

Assignment-1

Chaithanya - EE22BTECH11045

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1.4.4 Verify that

$$OA = OB = OC \quad (1)$$

Solution: Given

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

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

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

From problem-1.4.2 :

$$O = \begin{pmatrix} \frac{-53}{12} \\ \frac{12}{12} \end{pmatrix} \quad (5)$$

$$= \begin{pmatrix} -4.4167 \\ 0.4167 \end{pmatrix} \quad (6)$$

1.

$$OA = \sqrt{(\mathbf{O} - \mathbf{A})^\top (\mathbf{O} - \mathbf{A})} \quad (7)$$

$$= \sqrt{\begin{pmatrix} -5.4167 & 1.4167 \end{pmatrix} \begin{pmatrix} -5.4167 \\ 1.4167 \end{pmatrix}} \quad (8)$$

$$= \sqrt{31.3476} \quad (9)$$

$$= 5.5988 \quad (10)$$

2.

$$OB = \sqrt{(\mathbf{O} - \mathbf{B})^\top (\mathbf{O} - \mathbf{B})} \quad (11)$$

$$= \sqrt{\begin{pmatrix} -0.4167 & -5.5833 \end{pmatrix} \begin{pmatrix} -0.4167 \\ -5.5833 \end{pmatrix}} \quad (12)$$

$$= \sqrt{31.3468} \quad (13)$$

$$= 5.5988 \quad (14)$$

3.

$$OC = \sqrt{(\mathbf{O} - \mathbf{C})^\top (\mathbf{O} - \mathbf{C})} \quad (15)$$

$$= \sqrt{\begin{pmatrix} -1.4167 & 5.4167 \end{pmatrix} \begin{pmatrix} -1.4167 \\ 5.4167 \end{pmatrix}} \quad (16)$$

$$= \sqrt{31.3476} \quad (17)$$

$$= 5.5988 \quad (18)$$

From above,

$$OA = OB = OC \quad (19)$$

Hence verified.