

1-1.9-1

EE24BTECH11048-NITHIN.K

Question:

The distance between the points $(m, -n)$ and $(-m, n)$ is

Solution:

| Variable | Description | Values |
|----------|-------------|--|
| A | A Point | $\begin{pmatrix} m & -n \end{pmatrix}$ |
| B | A Point | $\begin{pmatrix} -m & n \end{pmatrix}$ |

TABLE 0

Let d be the distance between the two points then

$$\mathbf{A} - \mathbf{B} = \begin{pmatrix} m \\ -n \end{pmatrix} - \begin{pmatrix} -m \\ n \end{pmatrix} = \begin{pmatrix} 2m \\ -2n \end{pmatrix} \quad (1)$$

$$(\mathbf{A} - \mathbf{B})^T (\mathbf{A} - \mathbf{B}) = 4(m^2 + n^2) \quad (2)$$

$$d = \|\mathbf{A} - \mathbf{B}\| = \sqrt{(\mathbf{A} - \mathbf{B})^T (\mathbf{A} - \mathbf{B})} \quad (3)$$

$$d = 2\sqrt{m^2 + n^2} \quad (4)$$