1.5.25

EE24BTECH11010 - BALAJI B

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

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

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

TABLE 0: Variables Used

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

Section formula :-

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

Here,

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

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

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

Substituting the value of k in the equation0.2 we get value of y as

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