2.6.34

AI25BTECH11023 - Pratik R

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Question

Find the area of region bounded by the triangle whose vertices are $(-1, 1)$,$(0, 5)$ and $(3, 2)$.

Theoretical Solution

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

$$\mathbf{B}-\mathbf{A}=\begin{pmatrix}1\\4\end{pmatrix},\qquad \mathbf{C}-\mathbf{A}=\begin{pmatrix}4\\1\end{pmatrix}.$$

$$\|(\mathbf{B}-\mathbf{A})\times(\mathbf{C}-\mathbf{A})\| = \left\| \begin{pmatrix} |\mathbf{A_{11}} & \mathbf{B_{23}}| \\ |\mathbf{A_{31}} & \mathbf{B_{31}}| \\ |\mathbf{A_{12}} & \mathbf{B_{12}}| \end{pmatrix} \right\| = 15$$

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

$$\boxed{\textit{Area of Triangle } ABC \;=\; 7.5\,\textit{sq.units}} \tag{1}$$

Graph

figs/fig.png