

# VECTORS

## 12<sup>th</sup> 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

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

$$\vec{\mathbf{a}} \cdot \vec{\mathbf{b}} = \|a\| \|b\| \cos \theta \quad (2)$$

$$\cos \theta = \frac{\mathbf{a}^\top \mathbf{b}}{\|\mathbf{a}\| \|\mathbf{b}\|} \quad (3)$$

$$\theta = \cos^{-1} \frac{\mathbf{a}^\top \mathbf{b}}{\|\mathbf{a}\| \|\mathbf{b}\|} \quad (4)$$

$$\mathbf{a}^\top \mathbf{b} = 10 \quad (5)$$

$$\|\mathbf{a}\| = \sqrt{14} \quad (6)$$

$$\|\mathbf{b}\| = \sqrt{14} \quad (7)$$

by substituting the values of (5),(6),(7) in (4) then we get  $\theta = 44.41^\circ$   
The angle between the vectors  $\mathbf{a}$  and  $\mathbf{b}$  is  $44.41^\circ$