

Assignment 1

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Download all python codes from

https://github.com/KeshavRoy/area_of_triangle

and latex-tikz codes from

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$$\Delta = \frac{1}{2} \times (47) \quad (2.0.11)$$

$$\Delta = 23.5 \quad (2.0.12)$$

1 PROBLEM

(1.56) Find area of the triangle with vertices at the point given in each of the following :

(i) (2 7) , (1 1) , (10 8)

2 SOLUTION

vertices in vector form

$$\mathbf{A} = \begin{pmatrix} 2 \\ 7 \end{pmatrix}, \mathbf{B} = \begin{pmatrix} 1 \\ 1 \end{pmatrix}, \mathbf{C} = \begin{pmatrix} 10 \\ 8 \end{pmatrix} \quad (2.0.1)$$

Area of triangle $\triangle ABC$ is given by

$$\frac{1}{2} \times \begin{vmatrix} 1 & 1 & 1 \\ \mathbf{A} & \mathbf{B} & \mathbf{C} \end{vmatrix} \quad (2.0.2)$$

$$\begin{pmatrix} 1 & 1 & 1 \\ 2 & 1 & 10 \\ 7 & 1 & 8 \end{pmatrix} \xrightarrow{c_2 \leftarrow c_2 - c_1} \begin{pmatrix} 1 & 1 & 1 \\ 2 & 1 & 10 \\ 7 & 1 & 8 \end{pmatrix} \quad (2.0.3)$$

$$\xrightarrow{c_3 \leftarrow c_3 - c_1} \begin{pmatrix} 1 & 0 & 1 \\ 2 & -1 & 10 \\ 7 & -6 & 8 \end{pmatrix} \quad (2.0.4)$$

$$\xrightarrow{R_2 \leftarrow 2R_1 - R_2} \begin{pmatrix} 1 & 0 & 0 \\ 2 & -1 & 8 \\ 7 & -6 & 1 \end{pmatrix} \quad (2.0.5)$$

$$\xrightarrow{R_3 \leftarrow 7R_1 - R_3} \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & -8 \\ 7 & -6 & 1 \end{pmatrix} \quad (2.0.6)$$

$$\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & -8 \\ 0 & 6 & -1 \end{pmatrix} \quad (2.0.7)$$

$$= 1 \begin{vmatrix} 1 & -8 \\ 6 & -1 \end{vmatrix} \quad (2.0.8)$$

$$= 1(-1 + 48) \quad (2.0.9)$$

$$= 47 \quad (2.0.10)$$

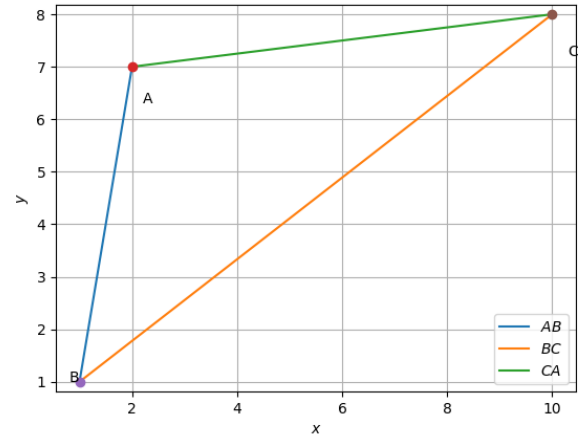


Fig. 0: triangle