1.1.4.10

EE24BTECH11032 - John Bobby

Question: If $\mathbf{P}(9a-2,-b)$ divides the line segment joining $\mathbf{A}(3a+1,-3)$ and $\mathbf{B}(8a,5)$ in the ratio 3 : 1, find the values of a and b.

Variable	Description
a, b	Variables inside the coordinates
$\mathbf{P}\,(9a-2,-b)$	coordinates of point P
$\mathbf{A}\,(3a+1.-3)$	coordinates of point A
$\mathbf{B}\,(8a,5)$	coordinates of point B
k	ratio in which P divides **AB**

TABLE 0: Input Parameters

Solution: As P lies between A and B, P can be represented as

$$P = \frac{kB + A}{k+1} \tag{0.1}$$

where k is the ratio,here k=3

$$P = \frac{3B + A}{4} \tag{0.2}$$

$$= \frac{3\begin{pmatrix}8a\\5\end{pmatrix} + \begin{pmatrix}3a+1\\-3\end{pmatrix}}{4} = \frac{\begin{pmatrix}27a+1\\12\end{pmatrix}}{4} \tag{0.3}$$

$$P = \begin{pmatrix}9a-2\\-b\end{pmatrix} \tag{0.4}$$

on equating both sides

$$a = 1 \tag{0.5}$$

$$b = -3 \tag{0.6}$$

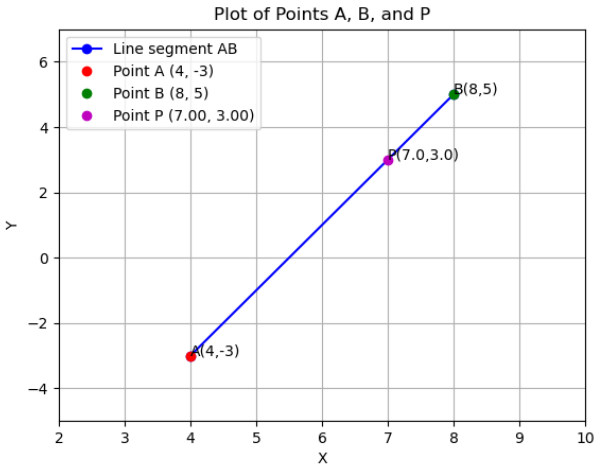

Fig. 0.1: Plot of points **A**, **B** and **P**