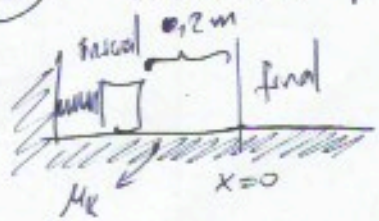
(3) Hallemos primero la constante K:



$E_{mi} = E_{mf} + Q$

$U_{ei} + U_{gi} + K_i = U_{ef} + U_{gf} + K_f + |\vec{f}_k||x|$

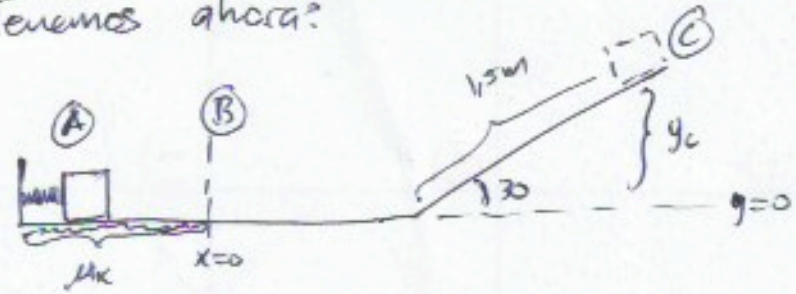
$\frac{1}{2}Kx^2 = \frac{1}{2}mv_f^2 + \mu_k mgx$

$Kx^2 = mv_f^2 + 2\mu_k mgx$

$K = \frac{mv_f^2}{x^2} + \frac{2\mu_k mg}{x} = (2kg)\left[\frac{4\,m^2/s^2}{0,04\,m^2} + \frac{2(0,25)(9,8\,m/s^2)}{0,2\,m}\right]$

$K = 249\ N/m$ ✓ (2 pts)

Tenemos ahora:



$E_{mA} = E_{mC} + Q$

$\frac{1}{2}Kx^2 = mgy_c + \mu_k mgx$ $\left(\sin 30 = \frac{y_c}{1,5m} \Rightarrow y_c = (1,5m)\sin 30\right)$

$\frac{1}{2}Kx^2 - mg(1,5m)\sin 30 - \mu_k mgx = 0$

$(124,5\,N/m)x^2 - (4,9\,N)x - (14,7\,N.m) = 0$

$x = \frac{-(-4,9N) \pm \sqrt{(-4,9N)^2 - 4(124,5\,N/m)(-14,7\,N.m)}}{2(124,5\,N/m)} = \frac{4,9N \pm \sqrt{24\,N^2 + 7320,6\,N^2}}{249\,N/m}$

$x = \frac{4,9N \pm 85,7N}{249\,N/m} = \begin{cases} 0,36\,m \checkmark \\ -0,32\,m \times \end{cases}$ (3 pts)

$E_{mA} = E_{mB} + Q$

$\frac{1}{2}Kx^2 = \frac{1}{2}m|\vec{v}_B|^2 + \mu_k mgx$

$|\vec{v}_B| = \sqrt{\frac{Kx^2 - 2\mu_k mgx}{m}} = \sqrt{\frac{(0,36\,m)^2(249\,N/m) - 2\mu_k(2kg)(9,8\,m/s^2)(0,36)}{2kg}}$

$|\vec{v}_B| = 3,79\,m/s$ ✓ (2 pts)