

3-3.2-6

EE24BTECH11010 - Balaji

Question :

Draw a right triangle ABC in which $BC = 12\text{cm}$, $AB = 5\text{cm}$ and $\angle B = 90^\circ$.

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 :

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

$$b^2 = 12^2 + 5^2 - 120 \cos 90^\circ \quad (2)$$

On solving, we get b as:

$$b = 13\text{cm} \quad (3)$$

We assume the coordinate \mathbf{B} to be $\begin{pmatrix} 0 \\ 0 \end{pmatrix}$

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

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

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

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

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

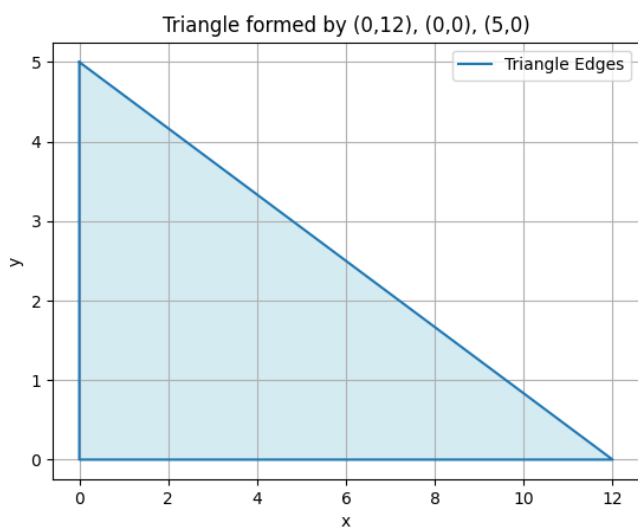


Fig. 0.1