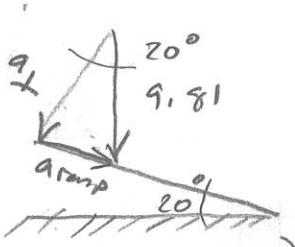
Hints for Ch 3 probs

Pros 19) Find a_{ramp}; use a kinematic Eq of

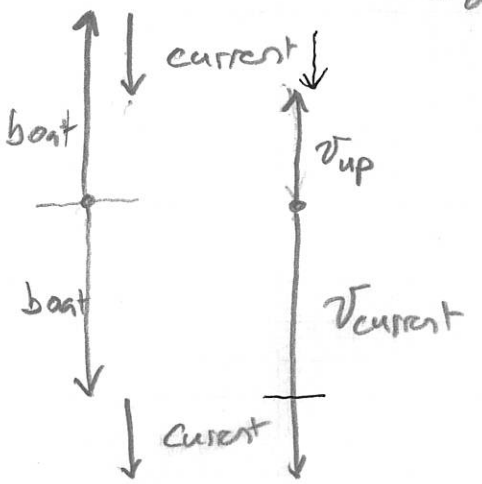
$$x_f = x_i + v_{x_i} t + \frac{1}{2} a \Delta t^2$$

and solve for Δt



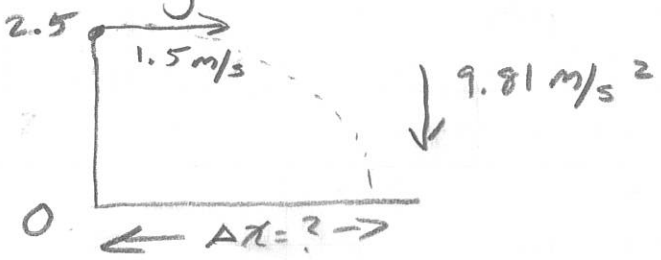
Pros 25) This is a vector addition problem.

$$\vec{v}_{up} = \vec{v}_{motor} + \vec{v}_{current}$$
$$\vec{v}_{down} = \vec{v}_{motor} + \vec{v}_{current}$$

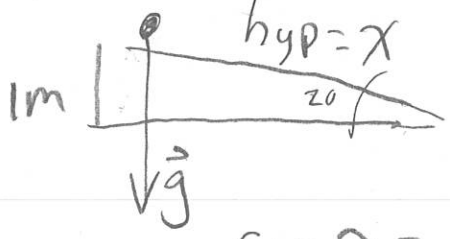


Prob 29

Projectile motion

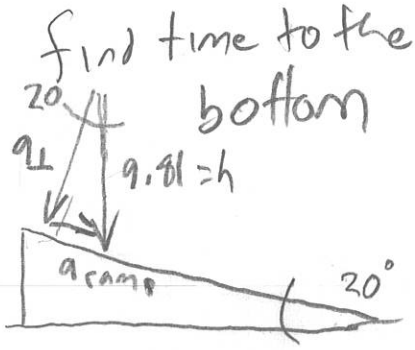


19)



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

find time to the bottom



$$a_{ramp} = a\sin(20)$$

$$\sin(20) = \frac{1}{x_{ramp}}$$

$$x_{ramp} = \frac{1}{\sin(20°)}$$

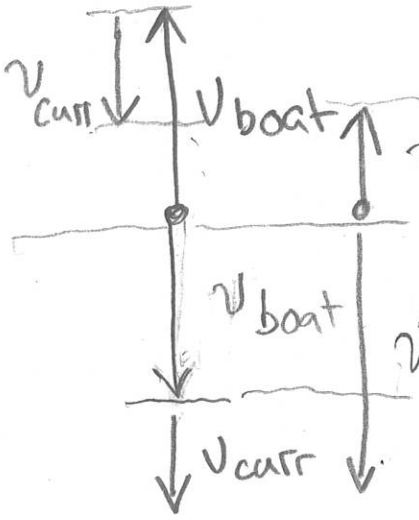
$$x_f = x_i + v_i\Delta t + \frac{1}{2}a_{ramp}\Delta t^2$$

$$\frac{1}{\sin(20)} = 0 + 0 + -9.81\sin(20)\Delta t^2$$

1) Split vectors into x & y components

2) Set your x axis along the ramp

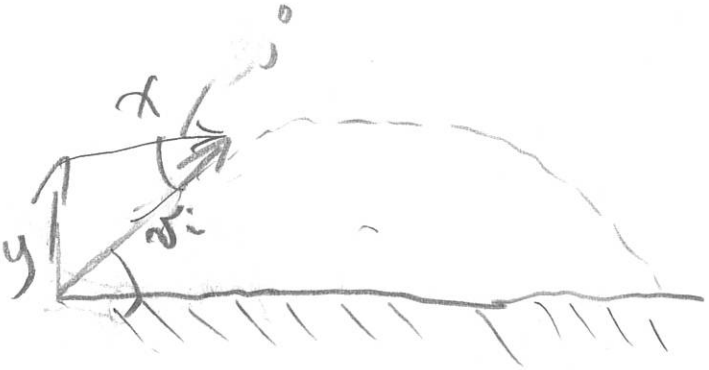
prob 25



prob 29 & 35 projectile motion

Solve for Δt in the y dim

find $x = v_x \Delta t$



$y_f = y_i = 0$

$y_f = y_i + v_y \Delta t + \frac{1}{2} g \Delta t^2$

find Δt ; $x = v_x \Delta t$