

# 1.2.14

EE24BTECH11053 - S A Aravind Eswar

**Question:** Verify if the points **A**(4, 3), **B**(6, 4), **C**(5, -6) and **D**(-3, 5) are the vertices of a parallelogram.

**Solution:**

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

TABLE 0: Given Values

For points **A**, **B**, **C** and **D** to form a parallelogram, we'll need 2 vectors formed by different points to be equivalent.

$$\begin{aligned}
 \mathbf{AB} &= \mathbf{B} - \mathbf{A} &&= \begin{pmatrix} 2 \\ 1 \end{pmatrix} \\
 \mathbf{BC} &= \mathbf{C} - \mathbf{B} &&= \begin{pmatrix} -1 \\ -10 \end{pmatrix} \\
 \mathbf{CD} &= \mathbf{D} - \mathbf{C} &&= \begin{pmatrix} -8 \\ 11 \end{pmatrix} \\
 \mathbf{DA} &= \mathbf{A} - \mathbf{D} &&= \begin{pmatrix} 7 \\ -2 \end{pmatrix} \\
 \mathbf{BD} &= \mathbf{D} - \mathbf{B} &&= \begin{pmatrix} -9 \\ 1 \end{pmatrix} \\
 \mathbf{AC} &= \mathbf{C} - \mathbf{A} &&= \begin{pmatrix} 1 \\ -9 \end{pmatrix}
 \end{aligned}$$

But here, we see no such possibility arising with the vectors. And thus, the points **A**, **B**, **C** and **D** are not forming a parallelogram.

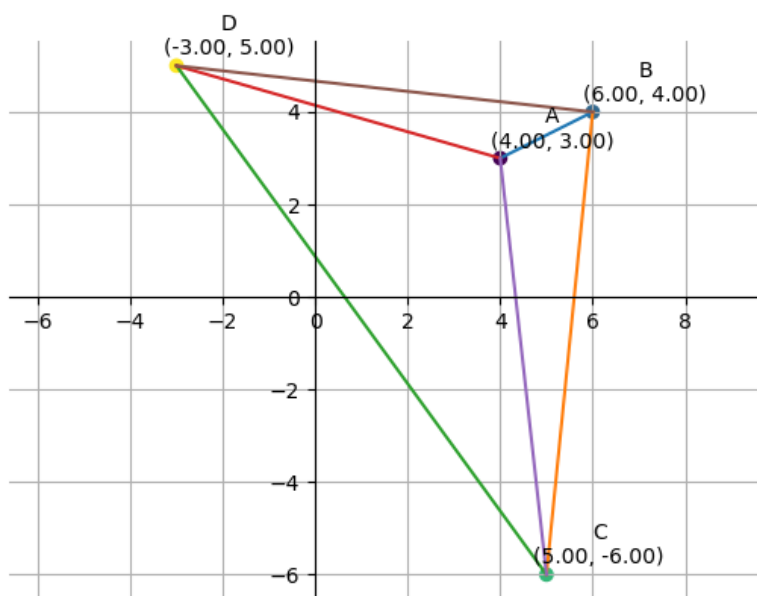


Fig. 0.1: Points **A,B,C** and **D**