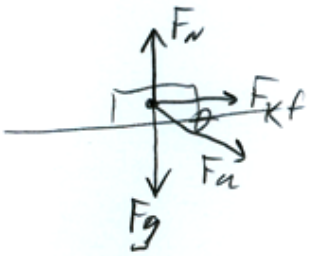
Thomas-Palmer Physics In-Class Lecture Notes:

A Friction Review Problem - The Original Billy Bobby and Bo
Thank You, Mr. Thomas-Palmer, for these notes. (Oh wait, that's me.)

CH04.4: BASIN of BELLIGERANT
BOSSA NOVA BANDITS
Friction (no Incline) Review Problem

$V_i = -3.0\ m/s$ $m = 52.4\ g\left(\frac{1\ kg}{1000\ g}\right) = 0.0524\ kg$ $\mu_K = 0.17$

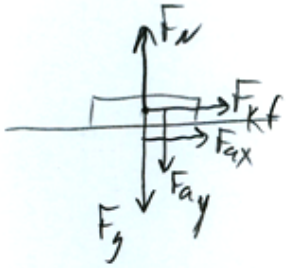
$\Delta X = 75\ cm\left(\frac{1\ m}{100\ cm}\right) = 0.75\ m$ $F_a = 0.20\ N$ @ 15° below Horiz.



$\sin\theta = \frac{O}{H} = \frac{F_{ay}}{F_a} \Rightarrow F_{ay} = F_a \sin\theta$

$F_{ay} = 0.2 \sin 15 = 0.051764\ N$

$\cos\theta = \frac{A}{H} = \frac{F_{ax}}{F_a} \Rightarrow F_{ax} = F_a \cos\theta = 0.2 \cos 15 = 0.19314\ N$



$\sum F_y = F_N - F_g - F_{ay} = ma_y = m(0) = 0$

$F_N - F_g - F_{ay} = 0 \Rightarrow F_N = F_g + F_{ay}$

$F_N = mg + F_{ay} = (0.0524)(9.8) + (0.051764)$

$F_N = 0.565284\ N$

$\sum F_x = F_{kf} + F_{ax} = ma_x \Rightarrow ma_x = \mu_K F_N + F_{ax} \Rightarrow a_x = \frac{\mu_K F_N + F_{ax}}{m}$

$a_x = \frac{(0.17)(0.565284) + 0.19319}{0.0524} = 5.5208\ m/s^2$

UAM $V_{fx}^2 = V_{ix}^2 + 2a_x \Delta x \Rightarrow V_{fx}^2 - V_{ix}^2 = 2a_x \Delta x$

$\Delta x = \frac{V_{fx}^2 - V_{ix}^2}{2a_x} = \frac{0^2 - (-3)^2}{(2)(5.5209)} = -0.81510\ m \approx -0.82\ m$

it slides too far, AH H!