

76. (a) The magnitude of the displacement vector $\Delta\vec{r}$ is given by

$$|\Delta\vec{r}| = \sqrt{21.5^2 + 9.7^2 + 2.88^2} = 23.8 \text{ km} .$$

Thus,

$$|\vec{v}_{\text{avg}}| = \frac{|\Delta\vec{r}|}{\Delta t} = \frac{23.8}{3.50} = 6.79 \text{ km/h} .$$

- (b) The angle θ in question is given by

$$\theta = \tan^{-1} \left(\frac{2.88}{\sqrt{21.5^2 + 9.7^2}} \right) = 6.96^\circ .$$