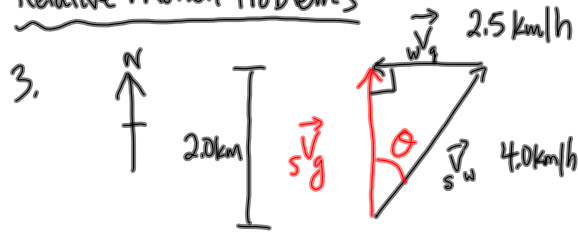


Relative Motion Problems



a)

$$\sin \theta = \frac{\text{opp}}{\text{hyp}}$$

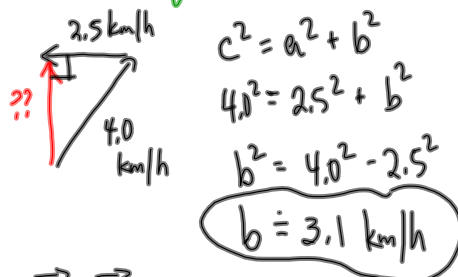
$$\sin \theta = \frac{2.5}{4.0}$$

$$\theta = \sin^{-1}\left(\frac{2.5}{4.0}\right)$$

$$\theta = 39^\circ$$

The swimmer should head $[N 39^\circ E]$

b) We need to know the velocity going straight across the river to use with 2.0 km
 (* velocity and displacement directions must match)



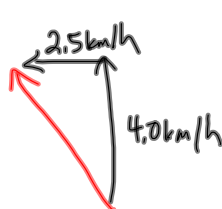
across: $\vec{V} = \frac{\Delta d}{\Delta t}$

$$\Delta t = \frac{\Delta d}{\vec{V}}$$

$$\Delta t = \frac{2.0 \text{ km } [N]}{3.1 \text{ km/h } [N]}$$

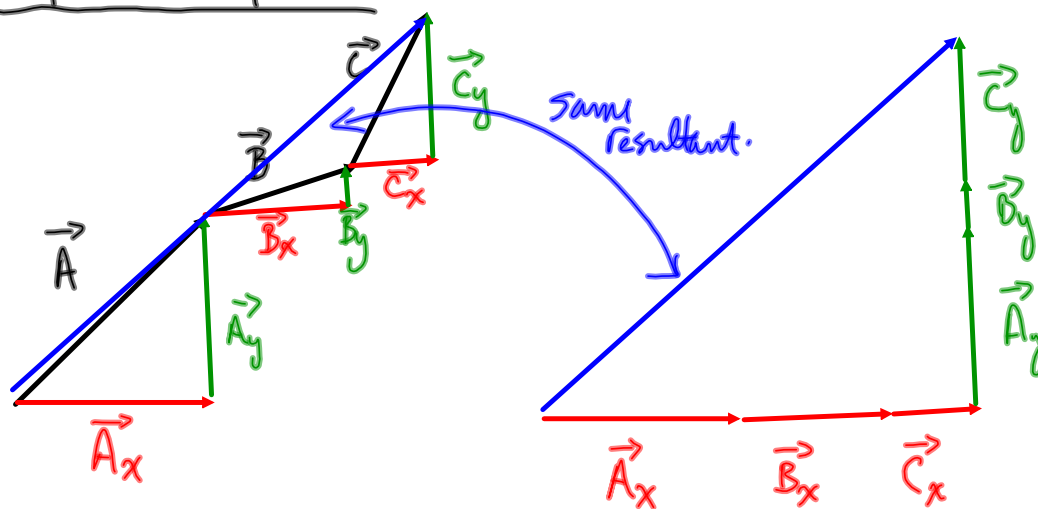
$\Delta t = 0.64 \text{ h}$

Compare to the time it would take if you headed straight across:



$$\Delta t = \frac{2.0 \text{ km } [N]}{4.0 \text{ km/h } [N]}$$

$$\Delta t = 0.5 \text{ h}$$

Working with ComponentsTo DO

- ① PP on FOP sheet
- ② PP/110/21-23, 25+27