

1.2.14

EE24BTECH11053 - S A Aravind Eswar

Question: Verify if the points $\mathbf{A} \begin{pmatrix} 4 \\ 3 \end{pmatrix}$, $\mathbf{B} \begin{pmatrix} 6 \\ 4 \end{pmatrix}$, $\mathbf{C} \begin{pmatrix} 5 \\ -6 \end{pmatrix}$ and $\mathbf{D} \begin{pmatrix} -3 \\ 5 \end{pmatrix}$ are the vertices of a parallelogram.

Solution:

Symbol	Value	Description
A	$\begin{pmatrix} 4 \\ 3 \end{pmatrix}$	Point A
B	$\begin{pmatrix} 6 \\ 4 \end{pmatrix}$	Point B
C	$\begin{pmatrix} 5 \\ -6 \end{pmatrix}$	Point C
D	$\begin{pmatrix} -3 \\ 5 \end{pmatrix}$	Point D

TABLE 0: Given Values

It requires two vectors formed by two unique points to be equivalent for points **A**, **B**, **C** and **D** to form a parallelogram.

$$AB = \mathbf{B} - \mathbf{A} = \begin{pmatrix} 2 \\ 1 \end{pmatrix} \quad (0.1)$$

$$BC = \mathbf{C} - \mathbf{B} = \begin{pmatrix} -1 \\ -10 \end{pmatrix} \quad (0.2)$$

$$CD = \mathbf{D} - \mathbf{C} = \begin{pmatrix} -8 \\ 11 \end{pmatrix} \quad (0.3)$$

$$DA = \mathbf{A} - \mathbf{D} = \begin{pmatrix} 7 \\ -2 \end{pmatrix} \quad (0.4)$$

$$DB = \mathbf{D} - \mathbf{B} = \begin{pmatrix} -9 \\ 1 \end{pmatrix} \quad (0.5)$$

$$AC = \mathbf{C} - \mathbf{A} = \begin{pmatrix} 1 \\ -9 \end{pmatrix} \quad (0.6)$$

Thus, the points **A**, **B**, **C** and **D** are not forming a parallelogram.

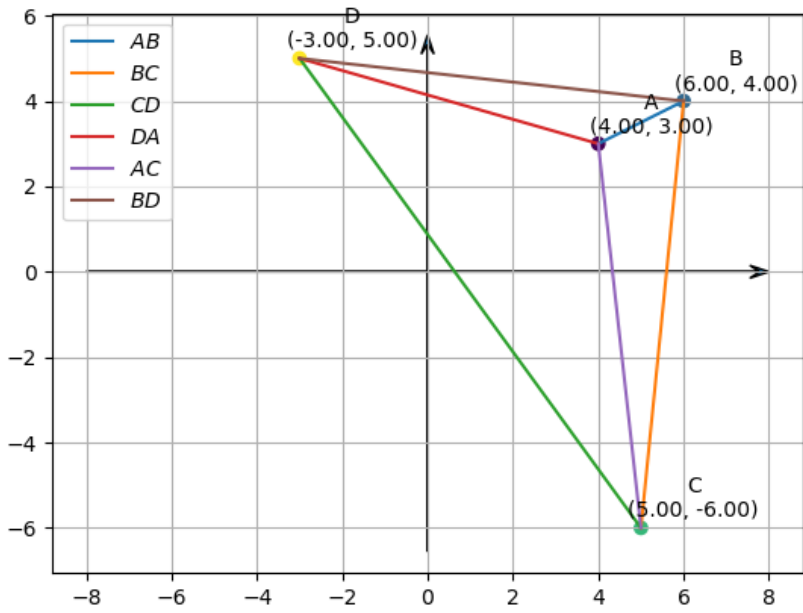


Fig. 0.1: Points A,B,C and D