## 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 2.5 km . Next they walk 45 degrees west of north for 7.3 km . 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.

$$
\begin{gathered}
\vec{a}=(2.5,0) \\
\vec{b}=(-7.3 \cos 45,7.3 \sin 45)
\end{gathered}
$$

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

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

The distance will be:

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

The direction is

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

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