



- 1 (a) Write down in figures the number twenty one million.

*Answer(a)*..... [1]

- (b) Write down the four factors of 21.

*Answer(b)*....., ....., ....., ..... [2]

- (c) Write 21% as a fraction.

*Answer(c)*..... [1]

- (d) Put brackets in this calculation to make it correct.

$$210 + 21 \div 2.1 + 21 = 10 \quad [1]$$

- (e) Write down the first two prime numbers after 21.

*Answer(e)* ..... and ..... [2]

- (f) Fill in the missing number.

$$\frac{21}{210} = \frac{210}{\dots\dots} \quad [1]$$

- (g) Calculate  $21^2 - \sqrt{21}$ .

*Answer(g)*..... [1]

- (h) Work out  $(\sqrt{21})^2$ .

*Answer(h)*..... [1]

- (i) Write down the value of  $21^0$ .

*Answer(i)*..... [1]

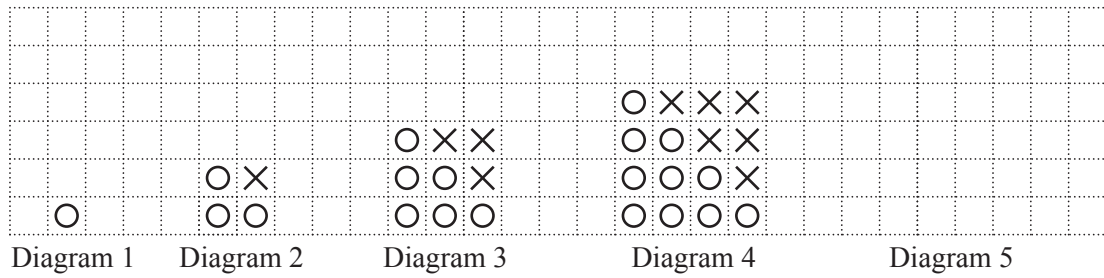
- (j) Write 0.0021 in standard form.

*Answer(j)*..... [1]

- (k) Write down the lowest common multiple (LCM) of 21 and 15.

*Answer(k)*..... [2]

2 Here are the first four diagrams in a sequence.



(a) On the grid, draw Diagram 5. [1]

(b) Complete the table below for Diagram 4 and Diagram 5.

Diagram number	Number of Os	Number of Xs	Total number of Os and Xs
1	1	0	1
2	3	1	4
3	6	3	9
4			
5			

[2]

(c) Find an expression, in terms of  $n$ , for the total number of Os and Xs in Diagram  $n$ .

*Answer(c)*..... [1]

(d) Find the total number of Os and Xs in Diagram 23.

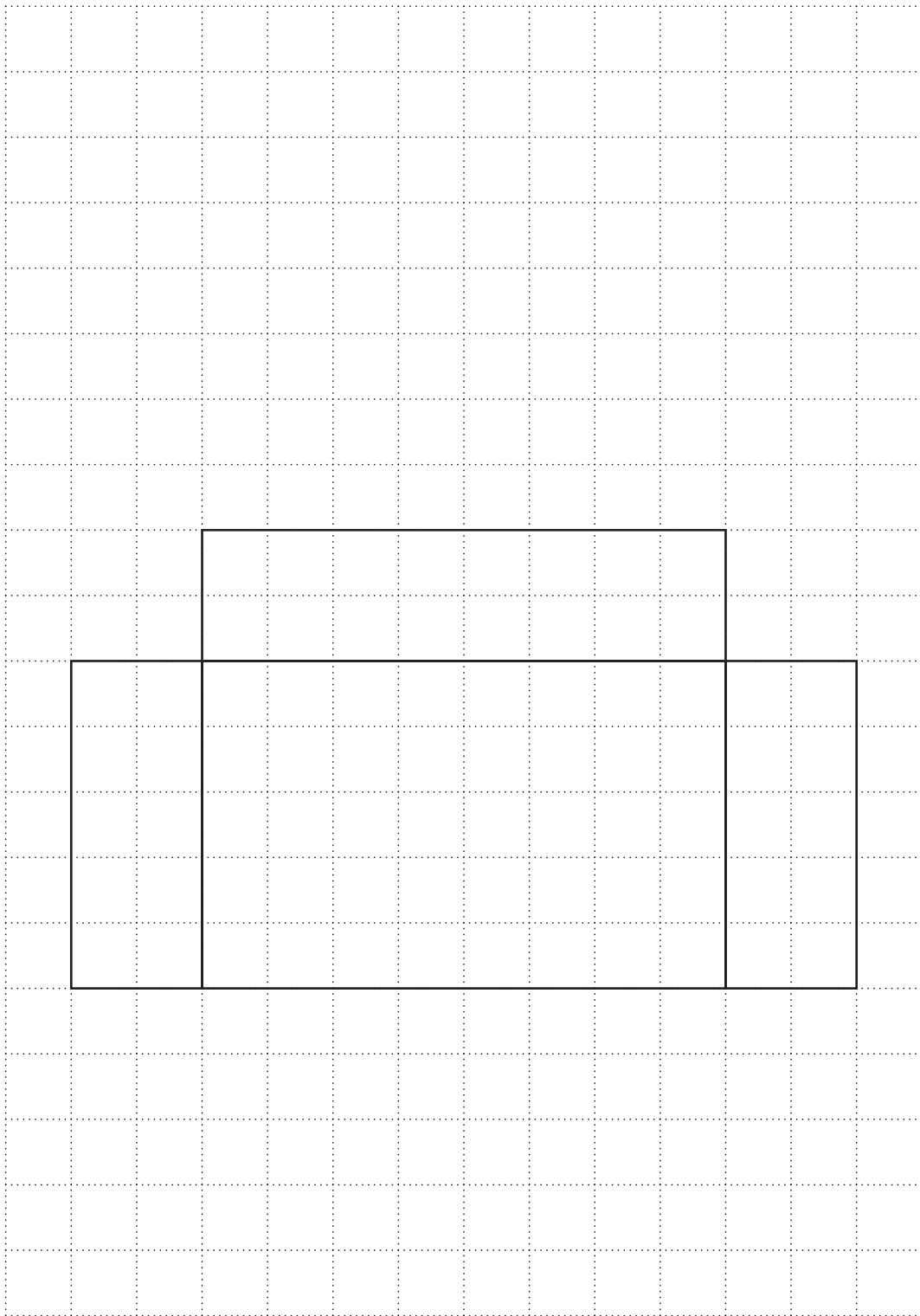
*Answer(d)*..... [1]

(e) Describe in words the rule for continuing the sequence for the number of Os.

1, 3, 6, ...

*Answer(e)*..... [1]

3 (a)



The diagram shows part of a net for a cuboid drawn on a  $1 \text{ cm}^2$  grid.

(i) Complete the diagram for the net of the cuboid.

[1]

- (ii) Calculate the surface area of the cuboid.

*Answer(a)(ii)*..... cm<sup>2</sup> [2]

- (iii) Calculate the volume of the cuboid.  
Give the units of your answer.

*Answer(a)(iii)*..... [3]

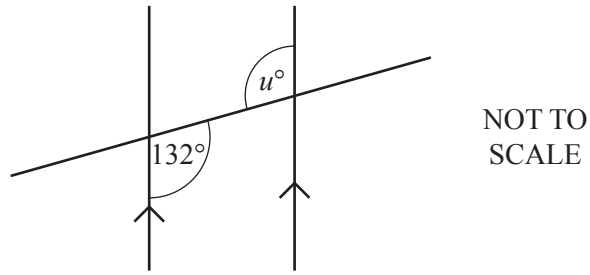
- (b) A different cuboid has volume 60 cm<sup>3</sup>.  
Its sides are all integer lengths.  
All of its sides have length greater than 1 cm.  
The length of one of its sides is a square number.

Write down the dimensions of the cuboid.

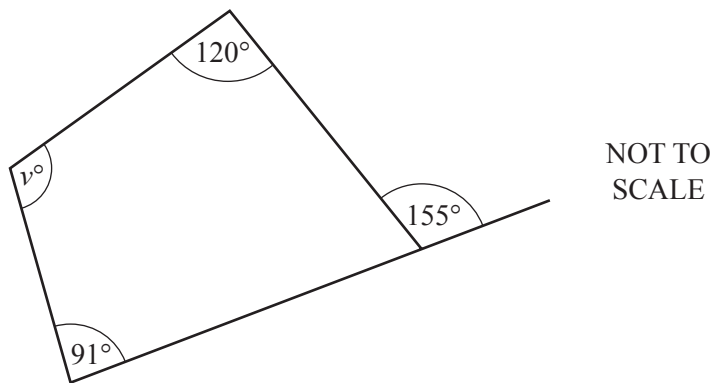
*Answer(b)* ..... cm by ..... cm by ..... cm [2]

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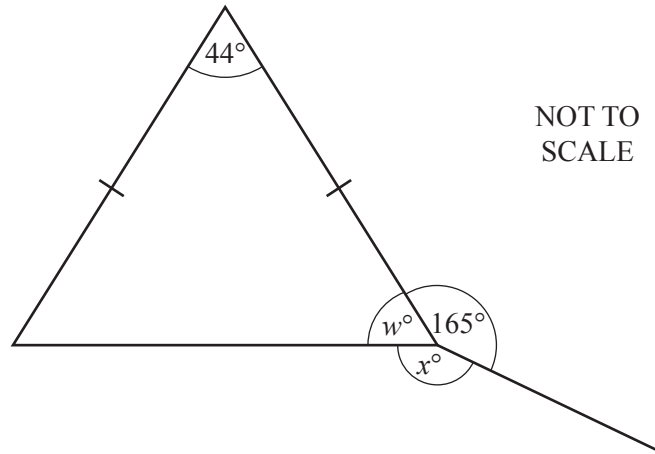
4 (a)

Find the value of  $u$ .Answer(a)  $u = \dots\dots\dots$  [1]

(b)

Find the value of  $v$ .Answer(b)  $v = \dots\dots\dots$  [2]

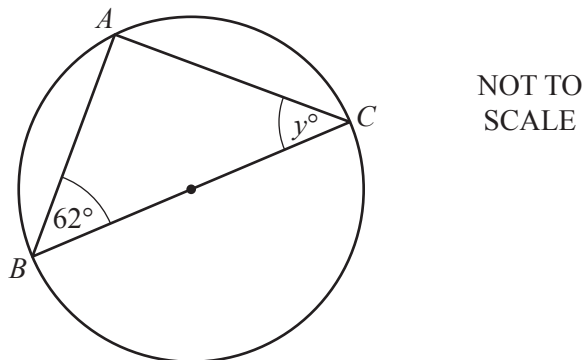
(c)



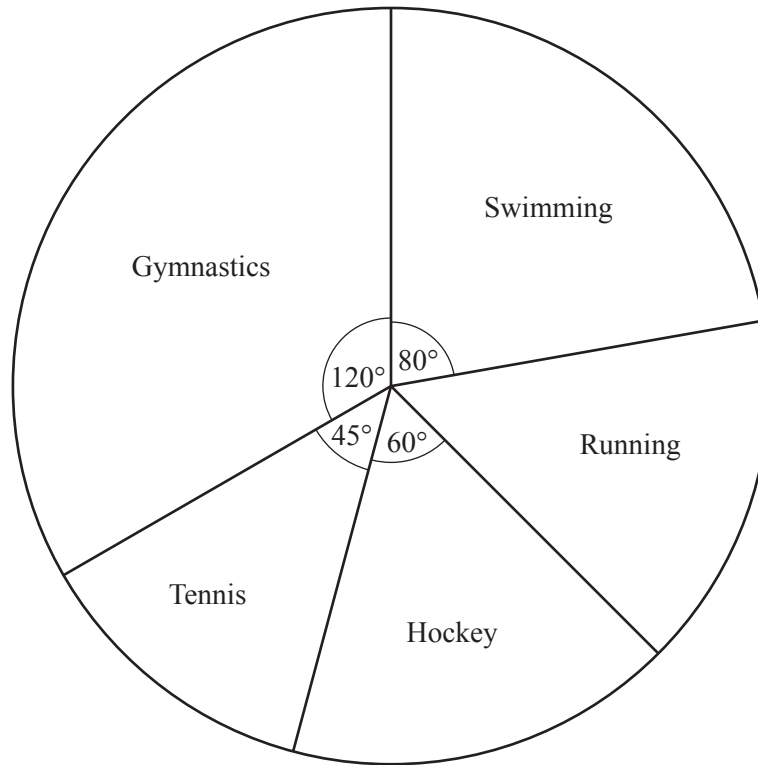
(i) Write down the mathematical name for this triangle.

*Answer(c)(i)* ..... [1](ii) Find the value of  $w$ .*Answer(c)(ii)*  $w =$  ..... [1](iii) Find the value of  $x$ .*Answer(c)(iii)*  $x =$  ..... [1]

(d)

 $A$ ,  $B$  and  $C$  lie on a circle with diameter  $BC$ .(i) Find the value of  $y$ .*Answer(d)(i)*  $y =$  ..... [2](ii) Write down the mathematical name for the straight line  $AB$ .*Answer(d)(ii)* ..... [1]

- 5 (a) Some children are asked what their favourite sport is.  
The results are shown in the pie chart.



- (i) Complete the statements about the pie chart.

The sector angle for running is ..... degrees.

The least popular sport is .....

$\frac{1}{6}$  of the children chose .....

Twice as many children chose ..... as ..... [4]

- (ii) Five more children chose swimming than hockey.

Use this information to work out the number of children who chose gymnastics.

*Answer(a)(ii)* ..... [3]



(b) Ten boys go swimming.  
The teacher records, in seconds, the time each boy takes to

- get ready for swimming
- swim one length.

These times are shown in the table below.

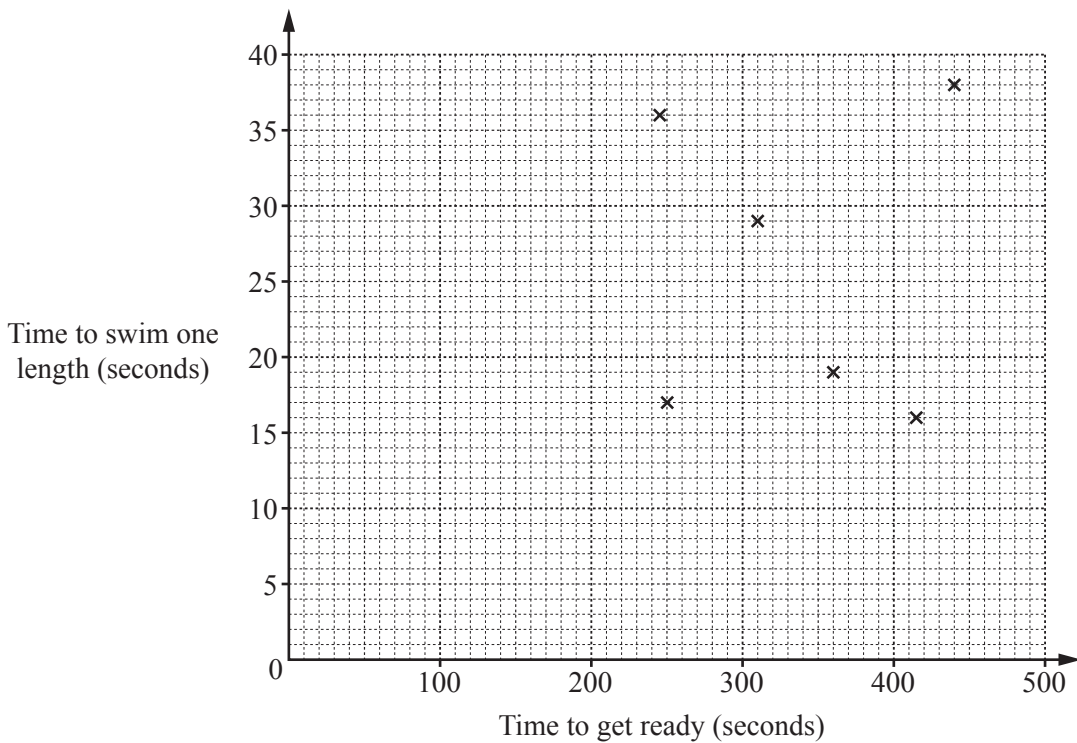
Boy	A	B	C	D	E	F	G	H	I	J
Time to get ready	310	250	360	245	440	415	290	420	480	400
Time to swim one length	29	17	19	36	38	16	40	32	20	30

(i) A boy is chosen at random.

Find the probability that he takes more than 300 seconds to get ready.

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

(ii) Complete the scatter diagram.  
The first six points have been plotted for you.



[2]

(iii) Another boy takes 340 seconds to get ready.

Can the scatter diagram be used to estimate the time it will take him to swim one length?  
Give a reason for your answer.

Answer(b)(iii)..... because .....

..... [1]

6 A sweet shop sells lots of different types of sweets.

- (a) (i) Each large bag of mixed sweets is divided in the ratio mints : jellies : toffees = 5 : 2 : 8.  
Each large bag has a total of 180 sweets.

Calculate the number of sweets of each type in a large bag.

*Answer(a)(i)* Mints = .....

Jellies = .....

Toffees = ..... [3]

- (ii) The mass,  $m$  grams, of a small bag of sweets is 75 g, correct to the nearest gram.

Complete the statement about the value of  $m$ .

*Answer(a)(ii)*.....  $\leq m <$  ..... [2]

- (b) There are 156 g of sugar in a 240 g bar of chocolate.

- (i) Write 156 as a percentage of 240.

*Answer(b)(i)* ..... % [1]

- (ii) Work out the number of grams of sugar in a 1.2 **kilogram** bar of chocolate.

*Answer(b)(ii)* ..... g [2]

- (iii) Another bar of chocolate is made.  
The mass is 35% greater than the 240 g bar.

Work out the mass of this chocolate bar.

*Answer(b)(iii)* ..... g [2]

- (c) A girl buys a large piece of fudge.  
She eats  $\frac{3}{10}$  herself and divides the rest equally between 4 friends.

Work out the fraction of this fudge that each friend receives.

*Answer(c)* ..... [2]

- (d) Gabriella and Max buy some bags of mints and some bags of toffees from the shop.  
The cost of one bag of mints is  $m$  cents and the cost of one bag of toffees is  $t$  cents.

- (i) Gabriella buys 3 bags of mints and 5 bags of toffees for \$4.70 .

Complete the equation.

$$3m + 5t = \dots\dots\dots [1]$$

- (ii) Max buys 4 bags of mints and 3 bags of toffees for \$3.70 .

Write this information as an equation.

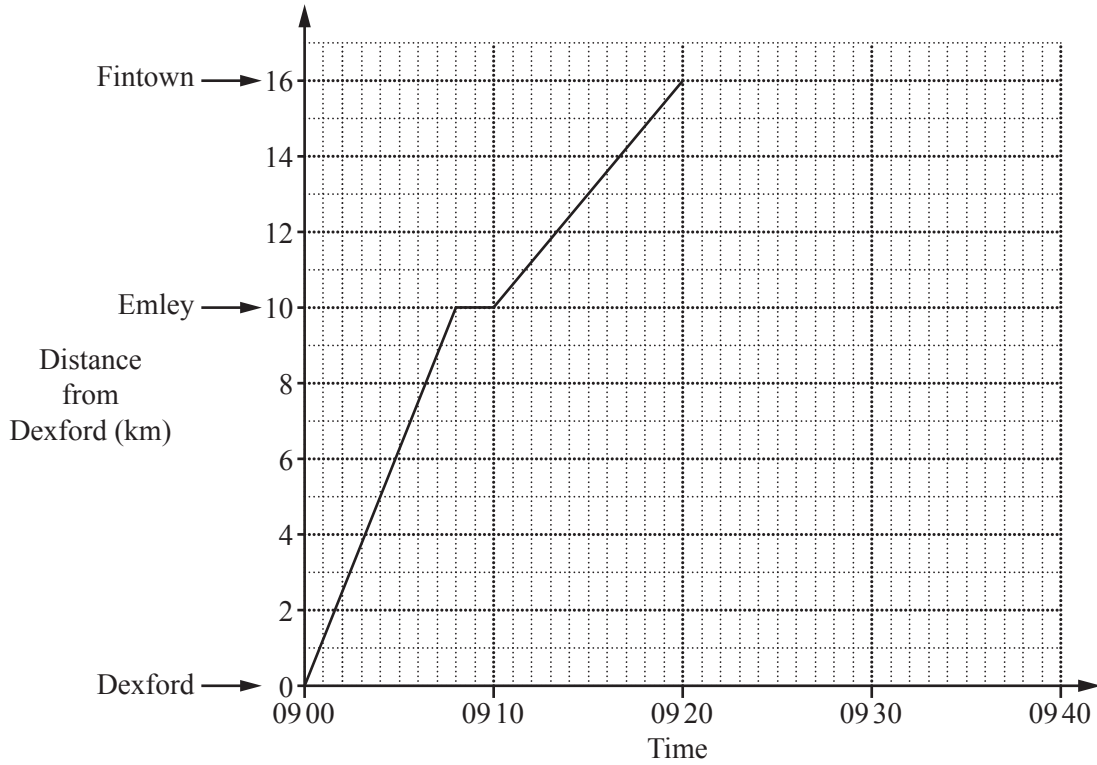
*Answer(d)(ii)* ..... = ..... [2]

- (iii) Solve your two equations to find the cost of a bag of mints and the cost of a bag of toffees.  
You must show all your working.

*Answer(d)(iii)* Cost of a bag of mints = ..... cents

Cost of a bag of toffees = ..... cents [4]

7



The grid shows the travel graph for a train travelling from Dexford to Fintown, stopping at Emley.

- (a) (i) Write down the distance the train travels in the first 8 minutes.

Answer(a)(i)..... km [1]

- (ii) Calculate the average speed, in kilometres per hour, for the journey from Dexford to Fintown.

Answer(a)(ii)..... km/h [3]

- (b) The train waits at Fintown for 4 minutes.  
The train then returns to Dexford without stopping at Emley.  
The return speed of the train is 80 km/h.

- (i) Complete the travel graph. [2]

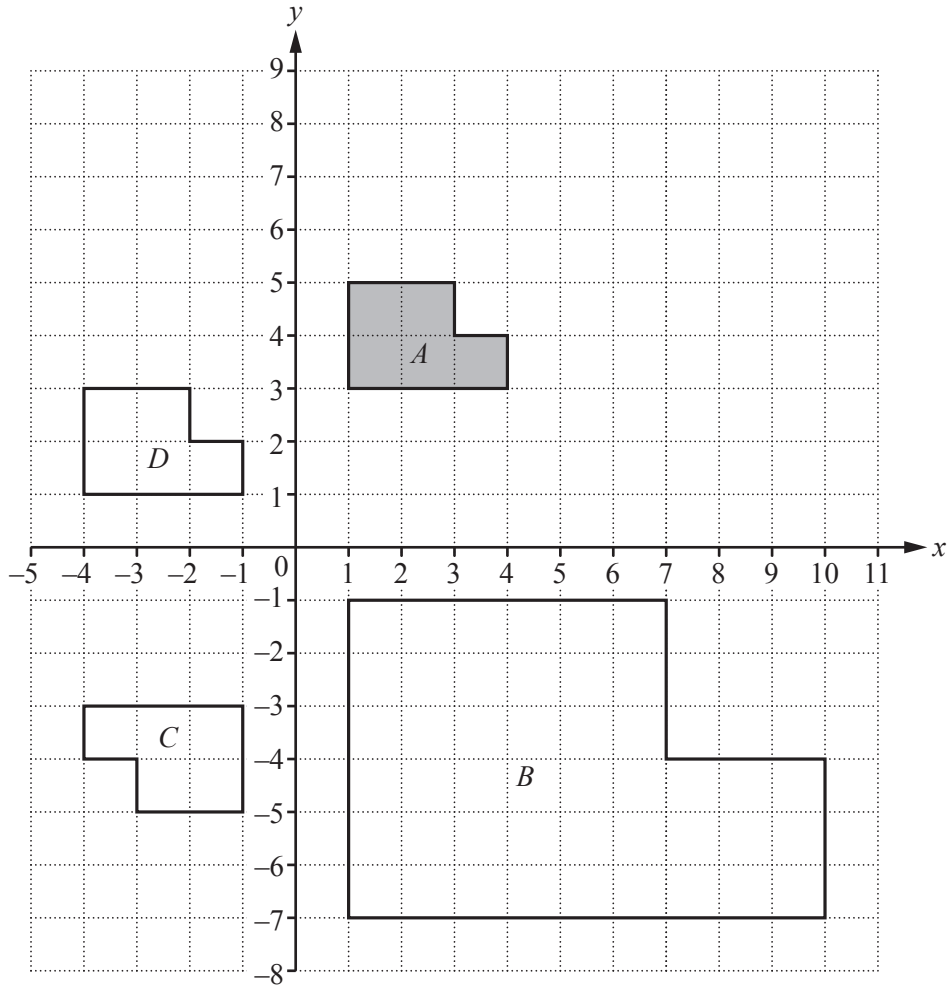
- (ii) Change 80 km/h to metres per second.

Answer(b)(ii)..... m/s [2]

- (c) Trains leave Dexford for Fintown every 75 minutes.  
The train that leaves Dexford at 09:00 is the first train of the day.

Write down the time that the fourth train leaves Dexford for Fintown.

Answer(c)..... [2]



The diagram shows four shapes  $A$ ,  $B$ ,  $C$  and  $D$ .

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

(i) shape  $B$ ,

Answer(a)(i) .....  
 ..... [3]

(ii) shape  $C$ ,

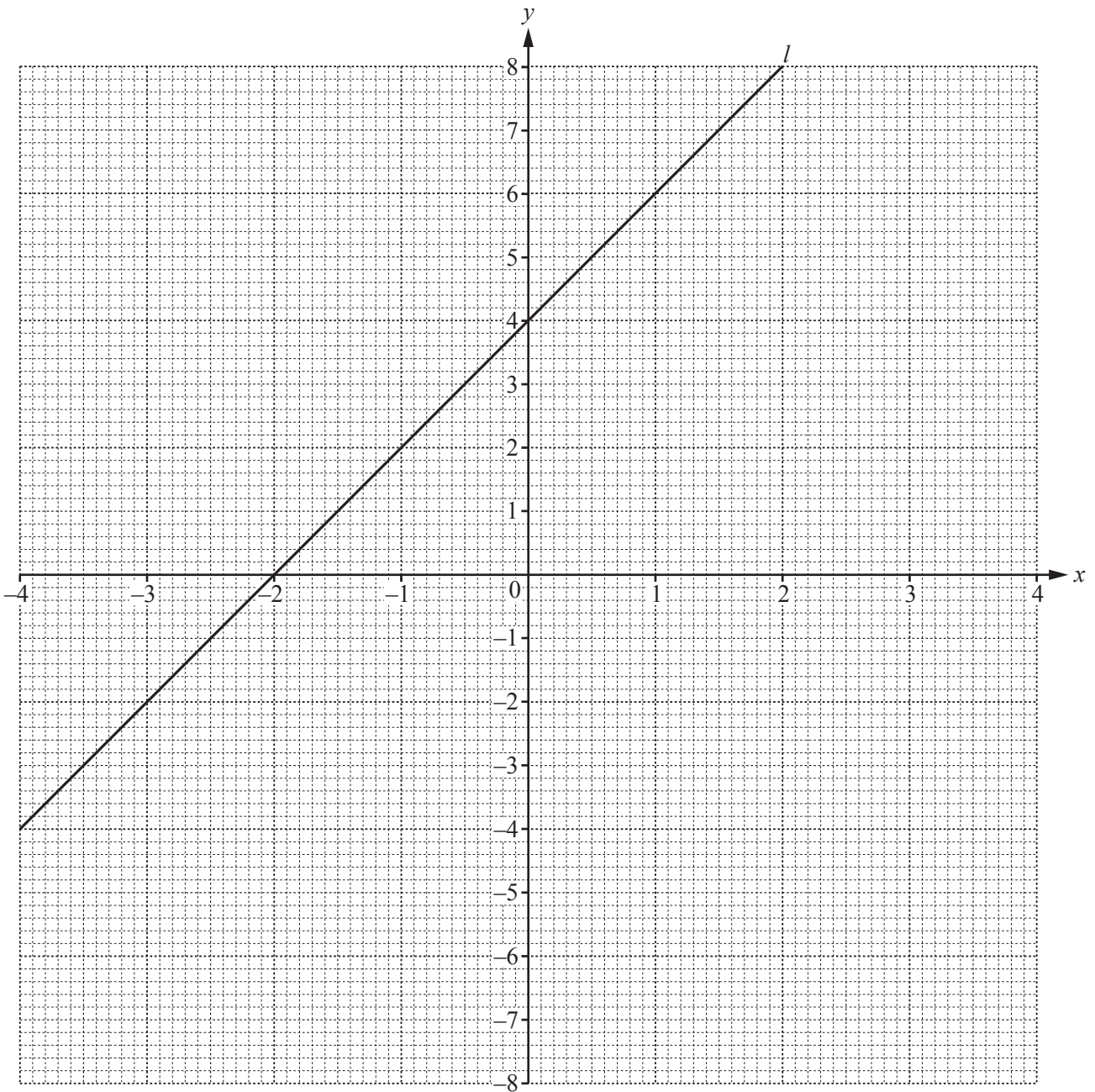
Answer(a)(ii) .....  
 ..... [3]

(iii) shape  $D$ .

Answer(a)(iii) .....  
 ..... [2]

(b) On the grid, draw the reflection of shape  $A$  in the line  $x = 5$ . [2]

9



(a) Write down the equation of the line  $l$  in the form  $y = mx + c$ .

Answer(a)  $y = \dots\dots\dots$  [3]

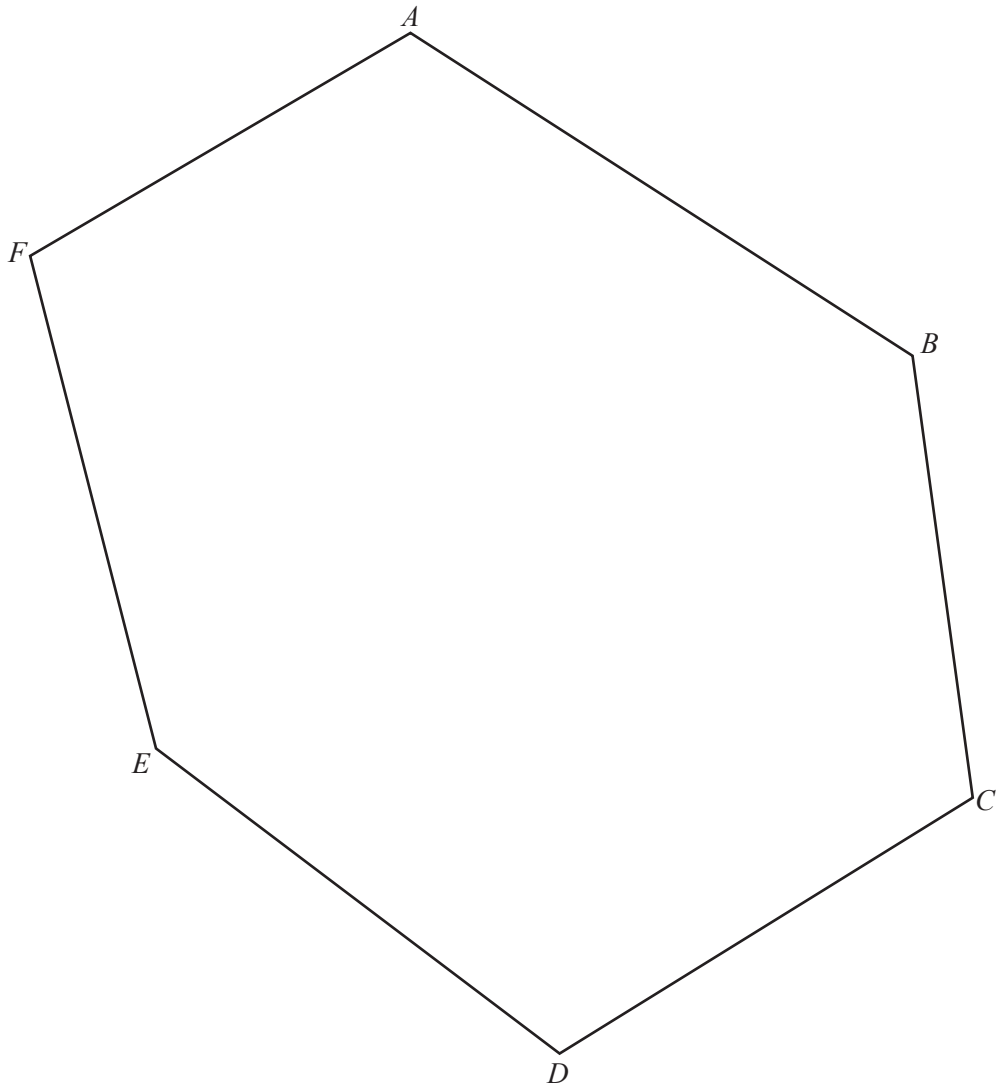
(b) Complete the table of values for  $y = \frac{2}{x}$ .

$x$	-4	-3	-2	-1	-0.5	-0.25		0.25	0.5	1	2	3	4
$y$		-0.7			-4				4			0.7	

[3]

(c) On the grid, draw the graph of  $y = \frac{2}{x}$  for  $-4 \leq x \leq -0.25$  and  $0.25 \leq x \leq 4$ .

[4]



(a) Complete this part of the question using a straight edge and compasses only.  
Show all your construction arcs.

(i) Construct the perpendicular bisector of  $AB$ . [2]

(ii) Construct the locus of points that are equidistant from  $FA$  and  $FE$ . [2]

(b) Complete this part of the question using a ruler and compasses only.

Shade the region inside the shape that is

- more than 5 cm from  $D$
- and**
- less than 4 cm from  $C$ .

[3]

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