1.8.20

EE24BTECH11007 - Arnav Makarand Yadnopavit

Question:
Find the value of a, if the distance between the points $\mathbf{A}\,(-3,-14)$ and $\mathbf{B}\,(a,-5)$ is 9 units.
Solution: Given that

Point	Vector
A	$\begin{pmatrix}-3\\-14\end{pmatrix}$
B	$\begin{pmatrix}a\\-5\end{pmatrix}$

TABLE 0: Given Values

$$d = \|A - B\| = 9 \tag{0.1}$$

$$\sqrt{\left(A-B\right)^{\top}\left(A-B\right)} = 9 \tag{0.2}$$

$$\implies \begin{pmatrix}-3-a & -9\end{pmatrix}\begin{pmatrix}-3-a\\-9\end{pmatrix} = 81 \tag{0.3}$$

$$\implies (a+3)^2 = 0 \tag{0.4}$$

$$\therefore a = -3 \tag{0.5}$$

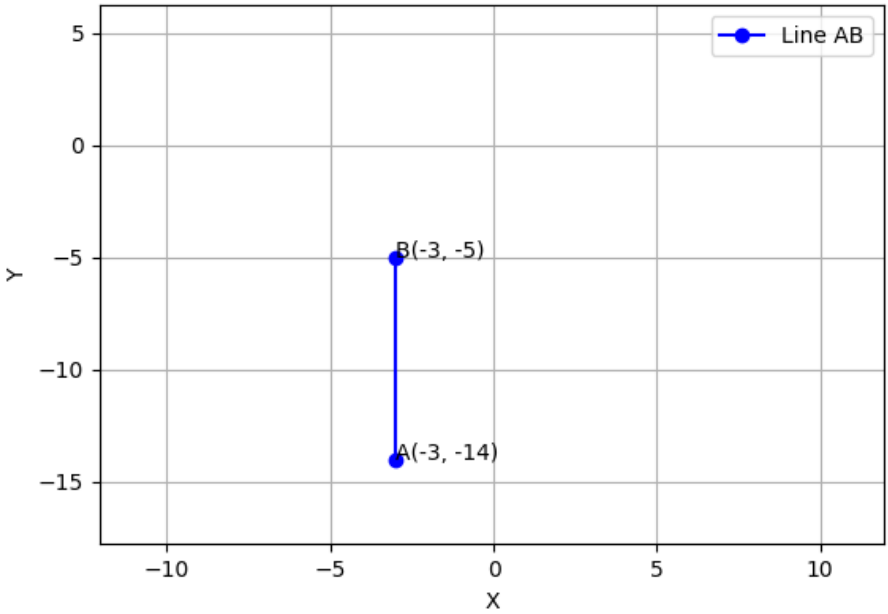

Fig. 0.1: Plot of A,B