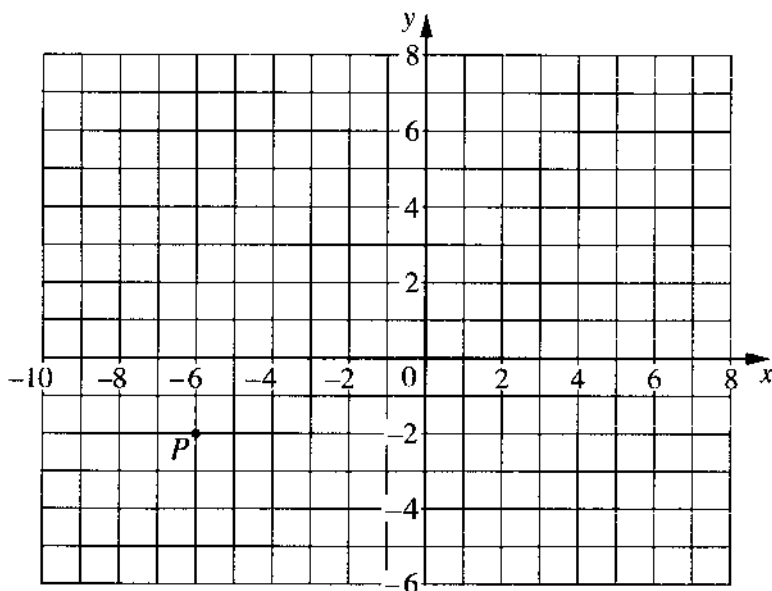


**Question 1**



The point  $P$  is marked on the diagram and  $\vec{PQ} = \begin{pmatrix} 9 \\ -4 \end{pmatrix}$ .

(a) (i) Draw  $\vec{PQ}$  on the diagram. [1]

(ii) Write down the coordinates of  $Q$ . *Answer (a) (ii)*  $(\dots\dots\dots, \dots\dots\dots)$  [1]

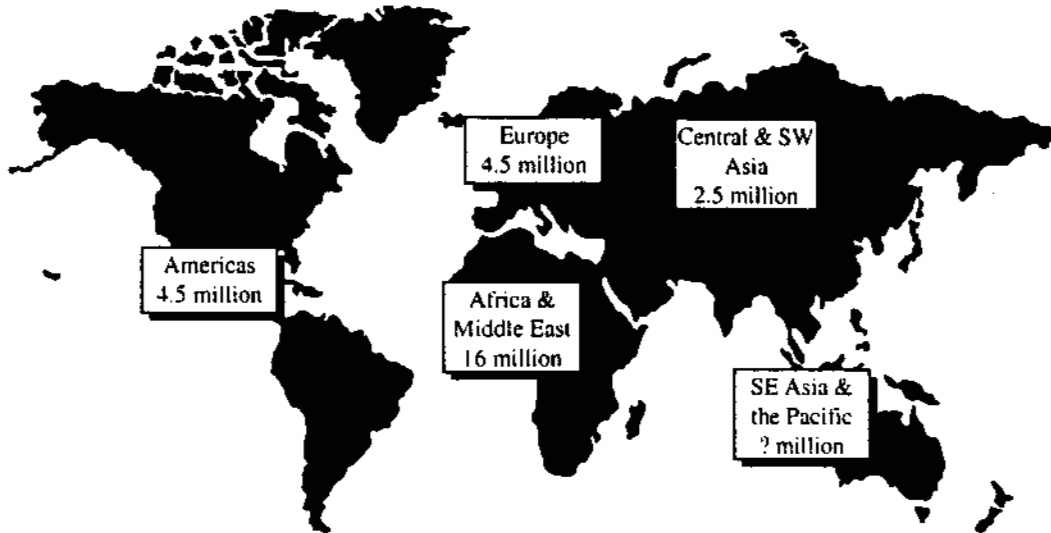
(b)  $\vec{QR} = \begin{pmatrix} 1 \\ 3 \end{pmatrix}$  and  $\vec{QS} = 3\vec{QR}$ .

Find the coordinates of  $S$ .

*Answer (b)*  $(\dots\dots\dots, \dots\dots\dots)$  [2]

**Question 2**

**BBC World Service Radio – 36 million listeners.**



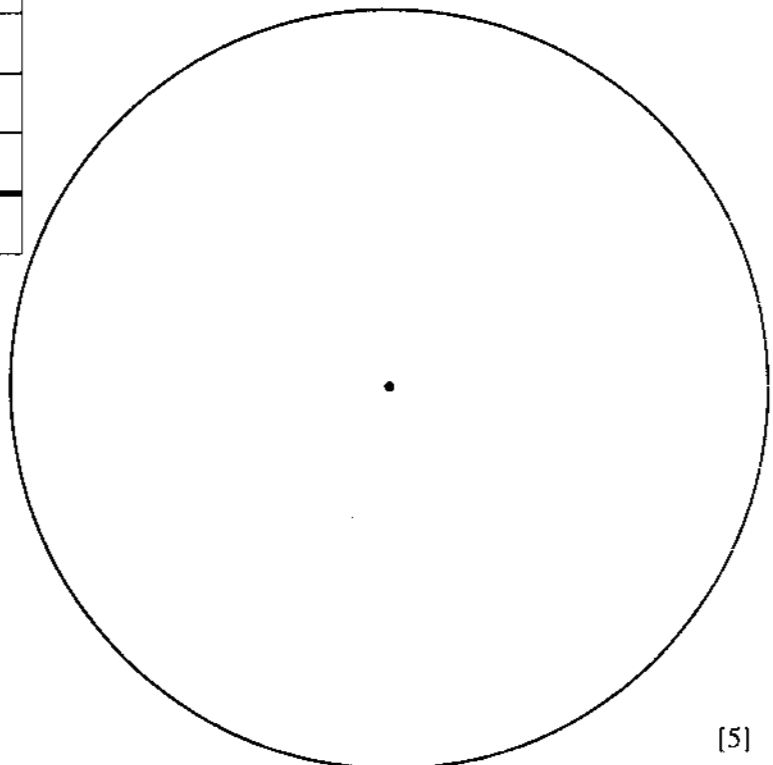
The diagram shows that 36 million people listen to the BBC's World Service Radio programmes.

- (a) The number of listeners for 'SE Asia and the Pacific' is missing from the diagram. Work out the missing number.

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

- (b) Complete the table below. In the given circle, draw an accurate pie chart to show this information.

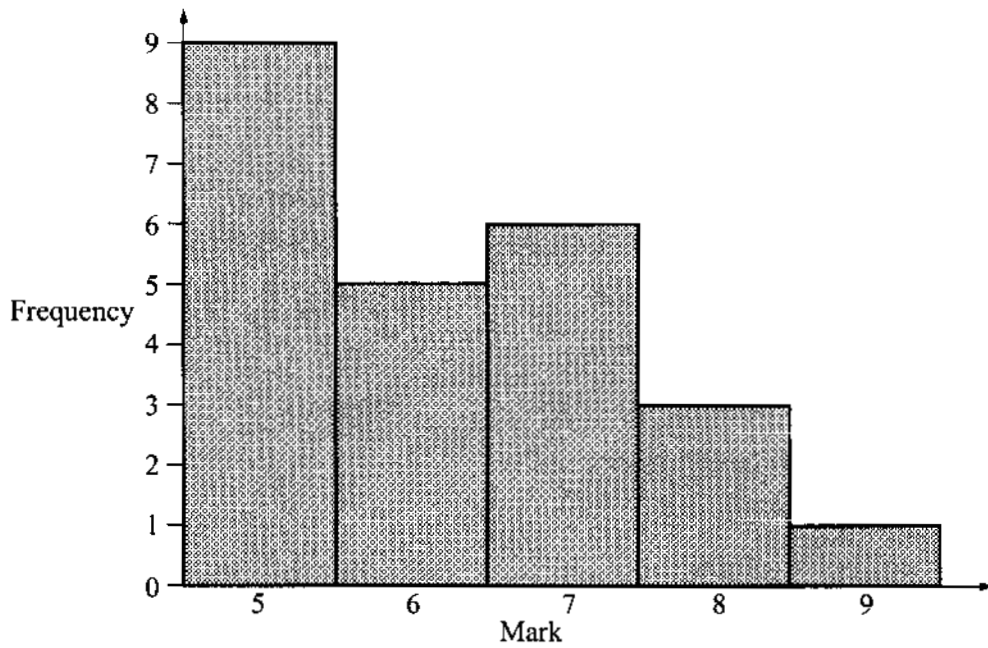
Region	Number of listeners (million)	Pie chart angle
Americas	4.5	
Europe		
Central & SW Asia		
Africa & Middle East		
SE Asia & the Pacific		
<b>TOTAL</b>	<b>36</b>	



[5]

**Question 3**

(a)



The bar chart shows the results of a test taken by 24 students.

(i) How many students scored 7 marks?

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

(ii) Use the bar chart to complete the frequency table.

Mark	5	6	7	8	9
Frequency					

[2]

(iii) Write down the mode.

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

(iv) Find the median.

*Answer (a) (iv)* ..... [2]

(v) Work out the mean.

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

(vi) Ahmed draws a pie chart to show the information in the bar chart above. Calculate the angle he should use to show the number of students who scored 6 marks.

*Answer (a) (vi)* ..... [2]

**Question 3**

(b) 12 boys and 8 girls take another test.  
The mean mark of these 20 students is 7.

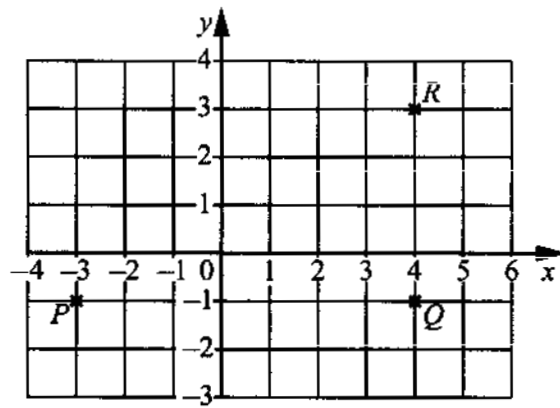
(i) Calculate the total of the marks of the 20 students.

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

(ii) The mean mark of the boys is 6.5.  
Calculate the mean mark of the girls.

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

**Question 4**



**(a) (i)** Write down the coordinates of  $P$ ,  $Q$  and  $R$ .

*Answer (a)(i)*  $P = ( \dots\dots\dots , \dots\dots\dots )$

$Q = ( \dots\dots\dots , \dots\dots\dots )$

$R = ( \dots\dots\dots , \dots\dots\dots )$  [2]

**(ii)**  $PQRS$  is a rectangle. Mark  $S$  on the diagram, and write down its coordinates.

*Answer (a)(ii)*  $S = ( \dots\dots\dots , \dots\dots\dots )$  [2]

**(iii)** Write down the order of rotational symmetry of the rectangle  $PQRS$ .

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

**(iv)** Write down the coordinates of the centre of rotational symmetry of the rectangle  $PQRS$ .

*Answer (a)(iv)*  $( \dots\dots\dots , \dots\dots\dots )$  [2]

**(b) (i)** Write down the vector  $\vec{QR}$  and the vector  $\vec{PS}$ .

*Answer (b)(i)*  $\vec{QR} = \begin{pmatrix} \phantom{0} \\ \phantom{0} \end{pmatrix}$

$\vec{PS} = \begin{pmatrix} \phantom{0} \\ \phantom{0} \end{pmatrix}$  [2]

**(ii)** What do you notice about the vectors  $\vec{QR}$  and  $\vec{PS}$ ?

*Answer (b)(ii)* ..... [1]

**(c)** The vector  $\vec{QT} = 2\vec{QR}$ . Write down

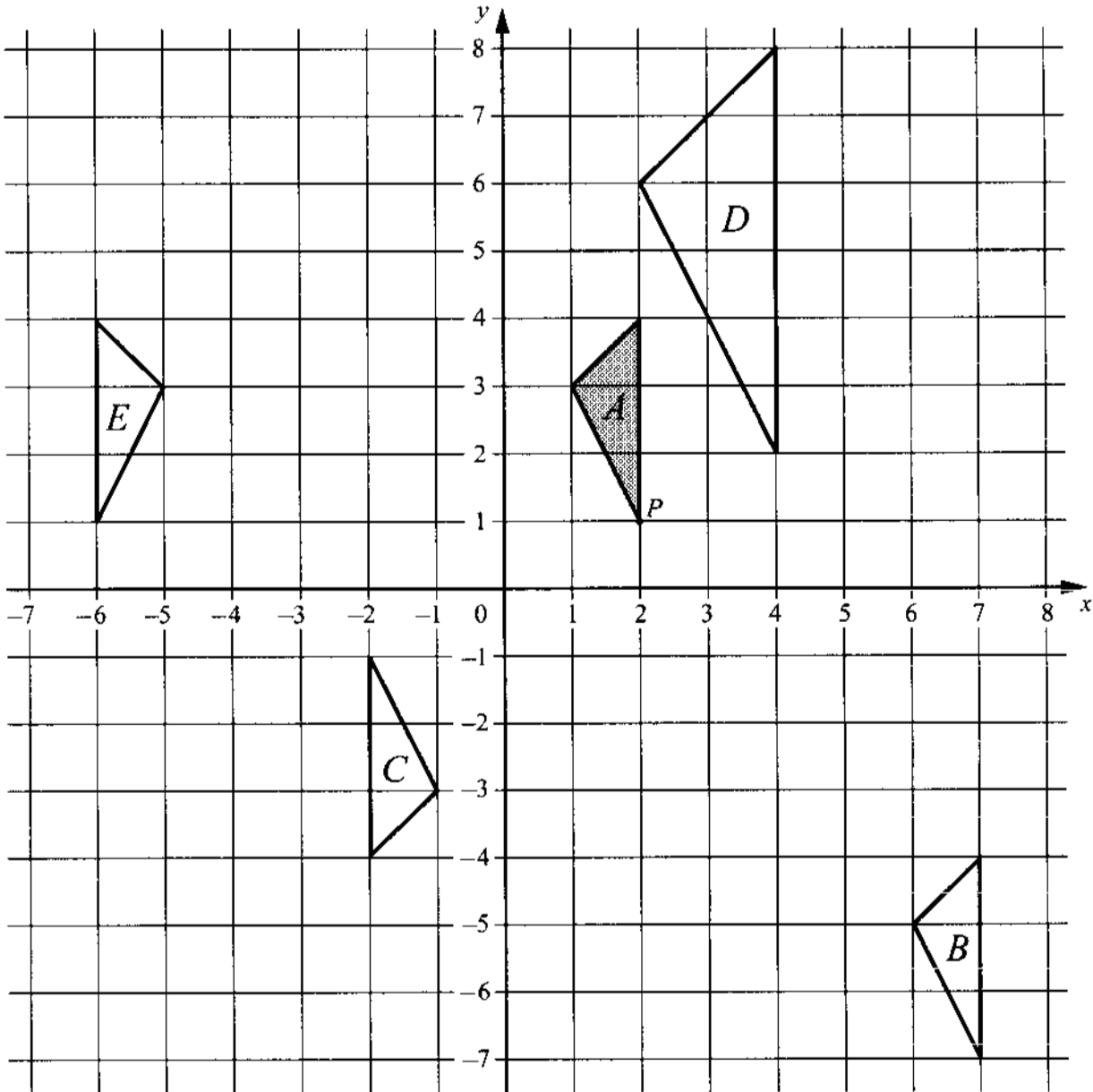
**(i)** the vector  $\vec{QT}$ ,

*Answer (c)(i)*  $\vec{QT} = \begin{pmatrix} \phantom{0} \\ \phantom{0} \end{pmatrix}$  [1]

**(ii)** the coordinates of  $T$ .

*Answer (c)(ii)*  $T = ( \dots\dots\dots , \dots\dots\dots )$  [1]

**Question 5**



(a) Describe **fully** the single transformation which maps

(i) triangle *A* onto triangle *B*,

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

(ii) triangle *A* onto triangle *C*,

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

(iii) triangle *A* onto triangle *D*,

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

(iv) triangle *A* onto triangle *E*.

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

(b) On the grid draw the image of each of the following transformations of **triangle A**.

(i) Reflection in the *y*-axis. Label it *F*. [2]

(ii) Rotation through  $90^\circ$  clockwise about the point *P*. Label it *G*. [2]

QUESTION	ANSWER	MARK																			
1 (a)(i)	Line from P drawn to Q(3, -6)	1																			
(a)(ii)	(3, -6)	1																			
(b)	(6, 3)	2	(B1) for $\begin{pmatrix} 3 \\ 9 \end{pmatrix}$ seen √ award (B1) for (a)(ii) + 'his' $\overrightarrow{QS}$																		
2 (a)	8.5 million	2	(M1) for $36 - (4.5 + 4.5 + 2.5 + 16)$ or equivalent																		
(b)	<table border="1"> <tbody> <tr> <td>Americas</td> <td>4.5</td> <td>45°</td> </tr> <tr> <td>Europe</td> <td>4.5</td> <td>45°</td> </tr> <tr> <td>Central &amp; SW Asia</td> <td>2.5</td> <td>25°</td> </tr> <tr> <td>Africa &amp; Middle East</td> <td>16</td> <td>160°</td> </tr> <tr> <td>SE Asia &amp; the Pacific</td> <td>8.5</td> <td>85°</td> </tr> <tr> <td>TOTAL</td> <td>36</td> <td>*</td> </tr> </tbody> </table>	Americas	4.5	45°	Europe	4.5	45°	Central & SW Asia	2.5	25°	Africa & Middle East	16	160°	SE Asia & the Pacific	8.5	85°	TOTAL	36	*	2	(T1) for each column correct. * Ignore any entry here
	Americas	4.5	45°																		
Europe	4.5	45°																			
Central & SW Asia	2.5	25°																			
Africa & Middle East	16	160°																			
SE Asia & the Pacific	8.5	85°																			
TOTAL	36	*																			
	All 5 sector angles correct ( $\pm 2^\circ$ ) in pie chart 4 or 5 sectors labelled correctly	2 1	(S1) for at least three sectors angles correct ( $\pm 2^\circ$ )																		
3 (a)(i)	6	1																			
(a)(ii)	9, 5, 6, 3, 1	2	(SC1) for 4 out of 5 correct																		
(a)(iii)	5	1																			
(a)(iv)	6	2	(M1) for attempt to rank and the middle number found																		
(a)(v)	6.25	3	√ award (B3) if exact or correct to 3s.f. from 'his' (a)(ii) (B1) for 150 seen (M1) for $150 \div 24$ or evidence of correct method																		
(a)(vi)	75°	2	(M1) for $5 \times 360 \div$ 'his' 24 or equivalent																		
(b)(i)	140	1																			
(b)(ii)	7.75	3	√ award (M2) for $((b)(i) - 12 \times 6.5) \div 8$ seen (B1) for 62 seen																		
4 (a)(i)	P = (-3, -1) Q = (4, -1) R = (4, 3)	2	(SC1) for any 2 correct																		
(a)(ii)	S marked (-3, 3)	1 1	Correct answer only																		
(a)(iii)	2	1																			
(a)(iv)	$(\frac{1}{2}, 1)$	2	(B1) for each correct value																		
(b)(i)	$\begin{pmatrix} 0 \\ 4 \end{pmatrix}; \begin{pmatrix} 0 \\ 4 \end{pmatrix}$	2	Correct answers only (B1) for each correct vector																		
(b)(ii)	Same or equal	1	Correct answer only																		
(c)(i)	$\begin{pmatrix} 0 \\ 8 \end{pmatrix}$	1	√ award (B1) for 2 x (b)(i)																		

QUESTION	ANSWER	MARK	
(c)(ii)	(4, 7)	1	√ award (B1) for correct follow through from (c)(i)
5 (a)(i)	Translation by vector $\begin{pmatrix} 5 \\ -8 \end{pmatrix}$	2	(B1) for 'translation' and (B1) for correct vector After (B0), allow (B1) for <u>any</u> indication of '5 right, 8 down'
(a)(ii)	Rotation, 180° about (0, 0)	2	(B1) for 'rotation' <b>or</b> 'turn' <b>or</b> 'rotational symmetry' <b>and</b> (B1) for '180° about (0, 0)' or equivalent <b>or</b> (B1) for 'enlargement' <b>and</b> (B1) for 'scale factor – 1, centre (0, 0)'
(a)(iii)	Enlargement, s.f. 2 centre (0, 0)	2	(B1) for 'enlargement' <b>and</b> (B1) for 'scale factor 2, centre (0, 0)'
(a)(iv)	Reflection, in the line $x = -2$	2	(B1) for 'reflection' <b>or</b> 'mirrored' (B1) for ' $x = -2$ ' <b>or</b> line drawn clearly on the diagram
(b)(i)	Reflection drawn clearly	2	(SC1) for reflection in x-axis, or correct reflection displaced 1 unit horizontally
(b)(ii)	Rotation drawn accurately	2	(SC1) for rotation of 90° or 180° anticlockwise about P <b>or</b> rotation 90° clockwise about another point

### TYPES OF MARK

Most of the marks (those without prefixes and 'B' marks) are given for accurate results, drawings or statements.

'M' marks are awarded for any correct method applied to the appropriate numbers.

'B' marks are given for a correct statement or step.

'SC' marks are awarded in special cases.

'A' marks are for accurate results or statements but are awarded only if the relevant 'M' marks have been earned.

The symbol '√' indicates that a previous error is to be 'followed through' i.e. the mark can be gained if the candidate has made no further error in obtaining the relevant result.