Assignment 3

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Find Python Codes from below link

https://github.com/HimaMadhu/INTERNSHIP−
IITH−1/blob/main/Assignment3/Assignment3.
py

and latex-tikz codes from

https://github.com/HimaMadhu/INTERNSHIP−
IITH−1/blob/main/Assignment3/Assignment3.
tex

1 EXAMPLES 2

1.1 Question 4

Find the area of the triangle the coordinates of whose angular points are respectively $(a, b + c), (a, b − c)$ and $(−a, c)$.

1.2 Solution

Area of a triangle whose vertex point vectors are $\mathbf{A}, \mathbf{B}$ and $\mathbf{C}$ is given by

$$Area(\mathbf{A}, \mathbf{B}, \mathbf{C}) = \left| \frac{1}{2} \left| \mathbf{A} - \mathbf{B} \quad \mathbf{A} - \mathbf{C} \right| \right| \quad (1.2.1)$$

Let $\mathbf{A} = \begin{pmatrix} a \\ b + c \end{pmatrix}, \mathbf{B} = \begin{pmatrix} a \\ b - c \end{pmatrix}, \mathbf{C} = \begin{pmatrix} -a \\ c \end{pmatrix}$

$$\mathbf{A} - \mathbf{B} = \begin{pmatrix} a \\ b + c \end{pmatrix} - \begin{pmatrix} a \\ b - c \end{pmatrix} \quad (1.2.2)$$

$$= \begin{pmatrix} 0 \\ 2c \end{pmatrix} \quad (1.2.3)$$

$$\mathbf{A} - \mathbf{C} = \begin{pmatrix} a \\ b + c \end{pmatrix} - \begin{pmatrix} -a \\ c \end{pmatrix} \quad (1.2.4)$$

$$= \begin{pmatrix} 2a \\ b \end{pmatrix} \quad (1.2.5)$$

From (1.2.1) area of the triangle is

$$= \left| \frac{1}{2} \begin{vmatrix} 0 & 2a \\ 2c & b \end{vmatrix} \right| \quad (1.2.6)$$

$$= \left| \frac{1}{2} \left[(0 \times b) - (2a \times 2c) \right] \right| \quad (1.2.7)$$

$$= \left| \frac{1}{2} (0 - 4ac) \right| \quad (1.2.8)$$

$$= |-2ac| \quad (1.2.9)$$

$$= 2ac \quad (1.2.10)$$

Area of the Triangle formed by $(a, b + c), (a, b − c)$ and $(−a, c)$ points is $2ac$