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:

(2.0.12)

$$\frac{\sin 105^{\circ}}{7} = \frac{\sin 45^{\circ}}{b} \tag{2.0.13}$$

$$\frac{\sqrt{3}+1}{14\cdot\sqrt{2}} = \frac{1}{b\cdot\sqrt{2}}$$
 (2.0.14)

$$\frac{\sqrt{3}+1}{14} = \frac{1}{b} \tag{2.0.15}$$

$$b(\sqrt{3} + 1) = 14 \tag{2.0.16}$$

similarly,

1 Question No. 2.5

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

$$\frac{\sin 105^{\circ}}{7} = \frac{\sin 30^{\circ}}{c} \tag{2.0.18}$$

$$\frac{\sqrt{3}+1}{14\cdot\sqrt{2}} = \frac{1}{c\cdot 2} \tag{2.0.19}$$

$$c(\sqrt{3} + 1) = 7 \cdot \sqrt{2} \tag{2.0.20}$$

(2.0.21)

(2.0.26)

(2.0.27)

(2.0.17)

2 EXPLANATION

we first need to find $\angle C$:

Finding $\angle C$ In $\triangle ABC$,

Then, AX=B

which can be expressed as the matrix equation

$$\begin{pmatrix} \sqrt{3} + 1 & 0 \\ 0 & \sqrt{3} + 1 \end{pmatrix} \begin{pmatrix} b \\ c \end{pmatrix} = \begin{pmatrix} 14 \\ 7 \cdot \sqrt{2} \end{pmatrix}$$
 (2.0.22)

By solving (2.0.22), we get values:

$$\implies a = 7; \tag{2.0.23}$$

$$\implies b = 5.12;$$
 (2.0.24)

$$\implies c = 3.62;$$
 (2.0.25)

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

 $\mathbf{A} = \begin{pmatrix} 0 \\ c \end{pmatrix} = \begin{pmatrix} 0 \\ 3.62 \end{pmatrix}$

$$\angle A + \angle B + \angle C = 180^{\circ} \tag{2.0.2}$$

$$105^{\circ} + 45^{\circ} + \angle C = 180^{\circ}$$
 (2.0.3)

$$150^{\circ} + \angle C = 180^{\circ} \tag{2.0.4}$$

$$\angle C = 180^{\circ} - 150^{\circ} \tag{2.0.5}$$

$$\angle C = 30^{\circ} \tag{2.0.6}$$

(2.0.7)

(2.0.1)

 $\mathbf{B} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}$

By law of sines

$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c} \tag{2.0.9}$$

$$\frac{\sin 105^{\circ}}{7} = \frac{\sin 45^{\circ}}{h} = \frac{\sin 30^{\circ}}{6}$$
 (2.0.10)

 $\mathbf{C} = \begin{pmatrix} a \\ 0 \end{pmatrix} = \begin{pmatrix} 7 \\ 0 \end{pmatrix}$ (2.0.28)

(2.0.11)

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

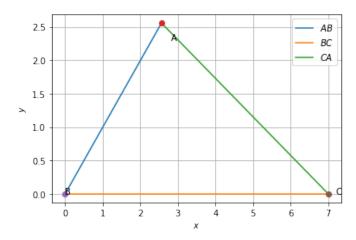


Fig. 2.1: △*ABC*