

1.2.12

EE24BTECH11020 - Ellanti Rohith

Question:

If $\begin{pmatrix} 1 \\ 2 \end{pmatrix}$, $\begin{pmatrix} 4 \\ y \end{pmatrix}$, $\begin{pmatrix} x \\ 6 \end{pmatrix}$ and $\begin{pmatrix} 3 \\ 5 \end{pmatrix}$ are the vertices of parallelogram taken in order, find x and y .

Solution:

Let ABCD be the given Parallelogram,

TABLE 0: Coordinates of the vertices of parallelogram ABCD

Vertex	Coordinates
A	(1, 2)
B	(4, y)
C	(x, 6)
D	(3, 5)

we know that **AB** is parallel to **DC** and $\|AB\| = \|DC\|$
Then,

$$\mathbf{B} - \mathbf{A} = \mathbf{C} - \mathbf{D} \quad (0.1)$$

$$\begin{pmatrix} 4 \\ y \end{pmatrix} - \begin{pmatrix} 1 \\ 2 \end{pmatrix} = \begin{pmatrix} x \\ 6 \end{pmatrix} - \begin{pmatrix} 3 \\ 5 \end{pmatrix} \quad (0.2)$$

$$\begin{pmatrix} 3 \\ y-2 \end{pmatrix} = \begin{pmatrix} x-3 \\ 1 \end{pmatrix} \quad (0.3)$$

From equation (0.3),

$$3 = x - 3 \Rightarrow x = 6 \quad (0.4)$$

$$y - 2 = 1 \Rightarrow y = 3 \quad (0.5)$$

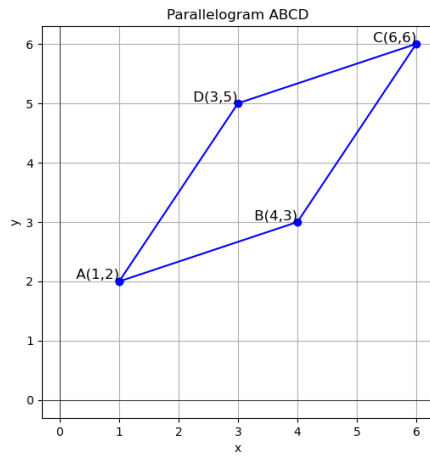


Fig. 0.1: Plot of parallelogram ABCD