbf{6a}$

$\overrightarrow{OB} = \mathbf{4b}$

$\overrightarrow{BP} = \mathbf{4a - b}$

Y is the point on *AP* such that *AY* : *YP* = 2 : 1

Show that $\overrightarrow{OY}$ is parallel to the vector $\mathbf{7a + 3b}$

$\overrightarrow{AP} = -6a + 4b + 4a - b$

$= -2a + 3b$

$\overrightarrow{OY} = \overrightarrow{OA} + \frac{2}{3}\overrightarrow{AY}$

$= 6a + \frac{2}{3}(-2a + 3b)$

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

$= \frac{18}{3}a - \frac{4}{3}a + 2b$

$= \frac{14}{3}a + 2b$

$= \frac{2}{3}(7a + 3b)$

multiple of $7a + 3b$ ∴ parallel

(Total for Question 24 is 4 marks)

TOTAL FOR PAPER IS 100 MARKS