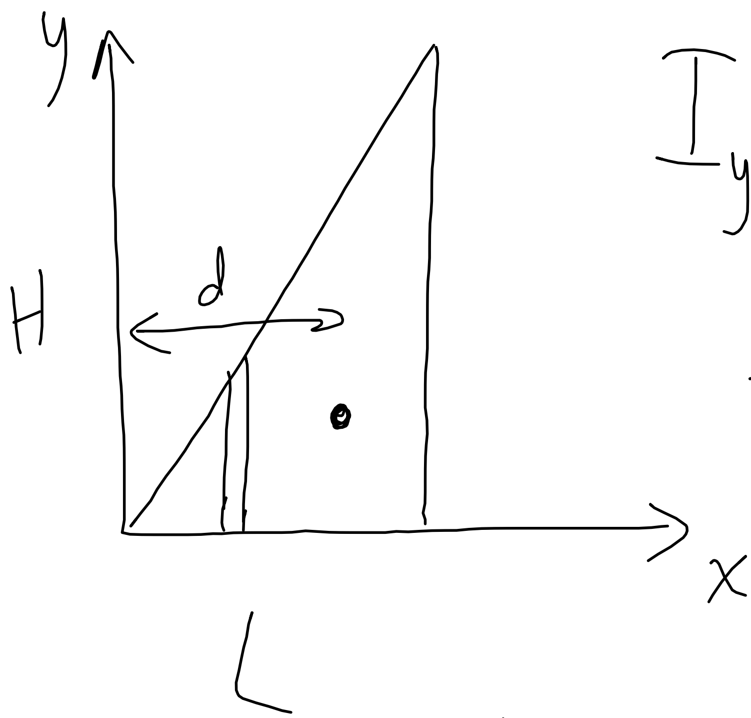


$$I_{y,0} = I_{y,c} + Ad^2$$

$$A = \frac{1}{2} LH$$

Because
Reid
asked....

$$I_{y0} = \int x^2 dA = \int_0^L x^2 \left(\frac{H}{L} x\right) dx = \frac{H}{L}\frac{L^4}{4} = \frac{HL^3}{4}$$

$$I_{yc} = \frac{HL^3}{4} - \frac{HL}{2}\left(\frac{2L}{3}\right)^2 = \frac{HL^3}{4} - \frac{2}{9} HL^3 = \frac{HL^3}{36}$$

Ch 11 Virtual Work

$$dW = \vec{F} \cdot \vec{dr} \quad \text{for const } \vec{F}$$

$$= F \cos\theta \, dr$$

We'll call it

$$\delta W = F \cos\theta \, \delta r$$

For static equil, total $\delta W = 0$

For moments, $\delta W = M\,\delta\theta$

Recipe ① Write out δ's (δx, δy, δs, $\delta\dot{\theta}$...)

for every point that:

A) moves

B) has net ext. force (or M) acting there

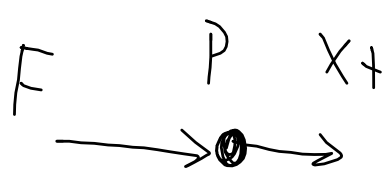
② Write out δ's in terms of min # (pref 1) of the ind coords

3 Set total $\delta W = 0$

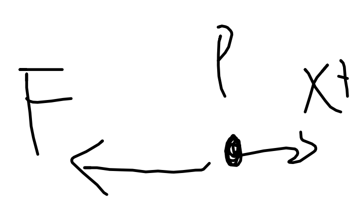
Worry about <u>signs</u>

Assume all $\delta_{\text{coordinates}}$ go in + dir given by coord axes

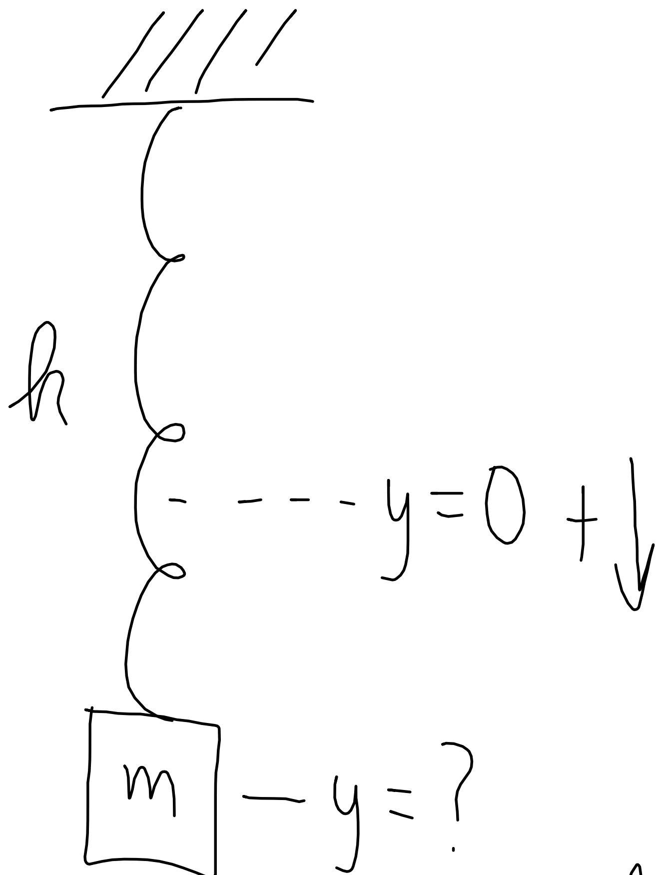
Now give appropriate sign to each δW

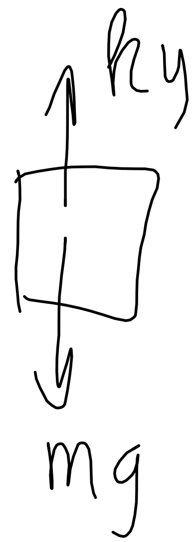


$\delta W = F\,\delta x_p$



$\delta W = -F\,\delta x_p$





$$\delta W_g = mg\,\delta y$$

$$\delta W_s = -ky\,\delta y$$

$$\delta W_{total} = 0$$

$$mg\cancel{\delta y} - ky\cancel{\delta y} = 0$$

$$mg = ky \qquad y = \frac{mg}{k}$$