3-3.3-2

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Question: Construct a triangle with sides $5cm$, $6cm$ and $7cm$

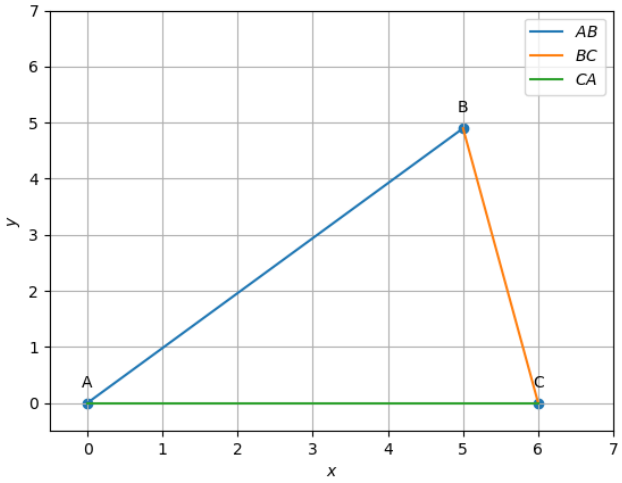
Solution: Let the vertices of triangle be **A**, **B** and **C** and lengths of the sides opposing them be denoted by $a = 5cm$, $b = 6cm$ and $c = 7cm$ respectively.

By Cosine rule in ΔABC,

$$a^2 = b^2 + c^2 - 2bc\cos A$$
$$\cos A = \frac{b^2 + c^2 - a^2}{2bc}$$
$$\cos A = \frac{60}{84}$$

Let $\mathbf{A} = \mathbf{0}$ and $\mathbf{C} = \begin{pmatrix} b \\ 0 \end{pmatrix}$. Then $\mathbf{B} = c\begin{pmatrix} \cos A \\ \sin A \end{pmatrix}$

Substituting values we get, $\mathbf{A} = \mathbf{0}, \mathbf{B} = \begin{pmatrix} 5 \\ \sqrt{24} \end{pmatrix}, \mathbf{C} = \begin{pmatrix} 6 \\ 0 \end{pmatrix}$



Code for this plot can be found at:

Codes/main.py
Codes/main.c