1-1.4-9j

EE24BTECH11006 - Arnav Mahishi

Q) Point $\mathbf{P}(5,-3)$ is one of the points of trisection of line segment joining the points $\mathbf{A}(7,-2)$ and $\mathbf{B}(1,-5)$

Soln: Trisection is defined as points dividing into three equal parts. Let the two points of trisection of line segment AB be point Q and R

Using section formula:

Point	X	Y
P	5	-3
A	7	-2
B	1	-5
R	3	-4

TABLE 0: Points in question

$$Q = \frac{1}{1+\frac{1}{2}}\left(A + \frac{1}{2}B\right) = \frac{2}{3}\left(\begin{pmatrix}7\\-2\end{pmatrix} + \frac{1}{2}\begin{pmatrix}1\\-5\end{pmatrix}\right) = \begin{pmatrix}5\\-3\end{pmatrix} \tag{0.1}$$

$$R = \frac{1}{1+\frac{1}{2}}\left(B + \frac{1}{2}A\right) = \frac{2}{3}\left(\begin{pmatrix}1\\-5\end{pmatrix} + \frac{1}{2}\begin{pmatrix}7\\-2\end{pmatrix}\right) = \begin{pmatrix}3\\-4\end{pmatrix} \tag{0.2}$$

One of the points i.e Q the same as $\mathbf{P}\,(5,-3)$ which means P trisects the line segment AB

$\therefore$ P is one of the two points that trisects the line segment AB

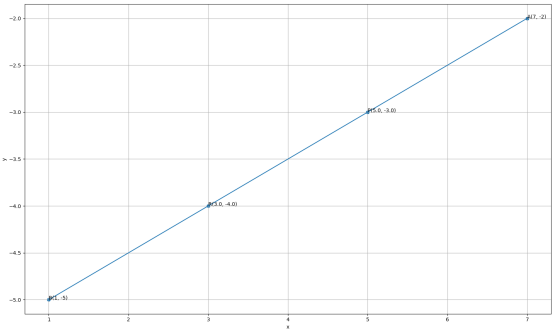

Fig. 0.1: Plot of trisection