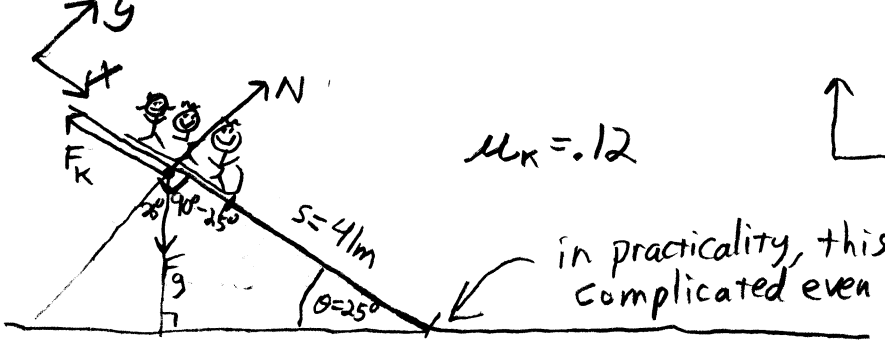
6-54



$\mu_K = .12$

Define Up as Positive
Right as Positive

in practicality, this is extremely complicated even if rounded

As in Ex 6-10 Horizontal: $mg\sin\theta - \mu_K N = ma$

Vertical: $N - mg\cos\theta = 0 \Rightarrow N = mg\cos\theta$

X: • $mg\sin\theta - \mu_K mg\cos\theta = ma$

$g\sin\theta - \mu_K g\cos\theta = a$

$(9.8 m/s^2)(\sin 25°) - .12(9.8 m/s^2)(\cos 25°) = a$

$a = 3.08 m/s^2$

• Assume $V_0 = 0$

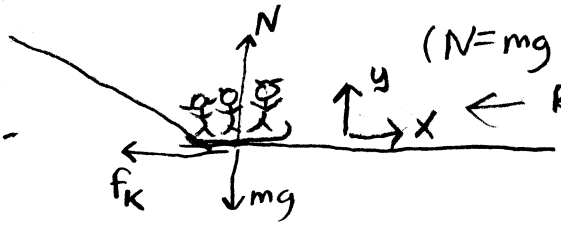
V_F = Speed @ Bottom of Hill $\longrightarrow$ $V_F^2 = V_0^2 + 2a \cdot s$

$V_F^2 = 2as$

$V_F = \sqrt{2as} \longrightarrow V_F = \sqrt{2 \cdot 3.08 \frac{m}{s^2} \cdot 41m} = 15.89 \frac{m}{s}$

y: $N - mg = 0$

($N = mg$ Boring...)



← Redefine coords.

• On level ground..

X: $f_K = \mu_K mg$

$ma = -\mu_K mg$

$a = -\mu_K g$

$V_0 = 15.89 \frac{m}{s}$

$V_F = 0 \frac{m}{s}$

stopping distance ↓

$V_F^2 = V_0^2 + 2aX$

$\frac{-V_0^2}{2a} = X$

$X = \frac{-(15.89 \frac{m}{s})^2}{2 \cdot (-.12 \cdot 9.81 m/s^2)}$

$\boxed{X = 107m}$