3.2.1

EE25BTECH11060 - V.Namaswi

Question

Draw a triangle ABC in which AB=4cm,BC=6cm and AC=9cm.

Solution

According to given data lets assume,

$$A = \begin{pmatrix} 0 \\ 0 \end{pmatrix} \qquad B = \begin{pmatrix} 4 \\ 0 \end{pmatrix} \qquad C = \begin{pmatrix} x \\ y \end{pmatrix}$$

$$\|C - A\| = 9 \tag{1}$$

$$C^\top C = 81 \tag{2}$$

$$\|C - B\| = 6 \tag{3}$$

$$(C - B)^\top (C - B) = 36 \tag{4}$$

$$C^\top C - 2B^\top C + B^\top B = 36 \tag{5}$$

$$as, B^\top B = 16 \; ; C^\top C = 81 \tag{6}$$

$$2B^\top C = 61 \tag{7}$$

$$\begin{pmatrix} 8 & 0 \end{pmatrix} C = 61 \tag{8}$$

$$Augmented\ Matrix \implies \left(\begin{array}{cc|c} 8 & 0 & 61 \end{array}\right) \tag{9}$$

$$\implies \left(\begin{array}{cc|c} 1 & 0 & 61/8 \end{array}\right) \tag{10}$$

$$x = 61/8 \tag{11}$$

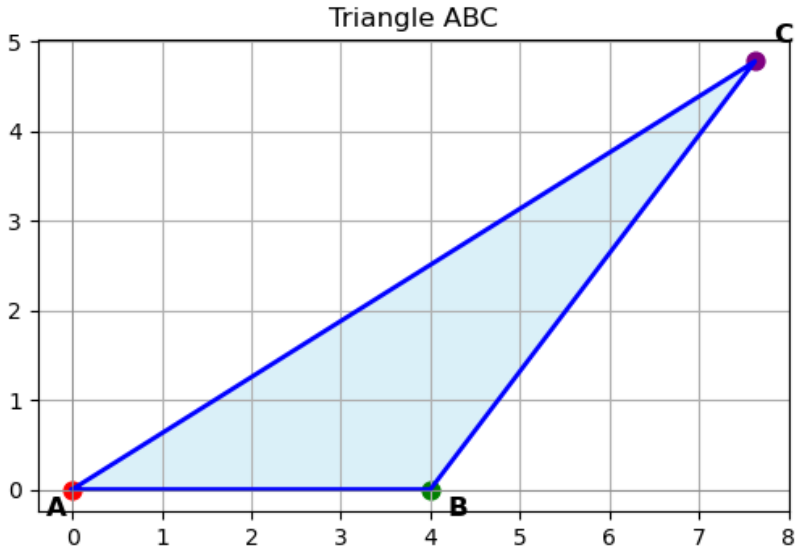
$$as, C^\top C = 81 \tag{12}$$

$$x^2 + y^2 = 81 \tag{13}$$

$$y = \sqrt{\frac{1463}{64}} \tag{14}$$

$$C = \begin{pmatrix} 7.625 \\ \pm 4.781 \end{pmatrix} \tag{15}$$

Refer fig


Triangle ABC
C
A
B
0
1
2
3
4
5
6
7
8