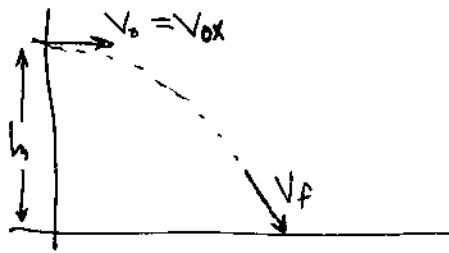


WRITTEN HW week 4



Thrown horizontal: $V_x = V_0$ at all times, no x-acceleration.

y-velocity: $V_{y0} = 0$, constant $a = -g$. $y_0 = h$.

Use v-y relation to find V_{yf} at $y=0$:

$$V_{yf}^2 = V_{0y}^2 - 2g(y - y_0)$$

$= 0 - h = -h$

$$V_{yf}^2 = 2gh$$

Speed is $V_f = \sqrt{V_{yf}^2 + V_{fx}^2} = nV_0$

$n = V_f$

$$nV_0 = \sqrt{(2gh)^2 + V_0^2}$$

square both sides: $n^2 V_0^2 = (2gh)^2 + V_0^2$

$$V_0^2 (n^2 - 1) = (2gh)^2$$

$$V_0^2 = \frac{(2gh)^2}{n^2 - 1}$$

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