

# ASSIGNMENT-1

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Download all python codes from

(2.0.9)

<https://github.com/kavya/ASSIGNMENT-1/tree/main/ASSIGNMENT%201/CODES>

and latex-tikz codes from

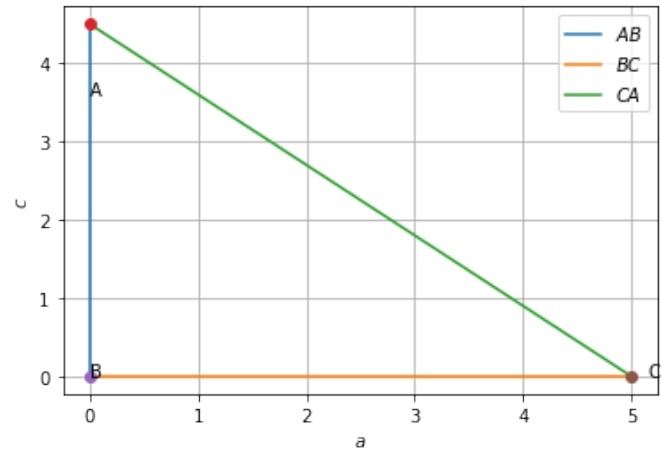
<https://github.com/kavya/ASSIGNMENT-1/tree/main/ASSIGNMENT%201>

Now, Vertices of given  $\triangle ABC$  can be written as,

$$\mathbf{A} = \begin{pmatrix} p \\ q \end{pmatrix} = \begin{pmatrix} 0 \\ 4.5 \end{pmatrix}, \mathbf{B} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}, \mathbf{C} = \begin{pmatrix} a \\ 0 \end{pmatrix} = \begin{pmatrix} 5 \\ 0 \end{pmatrix} \quad (2.0.10)$$

Now,  $\triangle ABC$  can be plotted using vertices  $AB$ ,  $BC$  and  $CA$ .

Plot of the Right angle  $\triangle ABC$ :



Right Angle  $\triangle ABC$

## 1 QUESTION NO-2.10

Construct  $\triangle ABC$  where  $AB=4.5, BC=5$  and  $CA=6$

## 2 SOLUTION

Let the vertices of  $\triangle ABC$  be

$$\mathbf{A} = \begin{pmatrix} p \\ q \end{pmatrix}, \mathbf{B} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}, \mathbf{C} = \begin{pmatrix} a \\ 0 \end{pmatrix} \quad (2.0.1)$$

Then

$$\|\mathbf{A} - \mathbf{B}\|^2 = \|\mathbf{A}\|^2 = c^2 = (4.5)^2 = 20.25 \quad (2.0.2)$$

$$\|\mathbf{C} - \mathbf{B}\|^2 = \|\mathbf{C}\|^2 = a^2 = 5^2 = 25 \quad (2.0.3)$$

$$\|\mathbf{A} - \mathbf{C}\|^2 = b^2 = 6^2 = 36 \quad (2.0.4)$$

From(2.0.4)

$$b^2 = \|\mathbf{A} - \mathbf{C}\|^2 = \|\mathbf{A} - \mathbf{C}\|^T \|\mathbf{A} - \mathbf{C}\|$$

$$= \mathbf{A}^T \mathbf{A} + \mathbf{C}^T \mathbf{C} - \mathbf{A}^T \mathbf{C} - \mathbf{C}^T \mathbf{A}$$

$$= \|\mathbf{A}\|^2 + \|\mathbf{C}\|^2 - 2\mathbf{A}^T \mathbf{C}$$

$$b^2 = a^2 + c^2 - 2ab$$

$$p = (a^2 + c^2 - b^2)/2a$$

$$p = (5^2 + (4.5)^2 - 6^2)/2(5)$$

$$p = 0$$

From(2.0.2)

$$\|\mathbf{A}\|^2 = c^2 = p^2 + q^2 \quad (2.0.5)$$

$$(4.5)^2 = 0 + q^2 \quad (2.0.6)$$

$$q^2 = 20.25 \quad (2.0.7)$$

$$q = 4.5 \quad (2.0.8)$$