2.7.2

AI25BTECH11030 -Sarvesh Tamgade

Question: The area of a triangle with vertices A(-1,1), B(0,5) and C(3,2) is

Solution:

Given: $A(-1,1),\ B(0,5),\ C(3,2)$.

$$\mathbf{B}-\mathbf{A}=\begin{pmatrix}0-(-1)\\5-1\end{pmatrix}=\begin{pmatrix}1\\4\end{pmatrix},\qquad \mathbf{C}-\mathbf{A}=\begin{pmatrix}3-(-1)\\2-1\end{pmatrix}=\begin{pmatrix}4\\1\end{pmatrix}.$$

$$\|(\mathbf{B}-\mathbf{A})\times(\mathbf{C}-\mathbf{A})\|=\left\|\begin{pmatrix}|\mathbf{A_{23}} & \mathbf{B_{23}}|\\ |\mathbf{A_{31}} & \mathbf{B_{31}}|\\ |\mathbf{A_{12}} & \mathbf{B_{12}}|\end{pmatrix}\right\|=7.5$$

$$\text{Area}=\frac{1}{2}\|(\mathbf{B}-\mathbf{A})\times(\mathbf{C}-\mathbf{A})\|=7.5$$

$$\boxed{Area\ of\ Triangle\ ABC\ =\ 7.5\ sq.units} \tag{0.1}$$

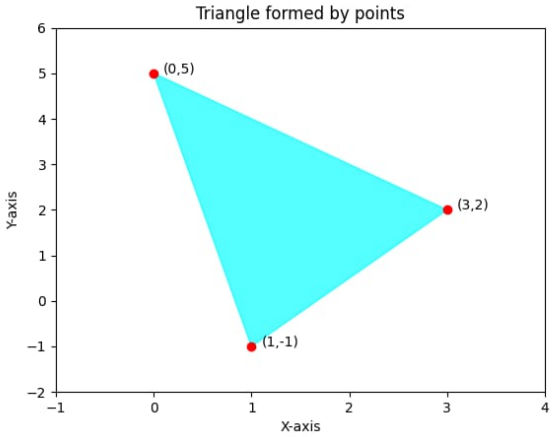

Fig. 0.1: Vector Representation