2.6.21

AI25BTECH11012 - GARIGE UNNATHI

Question:
Find the area of the triangle whose vertices are $(3, 8)$, $(-4, 2)$ and $(5, 1)$.
Solution:

Variable	Formula
A	$A = \begin{pmatrix} 3 \\ 8 \end{pmatrix}$
B	$B = \begin{pmatrix} -4 \\ 2 \end{pmatrix}$
C	$C = \begin{pmatrix} 5 \\ 1 \end{pmatrix}$

TABLE 0: Variables Used

The area of a triangle ABC is given by :

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

$$\mathbf{A} - \mathbf{B} = \begin{pmatrix} 3 \\ 8 \end{pmatrix} - \begin{pmatrix} -4 \\ 2 \end{pmatrix} = \begin{pmatrix} 7 \\ 6 \end{pmatrix} \tag{0.1}$$

$$\mathbf{A} - \mathbf{C} = \begin{pmatrix} 3 \\ 8 \end{pmatrix} - \begin{pmatrix} 5 \\ 1 \end{pmatrix} = \begin{pmatrix} -2 \\ 7 \end{pmatrix} \tag{0.2}$$

$$\frac{1}{2} \|(\mathbf{A} - \mathbf{B}) \times (\mathbf{A} - \mathbf{C})\| = 14 \tag{0.3}$$

The area of the triangle ABC is 14

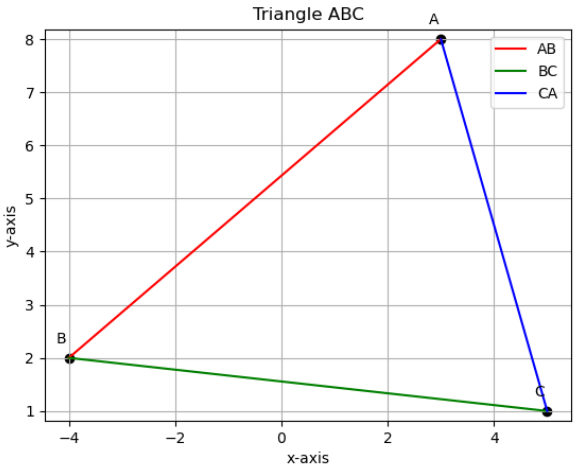

Fig. 0.1