Assignment 1

Atla keerthana

Download all python codes from

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1 QUESTION No. 2.5

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

2 EXPLANATION

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

$$105° + 45° + \angle C = 180°$$

$$150° + \angle C = 180°$$

$$\angle C = 180° - 150°$$

$$\angle C = 30°$$

By law of sines

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

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

$$plug\,in\,the\,values\,we\,have: \tag{2.0.3}$$

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

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

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

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

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

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

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

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

$$similarly, \tag{2.0.12}$$

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

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

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

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

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

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

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

$$\mathbf{A} = \begin{pmatrix} 0 \\ c \end{pmatrix} = \begin{pmatrix} 0 \\ 3.62 \end{pmatrix}, \mathbf{B} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}, \mathbf{c} = \begin{pmatrix} a \\ 0 \end{pmatrix} = \begin{pmatrix} 7 \\ 0 \end{pmatrix} \tag{2.0.19}$$
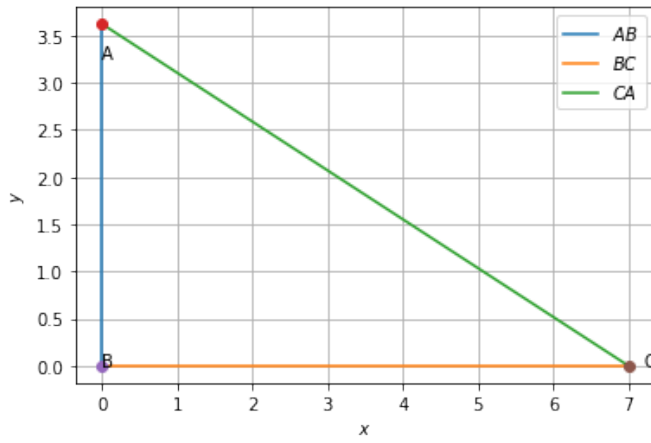
Now,$\triangle ABC$ can be plotted using vertices a ,b and c.

Plot of the angle $\triangle ABC$:

Fig. 2.1: $\triangle ABC$