

1.5.9

EE24BTECH11001 - Aditya Tripathy

Question:

In what ratio does the x -axis divide the line segment joining the points **A** (3,6) and **B** (-12, -3)?

Solution:

From (1.1.4.1), if **D** divides **BC** in the ratio $k : 1$,

$$\mathbf{D} = \frac{k\mathbf{C} + \mathbf{B}}{k + 1} \quad (0.1)$$

Since the point lies on the x -axis, it is of the form $(x, 0)$. So,

$$\begin{pmatrix} x \\ 0 \end{pmatrix} = \frac{\begin{pmatrix} -12 \\ -3 \end{pmatrix} + \begin{pmatrix} 3 \\ 6 \end{pmatrix}}{k + 1} \begin{pmatrix} x \\ 0 \end{pmatrix} = \frac{\begin{pmatrix} -12k + 3 \\ -3k + 6 \end{pmatrix}}{k + 1} \begin{pmatrix} x \\ 0 \end{pmatrix} = \begin{pmatrix} \frac{-12k+3}{k+1} \\ \frac{-3k+6}{k+1} \end{pmatrix} \quad (0.2)$$

On comparing the entries in the two vectors we get,

$$0 = \frac{-3k + 6}{k + 1} \implies k = 2x = \frac{-12k + 3}{k + 1} \implies x = -7 \quad (0.3)$$

Hence the x -axis divides the line segment joining **A** ,**B** in the ratio 2 : 1

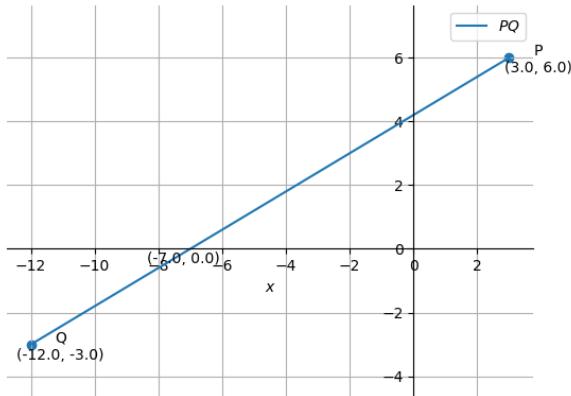


Fig. 0.1: Point joining A and B