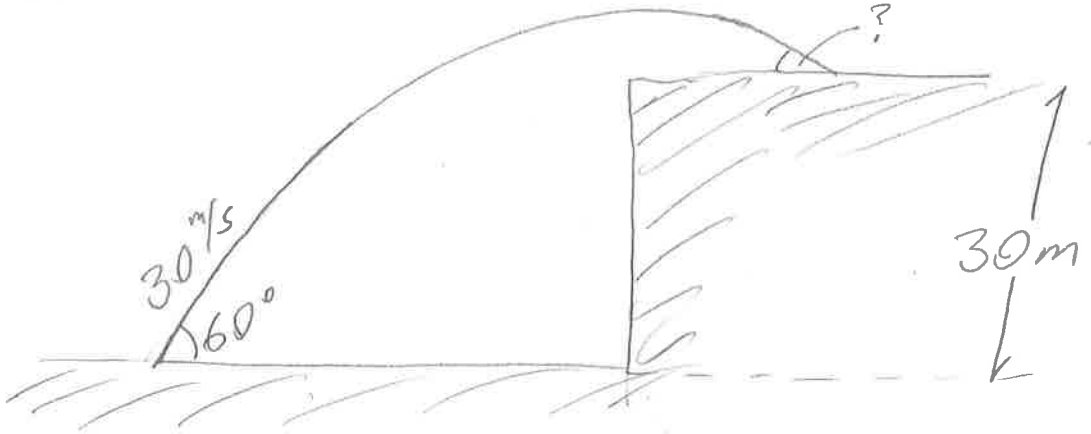
Extra Credit #5

Pete's way



$V_H = 15\ m/s$ → stays Const.

Using conservation of energy, we can find $|V_f|$

$$E_0 = E_f$$

$$PE_0 + KE_0 = PE_f + KE_f$$

$$PE_0 = 0$$

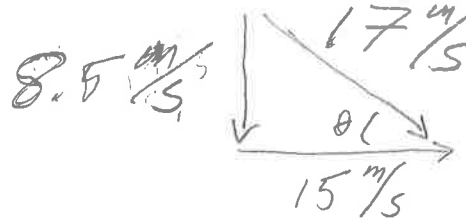
$$\frac{1}{2} m V_0^2 = mgh + \frac{1}{2} m V_f^2$$

$$\frac{1}{2} V_f^2 = \frac{1}{2} V_0^2 - gh$$

$$V_f = (V_0^2 - 2gh)^{\frac{1}{2}} = \left[(30\ m/s)^2 - 2(10\ m/s^2)30m\right]^{\frac{1}{2}}$$

$$= (900\ m^2/s^2 - 600\ m^2/s^2)^{\frac{1}{2}}$$

$$= (300\ m^2/s^2)^{\frac{1}{2}} \approx 17.\ m/s$$



$$\cos\theta = \frac{17\ m/s}{20\ m/s} \approx 0.87$$

$$\cos 30°$$

$$\theta \sim 30°$$