

# Solution of 1.3.2

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Question:- We are given the three vertices of a triangle  $(A, B, C)$ .  $D_1$  is a point on line  $BC$  such that  $AD$  is perpendicular to  $BC$ . Find the equation of  $AD$ .

**Solution:**

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

$$\mathbf{B} = \begin{pmatrix} -4 \\ 6 \end{pmatrix} \quad (2)$$

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

From Question 1.3.1 we got normal vector of  $AD(\mathbf{n})$ :-

$$\mathbf{n} = \begin{pmatrix} -1 \\ 11 \end{pmatrix} \quad (4)$$

Now, normal form of line  $AD$  is:-

$$\mathbf{n}^T(\mathbf{x} - \mathbf{A}) = 0 \quad (5)$$

$$\mathbf{n}^T \mathbf{x} = \mathbf{n}^T \mathbf{A} \quad (6)$$

$$\begin{pmatrix} -1 & 11 \end{pmatrix} \mathbf{x} = \begin{pmatrix} -1 & 11 \end{pmatrix} \begin{pmatrix} 1 \\ -1 \end{pmatrix} \quad (7)$$

$$\begin{pmatrix} -1 & 11 \end{pmatrix} \mathbf{x} = -12 \quad (8)$$

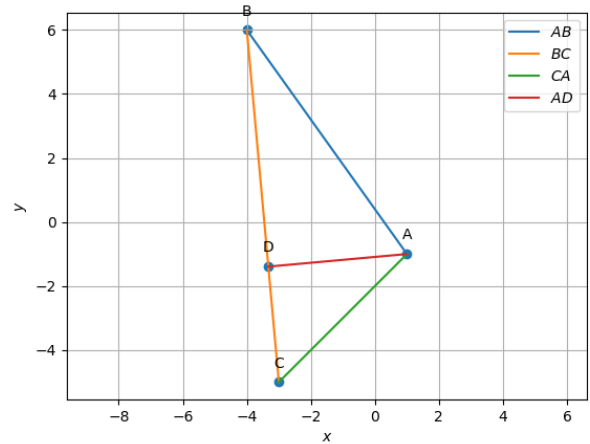


Fig. 0. Line AD