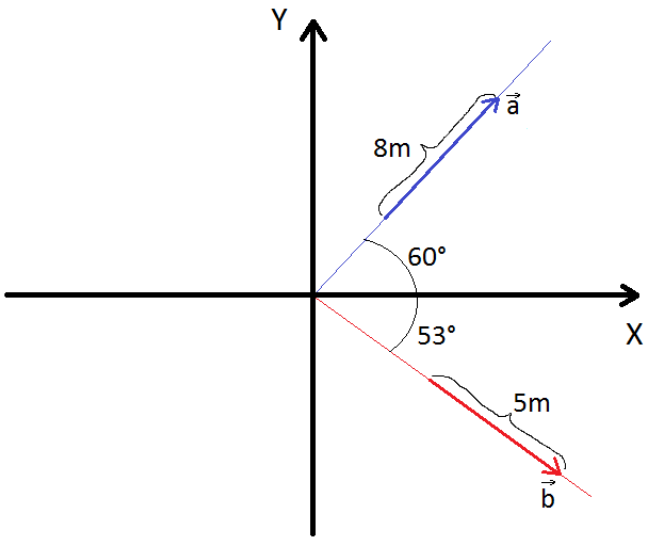
Answer on Question #58021 - Physics - Mechanics – Relativity

$|\vec{a}| = 8m,\ \angle(Ox, \vec{a}\,) = 60°$
$|\vec{b}| = 5m,\ \angle(Ox, \vec{b}\,) = -53°$

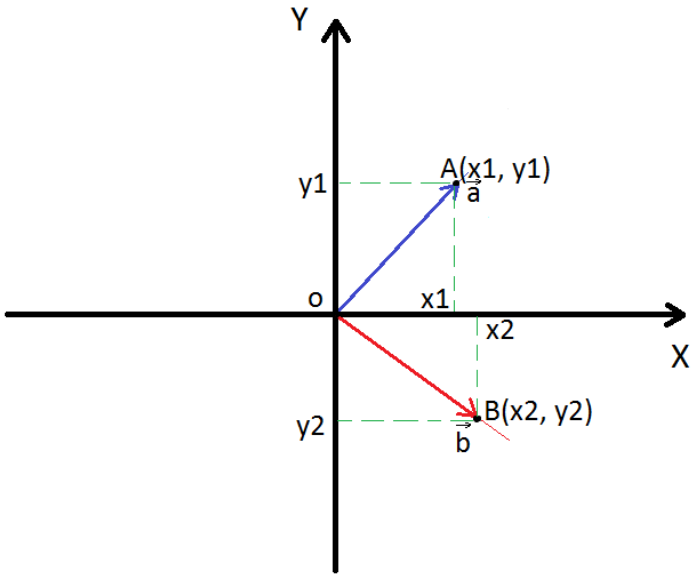


For convenience denote:

$|\vec{a}| = l_1,\ \angle(Ox, \vec{a}\,) = \gamma_1$

$|\vec{b}| = l_2, \angle(Ox, \vec{b}\,) = \gamma_2$

Transfer vectors at the beginning of the coordinate system:



Coordinates of vectors:

$$\vec{a} = (x_1, y_1)$$
$$\vec{b} = (x_2, y_2)$$

Search these coordinates:

$$y_1 = l_1 \sin \gamma_1$$

$$x_1 = l_1 \cos \gamma_1$$

$$y_2 = l_2 \sin\gamma_2$$

$$x_2 = l_2 \cos\gamma_2$$

Search difference of vectors:

$$\vec{a} - \vec{b} = \overrightarrow{(l_1 \cos\gamma_1 - l_2 \cos\gamma_2 , l_1 \sin\gamma_1 - l_2 \sin\gamma_2)} =$$

$$= \overrightarrow{(8 * cos60° - 5 * cos(-53°), 8 * sin60° - 5 * sin(-53°))} \approx \overrightarrow{(0{,}99, 10{,}92)}$$

The magnitude:

$|\vec{a} - \vec{b}| = \sqrt{(l_1 \cos\gamma_1 - l_2 \cos\gamma_2)^2 + (l_1 \sin\gamma_1 - l_2 \sin\gamma_2)^2} \approx 10{,}96\text{m}$