

# 1.5.25

EE24BTECH11010 - BALAJI B

## Question:

In what ratio does the point  $\left(\frac{24}{11}, y\right)$  divide the line segment joining the points  $\mathbf{P} = \begin{pmatrix} 2 \\ -2 \end{pmatrix}$  and  $\mathbf{Q} = \begin{pmatrix} 3 \\ 7 \end{pmatrix}$ ? Also find the value of  $y$ . (10,2017)

## Answer:

Let the point  $\left(\frac{24}{11}, y\right)$  be equals to  $\mathbf{R}$ .

Point	Description
$\mathbf{P} (2, -2)$	First endpoint
$\mathbf{Q} (3, 7)$	Second end-point
$\mathbf{R} \left(\frac{24}{11}, y\right)$	Point divides $\mathbf{P}$ and $\mathbf{Q}$ in the ratio $k : 1$

TABLE 0: Variables Used

The point  $\mathbf{R} \left(\frac{24}{11}, y\right)$  divides the points  $\mathbf{P} \begin{pmatrix} 2 \\ -2 \end{pmatrix}$  and  $\mathbf{Q} \begin{pmatrix} 3 \\ 7 \end{pmatrix}$  in the ratio  $k : 1$ .

Section formula :-

$$\mathbf{C} = \frac{k\mathbf{B} + \mathbf{A}}{k + 1} \quad (0.1)$$

Here,

$$\begin{pmatrix} \frac{24}{11} \\ y \end{pmatrix} = \frac{k \begin{pmatrix} 3 \\ 7 \end{pmatrix} + \begin{pmatrix} 2 \\ -2 \end{pmatrix}}{k + 1} \quad (0.2)$$

$$(k + 1) \begin{pmatrix} \frac{24}{11} \\ y \end{pmatrix} = k \begin{pmatrix} 3 \\ 7 \end{pmatrix} + \begin{pmatrix} 2 \\ -2 \end{pmatrix} \quad (0.3)$$

$$\Rightarrow k = \frac{2}{9} \quad (0.4)$$

Substituting the value of  $k$  in the equation(0.2) we get value of  $y$  as

$$y = \frac{-4}{11} \quad (0.5)$$

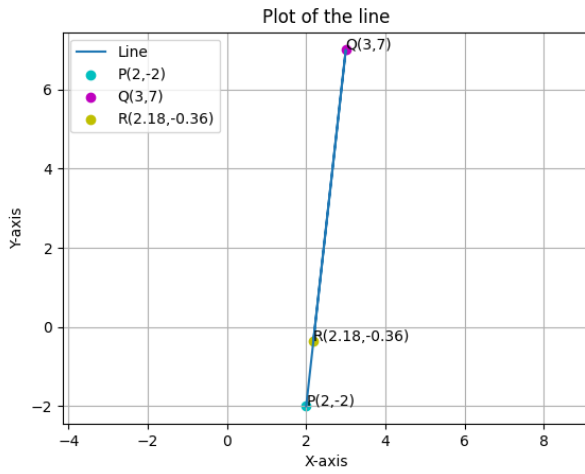


Fig. 0.1: Plot of the line