Question 3-3.3-12

EE24BTECH11015 - Dhawal

1) Construct a ΔABC in which $AB = 6cm, BC = 8cm$ and $\angle ABC = 60°$.

Variable	Description	Values
AB	Length	6 cm
BC	Length	8 cm
$\angle ABC$	Angle	$60°$
A	Point	$(6, 0)$
B	Origin	$(0, 0)$
$R(\theta)$	Rotational Matrix	
C	To find	?

TABLE 1: Variables given

Solution:
As $AB = 6cm$ put:

$$\mathbf{A} = \begin{pmatrix} 6 \\ 0 \end{pmatrix}, \mathbf{B} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}, \tag{1.1}$$

Let $R(\theta)$ be rotational matrix; Then

$$BC = R(60°)\begin{pmatrix} 8 \\ 0 \end{pmatrix} = \begin{pmatrix} \frac{1}{2} & \frac{-\sqrt{3}}{2} \\ \frac{\sqrt{3}}{2} & \frac{1}{2} \end{pmatrix}\begin{pmatrix} 8 \\ 0 \end{pmatrix} = \begin{pmatrix} 4 \\ 4\sqrt{3} \end{pmatrix} \tag{1.2}$$

Hence

$$\mathbf{C} = \begin{pmatrix} 4 \\ 4\sqrt{3} \end{pmatrix} \tag{1.3}$$

Plot:

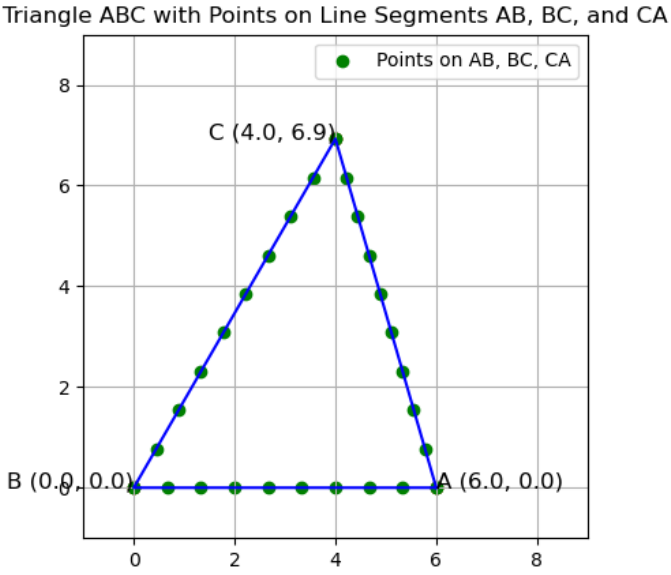

Fig. 1.1: ΔABC