Benjamin Davidson
October 29, 2008
Section C

Fighting Bears

Story: Un jour (comme chaque jour), j'ai bagarré contre un ours grand. J'ai ramassé l'ours parce que je suis très fort. J'ai porté l'ours à une falaise petite. J'au couru à la falaise (à une vitesse constante), et puis j'ai jeté l'ours! Il y avait vent faire voler à moi.

Givens:

g= -9.8m/s

a_w= -4.1m/s^2

θ= 61°

h= 37m

v= 58mph= (58mph)$\left(\frac{.44704\text{m/s}}{1\text{mph}}\right)$= <u>25.928m/s</u>

$v_{x\ cannon}$=6.5m/s

v_x= vcos θ+ $v_{x\ cannon}$ = 25.928(cos(61))+6.5= <u>19.070m/s</u>

v_y= vsin θ= 25.928(sin(61))= <u>22.677m/s</u>

Strategy: Knowing that horizontal and vertical components of the problem are independent of each other, I first solved for time using the vertical components of the problem. After I found the time, I found the horizontal displacement. Then, I modified my distance calculator to include $v_{x\ cannon}$ and a_w.

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

$\frac{1}{2} g t^2 + v_y t - \Delta x_y = 0$

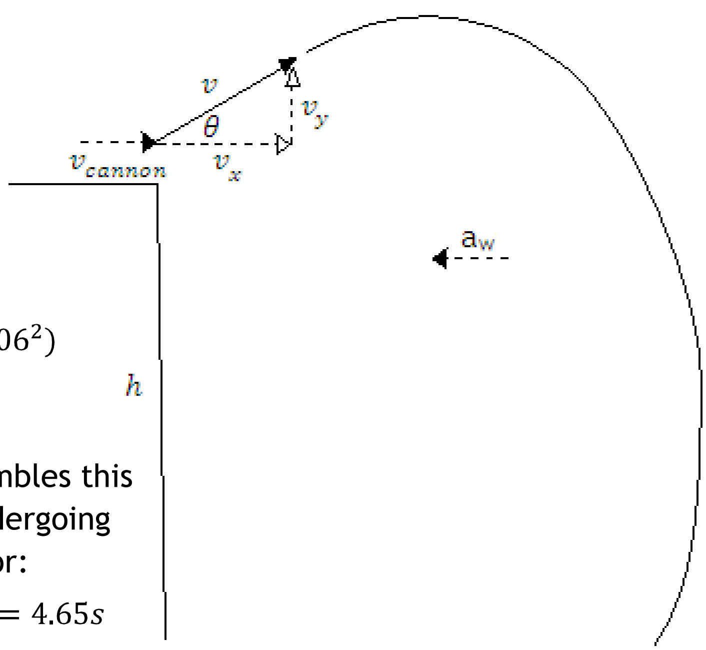
$-4.9t^2 + 22.677t + 37 = 0$

$t = \underline{5.906s}\ , -1.278s$

$\Delta x_x = v_x t + \frac{1}{2} a_w t^2$

$\Delta x_x = (19.070 \cdot 5.906) + \left(\frac{1}{2} \cdot -4.1 \cdot 5.906^2\right)$

$\Delta x_x = 41.12m$



Note: I know the projectile path resembles this diagram because the projectile is undergoing negative velocity in the x direction for:

$v_f = v_i + at;\ v_f = 0 \ \rightarrow\ \frac{v_i}{-a} = t = \frac{19.070}{4.1} = 4.65s$

$5.906 - 4.65 = \underline{1.25s}$