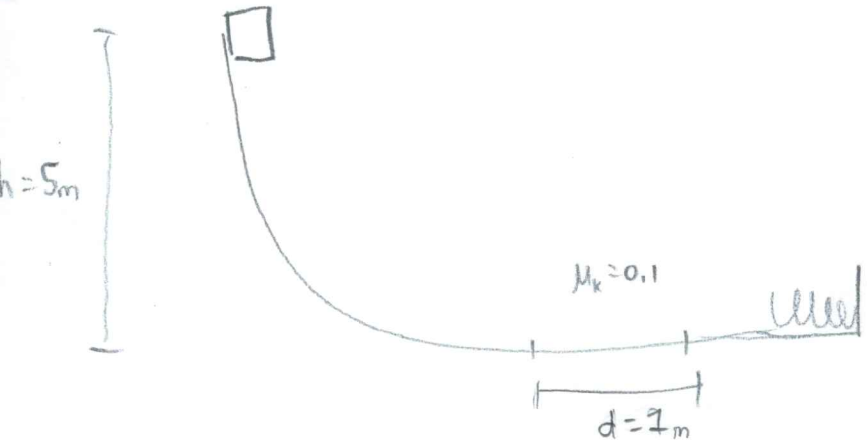
# Energy




Find $\Delta x$ (how much spring compresses)

In a system, the change in energy of the whole system is 0.

So I can write $\Delta E = 0$.

$W = F\Delta d$

or $0 = \Delta E_k + \Delta U_g + \Delta U_{spring} + \Delta U_{friction}$

or $W_{ext} = \Delta E_k + \Delta U_g + \Delta U_{spring}$

EX

$$0 = \tfrac{1}{2}mv^2 - mgh + \tfrac{1}{2}k\Delta x^2 + \mu_k mgd$$

$$mgh - \mu_k mgd = \tfrac{1}{2}k\Delta x^2$$

$$\sqrt{\frac{2(mgh - \mu_k mgd)}{k}} = \Delta x$$