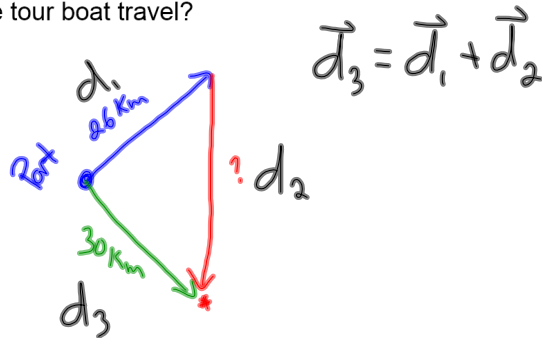


8. An inept boating tour guide takes you to a point 26 km [E33°N] from port when in fact you should be located 30 km [E33°S]. To get to your proper destination in 0.75 hours, with what velocity should the tour boat travel?



$$\vec{d}_2 = \vec{d}_3 - \vec{d}_1$$

$$d_{3E} = 30 \cos 33 = 25 \text{ km}$$

$$d_{3N} = 30 \sin 33 = -16 \text{ km}$$

$$d_{1E} = 26 \cos 33 = 22 \text{ km}$$

$$d_{1N} = 26 \sin 33 = 14 \text{ km}$$

$$\begin{aligned} d_{2E} &= d_{3E} - d_{1E} & d_{2N} &= d_{3N} - d_{1N} \\ &= 25 - 22 & &= -16 - 14 \\ &= 3.0 \text{ km} & &= -30 \text{ km} \end{aligned}$$

$$\begin{aligned} |d_2| &= \sqrt{(d_{2E})^2 + (d_{2N})^2} \\ &= \sqrt{(3)^2 + (-30)^2} = \underline{\underline{30 \text{ km}}} \end{aligned}$$

$$\theta = \tan^{-1} \left| \frac{d_{2N}}{d_{2E}} \right| = \tan^{-1} \left(\frac{30}{3} \right) = 84^\circ$$

$$\underline{\underline{\vec{d}_2 = 30 \text{ km [E } 84^\circ \text{ S]}}}$$

$$\vec{v}_{\text{avg}} = \frac{\vec{d}_2}{t} = \frac{30 \text{ km}}{0.75} = 40 \frac{\text{km}}{\text{h}}$$

$$\boxed{\vec{v}_{\text{avg}} = 40 \frac{\text{km}}{\text{h}} \text{ [E } 84^\circ \text{ S]}}$$