

# Assignment 1

Atla keerthana

Download all python codes from

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

and latex-tikz codes from

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

we have:

$$\frac{\sin 105^\circ}{7} = \frac{\sin 30^\circ}{c} \quad (2.0.10)$$

$$c \sin 105^\circ = 7 \sin 30^\circ \quad (2.0.11)$$

$$c = \frac{7 \sin 30^\circ}{\sin 105^\circ} \quad (2.0.12)$$

$$c = 3.62 \quad (2.0.13)$$

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

$$\mathbf{A} = c \begin{pmatrix} \cos B \\ \sin B \end{pmatrix} \quad (2.0.14)$$

$$\mathbf{A} = 3.62 \begin{pmatrix} \cos 45^\circ \\ \sin 45^\circ \end{pmatrix} \quad (2.0.15)$$

$$\mathbf{A} = \begin{pmatrix} 2.55 \\ 2.55 \end{pmatrix} \quad (2.0.16)$$

## 1 QUESTION NO. 2.5

Draw a  $\triangle ABC$  with side  $a = 7\text{cm}$ ,  $\angle B = 45^\circ$ ,  $\angle A = 105^\circ$ .

## 2 EXPLANATION

Given,

$$\angle A = 105^\circ, \angle B = 45^\circ \text{ and } a = 7 \quad (2.0.1)$$

we need to find

Let us assume that the vertices of the  $\triangle ABC$  as:

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

Finding  $\angle C$

In  $\triangle ABC$ ,

$$\angle A + \angle B + \angle C = 180^\circ \quad (2.0.3)$$

$$105^\circ + 45^\circ + \angle C = 180^\circ \quad (2.0.4)$$

$$150^\circ + \angle C = 180^\circ \quad (2.0.5)$$

$$\angle C = 180^\circ - 150^\circ \quad (2.0.6)$$

$$\angle C = 30^\circ \quad (2.0.7)$$

By law of sines

$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c} \quad (2.0.8)$$

$$\frac{\sin 105^\circ}{7} = \frac{\sin 45^\circ}{b} = \frac{\sin 30^\circ}{c} \quad (2.0.9)$$

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

$$\mathbf{A} = \begin{pmatrix} 2.55 \\ 2.55 \end{pmatrix}, \mathbf{B} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}, \mathbf{C} = \begin{pmatrix} 7 \\ 0 \end{pmatrix} \quad (2.0.17)$$

Now,  $\triangle ABC$  can be plotted using vertices  $a, b$  and  $c$   
Plot of the angle  $\triangle ABC$ :

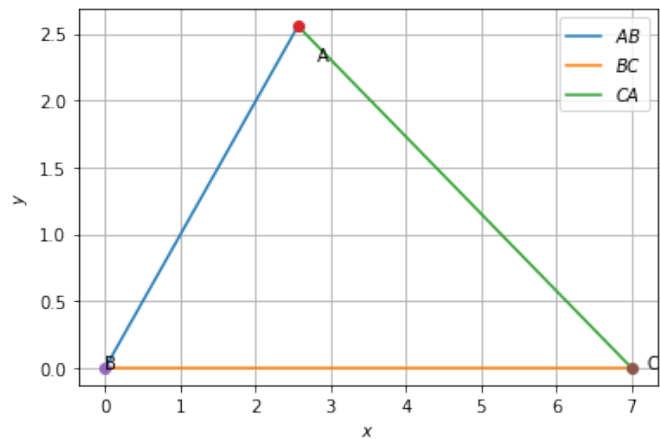


Fig. 2.1:  $\triangle ABC$