Assignment 1

Mondedla Anil

Download all python codes from

https://github.com/AnilMondedla/Python

and latex-tikz codes from

https://github.com/AnilMondedla/Python

1 Problem

(1.56) Find area of the triangle with vertices at the point given in each of the following :
(i) (1 0) , (6 0) , (4 3)

2 Solution

vertices in vector form

$$\mathbf{A} = \begin{pmatrix}1\\0\end{pmatrix}, \mathbf{B} = \begin{pmatrix}6\\0\end{pmatrix}, \mathbf{C} = \begin{pmatrix}4\\3\end{pmatrix} \tag{2.0.1}$$

Area of triangle $\triangle ABC$ is given by

$$\frac{1}{2} \times \begin{pmatrix}1 & 1 & 1\\ \mathbf{A} & \mathbf{B} & \mathbf{C}\end{pmatrix} \tag{2.0.2}$$

$$\det(ABC) = \begin{pmatrix}1 & 1 & 1\\ 1 & 6 & 4\\ 0 & 0 & 3\end{pmatrix} \tag{2.0.3}$$

$$\xleftrightarrow{C_1 \leftarrow C_2 - C_1} \begin{pmatrix}1 & 1 & 1\\ 1 & 6 & 4\\ 0 & 0 & 3\end{pmatrix} \tag{2.0.4}$$

$$\xleftrightarrow{C_2 \leftarrow C_3 - C_2} \begin{pmatrix}0 & 1 & 1\\ 5 & 6 & 4\\ 0 & 0 & 3\end{pmatrix} \tag{2.0.5}$$

$$\xleftrightarrow{C_3 \leftarrow C_3 - C_2} \begin{pmatrix}0 & 0 & 1\\ 5 & -2 & 4\\ 0 & 3 & 3\end{pmatrix} \tag{2.0.6}$$

$$\xleftrightarrow{C_3 \leftarrow C_3 - \frac{6}{5}C_1} \begin{pmatrix}0 & 0 & 1\\ 5 & -2 & 6\\ 0 & 3 & 0\end{pmatrix} \tag{2.0.7}$$

$$\begin{pmatrix}0 & 0 & 1\\ 5 & -2 & 0\\ 0 & 3 & 0\end{pmatrix} \tag{2.0.8}$$

$$= 1 \times (15 - 0) \tag{2.0.9}$$

$$\det(ABC) = 15 \tag{2.0.10}$$

Area of triangle $\triangle ABC$ is given by

$$\frac{1}{2} \times \det(ABC) \tag{2.0.11}$$

$$\Delta = \frac{1}{2} \times 15 \tag{2.0.12}$$

$$\Delta = 7.5 \tag{2.0.13}$$

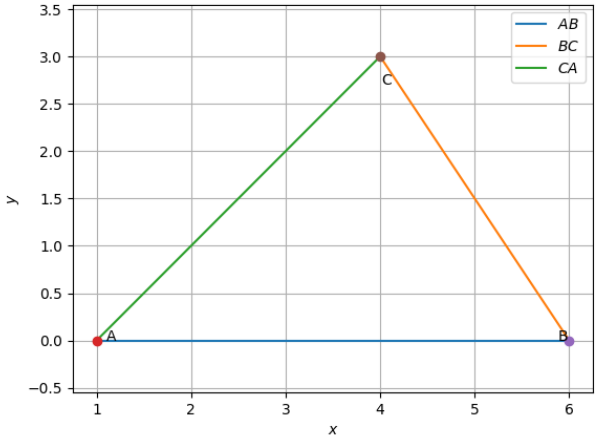

Fig. 0: triangle