

VECTORS

12th Maths - EXERCISE-10.3

1. Find the angle between the vectors
 $\vec{a} = \hat{i} - 2\hat{j} + 3\hat{k}$ and $\vec{b} = 3\hat{i} - 2\hat{j} + \hat{k}$

solution

Given points are

$$\mathbf{a} = \begin{pmatrix} 1 \\ -2 \\ 3 \end{pmatrix}, \mathbf{b} = \begin{pmatrix} 3 \\ -2 \\ 1 \end{pmatrix}, \quad (1)$$

$$\cos \theta = \frac{\mathbf{a}^T \mathbf{b}}{\|\mathbf{a}\| \|\mathbf{b}\|} \quad (2)$$

$$\mathbf{a}^T \mathbf{b} = 10 \quad (3)$$

$$\|\mathbf{a}\| = \sqrt{14} \quad (4)$$

$$\|\mathbf{b}\| = \sqrt{14} \quad (5)$$

by substituting the values of (3),(4),(5) in (2) then we get $\cos \theta$

$$\cos \theta = \frac{5}{7} \quad (6)$$

$$\theta = \cos^{-1} \frac{5}{7} \quad (7)$$

$$\implies \theta = 44.4^\circ \quad (8)$$

The angle between the vectors \mathbf{a} and \mathbf{b} is 44.4°