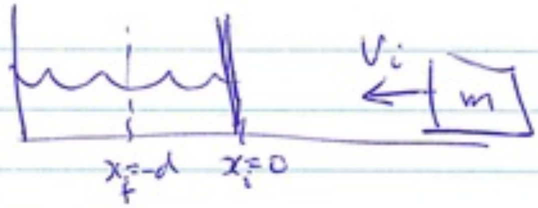
$$W_s = -\frac{1}{2} k \left(x_f^2 - x_i^2 \right)$$



$$x_i = 0$$

$$x_f = -d$$

$$\therefore W_s = -\frac{1}{2} k d^2$$

$$\Delta K = \frac{1}{2} m v_f^2 - \frac{1}{2} m v_i^2$$

$$v_i = v = -1.2 \, m/s$$

$$v_f = 0$$

$$W_s = \Delta K \implies -\frac{1}{2} k d^2 = -\frac{1}{2} m v_i^2$$

$$\therefore d = v \left(\frac{m}{k} \right)^{1/2}$$

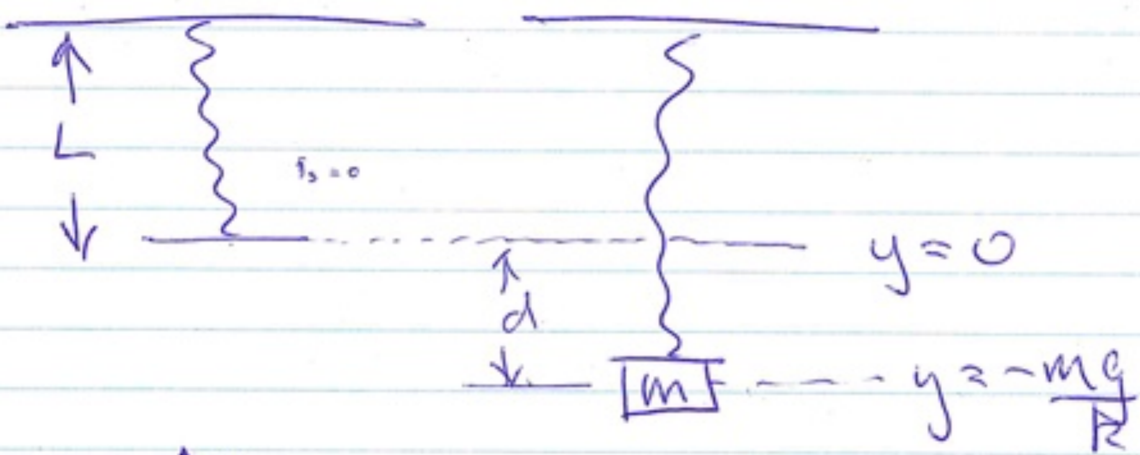
$$= 1.2 \frac{m}{s} \times \left(\frac{5.7 \, kg}{1500 \, kg/s^2} \right)^{1/2}$$

$$= 7.4 \times 10^{-2} \, m$$

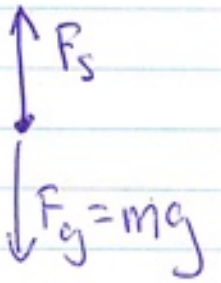
$$= 7.4 \, cm.$$

$$\boxed{\frac{1N}{m} = 1 \, kg \frac{m}{s^2} / m = 1 \frac{kg}{s^2}}$$

Hanging Weight



(a)



Net force vanishes at new equilibrium.

$$F_s + F_g = 0$$

$$F_s = -ky = kd$$

$$F_g = -mg$$

$$\therefore -ky - mg = 0$$

$$\therefore \therefore kd = mg$$

$$\therefore d = \frac{mg}{k}$$

$y = -\frac{mg}{k}$ at new equilibrium.