Answer on Question #56255-Physics-Mechanics-Relativity

Vector $\vec{a}$ of length 8 m lies at an angle of 60^o above the x-axis in the first quadrant. Vector $\vec{b}$ of length 5 m lies 53^o below the x-axis in the fourth quadrant. Determine the magnitude of $\vec{a} - \vec{b}$

9.94 m

7.60 m

10.96 m

20.21 m

Solution

$$\vec{a} = (a\cos 60^o ; a\sin 60^o) = (8\cos 60^o ; 8\sin 60^o) = (4; 6.93).$$

$$\vec{b} = (b\cos 53^o ; -b\sin 53^o) = (5\cos 53^o ; -5\sin 53^o) = (3.01; -3.99).$$

$$\vec{a} - \vec{b} = \big(4 - 3.01; 6.93 - (-3.99)\big) = (0.99; 10.92).$$

The magnitude of $\vec{a} - \vec{b}$ is

$$\left|\vec{a} - \vec{b}\right| = \sqrt{0.99^2 + 10.92^2} = 10.96\, m$$

Answer: 10.96 m.