

1-1.4-2

AI24BTECH11011 - Gourishetty Himani

- 1) Find the coordinates of the point **R** on the line segment joining the points **P**(-1, 3) and **Q**(2, 5) such that $PR = \frac{3}{5}PQ$.

Solution: Given,

Variable	Description	formula
point P	$\begin{pmatrix} -1 \\ 3 \end{pmatrix}$	-
point Q	$\begin{pmatrix} 2 \\ 5 \end{pmatrix}$	-
Ratio of $\frac{PR}{PQ}$	$\frac{3}{5}$	-
point R	Point on line PQ	$\frac{\mathbf{P}+n\mathbf{Q}}{1+n}$

R lies on the line joining the points **P** and **Q** so,

$$PR + RQ = PQ \quad (1)$$

$$\frac{PR}{PR + PQ} = \frac{3}{5} \quad (2)$$

$$5PR = 3PR + 3RQ \quad (3)$$

$$\frac{PR}{PQ} = \frac{3}{2} \quad (4)$$

$$n = \frac{3}{2} \quad (5)$$

$$(6)$$

By section formula ,

$$\mathbf{R} = \frac{n\mathbf{Q} + \mathbf{P}}{1 + n} \quad (7)$$

$$\mathbf{R} = \frac{1}{1 + \frac{3}{2}} \left(\begin{pmatrix} 2 \\ 5 \end{pmatrix} + \frac{3}{2} \begin{pmatrix} -1 \\ 3 \end{pmatrix} \right) \quad (8)$$

$$\mathbf{R} = \begin{pmatrix} \frac{4}{5} \\ \frac{21}{5} \end{pmatrix} \quad (9)$$

$$(10)$$

Therefore the coordinates of point **R** is $\left(\frac{4}{5}, \frac{21}{5}\right)$

