SP

2. $_s\vec{V}_w = 1.80\text{ m/s [N]}$

$_w\vec{V}_g = 1.00\text{ m/s [E]}$

200 m

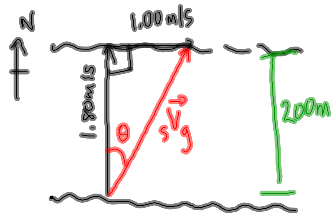
a) $_s\vec{V}_g = ?$

b) $\Delta t = ?$

c) $\Delta\vec{d}$ (downstream) = ?

a) $_s\vec{V}_g = {_s\vec{V}_w} + {_w\vec{V}_g}$

$_s\vec{V}_g = 1.80\text{ m/s [N]} + 1.00\text{ m/s [E]}$



a) $c^2 = a^2 + b^2$

$c^2 = (1.80\text{ m/s})^2 + (1.00\text{ m/s})^2$

$c \doteq 2.06\text{ m/s}$

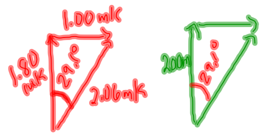
$\tan\theta = \frac{opp}{adj}$

$\tan\theta = \frac{1.00\text{ m/s}}{1.80\text{ m/s}}$

$\theta \doteq 29.1°$

The velocity of the swimmer with respect to the ground is: 2.06 m/s [N29.1°E]

b) $\vec{V} = \frac{\Delta\vec{d}}{\Delta t}$ ← directions MUST match



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

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

$\Delta t = \frac{200\text{ m [N]}}{1.80\text{ m/s [N]}}$

$\Delta t = 111\text{ s}$ ← time to cross the river

Note: This is the same time to swim this distance in still water .... b/c the swimmer is swimming perpendicular to the current ☺

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

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

$\Delta\vec{d}_{East} = \vec{V}_{East}\,\Delta t$

$\Delta\vec{d}_{East} = (1.00\text{ m/s [E]})(111\text{ s})$

$\Delta\vec{d}_{East} \doteq 111\text{ m [E]}$

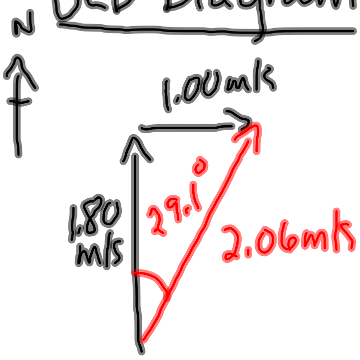
The swimmer lands 111m downstream

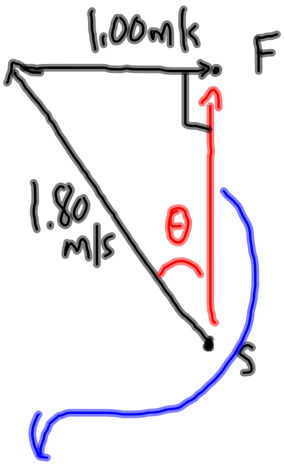
Sep 24-10:36 AM

THINK ABOUT...

What direction should the swimmer head in order to reach a point directly opposite the start?

OLD Diagram





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

$\sin\theta = \frac{1.00 m/s}{1.80 m/s}$

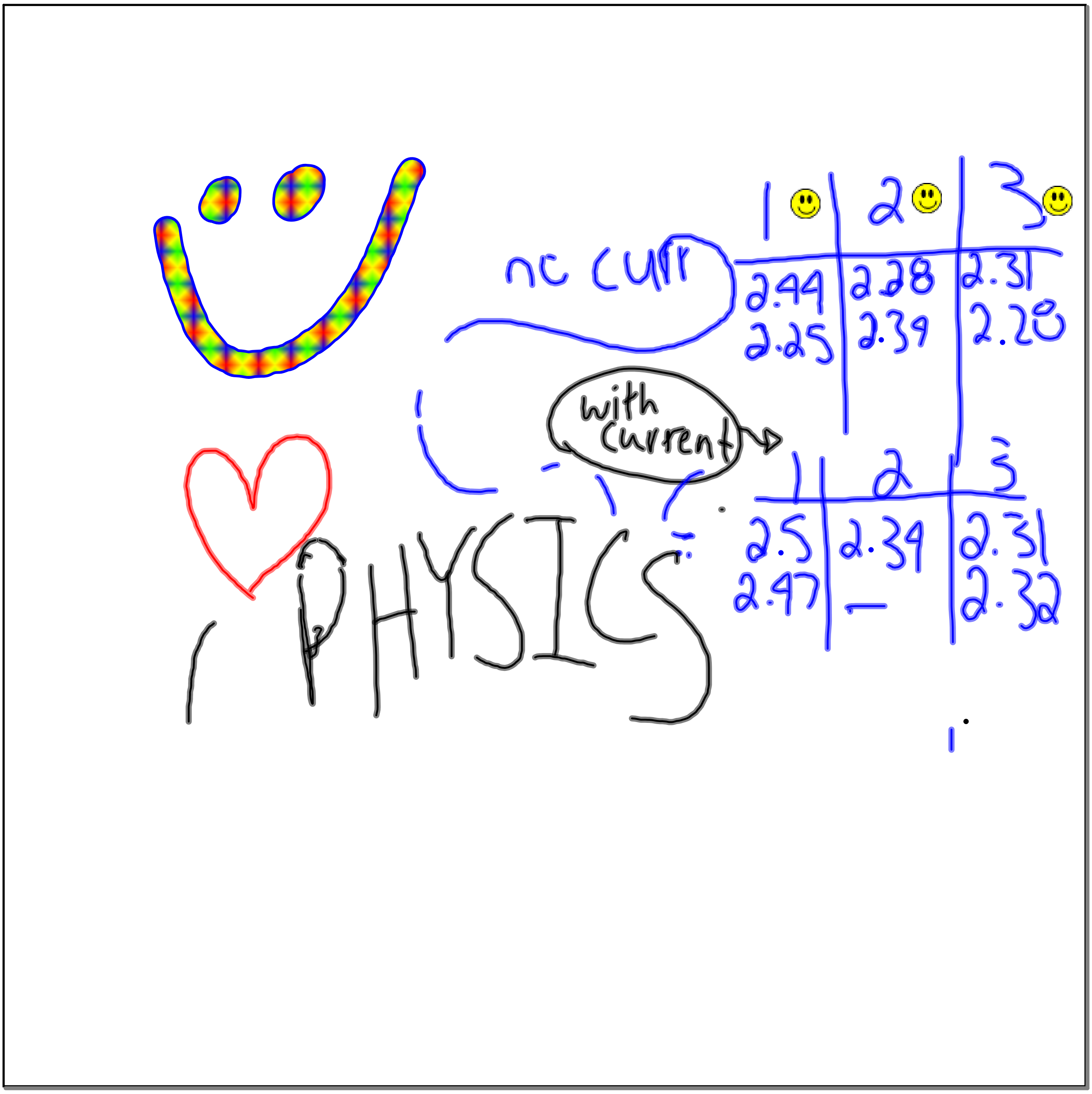
$\theta \doteq 33.7°$

You should head [N 33.7° W]

this v will be less than in the example and it will take longer to cross the river.

TODO

SP3
PP } Relative Motion Sheet.


nc curr
1 2 3
2.44 2.28 2.31
2.25 2.39 2.20
with current
1 2 3
2.5 2.34 2.31
2.47 — 2.32
PHYSICS