1.5.25

EE24BTECH11010 - BALAJI B

Question:

In what ratio does the point $\begin{pmatrix}\frac{24}{11}\\ y\end{pmatrix}$ divide the line segment joining he 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 $\begin{pmatrix}\frac{24}{11}\\ y\end{pmatrix}$ be equals to $\mathbf{R}$.

Symbol	Value	Description
$\mathbf{P}$	$\begin{pmatrix}2\\-2\end{pmatrix}$	First Endpoint
$\mathbf{Q}$	$\begin{pmatrix}3\\7\end{pmatrix}$	Second Endpoint
$\mathbf{R}$	$\begin{pmatrix}\frac{24}{11}\\ y\end{pmatrix}$	Point divides $\mathbf{P}$ and $\mathbf{Q}$ in the ratio $k:1$

TABLE 0: Variables Used

The point $\mathbf{R}\begin{pmatrix}\frac{24}{11}\\ y\end{pmatrix}$ 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 :-

$$\mathbf{C} = \frac{k\mathbf{B} + \mathbf{A}}{k+1} \tag{0.1}$$

Here,

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

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

$$\implies k = \frac{2}{9} \tag{0.4}$$

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

$$y = \frac{-4}{11} \tag{0.5}$$

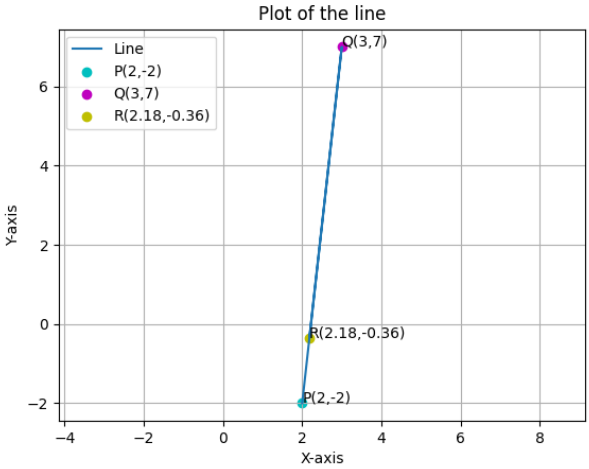

Fig. 0.1: Plot of the line