

1.8.9

AI25BTECH11033 - Spoorthi N

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Question:

The distance of the point $\mathbf{P}(-6, 8)$ from the origin is

solution:

Let the point be represented as a column matrix or (vector).

$$\mathbf{P} = \begin{pmatrix} -6 \\ 8 \end{pmatrix} \text{ and } \mathbf{O} = \begin{pmatrix} 0 \\ 0 \end{pmatrix} \quad (0.1)$$

Consider

$$\mathbf{P} - \mathbf{O} = \begin{pmatrix} -6 \\ 8 \end{pmatrix} \quad (0.2)$$

Transpose the vector

$$(\mathbf{P} - \mathbf{O})^T = (-6 \quad 8) \quad (0.3)$$

multiply the transpose with the original vector.

$$(\mathbf{P} - \mathbf{O})^T (\mathbf{P} - \mathbf{O}) = (-6)^2 + 8^2 \quad (0.4)$$

$$= 36 + 64 \quad (0.5)$$

$$= 100 \quad (0.6)$$

$$d = \|\mathbf{P} - \mathbf{O}\| = \sqrt{100} = 10 \quad (0.7)$$

The distance of the point $\mathbf{P}(-6, 8)$ from the origin is 10 units

Graphical Representation

