2.6.25

AI25BTECH11016-Varun

Question:

Find the area of a triangle formed by the points $A(5,2)$, $B(4,7)$ and $C(7,-4)$

Solution:

$$\mathbf{B}-\mathbf{A}=\begin{pmatrix}-1\\5\end{pmatrix} \tag{1}$$

$$\mathbf{C}-\mathbf{A}=\begin{pmatrix}2\\-6\end{pmatrix} \tag{2}$$

$$\|(\mathbf{B}-\mathbf{A})\times(\mathbf{C}-\mathbf{A})\| = \left\|\begin{pmatrix}|\mathbf{A_{23}} & \mathbf{B_{23}}|\\|\mathbf{A_{31}} & \mathbf{B_{31}}|\\|\mathbf{A_{12}} & \mathbf{B_{12}}|\end{pmatrix}\right\| = 4 \tag{3}$$

$$\text{Area of the triangle ABC} = \tfrac{1}{2}\|(\mathbf{B}-\mathbf{A})\times(\mathbf{C}-\mathbf{A})\| \tag{4}$$

$$= 2 \tag{5}$$

Therefore,

The area of triangle ABC is 2

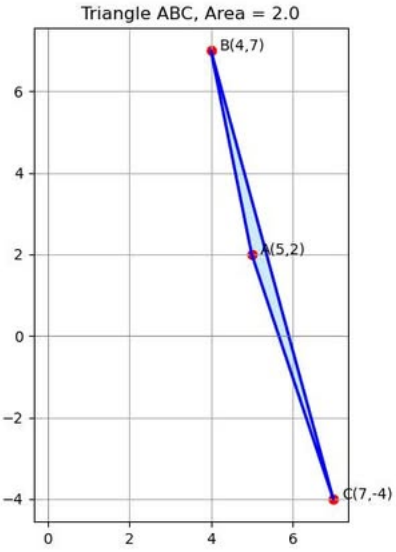

Fig. 0.1