

1 A carton of fruit juice contains apple, orange, pineapple and tropical juices.

(a) They are mixed in the ratio

$$\text{apple : orange : pineapple : tropical} = 9 : 7 : 4 : 5.$$

The carton contains 540 millilitres of apple juice.

(i) Show that the total amount of fruit juice in the carton is 1.5 **litres**.

Answer(a)(i)

[3]

(ii) Calculate the amount of tropical juice in the carton.
Give your answer in millilitres.

Answer(a)(ii) ml [2]

(iii) 70% of the tropical juice is mango.

Calculate the amount of mango juice in the carton.

Answer(a)(iii) ml [2]

(b) A shopkeeper pays \$36 for 16 cartons.

(i) How much does he pay for one carton?

Answer(b)(i) \$..... [1]

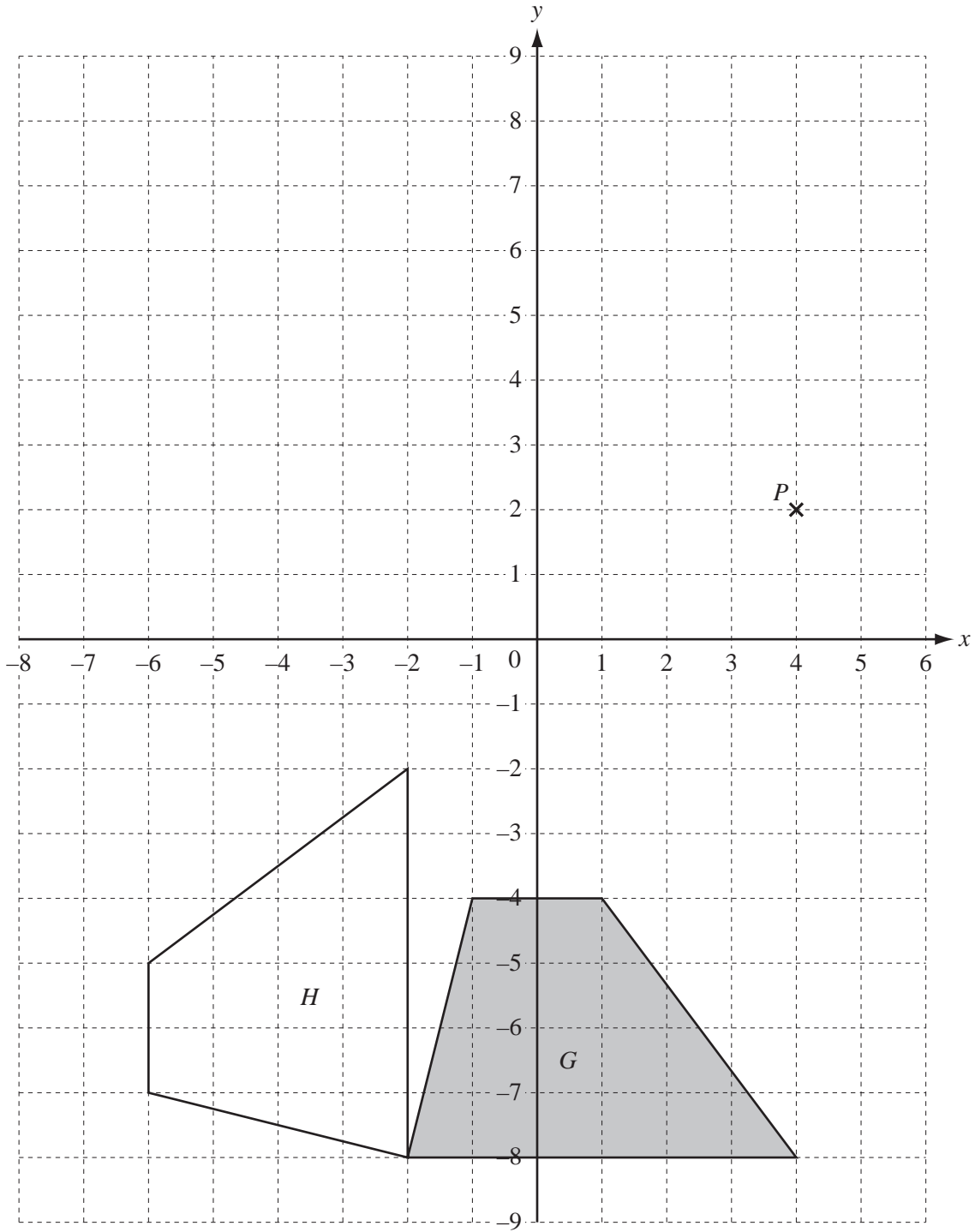
(ii) He sells $\frac{7}{8}$ of the 16 cartons for \$3.40 each and the rest for \$2.50 each.

Calculate the total amount he receives from selling the cartons.

Answer(b)(ii) \$..... [2]

(iii) Calculate his percentage profit.

Answer(b)(iii)% [3]



Two congruent quadrilaterals, G and H , and a point P are shown on this 1 cm^2 grid.

(a) (i) Write down the mathematical name of the shaded quadrilateral.

Answer(a)(i) [1]

- (ii) Calculate the area of the shaded quadrilateral.
Give the units of your answer.

Answer(a)(ii) [3]

- (b) Describe fully the **single** transformation that maps quadrilateral G onto quadrilateral H .

Answer(b)
..... [3]

- (c) On the grid, draw the images of quadrilateral G after the following transformations.

(i) Reflection in the line $y = 0$. [2]

(ii) Translation by the vector $\begin{pmatrix} -5 \\ 7 \end{pmatrix}$. [2]

(iii) Enlargement by scale factor 0.5 with centre P . [2]

- (d) On quadrilateral H mark, with an arc, an obtuse angle. [1]
-

3 12 athletes took part in the 100 metres race.

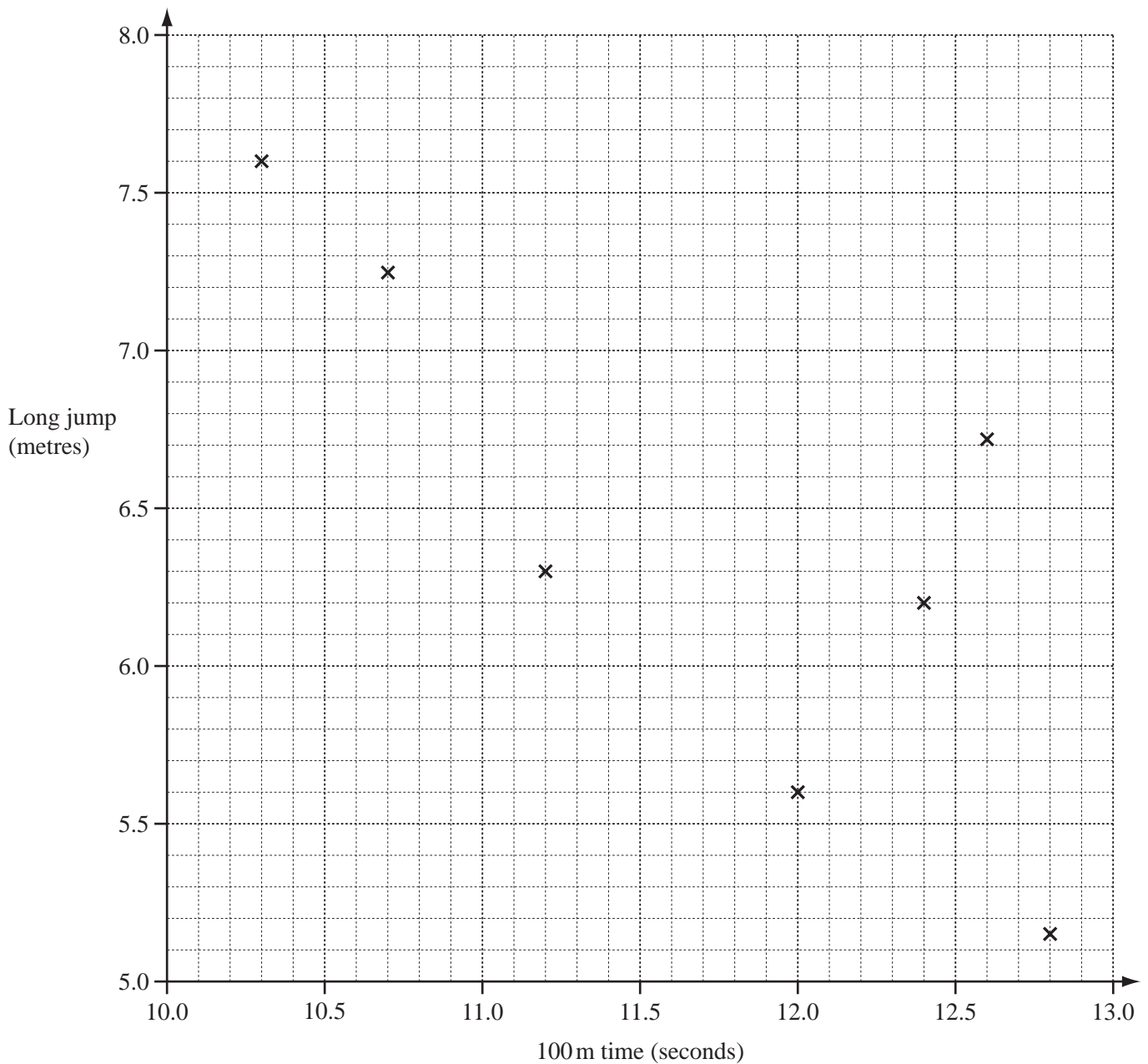
11 of these athletes also took part in the long jump.

The times and distances, each measured correct to 3 significant figures, for these athletes are shown in the table.

Athlete	A	B	C	D	E	F	G	H	I	J	K	L
100 m time (seconds)	12.1	10.3	12.8	10.7	12.6	11.2	12.0	12.4	10.6	12.7	11.8	11.1
Long jump (metres)	×	7.60	5.15	7.25	6.72	6.30	5.60	6.20	6.90	5.70	6.85	6.70

(a) The scatter diagram shows the times and distances for athletes B to H.

(i) Plot the times and distances for athletes I, J, K and L.



[2]

(ii) On the scatter diagram, draw a line of best fit. [1]

(iii) Athlete A did not take part in the long jump.

Use your line of best fit to estimate a long jump distance for athlete A.

Answer(a)(iii) m [1]

(iv) What type of correlation is shown on the scatter diagram?

Answer(a)(iv) [1]

(v) Describe in words the relationship between the time for 100 metres and the distance in the long jump.

Answer(a)(v)

..... [1]

(b) Use the table of times and distances to work out

(i) the mean of the 100 metres times,

Answer(b)(i) s [2]

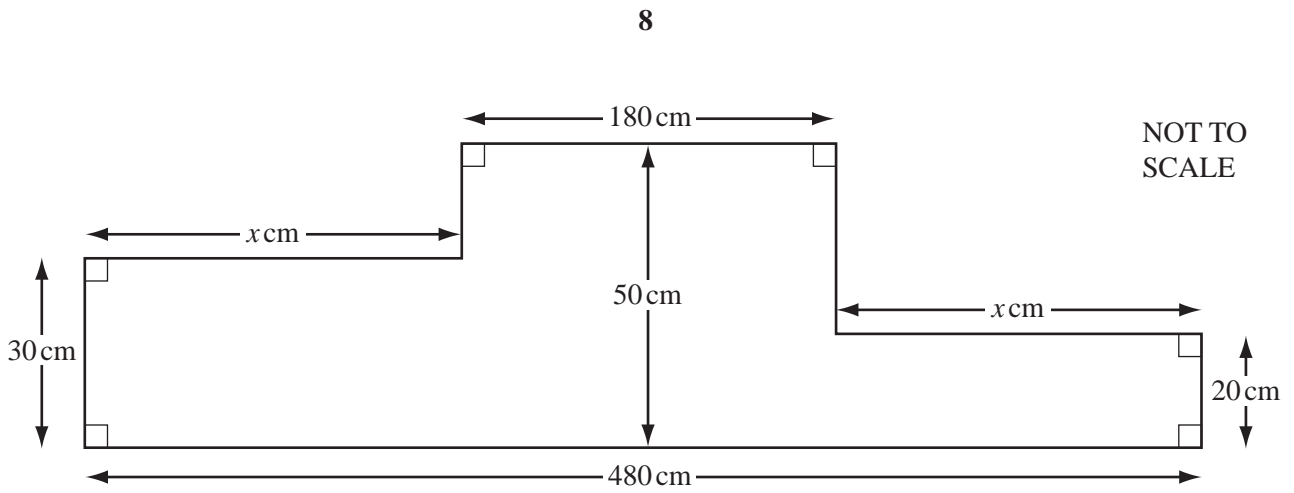
(ii) the percentage of athletes who ran 100 metres in less than 11.5 seconds,

Answer(b)(ii) % [2]

(iii) the range of the distances jumped by the 11 athletes, *B* to *L*.

Answer(b)(iii) m [1]

4



The diagram shows the cross section of a medal presentation platform.

(a) Show that $x = 150$.

Answer(a)

[2]

(b) Work out the perimeter of the cross section.

Answer(b) cm [2]

(c) (i) Calculate the area of the cross section.

Answer(c)(i) cm² [2]

(ii) The platform is a prism, 170 cm deep.

Find the volume of the platform.

Answer(c)(ii) cm³ [1]

(iii) The prism is completely filled with a light material.
1 **cubic metre** of this material has mass 16 kg.

Calculate the mass of the material used.

Answer(c)(iii) kg [2]

- 5 (a) Write in figures six million three thousand and seventy six.

Answer(a) [1]

- (b) (i) Work out the value of p when $p = -0.6 \div 1.6$.

Answer(b)(i) $p =$ [1]

- (ii) Work out the value of q when $q = -0.6 - 1.6$.

Answer(b)(ii) $q =$ [1]

- (iii) Use one of the symbols $>$, $<$, \geq , \leq , $=$ to complete this statement.

p q [1]

- (c) Mount Robson in Canada has a height of 3950 metres, correct to the nearest 10 metres.

Complete the following statement about the height, h m, of Mount Robson.

Answer(c) $\leq h <$ [2]

- (d) Calculate $2\frac{1}{12} \div 1\frac{1}{4}$.

Give your answer as a decimal, correct to 4 significant figures.

Answer(d) [2]

- (e) (i) Write down the value of 8^0 .

Answer(e)(i) [1]

- (ii) Work out 5^{-3} .
Write your answer as a fraction.

Answer(e)(ii) [1]

- (iii) Simplify the expression.

$$8x^5 \times 3x^4$$

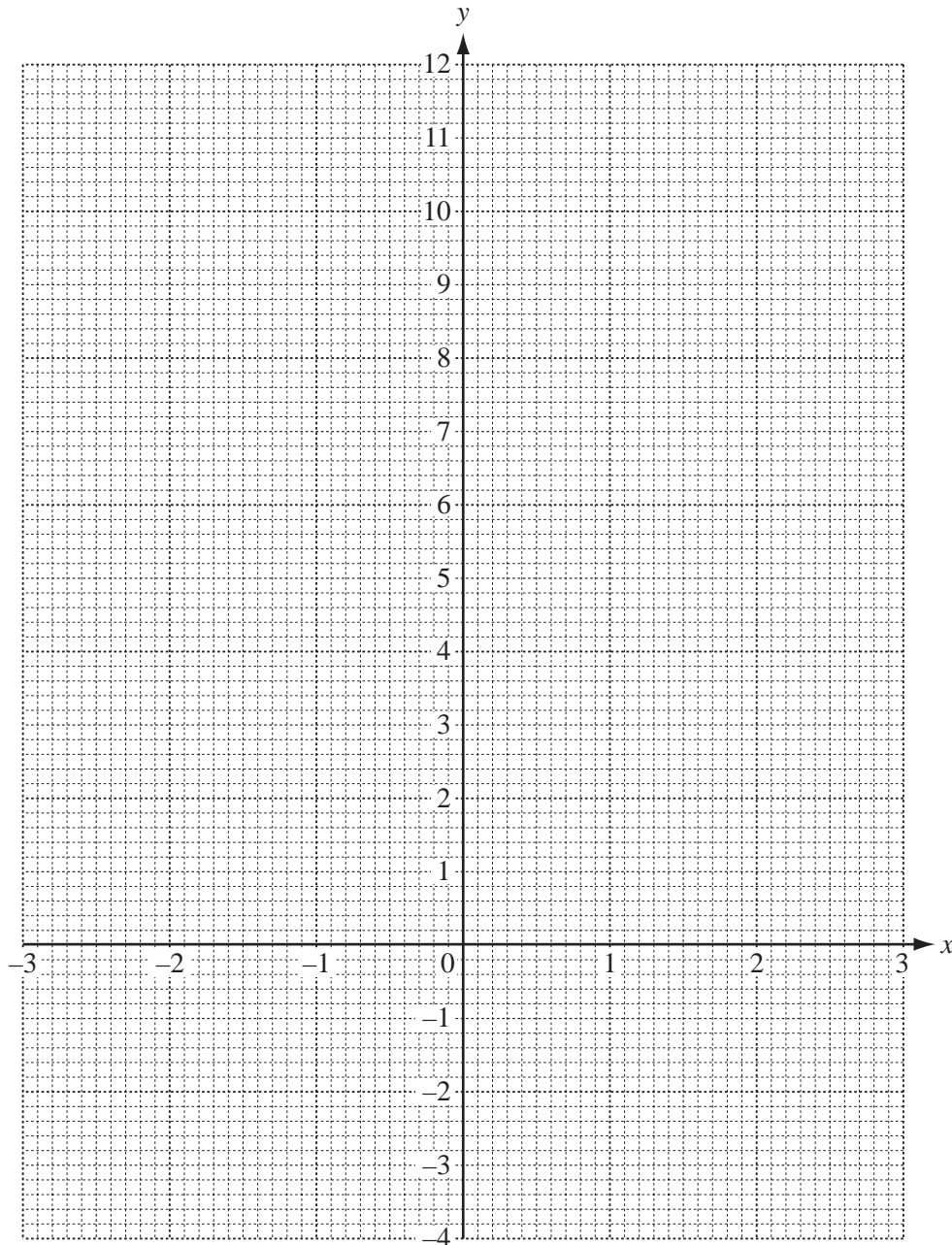
Answer(e)(iii) [2]

- 6 (a) (i) Complete the table of values for $y = 8 - x^2$.

x	-3	-2	-1	0	1	2	3
y	-1			8	7		-1

[2]

- (ii) On the grid, draw the graph of $y = 8 - x^2$ for $-3 \leq x \leq 3$.



[4]

(iii) Write down the equation of the line of symmetry of the graph.

Answer(a)(iii) [1]

(iv) Use your graph to solve the equation $8 - x^2 = 0$.

Answer(a)(iv) $x =$ or $x =$ [2]

(b) (i) On the grid, plot the points $(-2, 8)$ and $(2.5, -1)$.
Draw a straight line through these points. [2]

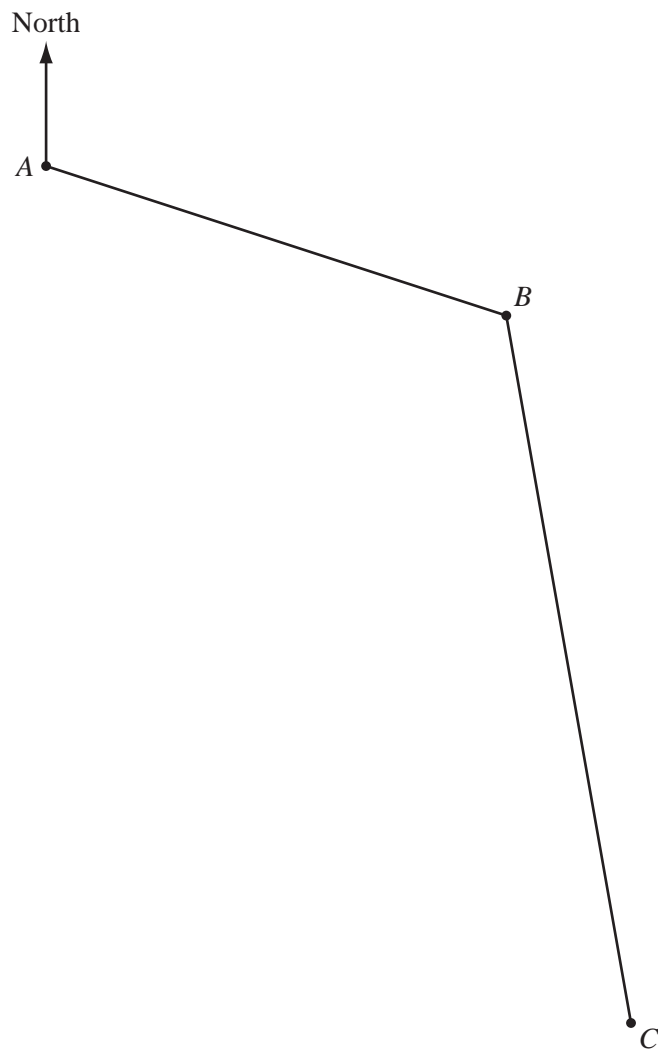
(ii) Find the equation of your line in the form $y = mx + c$.

Answer(b)(ii) $y =$ [3]

(iii) Write down the co-ordinates of the point of intersection of your line with $y = 8 - x^2$.

Answer(b)(iii) (.....,) [1]

- 7 The scale drawing represents the positions of 3 towns, *A*, *B* and *C*.
The scale is 1 centimetre represents 4 kilometres.



Scale: 1 cm to 4 km

(a) Measure the bearing of B from A .

Answer(a) [1]

(b) A transmitter is placed near to the 3 towns.

(i) The transmitter is equidistant from A and B .

Using a straight edge and compasses only, construct the locus of points equidistant from A and B . [2]

(ii) The transmitter is also on the bisector of angle ABC .

Using a straight edge and compasses only, construct the bisector of angle ABC . [2]

(iii) Mark the position, T , of the transmitter on the scale drawing. [1]

(c) Work out the actual distance, in kilometres, of town A from T .

Answer(c) km [2]

(d) The signal from the transmitter has a range of 30 kilometres in all directions.

On the scale drawing, construct the locus of points 30 kilometres from T . [2]

(e) Would the signal from the transmitter reach town C ?
Give a reason for your answer.

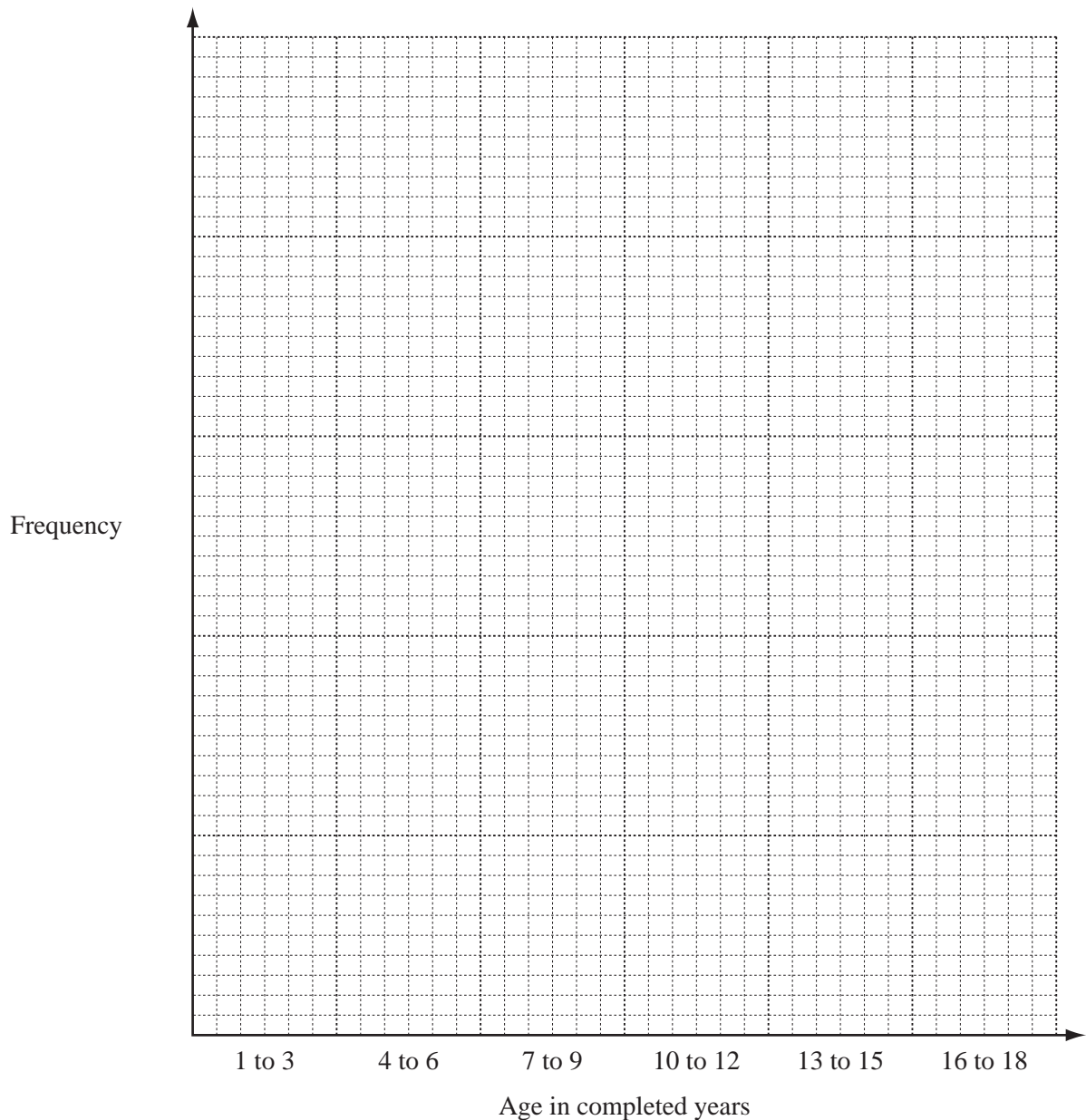
Answer(e) because [1]

.....

- 8 (a) One day a survey is taken of the ages of 120 children at a fairground.
The results are shown in the frequency table.

Age in completed years	Number of children
1 to 3	12
4 to 6	19
7 to 9	32
10 to 12	41
13 to 15	9
16 to 18	7

- (i) On the grid, draw a bar chart for this data.
Complete the scale on the frequency axis.



[3]

(ii) What is the modal age group?

Answer(a)(ii) [1]

(iii) One of the 120 children is chosen at random.

Write down the probability that the child is aged 4 to 6.

Answer(a)(iii) [1]

(b) Lalia says the probability of taking a yellow bead from a bag containing yellow beads and black beads is $\frac{7}{5}$.

Explain why $\frac{7}{5}$ cannot be a correct probability.

Answer(b) [1]

(c) Another bag contains 9 green marbles and 11 red marbles.
A marble is taken at random.

Write down the probability that the marble is

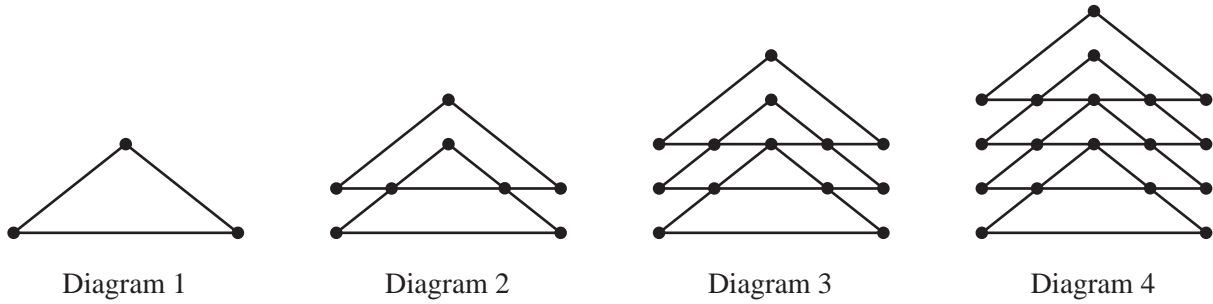
(i) green,

Answer(c)(i) [1]

(ii) blue.

Answer(c)(ii) [1]

Question 9 is printed on the next page.



Diagrams 1 to 4 show a sequence of shapes made up of lines and dots at the intersections of lines.

(a) (i) Complete the table showing the number of dots in each diagram.

Diagram	1	2	3	4	5	6
Dots	3	8	13			

[3]

(ii) Write down the rule for continuing the sequence of dots.

Answer(a)(ii) [1]

(iii) Write down an expression, in terms of n , for the number of dots in Diagram n .

Answer(a)(iii) [2]

(iv) Find the number of dots in Diagram 15.

Answer(a)(iv) [1]

(b) The dots are joined by sloping lines and horizontal lines.

(i) Diagram 1 has 2 sloping lines and Diagram 2 has 6 sloping lines.

Find the number of sloping lines in Diagrams 3 and 4.

Answer(b)(i) Diagram 3

Diagram 4 [2]

(ii) Write down an expression, in terms of n , for the number of sloping lines in Diagram n .

Answer(b)(ii) [2]

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