Probability Assignment 2

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Question : Verify that

$$\mathbf{A} - \mathbf{F} = \mathbf{E} - \mathbf{D} \qquad (1)$$

The quadrilateral $AFDE$ is defined to be parallelogram

Solution: Given that,

$$\mathbf{A} = \begin{pmatrix} 1 \\ -1 \end{pmatrix} \quad \mathbf{B} = \begin{pmatrix} -4 \\ 6 \end{pmatrix} \quad \mathbf{C} = \begin{pmatrix} -3 \\ -5 \end{pmatrix} \qquad (2)$$

From Problem 1.2.1 We know that, The point $\mathbf{D}, \mathbf{E}, \mathbf{F}$ is

$$\mathbf{D} = \begin{pmatrix} \frac{-7}{2} \\ \frac{1}{2} \end{pmatrix} \quad \mathbf{E} = \begin{pmatrix} -1 \\ -3 \end{pmatrix} \quad \mathbf{F} = \begin{pmatrix} \frac{-3}{2} \\ \frac{5}{2} \end{pmatrix} \qquad (3)$$

Evaluating the R.H.S of the equation

$$\mathbf{A} - \mathbf{F} = \begin{pmatrix} 1 \\ -1 \end{pmatrix} - \begin{pmatrix} \frac{-3}{2} \\ \frac{5}{2} \end{pmatrix} \qquad (4)$$

$$= \begin{pmatrix} \frac{5}{2} \\ \frac{-7}{2} \end{pmatrix} \qquad (5)$$

Evaluating the L.H.S of the equation

$$\mathbf{E} - \mathbf{D} = \begin{pmatrix} -1 \\ -3 \end{pmatrix} - \begin{pmatrix} \frac{-7}{2} \\ \frac{1}{2} \end{pmatrix} \qquad (6)$$

$$= \begin{pmatrix} \frac{5}{2} \\ \frac{-7}{2} \end{pmatrix} \qquad (7)$$

Hence verified that, R.H.S = L.H.S i.e.,

$$\mathbf{A} - \mathbf{F} = \mathbf{E} - \mathbf{D} \qquad (8)$$

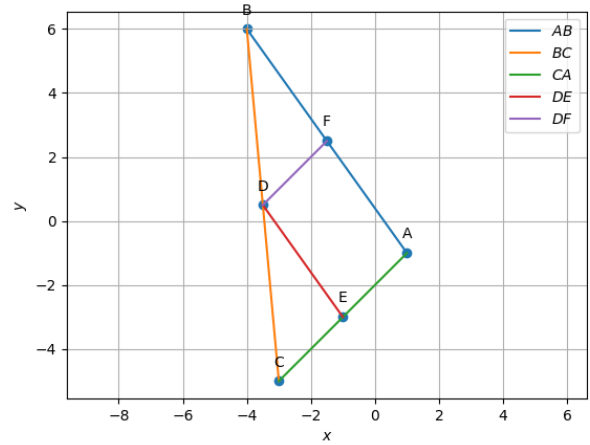From the figure, It is verified that $AFDE$ is a parallelogram

Fig. 0. *AFDE* form a parallelogram in triangle ABC