EE24BTECH11053 - S A Aravind Eswar

Question: Find the value of x if the distance between points $\mathbf{A}\begin{pmatrix}0\\0\end{pmatrix}$, and $\mathbf{B}\begin{pmatrix}\text{x}\\4\end{pmatrix}$ is 5 units.

Solution:

Symbol	Value	Description
A	$\begin{pmatrix}0\\0\end{pmatrix}$	Point **A**
B	$\begin{pmatrix}x\\-4\end{pmatrix}$	Point **B**
d	5	Distance between points **A** and **B**

TABLE 0: Given Values

Given,

$$\|AB\| = d \tag{0.1}$$
$$\|AB\|^2 = d^2 \tag{0.2}$$
$$AB^tAB = d^2 \tag{0.3}$$
$$(x - x_A)^2 + (y_B - y_A)^2 = d^2 \tag{0.4}$$

Solving,

$$x = x_A \pm \sqrt{d^2 - (y_B - y_A)^2} \tag{0.5}$$

$$x = 3 \text{ (or) } x = -3 \tag{0.6}$$

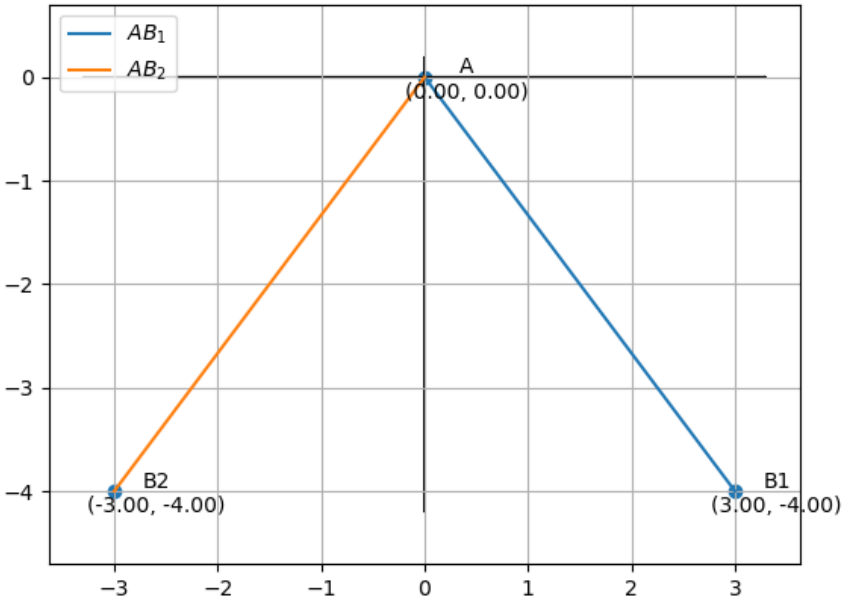

Fig. 0.1: Points **A**,**B**,**C** and **D**