



1 Aida, Bernado and Cristiano need \$30 000 to start a business.

For  
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Use

- (a) (i) They borrow  $\frac{2}{5}$  of this amount.  
Show that they still need \$18 000.

Answer (a)(i)

[1]

- (ii) They provide the \$18 000 themselves in the ratio

Aida : Bernado : Cristiano = 5 : 4 : 3.

Calculate the amount each of them provides.

Answer(a)(ii)Aida \$ .....

Bernado \$ .....

Cristiano \$ ..... [3]

- (b) (i) Office equipment costs 35 % of the \$30 000.  
Calculate the cost of the equipment.

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

- (ii) Office expenses cost another \$6500.  
Write this as a fraction of \$30 000.  
Give your answer in its lowest terms.

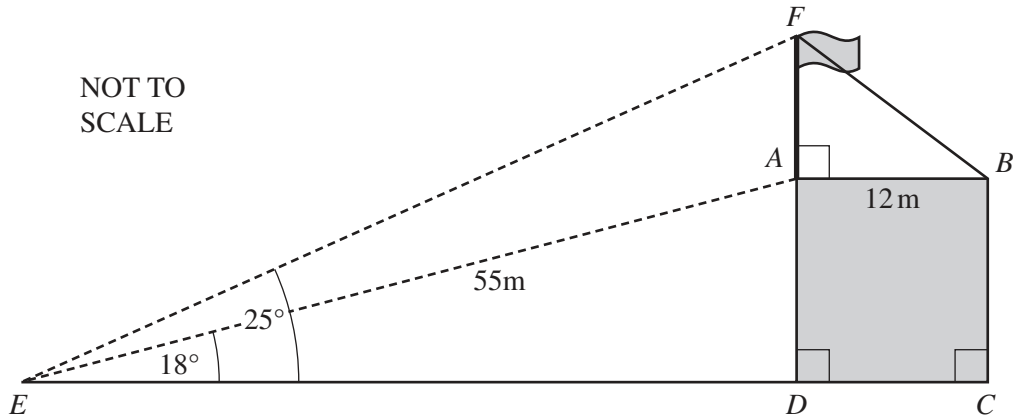
Answer(b)(ii) ..... [2]

- (iii) How much remains of the \$30 000 now?

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

- (c) They invest \$12 500.  
After one year this has increased to \$15 500.  
Calculate this percentage increase.

Answer(c) ..... % [3]



$ABCD$  represents a building with a vertical flagpole,  $AF$ , on the roof.  
 The points  $E$ ,  $D$  and  $C$  are on level ground.  $EA = 55$  metres.  
 The angle of elevation of  $A$  from  $E$  is  $18^\circ$  and the angle of elevation of  $F$  from  $E$  is  $25^\circ$ .

- (a) Calculate  
 (i)  $ED$ ,

Answer(a)(i) ..... m [2]

- (ii)  $FD$ ,

Answer(a)(ii) ..... m [2]

- (iii)  $DA$ .

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

- (b) Show that  $AF = 7.4$  metres, correct to 1 decimal place.  
 Answer(b)

[1]

- (c) The width,  $AB$ , of the building is 12 metres.  
 The top of the flagpole is attached to the point  $B$  by a rope.  
 Calculate

- (i) the length of the rope,  $FB$ ,

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

- (ii) the angle of elevation of  $F$  from  $B$ .

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

3 The table below shows the average daily sunshine,  $s$ , and the total monthly rainfall,  $r$ , for a city during one year.

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Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
$s$ (hours)	6	7	7	9	10	12	12	12	9	8	6	5
$r$ (mm)	70	52	72	41	20	6	1	4	16	52	65	67

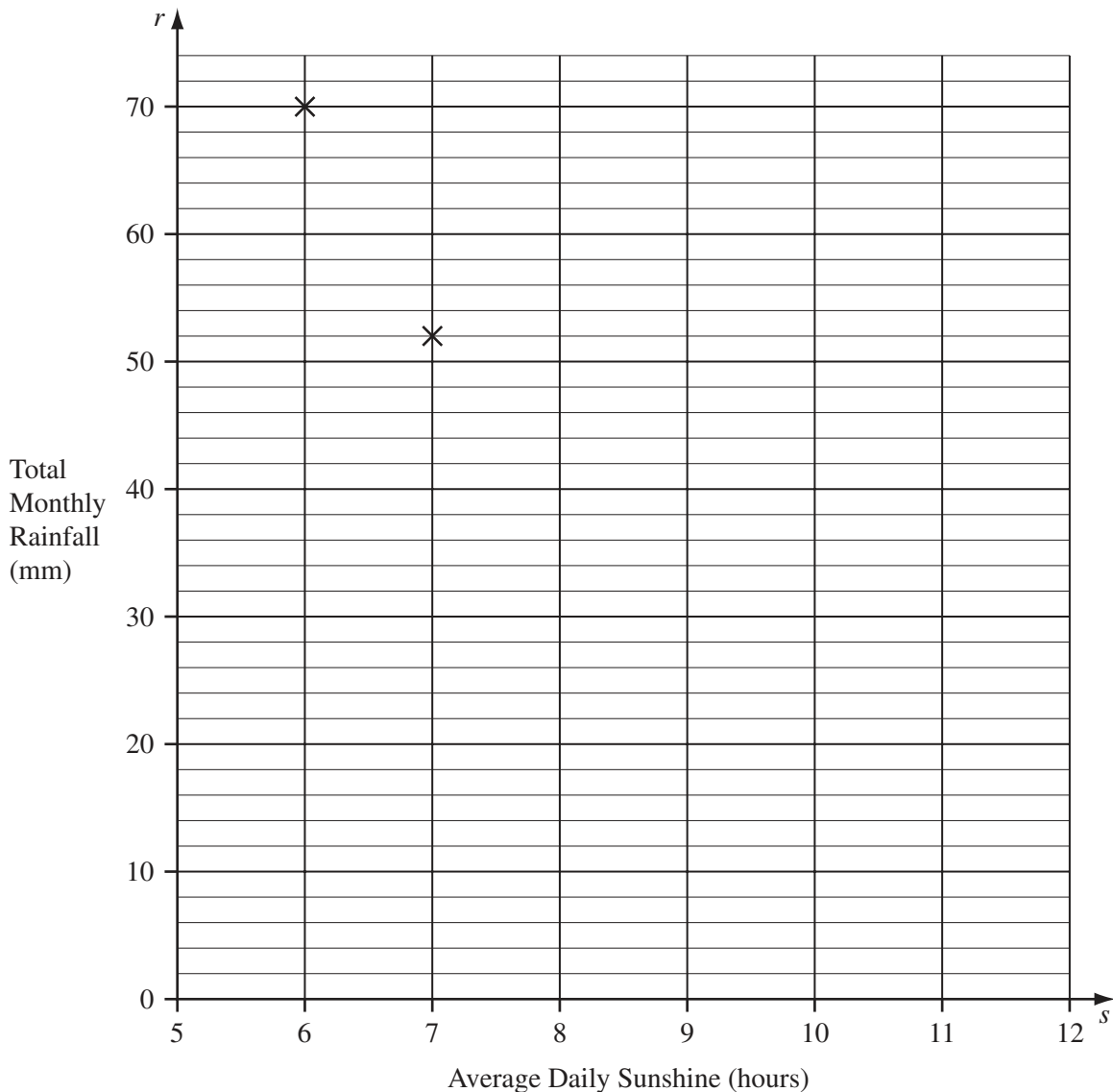
(a) For  $s$ , find

(i) the mode Answer(a)(i) ..... hours [1]

(ii) the range, Answer(a)(ii) ..... hours [1]

(iii) the median. Answer(a)(iii) ..... hours [2]

(b) On the grid below, plot the 10 points for March to December to complete the scatter diagram.



[3]

(c) (i) Calculate the mean of  $s$ .

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

(ii) The mean of  $r$  is 38.8 millimetres.

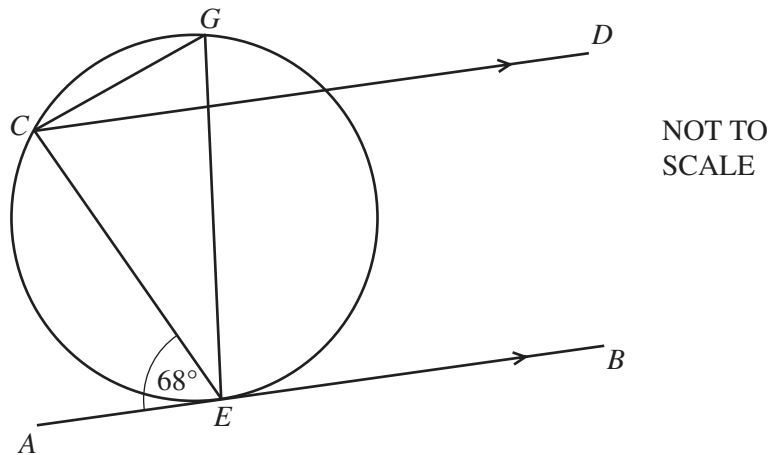
On the grid, plot the point representing these means. Label this point M. [1]

(d) (i) Draw a line of best fit on the grid. [1]

(ii) What type of correlation does your scatter diagram show?

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

4



$EG$  is a diameter of the circle through  $E, C$  and  $G$ .

The tangent  $AEB$  is parallel to  $CD$  and angle  $AEC = 68^\circ$ .

Calculate the size of the following angles and give a reason for each answer.

(a) Angle  $CEG =$  ..... because ..... [2]

(b) Angle  $ECG =$  ..... because ..... [2]

(c) Angle  $CGE =$  ..... because ..... [2]

(d) Angle  $ECD =$  ..... because ..... [2]

5 Aminata and her brother live 18 kilometres from a shopping centre.

- (a) Aminata leaves home at 09 00 and runs 3 kilometres to a bus stop. She arrives there at 09 30.

Write down her average speed, in kilometres per hour.

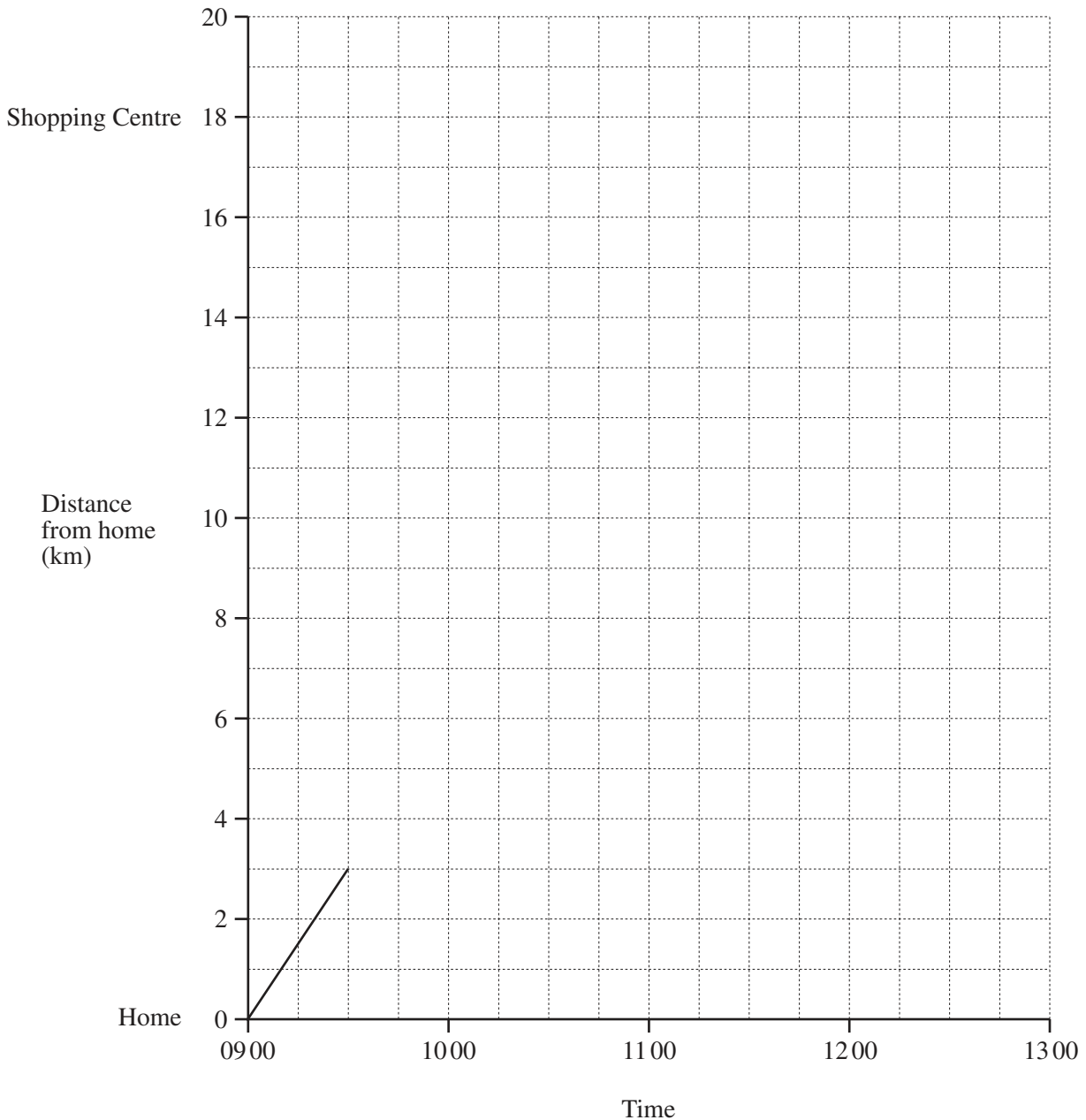
Answer(a) ..... km/h [1]

- (b) She waits 15 minutes for the bus. The bus travels the remaining 15 kilometres to the shopping centre at an average speed of 20 km/h.

- (i) At what time does she arrive at the shopping centre?

Answer(b)(i) ..... [2]

- (ii) On the grid below, complete the travel graph showing her journey to the shopping centre.



[2]

- (c) Her brother leaves home at 11 15.  
He travels to the shopping centre by car at an average speed of 54 km/h.

(i) Work out how long, in minutes, he takes to travel to the shopping centre.

Answer(c)(i) ..... minutes [1]

(ii) Show his journey on the grid. [1]

- (d) Aminata and her brother leave the shopping centre at 12 00.  
They travel home by car and arrive at 12 45.

(i) Show their journey home on the grid. [1]

(ii) Calculate the average speed of their journey home.

Answer(d)(ii) ..... km/h [2]

6 (a)  $2y = 75 - 7x$

(i) Find  $y$  when  $x = 7$ .

Answer(a)(i)  $y =$  ..... [2]

(ii) Find  $x$  when  $y = 6$ .

Answer(a)(ii)  $x =$  ..... [2]

(b) Make  $x$  the subject of the equation  $2y = 75 - 7x$ .

Answer(b)  $x =$  ..... [2]

(c) Solve these simultaneous equations.

$$\begin{aligned} 4x - y &= 45 \\ 7x + 2y &= 75 \end{aligned}$$

Answer(c)  $x =$  .....

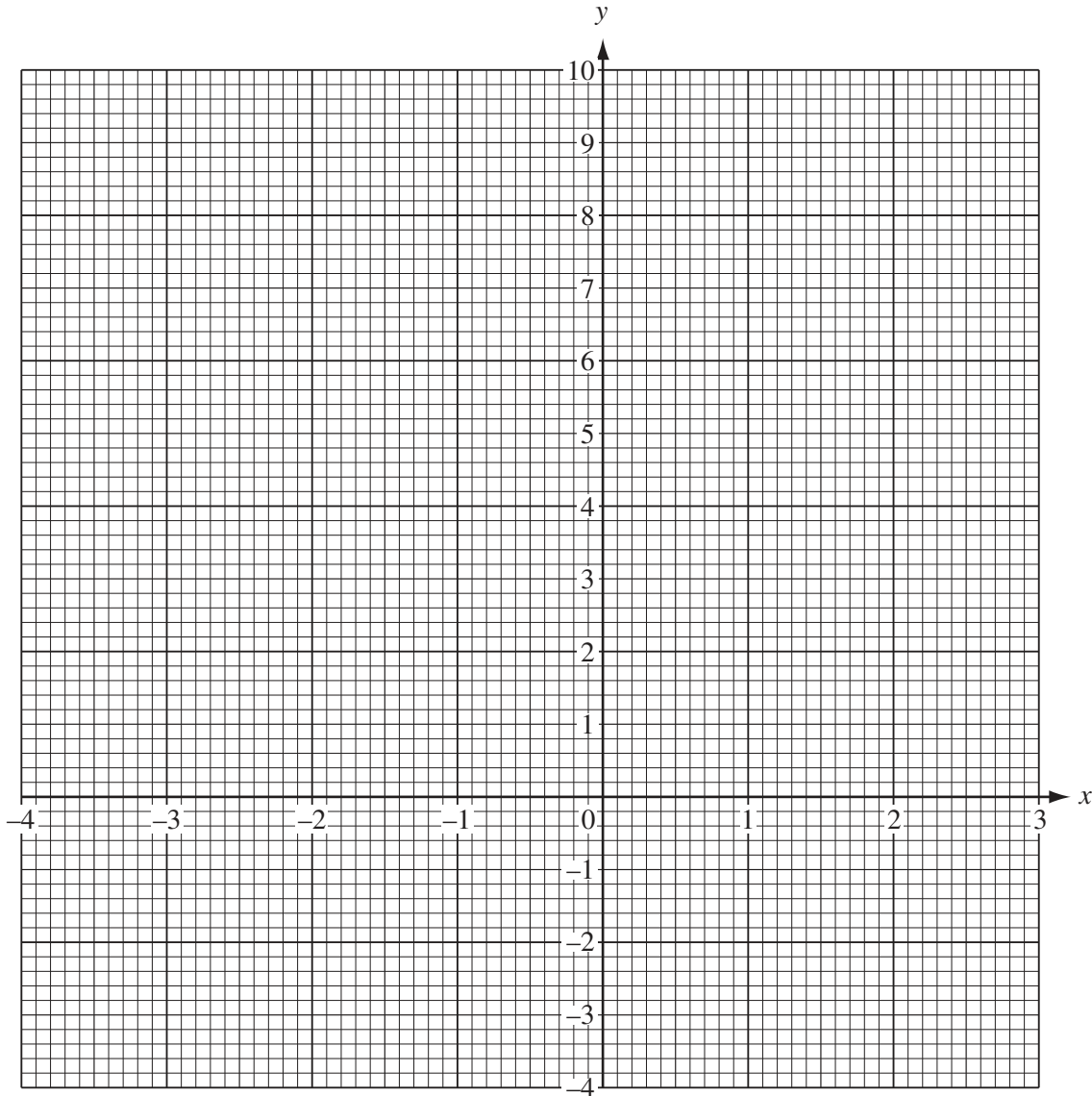
$y =$  ..... [3]

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

x	-4	-3	-2	-1	0	1	2	3
y	9		-1	-3		-1		9

[3]

- (b) On the grid, draw the graph of  $y = x^2 + x - 3$ .



[4]

- (c) Write down the coordinates of the lowest point of the curve.

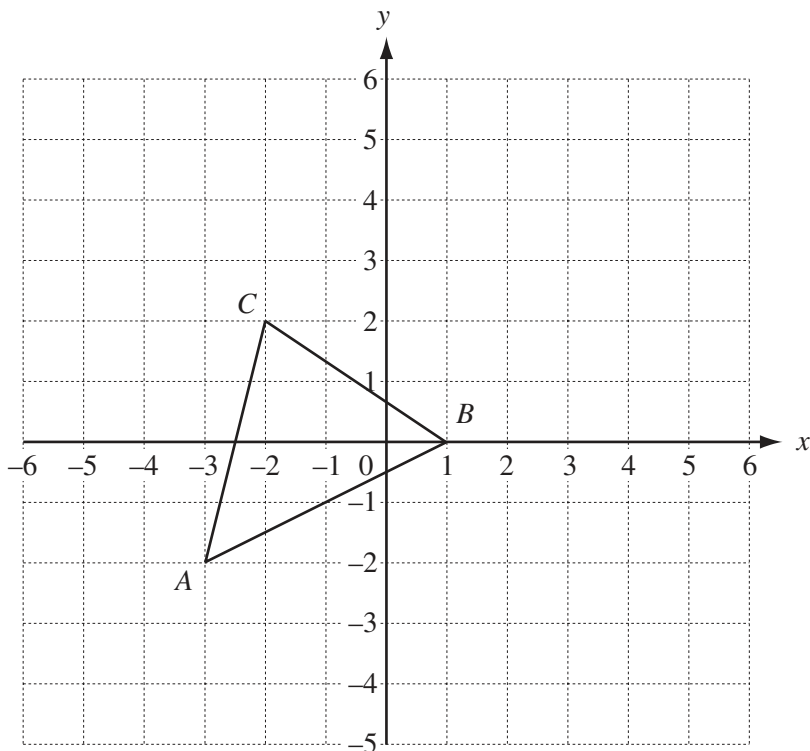
Answer(c) ( ..... , ..... ) [2]

- (d) (i) Draw the line of symmetry of the graph. [1]

- (ii) Write down the equation of the line of symmetry.

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





Triangle  $ABC$  is drawn on the grid.

- (a) (i) Write down the coordinates of  $A$ .

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

- (ii) Write  $\vec{AB}$  and  $\vec{BC}$  as column vectors.

Answer(a)(ii)  $\vec{AB} = \begin{pmatrix} \phantom{0} \\ \phantom{0} \end{pmatrix}$   $\vec{BC} = \begin{pmatrix} \phantom{0} \\ \phantom{0} \end{pmatrix}$  [2]

- (b) Translate triangle  $ABC$  by the vector  $\begin{pmatrix} 4 \\ -3 \end{pmatrix}$ . Label the image  $T$ . [2]

- (c)  $\vec{AP} = 2\vec{AB}$  and  $\vec{AQ} = 2\vec{AC}$ .

- (i) Plot the points  $P$  and  $Q$  on the grid. [2]

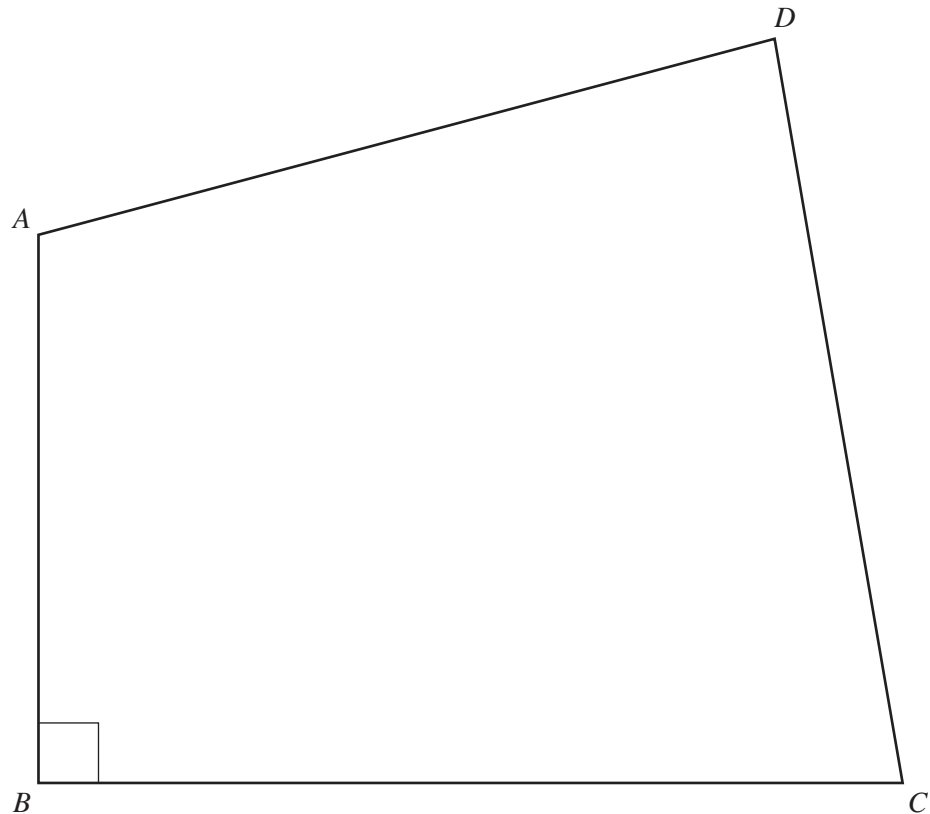
- (ii) Describe fully the single transformation which maps triangle  $ABC$  onto triangle  $APQ$ .

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

- (d) Rotate triangle  $ABC$  through  $180^\circ$  about the midpoint of the side  $AB$ . Label the image  $R$ . [2]

- 9 The quadrilateral  $ABCD$  is a scale drawing of a park.  
 Angle  $ABC = 90^\circ$  and 1 centimetre represents 10 metres.

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- (a) Write down
- (i) the actual length, in metres, of the side  $CD$ ,  
 Answer(a)(i) ..... m [1]
  - (ii) the size of angle  $BAD$ .  
 Answer(a)(ii) ..... [1]
- (b) Two straight paths cross the park.  
 One path is the same distance from  $AB$  as from  $BC$ .  
 The other path is the same distance from  $A$  as from  $D$ .
- (i) Using a straight edge and compasses only, construct the lines which show each path. [4]
  - (ii) Tennis courts in the park are situated in a region closer to  $AB$  than to  $BC$  and closer to  $A$  than to  $D$ . Label this region  $T$ . [1]
- (c) Keith cycles past the park, so that he is always 30 metres outside the boundary  $ABC$ .  
 Construct the locus of points which shows this part of his route. [2]

- 10 The first three diagrams in a sequence are shown below.  
Each diagram has one more trapezium added on the right.

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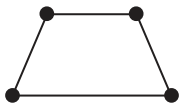


Diagram 1

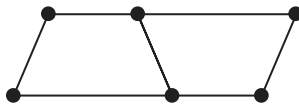


Diagram 2

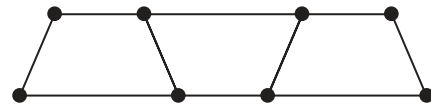


Diagram 3

- (a) Complete the table which shows the number of lines and dots in each diagram.

Diagram	1	2	3	4
Number of lines	4	7		
Number of dots	4	6		

[2]

- (b) Find the number of lines and dots in Diagram 10.

Answer(b) ..... lines and ..... dots [2]

- (c) For Diagram  $n$ , write down in terms of  $n$ , the number of

- (i) lines,

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

- (ii) dots.

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

- (d) Find the **difference**, in terms of  $n$ , between your answers to **parts (c)(i) and (c)(ii)**.  
Simplify your answer.

Answer(d) ..... [2]

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