x

3-3.2-10

EE24BTECH11063 - Y.Harsha Vardhan Reddy

Question:
Draw a triangle ABC in which BC=6cm, CA=5cm and AB=4cm.
Solution: Given, a=6cm, b=5cm and c=4cm.

Variable	Description
a	length of side-BC
b	length of side-CA
c	length of side-AB
A	co-ordinates of vertex-1
B	co-ordinates of vertex-2
C	co-ordinates of vertex-3

TABLE 0: Variables Used

Let us place B at origin and C along the x-axis i.e,

$$B = \begin{pmatrix} 0 \\ 0 \end{pmatrix} \tag{0.1}$$

$$C = \begin{pmatrix} 6 \\ 0 \end{pmatrix} \tag{0.2}$$

Let us use distances AB and CA to find co-ordinates of A,

By using c=4cm

$$(A-B)=\begin{pmatrix}x\\y\end{pmatrix} \tag{0.3}$$

$$\|A-B\|=4 \tag{0.4}$$

$$\sqrt{\begin{pmatrix}x & y\end{pmatrix}\begin{pmatrix}x\\y\end{pmatrix}}=4 \tag{0.5}$$

$$\sqrt{x^2+y^2}=4 \tag{0.6}$$

$$x^2+y^2=16 \tag{0.7}$$

By using b=5cm

$$(A-C)=\begin{pmatrix}x-6\\y\end{pmatrix} \tag{0.8}$$

$$\|A-B\|=5 \tag{0.9}$$

$$\sqrt{\begin{pmatrix}x-6 & y\end{pmatrix}\begin{pmatrix}x-6\\y\end{pmatrix}}=5 \tag{0.10}$$

$$\sqrt{x^2+y^2}=5 \tag{0.11}$$

$$x-6^2+y^2=25 \tag{0.12}$$

By solving both the equations we get, x=2.25 , y=3.308
Therefore,

$$A=\left(2.25//3.308\right) \tag{0.13}$$

Therefore,

$$A=\begin{pmatrix}2.25\\3.308\end{pmatrix},B=\begin{pmatrix}0\\0\end{pmatrix},C=\begin{pmatrix}6\\0\end{pmatrix}. \tag{0.14}$$

Using these co-ordinates of A,B,C the triangle ABC can be constructed.