

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 .

Solution: As \mathbf{P} lies between \mathbf{A} and \mathbf{B} , \mathbf{P} can be represented as

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

where k is the ratio, here $k = 3$

$$\mathbf{P} = \frac{3\mathbf{B} + \mathbf{A}}{4} = \frac{3 \begin{pmatrix} 8a \\ 5 \end{pmatrix} + \begin{pmatrix} 3a + 1 \\ -3 \end{pmatrix}}{4} = \frac{\begin{pmatrix} 27a + 1 \\ 12 \end{pmatrix}}{4}$$

also,

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

on equating both sides and solving the two equations, we get

$$a = 1, b = -3$$

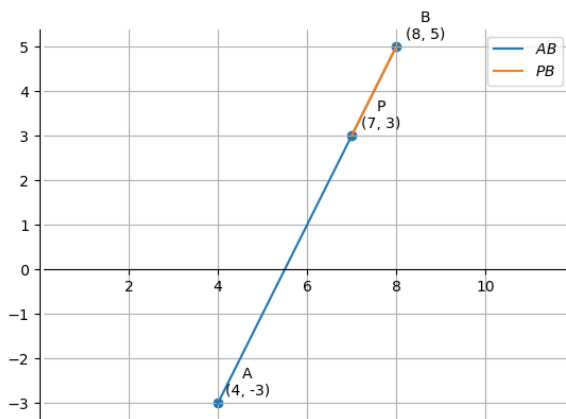


Fig. 0.1: Plot of points **A**, **B** and **P**