

Presentation

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Problem Statement

Find value of k , if area of triangle is 4sq.units and vertices are $(k, 0)$, $(4, 0)$, $(0, 2)$

Vector Representation

To construct triangle vertices in vector form

$$A = \begin{pmatrix} k \\ 0 \end{pmatrix}, B = \begin{pmatrix} 4 \\ 0 \end{pmatrix}, C = \begin{pmatrix} 0 \\ 2 \end{pmatrix} \quad (3.1)$$

Matrix Representation

The Area Matrix is

$$\begin{pmatrix} 1 & 1 & 1 \\ A & B & C \end{pmatrix} \quad (3.2)$$

$$\begin{pmatrix} 1 & 1 & 1 \\ k & 4 & 0 \\ 0 & 0 & 2 \end{pmatrix} \quad (3.3)$$

Find Value of k

Given that Area of triangle is 4

$$AreaofTriangle = \frac{1}{2} \times AreaMatrix \quad (3.4)$$

$$4 = \frac{1}{2} \times \begin{vmatrix} 1 & 1 & 1 \\ A & B & C \end{vmatrix} \quad (3.5)$$

$$4 = \frac{1}{2} \times \begin{vmatrix} 1 & 1 & 1 \\ k & 4 & 0 \\ 0 & 0 & 2 \end{vmatrix} \quad (3.6)$$

$$4 = \frac{1}{2} \times (2 \times (4 - k)) \quad (3.7)$$

$$4 = \frac{1}{2} \times (8 - 2k) \quad (3.8)$$

$$8 = 8 - 2k \quad (3.9)$$

$$k = 0 \quad (3.10)$$

The code in

https://github.com/Nagarajunaddi/Assignments_CSP/blob/main/Area_of_Triangle.py

Plot

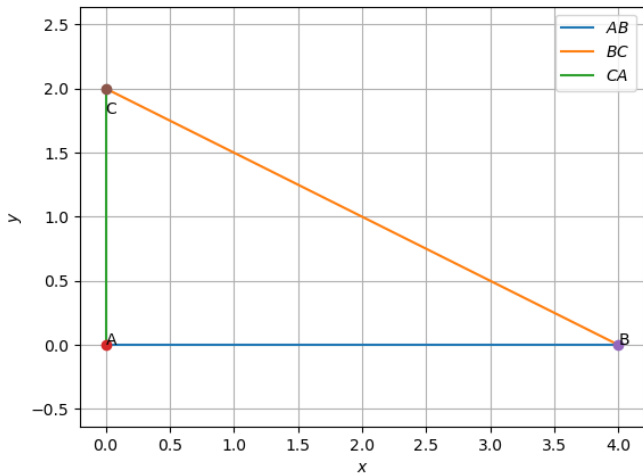


Figure: Triangle