1.4.9.9

EE24BTECH11047 - Niketh Prakash Achanta

Question:
Find the coordinates of the points of trisection (*i.e. points dividing to three equal parts*) of the line segment joining the points $\mathbf{A}\,(\mathbf{2},\mathbf{-2})$ and $\mathbf{B}\,(\mathbf{-7},\mathbf{4})$.
Solution:

Variable	Description
A	One end of line segment
B	Other end of line segment
P_1	First point of trisection
P_2	Second point of trisection
m	Ratio in which P_1 divides AB
n	Ratio in which P_2 divides AB

TABLE 0: Variables Used

Using the section formula:

$$\mathbf{C} = \left(\frac{\mathbf{B} + m\mathbf{A}}{1+m}\right) \tag{0.1}$$

$$\mathbf{P1 or P2} = \begin{pmatrix} \frac{-7+2m}{1+m} \\ \frac{4-2m}{1+m} \end{pmatrix} \tag{0.2}$$

P1 divides AB in the ratio 1 : 2, so

$$m = \frac{1}{2} \tag{0.3}$$

Plugging this value in 0.2, we get

$$\mathbf{P1} = \begin{pmatrix} -1 \\ 0 \end{pmatrix} \tag{0.4}$$

Similarly, in case of **P2**,

$$n = 2 \tag{0.5}$$

Again, putting this value in place of m in 0.2, we get

$$\mathbf{P2} = \begin{pmatrix} -4 \\ 2 \end{pmatrix} \tag{0.6}$$

Thus, we have found the points of intersection viz. $\mathbf{P1} = \begin{pmatrix} -1 \\ 0 \end{pmatrix}$ and $\mathbf{P2} = \begin{pmatrix} -4 \\ 2 \end{pmatrix}$.

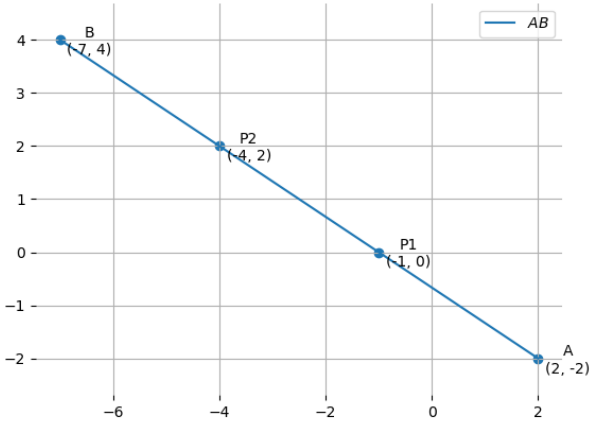

Fig. 0.1