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	$\begin{pmatrix} m & -n \end{pmatrix}^T$
B	A Point	$\begin{pmatrix} -m & n \end{pmatrix}^T$

TABLE 0

Let d be the distance between the two points then

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

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

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

$$d = 2\sqrt{m^2 + n^2} \tag{4}$$

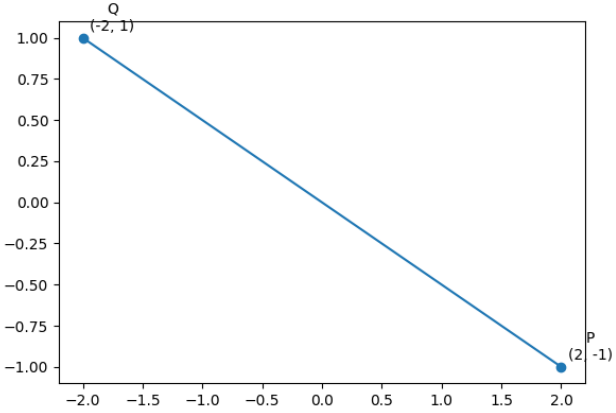
Q
(-2, 1)
P
(2, -1)
1.00
0.75
0.50
0.25
0.00
−0.25
−0.50
−0.75
−1.00
−2.0
−1.5
−1.0
−0.5
0.0
0.5
1.0
1.5
2.0

Fig. 0