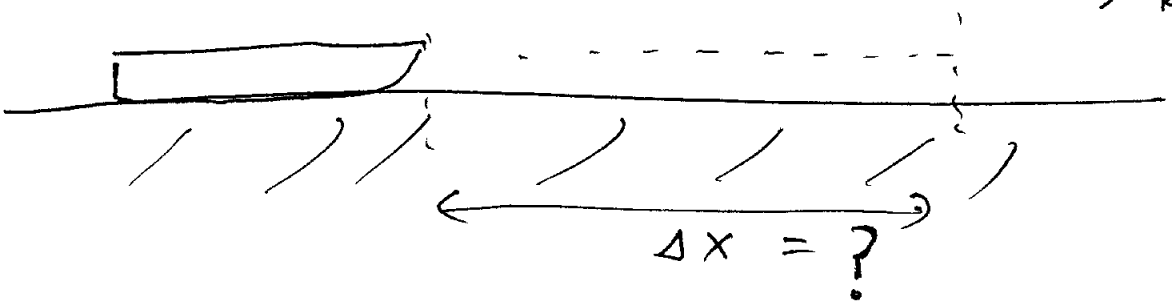
PROBLEM 5-18

$m = 10$ kg

$\mu_K = 0.1$



WORK-ENERGY THEOREM

$$W_{NET} = \Delta KE = KE_f - KE_i$$

$$KE_f = \frac{1}{2} m v^2 = 0$$

$$KE_i = \frac{1}{2} m v_0^2$$

$$\Rightarrow \Delta KE = -\frac{1}{2} m v_0^2$$

WE KNOW THAT $W_{NET} = -F_k \Delta x$ (opposes motion)

WHERE F_k IS THE KINETIC FRICTION FORCE

i.e. $F_k = \mu_K m g$

$\Rightarrow$ $W_{NET} = \Delta KE$ BECOMES $-\mu_K m g \Delta x = -\frac{1}{2} m v_0^2$

SOLVE FOR Δx: $\Delta x = \dfrac{v_0^2}{2\mu_K g}$

$$\Delta x = \frac{(2.0 \text{ m/s})^2}{2(0.1)(9.8 \text{ m/s}^2)} = \boxed{2.04 \text{ m}}$$

NOTE: DON'T NEED THE MASS!!