

VECTOR

Question : Construct a triangle APB in which $BC = 7\text{cm}$, $\angle B = 75^\circ$ and $AB + AC = 13\text{cm}$.

Figure :

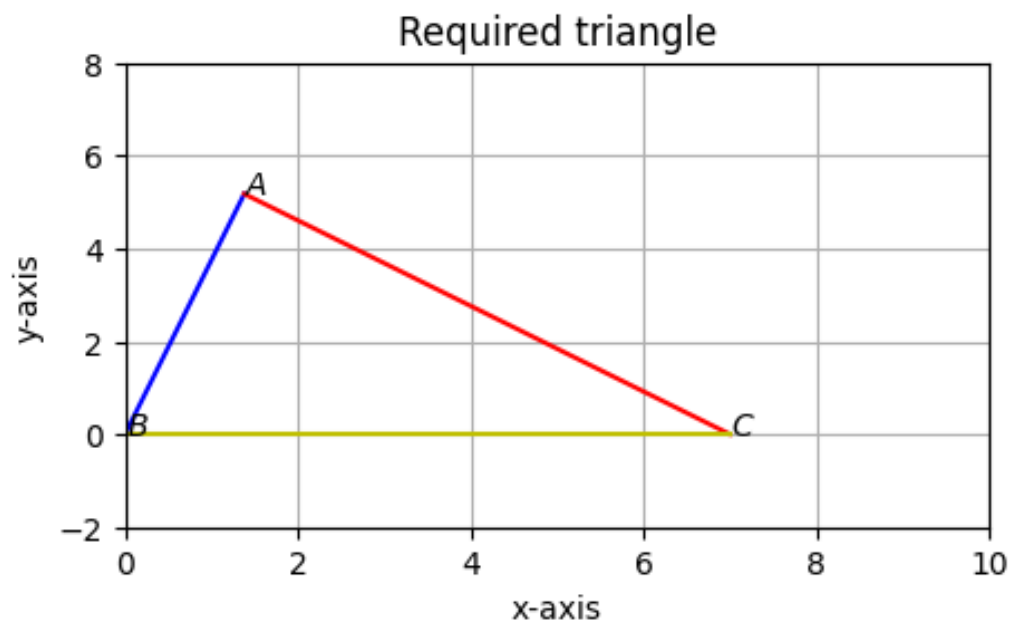


Figure 1:

Solution :

Input parameters	Description	Value
B	Vertex(at origin)	0
a	Side of $\triangle ABC$, BC	7
b	Side of $\triangle ABC$, AB	b
c	Side of $\triangle ABC$, AC	c
θ	Angle of $\triangle ABC$, $\angle B$	75°

Table 1: Table of input parameters

Output parameters	Description	Value
C	Vertex	ae_1
A	Vertex	$c \begin{bmatrix} \cos \theta \\ \sin \theta \end{bmatrix}$
$b + c$	$AB + AC$	13

Table 2: Table of output parameters

From appendix,

$$c = \frac{k^2 - a^2}{2(k - a \cos \theta)} \quad (1)$$

$$= \frac{240}{52 - 7\sqrt{6} + 7\sqrt{2}} \quad (2)$$

Therefore,

$$\mathbf{A} = c \begin{bmatrix} \cos \theta \\ \sin \theta \end{bmatrix} \quad (3)$$

$$= \frac{240}{52 - 7\sqrt{6} + 7\sqrt{2}} \begin{bmatrix} \cos 75^\circ \\ \sin 75^\circ \end{bmatrix} \quad (4)$$

$$= \begin{bmatrix} 1.388 \\ 5.18 \end{bmatrix} \quad (5)$$

$$(6)$$