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 $B(7,8)$

solution :

variable	Description	formula
A$(2,3)$	one end of the line segment	–
B$(7,8)$	another end of the line segment	–
P $(4,5)$	divides**A**and **B** in the ratio $k:1$	$P=\frac{\mathbf{A}+k\mathbf{B}}{k+1}$

TABLE 0: variable used

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

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

$$\implies P=\frac{\mathbf{A}}{k+1}+\frac{k\mathbf{B}}{k+1} \tag{2}$$

$$\implies p=\begin{pmatrix}\mathbf{A} & \mathbf{B}\end{pmatrix}\begin{pmatrix}\frac{1}{k+1}\\ \frac{k}{k+1}\end{pmatrix} \tag{3}$$

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

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

$$\implies 4=\frac{2+7k}{k+1} \tag{6}$$

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

$$3k=2 \tag{8}$$

$$k=\frac{2}{3} \tag{9}$$

$$\implies k:1=\frac{2}{3}:1 \tag{10}$$

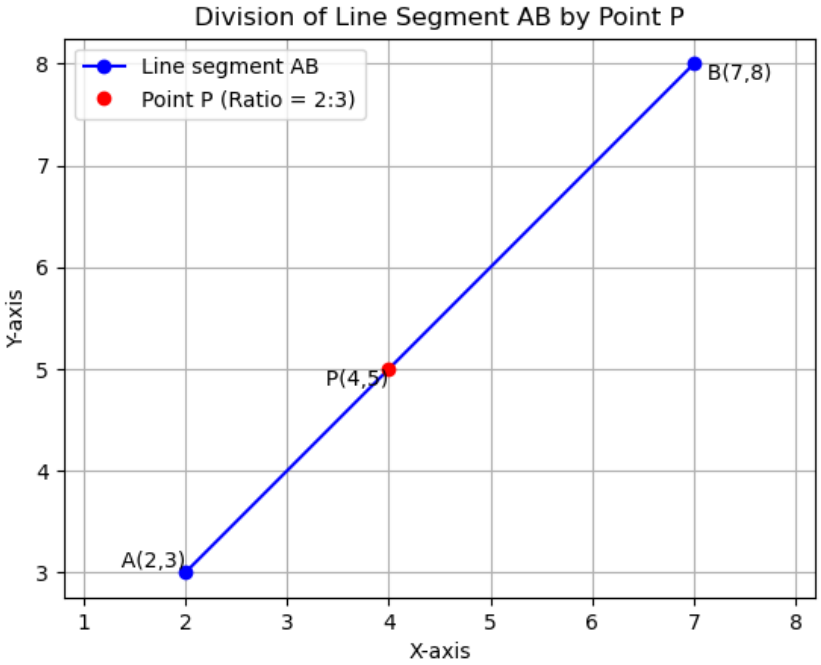

Fig. 0: plot of A,B and P