

VECTORS

1 10th 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

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

The equation of the formula is

$$\mathbf{R} = \frac{\mathbf{Q} + n\mathbf{P}}{1 + n} \quad (2)$$

Ratio 2:1 has taken

$$n = \frac{1}{2} \quad (3)$$

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

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

$$= \frac{1}{\frac{3}{2}} \left((4 \quad -1) - \mathbf{1} \frac{-3}{2} \right) \quad (6)$$

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

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

$$(9)$$

Ratio 1:2 has taken

$$n = \frac{2}{1} \quad (10)$$

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

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

$$= \frac{1}{3} ((4 + -4) (-1 + -6)) \quad (13)$$

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

$$\mathbf{s} = \begin{pmatrix} 0 \\ \frac{-7}{3} \end{pmatrix} \quad (15)$$

3 Figure

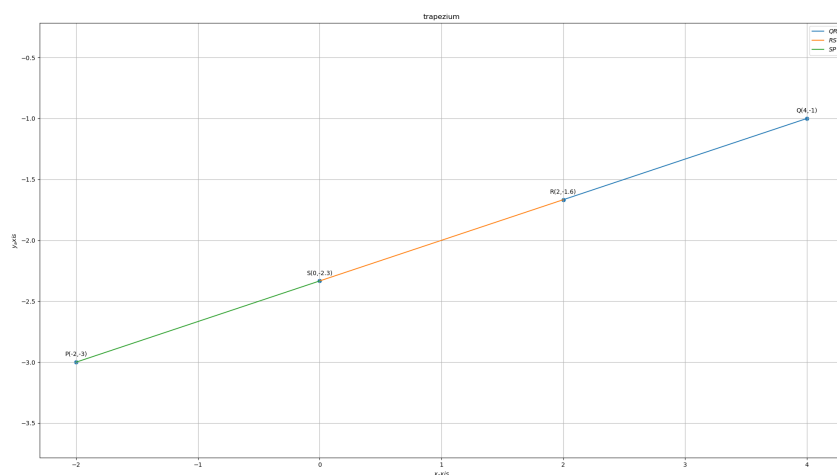


Figure 1: trisecton

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