1.2.12

AI25BTECH11006 - Nikhila

Question:
If the points **A**(6,1),**B**(8,2),**C**(9,4) and **D**(p,3) are the vertices of a parallelogram,taken in order. find the value of p .
Solution:

Variable	Description	Formula
A	A Point to be plotted	$A = \begin{pmatrix} 6 \\ 1 \end{pmatrix}$
B	A Point to be plotted	$B = \begin{pmatrix} 8 \\ 2 \end{pmatrix}$
C	A Point to be plotted	$C = \begin{pmatrix} 5 \\ -6 \end{pmatrix}$
D	A Point to be found	$D = \begin{pmatrix} p \\ 3 \end{pmatrix}$

TABLE 0: Variables Used

If ABCD be a parallelogram with AB || CD ,

$$\mathbf{B\text{-}A} = \mathbf{C\text{-}D}$$

$$\mathbf{B} - \mathbf{A} = \begin{pmatrix} 8 \\ 2 \end{pmatrix} - \begin{pmatrix} 6 \\ 1 \end{pmatrix} = \begin{pmatrix} 2 \\ 1 \end{pmatrix} \tag{0.1}$$

$$\mathbf{C} - \mathbf{D} = \begin{pmatrix} 9 \\ 4 \end{pmatrix} - \begin{pmatrix} p \\ 3 \end{pmatrix} = \begin{pmatrix} 9 - p \\ 1 \end{pmatrix} \tag{0.2}$$

By comparing

$$9 - p = 2 \tag{0.3}$$

We get

$$p = 7 \tag{0.4}$$

Hence the coordinates of **D** are $\begin{pmatrix} 7 \\ 3 \end{pmatrix}$

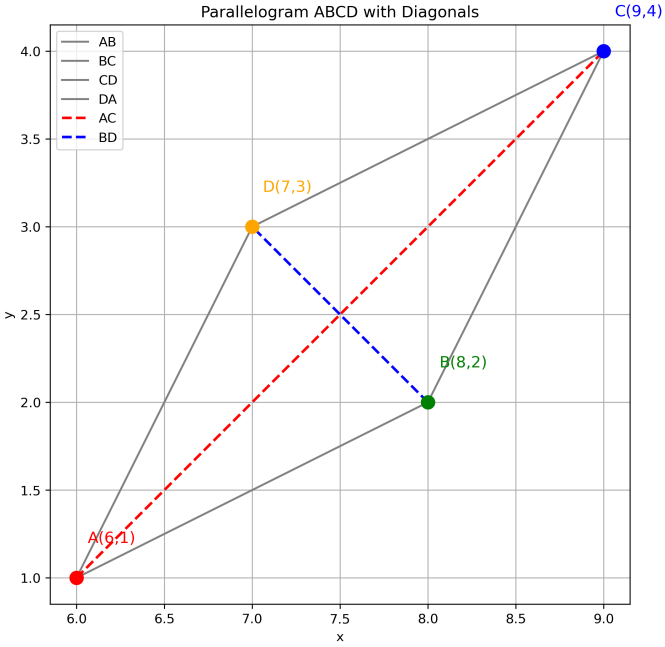

Fig. 0.1: Stem Plot of y(n)