

2.6.9

AI25BTECH11003 - Bhavesh Gaikwad

Question: The area of a triangle with vertices A(3,0), B(7,0) and C(8,4) is

Solution:

Given: A(3, 0), B(7, 0), C(8, 4).

$$\mathbf{B} - \mathbf{A} = \begin{pmatrix} 7-3 \\ 0-0 \end{pmatrix} = \begin{pmatrix} 4 \\ 0 \end{pmatrix}, \quad \mathbf{C} - \mathbf{A} = \begin{pmatrix} 8-3 \\ 4-0 \end{pmatrix} = \begin{pmatrix} 5 \\ 4 \end{pmatrix}.$$

$$\|(\mathbf{B} - \mathbf{A}) \times (\mathbf{C} - \mathbf{A})\| = \left\| \begin{pmatrix} |\mathbf{A}_{23} & \mathbf{B}_{23}| \\ |\mathbf{A}_{31} & \mathbf{B}_{31}| \\ |\mathbf{A}_{12} & \mathbf{B}_{12}| \end{pmatrix} \right\| = 16$$

$$\text{Area} = \frac{1}{2} \|(\mathbf{B} - \mathbf{A}) \times (\mathbf{C} - \mathbf{A})\| = 8$$

$$\boxed{\text{Area of Triangle ABC} = 8 \text{ sq.units}}$$

(0.1)

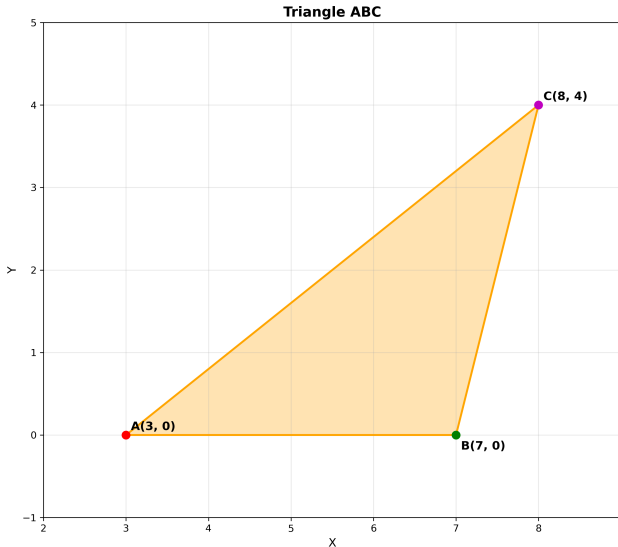


Fig. 0.1: Vector Representation