ASSIGNMENT-1

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Question 1.1.2 : Find the length of side BC.
Solution: Given,

$$\mathbf{A} = \begin{pmatrix} 1 \\ -1 \end{pmatrix}, \mathbf{B} = \begin{pmatrix} -4 \\ 6 \end{pmatrix}, \mathbf{C} = \begin{pmatrix} -3 \\ -5 \end{pmatrix} \tag{1}$$

$$\|\mathbf{B} - \mathbf{C}\| = \sqrt{(\mathbf{B} - \mathbf{C})^\top (\mathbf{B} - \mathbf{C})} \tag{2}$$

$$\mathbf{B} - \mathbf{C} = \begin{pmatrix} -4 \\ 6 \end{pmatrix} - \begin{pmatrix} -3 \\ -5 \end{pmatrix} \tag{3}$$

$$\mathbf{B} - \mathbf{C} = \begin{pmatrix} -1 \\ 11 \end{pmatrix} \tag{4}$$

$$(\mathbf{B} - \mathbf{C})^\top = \begin{pmatrix} -1 \\ 11 \end{pmatrix}^\top = \begin{pmatrix} -1 & 11 \end{pmatrix} \tag{5}$$

$$(\mathbf{B} - \mathbf{C})^\top (\mathbf{B} - \mathbf{C}) = \begin{pmatrix} -1 & 11 \end{pmatrix} \begin{pmatrix} -1 \\ 11 \end{pmatrix} \tag{6}$$

$$= 1 + 121 \tag{7}$$

$$= 122 \tag{8}$$

$$\sqrt{(\mathbf{B} - \mathbf{C})^\top (\mathbf{B} - \mathbf{C})} = \sqrt{122} \tag{9}$$

$$\implies \|\mathbf{B} - \mathbf{C}\| = \sqrt{122} \tag{10}$$