1-1.5-8

EE24BTECH11029- JANAGANI SHRETHAN REDDY

Question:
Find the ratio in which $P(4,5)$ divides the line segment joining $A(2,3)$ and $B(7,8)$

sol : $P\begin{pmatrix}4 & 5\end{pmatrix}$ divides A and B in the ratio $k:1$

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

(2)

$$P = \frac{\mathbf{A}}{k+1} + \frac{k\mathbf{B}}{k+1} \tag{3}$$

(4)

$$p = \begin{pmatrix}\mathbf{A} & \mathbf{B}\end{pmatrix}\begin{pmatrix}\frac{1}{k+1} \\ \frac{k}{k+1}\end{pmatrix} \tag{5}$$

(6)

$$\begin{pmatrix}4 \\ 5\end{pmatrix} = \begin{pmatrix}2 & 7 \\ 3 & 8\end{pmatrix}\begin{pmatrix}\frac{1}{k+1} \\ \frac{k}{k+1}\end{pmatrix} \tag{7}$$

(8)

$$\begin{pmatrix}4 \\ 5\end{pmatrix} = \begin{pmatrix}\frac{2}{k+1} + \frac{7k}{k+1} \\ \frac{3}{k+1} + \frac{8k}{k+1}\end{pmatrix} \tag{9}$$

(10)

(11)

$$4 = \frac{2+7k}{k+1} \tag{12}$$

(13)

$$4k + 4 = 2 + 7k \tag{14}$$

(15)

$$3k = 2 \tag{16}$$

(17)

$$k = \frac{2}{3} \tag{18}$$

(19)

$\therefore P\begin{pmatrix}4 & 5\end{pmatrix}$ divides $\mathbf{A}$ and $\mathbf{B}$ in the ratio $\frac{2}{3}:1$

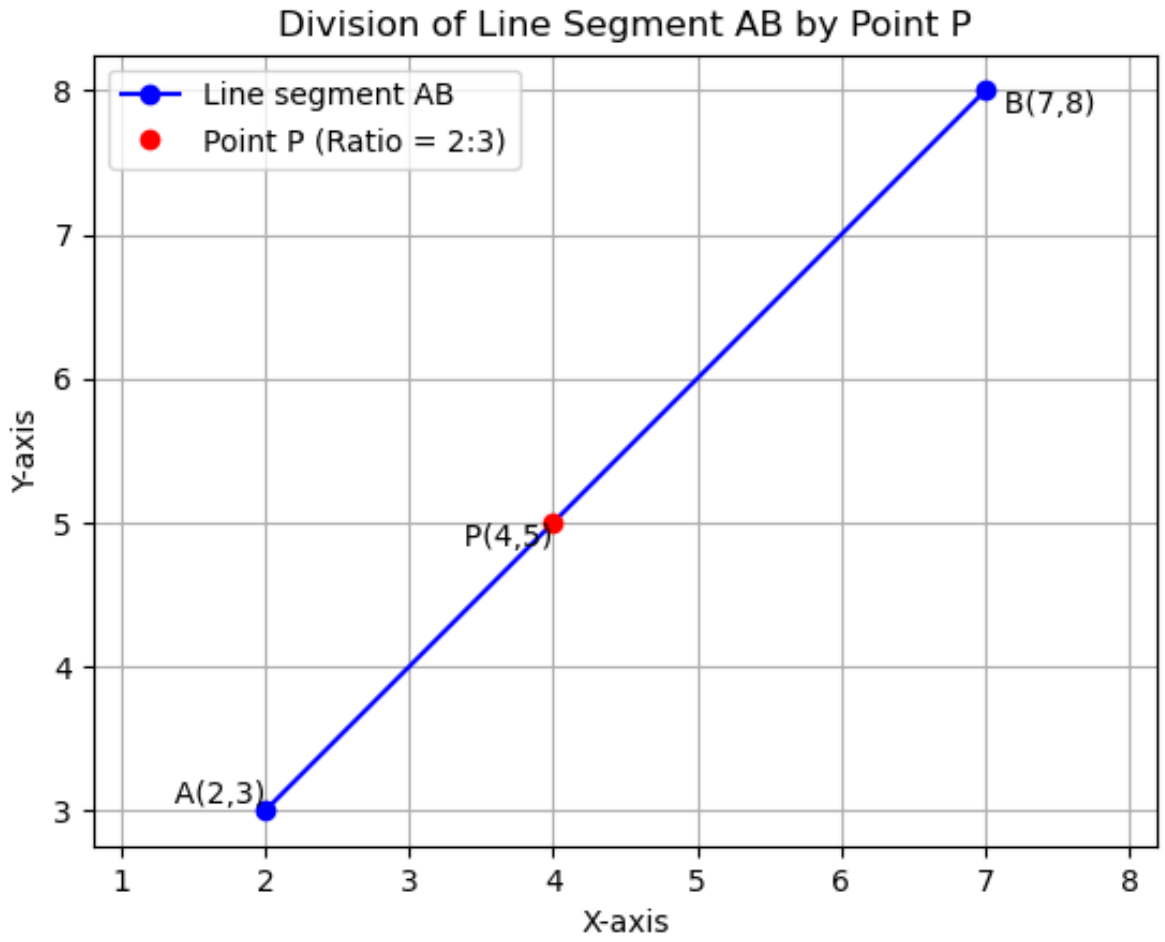

Fig. 0. plot of A,B and P