3-3.2-6

EE24BTECH11010 - Balaji

Question :

Draw a right triangle ABC in which BC = 12cm, AB = 5cm and $\angle B = 90°$.

Solution:

Variable	Description	Value
a	Length of BC	$12cm$
b	Length of AC	?
c	Length of AB	$5cm$
$\angle ABC$	Angle B	$90°$

TABLE 0

Using cosine rule, we can find the length of AC, i.e., b:

$$b^2 = a^2 + c^2 - 2ac\cos B \qquad (1)$$

$$b^2 = 12^2 + 5^2 - 120\cos 90° \qquad (2)$$

On solving, we get b as:

$$b = 13cm \qquad (3)$$

We assume **B** to be $\begin{pmatrix} 0 \\ 0 \end{pmatrix}$

The coordinates of $\triangle ABC$ can then be expressed as

$$\mathbf{A} = c\begin{pmatrix} \cos B \\ \sin B \end{pmatrix}, \mathbf{B} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}, \mathbf{C} = \begin{pmatrix} a \\ 0 \end{pmatrix} \qquad (4)$$

From above substituting the values of a, b, c and $\angle B$, we get

$$\mathbf{A} = 5\begin{pmatrix} \cos 90° \\ \sin 90° \end{pmatrix}, \mathbf{B} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}, \mathbf{C} = \begin{pmatrix} 12 \\ 0 \end{pmatrix} \qquad (5)$$

$$\therefore \mathbf{A} = \begin{pmatrix} 0 \\ 5 \end{pmatrix}, \mathbf{B} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}, \mathbf{C} = \begin{pmatrix} 12 \\ 0 \end{pmatrix} \qquad (6)$$
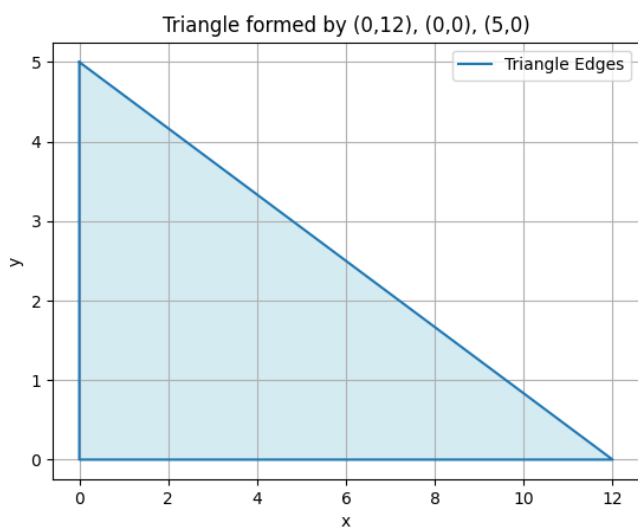
Fig. 0.1