

# Solution to 1.2.1

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Question: If **D** divides  $BC$  in the ratio  $k : 1$ ,

$$\mathbf{D} = \frac{k\mathbf{C} + \mathbf{B}}{k + 1} \quad (1)$$

Find the mid points **D**, **E**, **F** of the sides  $BC$ ,  $CA$  and  $AB$  respectively.

Given:

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

$$\mathbf{B} = \begin{pmatrix} -4 \\ 6 \end{pmatrix} \quad (3)$$

$$\mathbf{C} = \begin{pmatrix} -3 \\ -5 \end{pmatrix} \quad (4)$$

Solution: Since **D** is the midpoint of  $BC$ ,

$$\begin{aligned} k &= 1 & (5) \\ \Rightarrow \mathbf{D} &= \frac{\mathbf{C} + \mathbf{B}}{2} & (6) \\ &= \frac{1}{2} \begin{pmatrix} -7 \\ 1 \end{pmatrix} & (7) \end{aligned}$$

Similarly,

$$\begin{aligned} \Rightarrow \mathbf{E} &= \frac{\mathbf{A} + \mathbf{C}}{2} & (8) \\ &= \begin{pmatrix} -1 \\ -3 \end{pmatrix} & (9) \end{aligned}$$

$$\begin{aligned} \Rightarrow \mathbf{F} &= \frac{\mathbf{A} + \mathbf{B}}{2} & (10) \\ &= \frac{1}{2} \begin{pmatrix} -3 \\ 5 \end{pmatrix} & (11) \end{aligned}$$

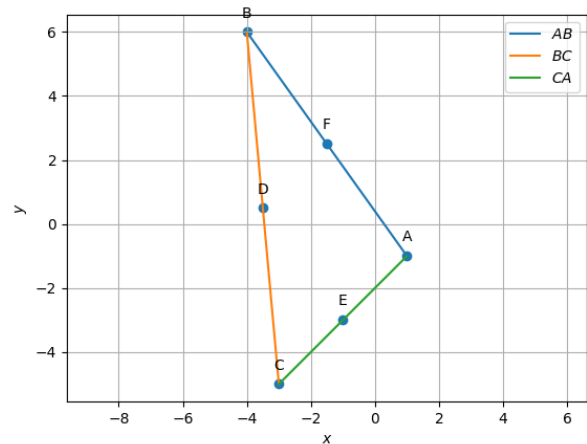


Fig. 0. Triangle ABC with midpoints D,E and F