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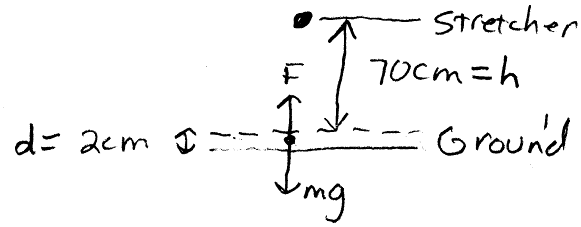
- We could use Newton's second law & kinematics, but it is a much shorter problem if we apply the work-energy theorem: $W_{net} = W_g + W_F = \Delta K$ (↑ change in kinetic energy)
- Since particle starts at rest and stops at rest, $\Delta K = 0$

$$\begin{pmatrix} v_0 = 0 & K_0 = \frac{1}{2} m v_0^2 = 0 \\ v_F = 0 & K_F = \frac{1}{2} m v_F^2 = 0 \end{pmatrix}$$

- $W_g = m \cdot g \cdot \text{height}$
- $W_F = -F \cdot d$



$m = 8\ \text{Kg}$

$$m \cdot g \cdot \text{height} - F \cdot d = 0$$

$$m \cdot g \cdot (h+d) - F \cdot d = 0$$

$$F = \frac{m \cdot g (h+d)}{d}$$

$$F = \frac{(8\ \text{Kg})(9.81 \frac{m}{s^2})(.70m + .02m)}{.02m}$$

$$F = 2{,}820N$$

$$F = 2.82\ KN$$

$$\boxed{F = 635\ \text{lbs.}}$$