

Problem 1.4.1

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question :the equation of the perpendicular bisector of **BC** is

$$\left(\mathbf{x} - \frac{\mathbf{B} + \mathbf{C}}{2}\right)(\mathbf{B} - \mathbf{C}) = 0$$

Substitute numerical values and find the equations of the perpendicular bisectors of **AB**, **BC** and **CA**.

Solution: : as given in the question

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

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

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

1) the equation of perpendicular bisector of **AB** is :

$$\left(\mathbf{x} - \frac{\mathbf{B} + \mathbf{A}}{2}\right)(\mathbf{A} - \mathbf{B}) = 0 \quad (4)$$

$$\frac{\mathbf{B} + \mathbf{A}}{2} = \begin{pmatrix} \frac{-3}{2} \\ \frac{5}{2} \end{pmatrix} \quad (5)$$

$$\mathbf{A} - \mathbf{B} = \begin{pmatrix} 5 \\ -7 \end{pmatrix} \quad (6)$$

$$\left(\mathbf{x} - \begin{pmatrix} \frac{-3}{2} \\ \frac{5}{2} \end{pmatrix}\right)\begin{pmatrix} 5 \\ -7 \end{pmatrix} = 0 \quad (7)$$

2) the equation of perpendicular bisector of **BC** is :

$$\left(\mathbf{x} - \frac{\mathbf{B} + \mathbf{C}}{2}\right)(\mathbf{B} - \mathbf{C}) = 0 \quad (8)$$

$$\frac{\mathbf{B} + \mathbf{C}}{2} = \begin{pmatrix} \frac{-7}{2} \\ \frac{1}{2} \end{pmatrix} \quad (9)$$

$$\mathbf{B} - \mathbf{C} = \begin{pmatrix} -1 \\ 11 \end{pmatrix} \quad (10)$$

$$\left(\mathbf{x} - \begin{pmatrix} \frac{-7}{2} \\ \frac{1}{2} \end{pmatrix}\right)\begin{pmatrix} -1 \\ 11 \end{pmatrix} = 0 \quad (11)$$

3) the equation of perpendicular bisector of **CA** is :

$$\left(\mathbf{x} - \frac{\mathbf{A} + \mathbf{C}}{2}\right)(\mathbf{C} - \mathbf{A}) = 0 \quad (12)$$

$$\frac{\mathbf{A} + \mathbf{C}}{2} = \begin{pmatrix} \frac{-1}{2} \\ -3 \end{pmatrix} \quad (13)$$

$$\mathbf{C} - \mathbf{A} = \begin{pmatrix} -4 \\ -4 \end{pmatrix} \quad (14)$$

$$\left(\mathbf{x} - \begin{pmatrix} -1 \\ -3 \end{pmatrix}\right)\begin{pmatrix} -4 \\ -4 \end{pmatrix} = 0 \quad (15)$$