3.3.14

AI25BTECH11030 -Sarvesh Tamgade

Question: Construct a right triangle in which the sides, (other than the hypotenuse) are of length 6 cm and 8 cm.

Solution:

Let the two sides of the right triangle be represented as vectors:

$$\mathbf{A} = \begin{bmatrix} 6 \\ 0 \end{bmatrix}, \quad \mathbf{B} = \begin{bmatrix} 0 \\ 8 \end{bmatrix}.$$

The hypotenuse vector is the sum of these two vectors:

$$\mathbf{C} = \mathbf{A} + \mathbf{B} = \begin{bmatrix} 6 \\ 0 \end{bmatrix} + \begin{bmatrix} 0 \\ 8 \end{bmatrix} = \begin{bmatrix} 6 \\ 8 \end{bmatrix}.$$

The length (magnitude) of the hypotenuse is calculated as

$$\begin{aligned} c = \|\mathbf{C}\| &= \sqrt{6^2 + 8^2} \\ &= \sqrt{36 + 64} = \sqrt{100} = 10 \text{ cm}. \end{aligned}$$

Therefore, the sides of the right triangle are 6 cm, 8 cm, and 10 cm.

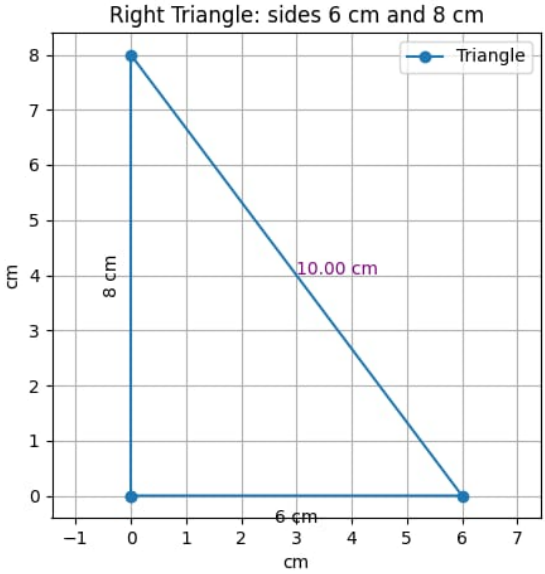

Fig. 0.1: Vector Representation