

Assignment 1

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Download all python codes from

<https://github.com/K.NIKHITHA/Assignment1/blob/main/assignment1.py>

and latex-tikz codes from

<https://github.com/K.NIKHITHA/Assignment1/blob/main/main.tex>

1 QUESTION No.2.8

In $\triangle ABC$, $a = 6$, $\angle B = 60^\circ$ and $c - b = 2$. Sketch $\triangle ABC$.

2 SOLUTION

Given,

$$BC = 6, \angle B = 60^\circ \text{ and } AC - AB = 2 \quad (2.0.1)$$

The vertex **A** can be expressed in *polar coordinate form* as

$$\mathbf{A} = b \begin{pmatrix} \cos \theta \\ \sin \theta \end{pmatrix}, \mathbf{B} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}, \mathbf{C} = \begin{pmatrix} a \\ 0 \end{pmatrix}, \quad (2.0.2)$$

we have,

$$b - c = 2 \quad (2.0.3)$$

$$\Rightarrow c = b - 2 \quad (2.0.4)$$

from $\triangle ABC$, we use the law of Cosines:

$$b^2 = a^2 + c^2 - 2ac \cos B \quad (2.0.5)$$

$$b^2 = (6)^2 + (b - 2)^2 - 2(6)(b - 2) \cos 60 \quad (2.0.6)$$

$$\Rightarrow b = 5.2 \quad (2.0.7)$$

so, the vertices of $\triangle ABC$ are

$$\mathbf{A} = 5.2 \begin{pmatrix} \cos 60 \\ \sin 60 \end{pmatrix} = \begin{pmatrix} 2.6 \\ 4.5 \end{pmatrix}, \mathbf{B} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}, \mathbf{C} = \begin{pmatrix} 6 \\ 0 \end{pmatrix} \quad (2.0.8)$$

Plot of the $\triangle ABC$:

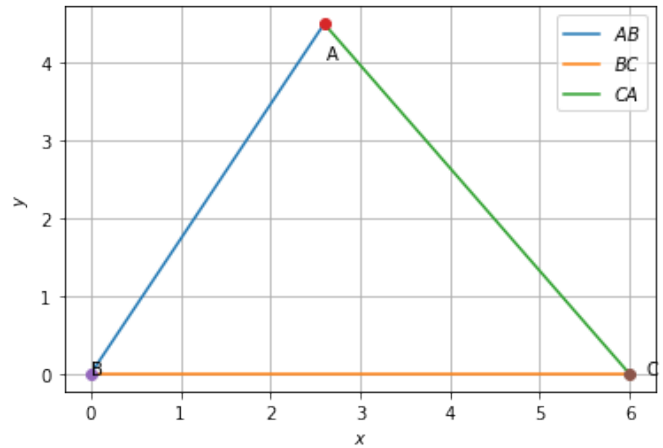


Fig. 2.1: $\triangle ABC$