

# 1.9.34

Puni Aditya - EE25BTECH11046

## Question:

Find the distance of the point  $(-6, 8)$  from the origin.

## Solution:

Let the given point be

$$\mathbf{P} = \begin{pmatrix} -6 \\ 8 \end{pmatrix}$$

The distance of the point from the origin is the length of its position vector  $\mathbf{P}$ . The formula is given as

$$\|\mathbf{P}\| = \sqrt{\mathbf{P}^T \mathbf{P}} \quad (1)$$

$$\mathbf{P}^T = (-6 \quad 8)$$

From 1, we have

$$\mathbf{P}^T \mathbf{P} = (-6 \quad 8) \begin{pmatrix} -6 \\ 8 \end{pmatrix} \quad (2)$$

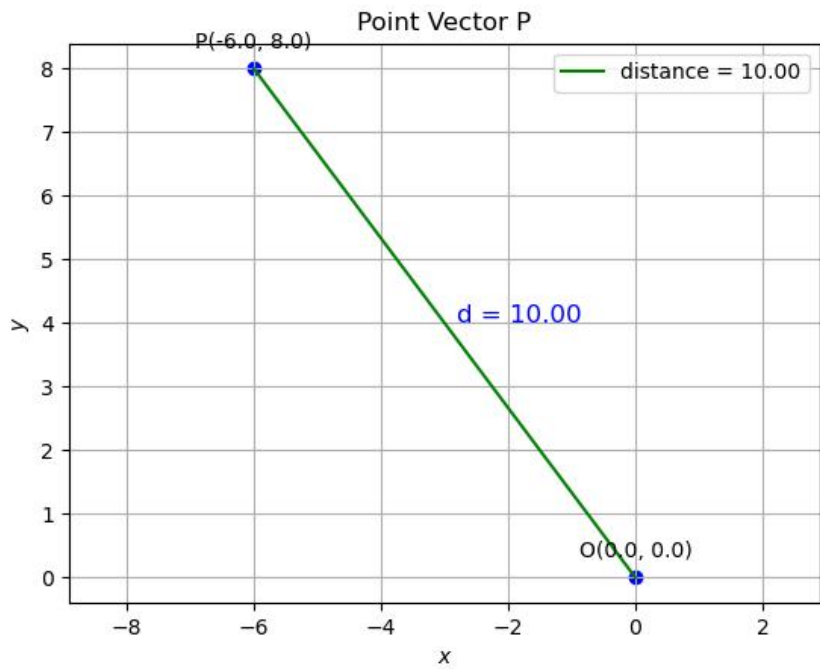
$$= (-6)(-6) + (8)(8) \quad (3)$$

$$= 36 + 64 \quad (4)$$

$$= 100 \quad (5)$$

$$\text{Distance} = \|\mathbf{P}\| = \sqrt{\mathbf{P}^T \mathbf{P}} = \sqrt{100} = 10$$

$\therefore$  The distance of the point  $(-6, 8)$  from the origin is **10 units**.



Point P(-6, 8)