Assignment 1

Atla keerthana

Download all python codes from

https://github.com/ATLA KEERTHANA/Matrix−Theory/tree/main/Assignment1/Codes

and latex-tikz codes from

https://github.com/ATLA KEERTHANA/Matrix−Theory/tree/main/Assignment1

1 Question No. 2.5

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

2 Explanation

we first need to find $\angle C$:
Finding $\angle C$
In $\triangle ABC$, $\angle A + \angle B + \angle C = 180^\circ$

$$105^\circ + 45^\circ + \angle C = 180^\circ$$

$$150^\circ + \angle C = 180^\circ$$

$$\angle C = 180^\circ - 150^\circ$$

$$\angle C = 30^\circ$$

By law of sines

$$\frac{sinA}{a} = \frac{sinB}{b} = \frac{sinC}{c} \tag{2.0.1}$$

$$\frac{sin105^\circ}{7} = \frac{sin45^\circ}{b} = \frac{sin30^\circ}{c} \tag{2.0.2}$$

$$pluginthevalueswehave: \tag{2.0.3}$$

$$\frac{sin105^\circ}{7} = \frac{sin45^\circ}{b} \tag{2.0.4}$$

$$\frac{sin(90+15)^\circ}{7} = \frac{sin45^\circ}{b} \tag{2.0.5}$$

$$\frac{cos90^\circ}{7} = \frac{sin45^\circ}{b} \tag{2.0.6}$$

$$\frac{\sqrt{3}+1}{14\cdot\sqrt{2}} = \frac{1}{b\cdot\sqrt{2}} \tag{2.0.7}$$

$$\frac{\sqrt{3}+1}{14} = \frac{1}{b} \tag{2.0.8}$$

$$b = \frac{14}{\sqrt{3}+1} \tag{2.0.9}$$

$$b = \frac{14}{1.732+1} \tag{2.0.10}$$

$$b = 5.12 \tag{2.0.11}$$

$$similarly, \tag{2.0.12}$$

$$\frac{sin105^\circ}{7} = \frac{sin30^\circ}{c} \tag{2.0.13}$$

$$\frac{sin(90+15)^\circ}{7} = \frac{sin30^\circ}{c} \tag{2.0.14}$$

$$\frac{cos15^\circ}{7} = \frac{sin30^\circ}{c} \tag{2.0.15}$$

$$\frac{\sqrt{3}+1}{14\cdot\sqrt{2}} = \frac{1}{c\cdot 2} \tag{2.0.16}$$

$$c = \frac{7\cdot\sqrt{2}}{\sqrt{3}+1} \tag{2.0.17}$$

$$c = 3.62 \tag{2.0.18}$$

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

$$\mathbf{A} = \begin{pmatrix}0\\c\end{pmatrix} = \begin{pmatrix}0\\3.62\end{pmatrix}, \mathbf{B} = \begin{pmatrix}0\\0\end{pmatrix}, \mathbf{c} = \begin{pmatrix}a\\0\end{pmatrix} = \begin{pmatrix}7\\0\end{pmatrix} \tag{2.0.19}$$

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

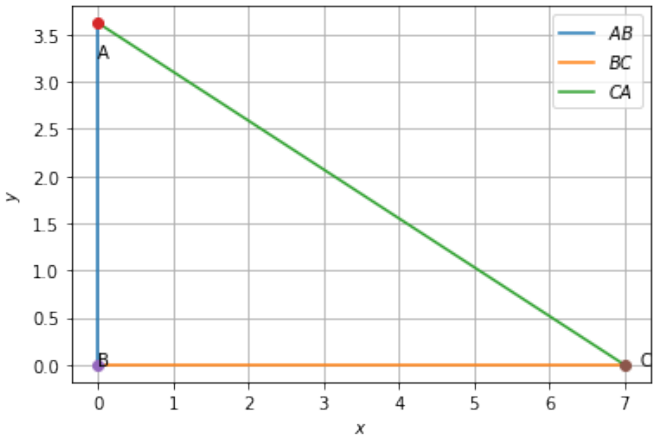

Fig. 2.1: $\triangle ABC$