

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

- (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

$$\text{Aida : Bernado : Cristiano} = 5 : 4 : 3.$$

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.

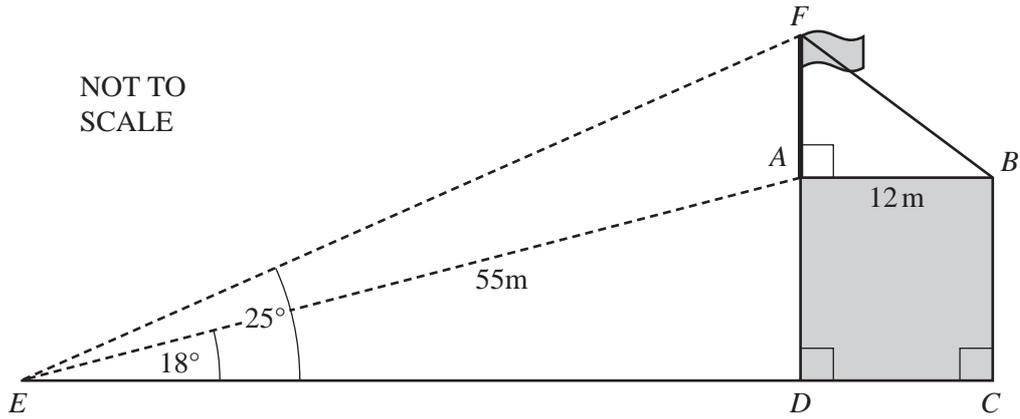
Answer(b)(ii) [2]

- (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° and the angle of elevation of *F* from *E* is 25° .

- (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

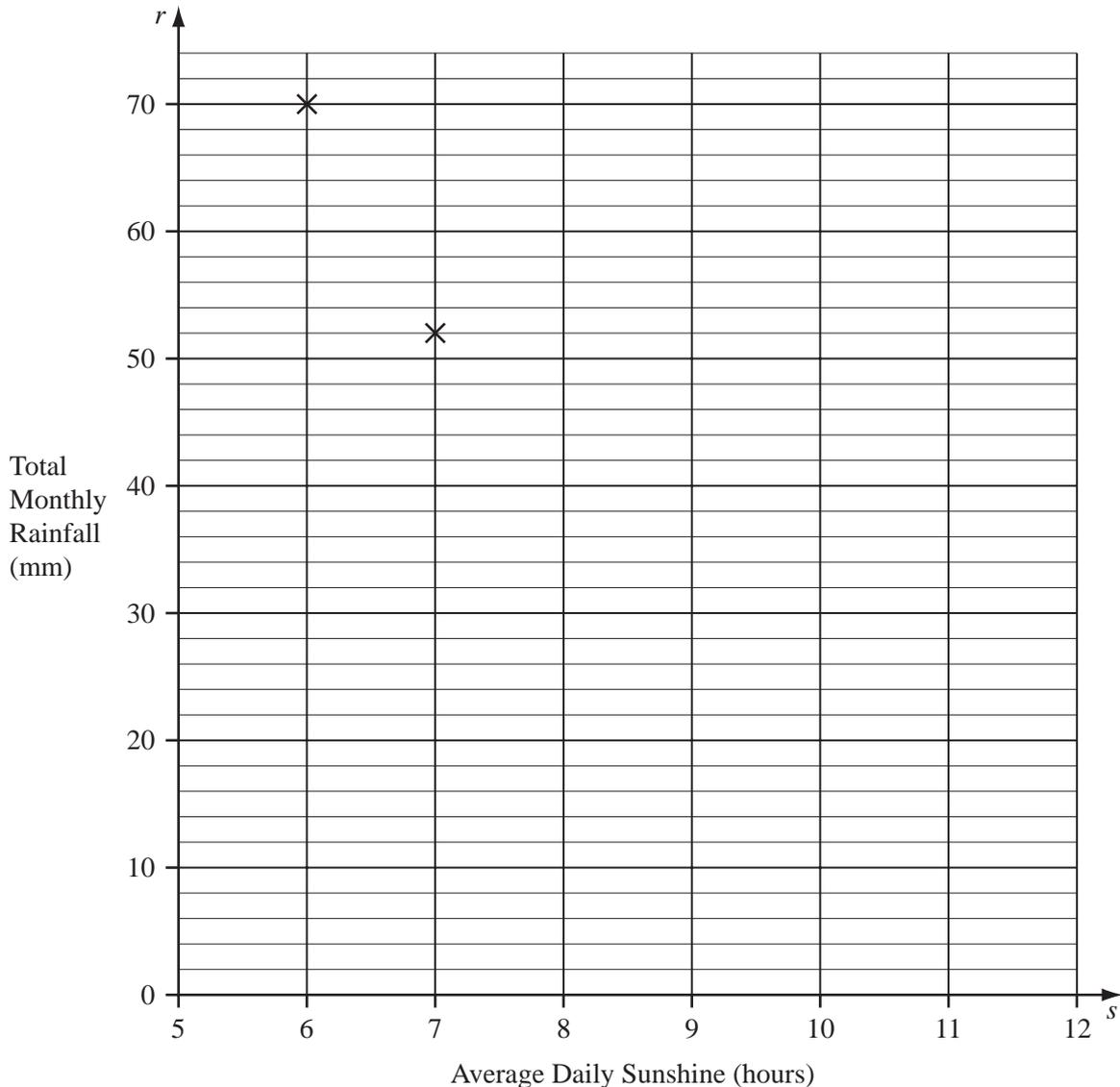
(a) For s , find

(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.

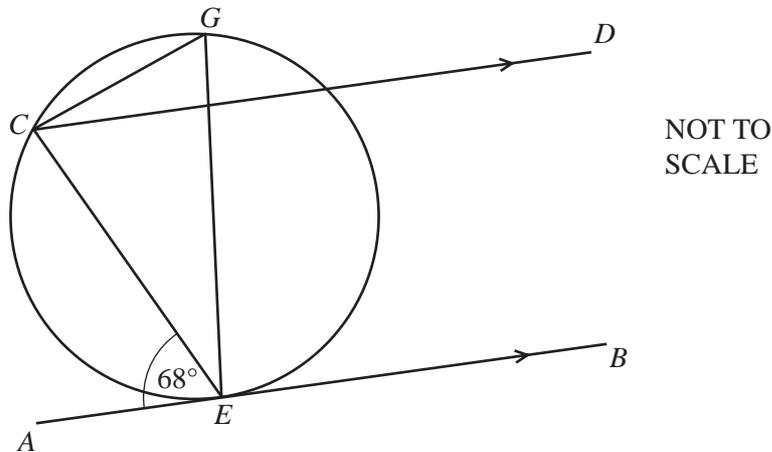
On the grid, plot the point representing these means. Label this point M. [1]

(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.

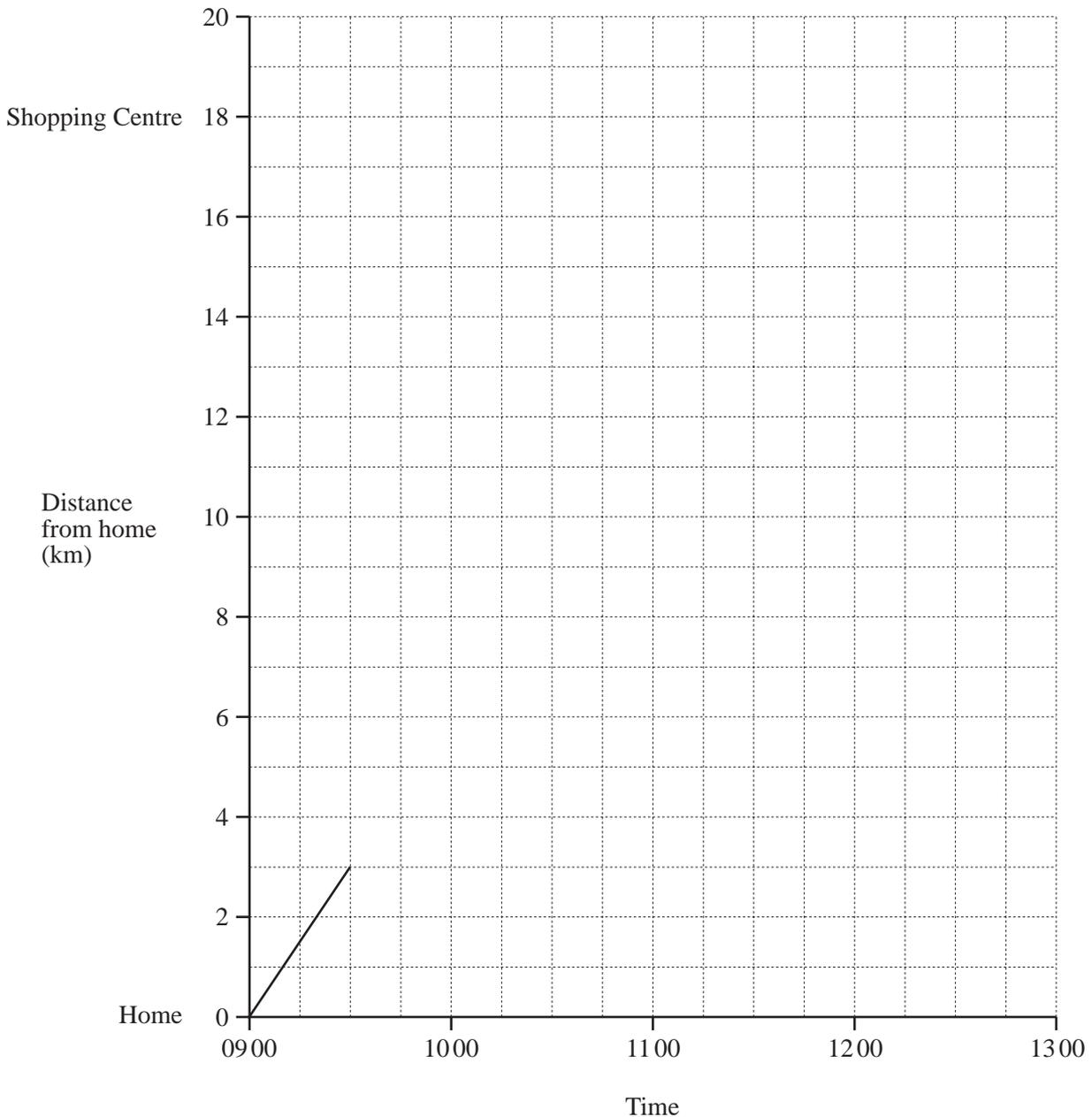
Answer(a) km/h [1]

- (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) $x =$

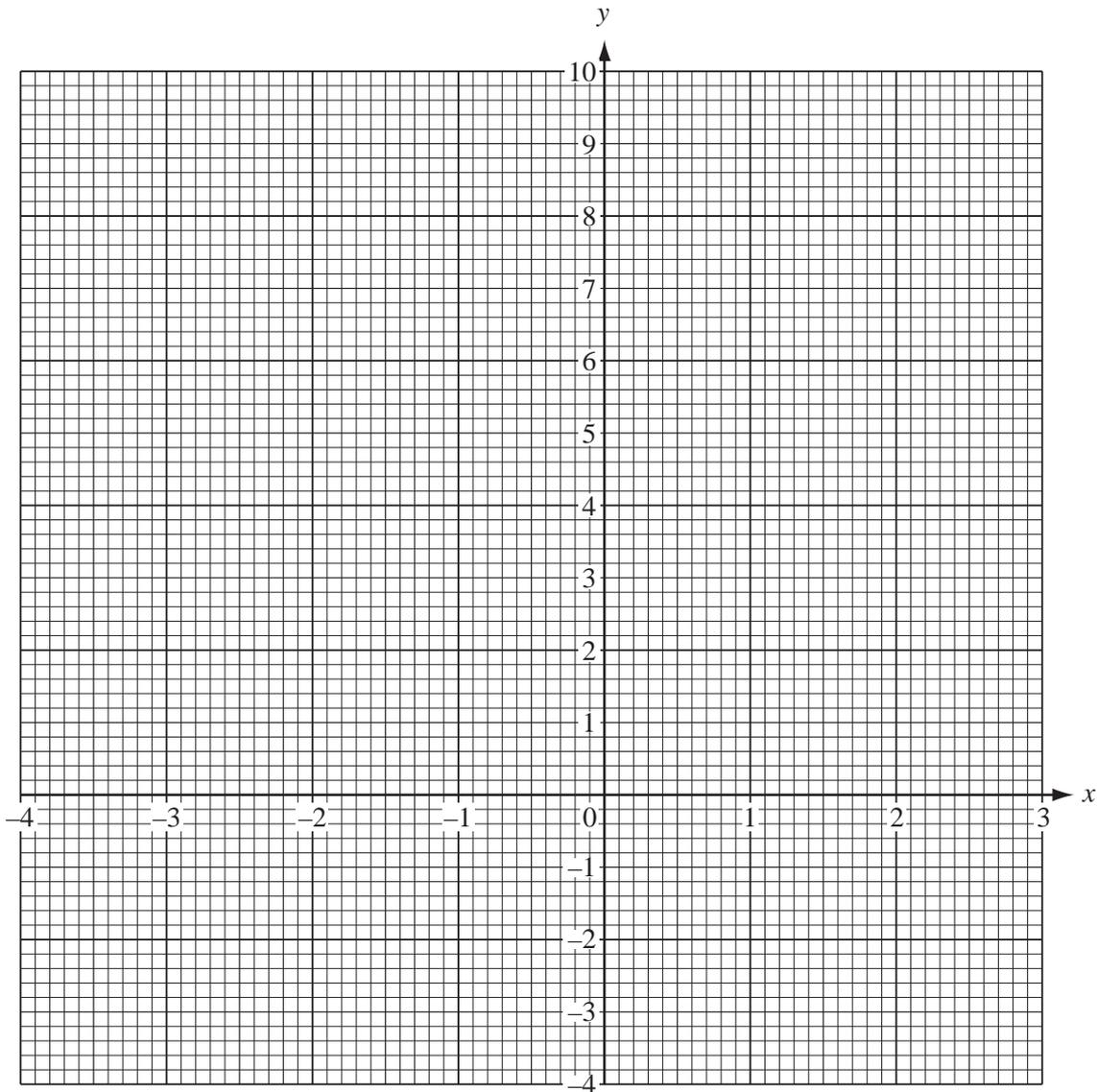
$y =$ [3]

- 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]

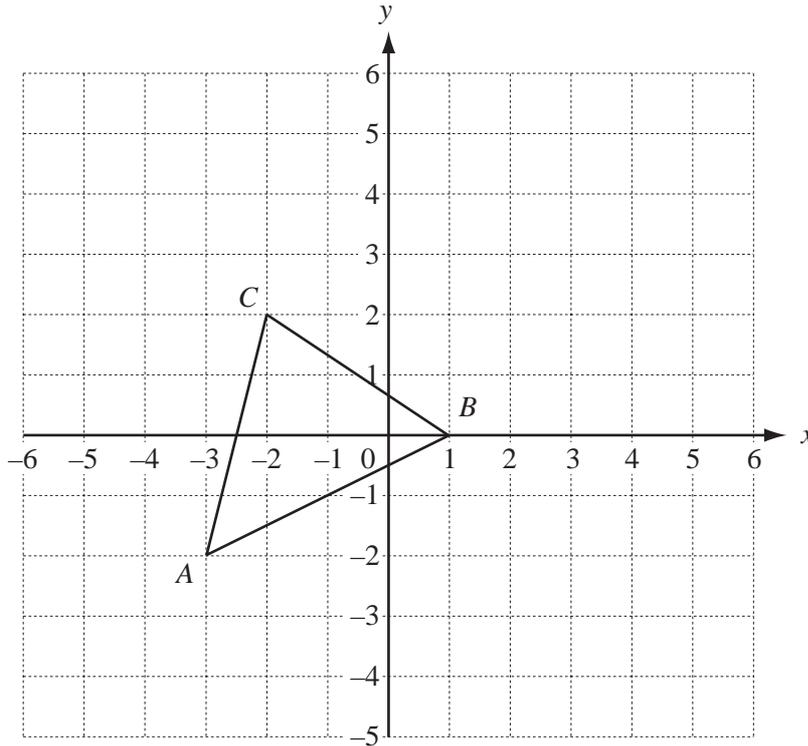
- (c) Write down the coordinates of the lowest point of the curve.

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) $\vec{AB} = \begin{pmatrix} \\ \end{pmatrix}$ $\vec{BC} = \begin{pmatrix} \\ \end{pmatrix}$ [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]

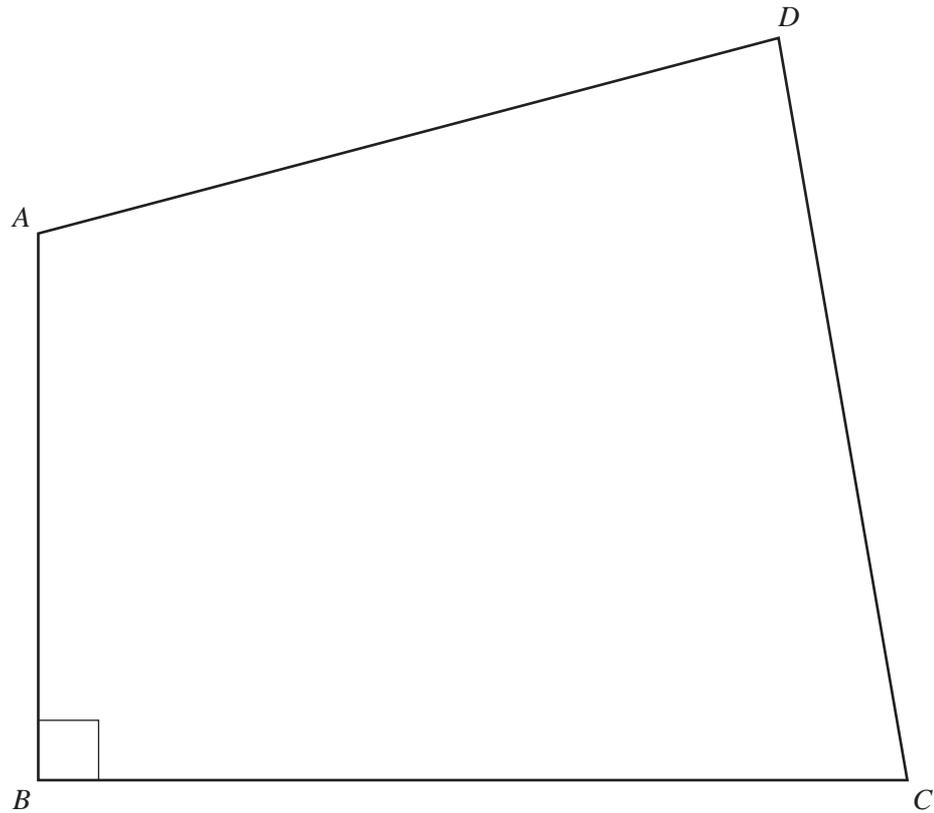
- (ii) Describe fully the single transformation which maps triangle ABC onto triangle APQ .

Answer(c)(ii) [3]

- (d) Rotate triangle ABC through 180° 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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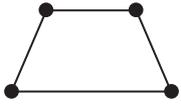


Diagram 1

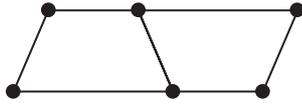


Diagram 2

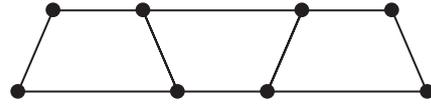


Diagram 3

- (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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