## Answer on Question #64777-Physics-Classical Mechanics

A scout troop is practicing his orienting skills with map and compass. First they walk due east for 2.5km. Next they walk 45 degrees west of north for 7.3km. In what direction must they walk to go directly back to their starting point? How far will they have to walk?

## Solution

We need to find the displacement.

$$\vec{a} = (2.5,0)$$

$$\vec{b} = (-7.3\cos 45, 7.3\sin 45).$$

The displacement is  $\vec{a} + \vec{b}$ . Thus, their displacement vector to go directly back to their starting point is

$$-\vec{a} - \vec{b} = (7.3\cos 45 - 2.5, -7.3\sin 45) = (2.66, -5.16) \, km$$

The distance will be:

$$d = \sqrt{(2.66)^2 + (-5.16)^2} = 5.8 \, km.$$

The direction is

$$\theta = \tan^{-1} \frac{5.16}{2.66} = 63^{\circ} \text{ south of east.}$$

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