

Question: Find the equation of AD_1 .

Solution: :

Given points:

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

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

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

Direction vector of BC :

$$\mathbf{m} = \mathbf{B} - \mathbf{C} \quad (4)$$

$$= \begin{pmatrix} -3 \\ -5 \end{pmatrix} - \begin{pmatrix} -4 \\ 6 \end{pmatrix} \quad (5)$$

$$= \begin{pmatrix} 1 \\ -11 \end{pmatrix} \quad (6)$$

Normal vector \mathbf{n} of AD_1 :

$$\mathbf{n} = \begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix} \mathbf{m} \quad (7)$$

$$= \begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix} \begin{pmatrix} 1 \\ -11 \end{pmatrix} \quad (8)$$

$$= \begin{pmatrix} 11 \\ 1 \end{pmatrix} \quad (9)$$

Normal equation of AD_1 :

$$\mathbf{n}^\top \mathbf{x} = \mathbf{n}^\top \mathbf{A} \quad (10)$$

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

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

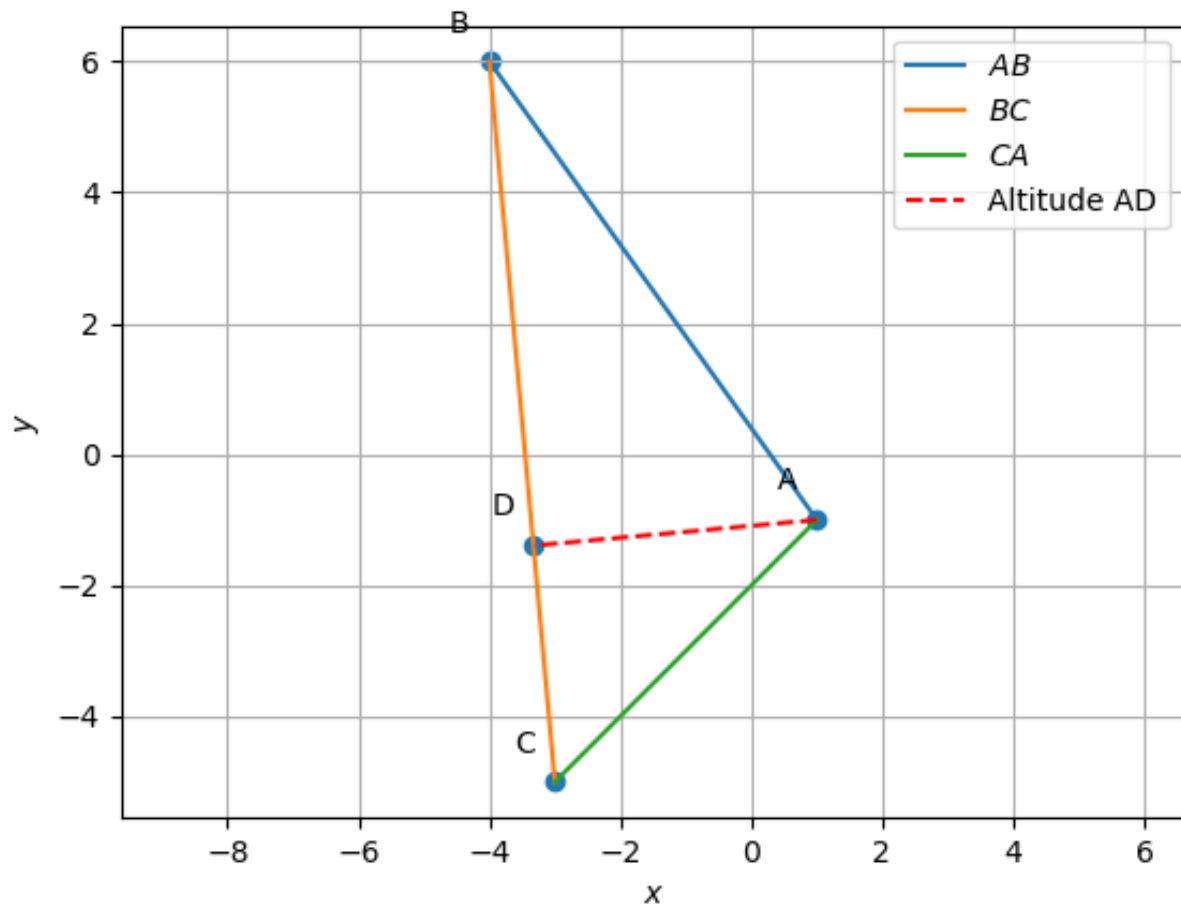


Fig. 0. Altitude AD_1