

SM5083

Assignment Number 01

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1. CHAPTER II Ex-14 Q. 1

- 1) Problem Statement: Find the in-centres of the triangles whose vertices are as follows, (6,-3), (6,18), $(\frac{-2}{3}, 2)$

Solution: let

$$\mathbf{A} = \begin{pmatrix} 6 \\ -3 \end{pmatrix}, \mathbf{B} = \begin{pmatrix} 6 \\ 18 \end{pmatrix}, \mathbf{C} = \begin{pmatrix} \frac{-2}{3} \\ 2 \end{pmatrix} \quad (1.1)$$

$$\mathbf{a} = \|\mathbf{B} - \mathbf{C}\| = 17.334 \quad (1.2)$$

$$\mathbf{b} = \|\mathbf{C} - \mathbf{A}\| = 16.416 \quad (1.3)$$

$$\mathbf{c} = \|\mathbf{A} - \mathbf{B}\| = 31 \quad (1.4)$$

Now in-centre of a triangle,

$$\text{In-centre } \mathbf{H} = \frac{\mathbf{a}\|\mathbf{A}\| + \mathbf{b}\|\mathbf{B}\| + \mathbf{c}\|\mathbf{C}\|}{\mathbf{a} + \mathbf{b} + \mathbf{c}} \quad (1.5)$$

$$\mathbf{H} = \begin{pmatrix} \frac{181.73}{64.75} \\ \frac{132.15}{64.75} \end{pmatrix} \quad (1.6)$$

$$\mathbf{H} = \begin{pmatrix} 2.8 \\ 2.1 \end{pmatrix} \quad (1.7)$$

Hence, the In-Centre of Triangle

$$\mathbf{H} = (2.8, 2.1)$$

Incentre_of_triangle.png

Fig. 1. A Triangle for given points