VECTORS

1 10^{th} Maths - EXERCISE-7.2

1. Find the coordinates of the points of trisection of the line segment joining $(4,-1)$ and $(-2,-3)$

2 SOLUTION

Given points are

$$\mathbf{Q} = \begin{pmatrix} 4 \\ -1 \end{pmatrix}, \mathbf{P} = \begin{pmatrix} -2 \\ -3 \end{pmatrix} \tag{1}$$

The equation of the formula is

$$\mathbf{R} = \frac{\mathbf{Q} + n\mathbf{P}}{1+n} \tag{2}$$

Ratio 2:1 has taken

$$n = \frac{1}{2} \tag{3}$$

$$\mathbf{R} = \frac{1}{1+\frac{1}{2}} \left(\begin{pmatrix} 4 \\ -1 \end{pmatrix} + \frac{1}{2} \begin{pmatrix} -2 \\ -3 \end{pmatrix} \right) \tag{4}$$

$$= \frac{1}{\frac{3}{2}} \left(\begin{pmatrix} 4 \\ -1 \end{pmatrix} + \begin{pmatrix} -1 \\ \frac{-3}{2} \end{pmatrix} \right) \tag{5}$$

$$= \frac{1}{\frac{3}{2}} \left(\begin{pmatrix} 4 & -1 \end{pmatrix} - \mathbf{1} \frac{-3}{2} \right) \tag{6}$$

$$= \frac{1}{\frac{3}{2}} \left(\begin{pmatrix} 3 \\ \frac{-5}{3} \end{pmatrix} \right) \tag{7}$$

$$\mathbf{R} = \begin{pmatrix} 2 \\ \frac{-5}{3} \end{pmatrix} \tag{8}$$

$$\tag{9}$$

Ratio 1:2 has taken

$$n = \frac{2}{1} \tag{10}$$

$$\mathbf{S} = \frac{1}{1+\frac{2}{1}}\left(\begin{pmatrix}4\\-1\end{pmatrix} + \frac{2}{1}\begin{pmatrix}-2\\-3\end{pmatrix}\right) \tag{11}$$

$$= \frac{1}{3}\left(\begin{pmatrix}4\\-1\end{pmatrix} + \begin{pmatrix}-4-6\end{pmatrix}\right) \tag{12}$$

$$= \frac{1}{3}\left(\begin{pmatrix}4+&-4\end{pmatrix}\begin{pmatrix}-1+&-6\end{pmatrix}\right) \tag{13}$$

$$= \frac{1}{3}\left(\begin{pmatrix}0\\-7\end{pmatrix}\right) \tag{14}$$

$$\mathbf{S} = \begin{pmatrix}0\\\frac{-7}{3}\end{pmatrix} \tag{15}$$

3 Figure

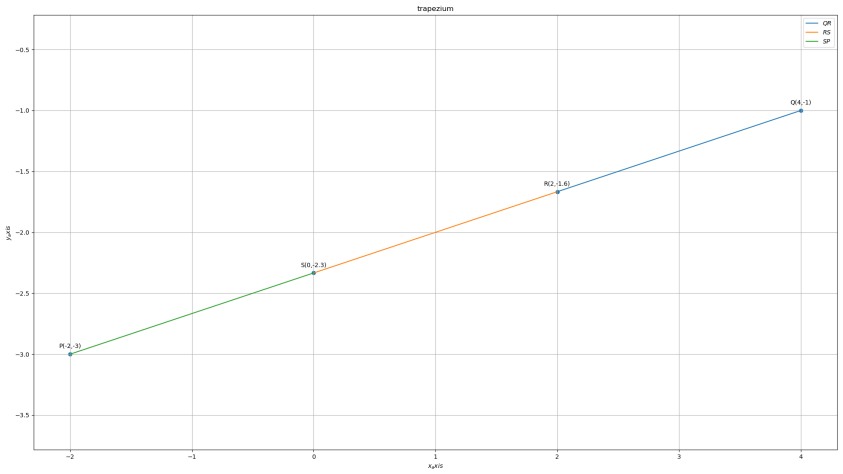

Figure 1: trisecton

https://github.com/prasaddeva287/FWC/tree/main/VECTORS/7.2/codes