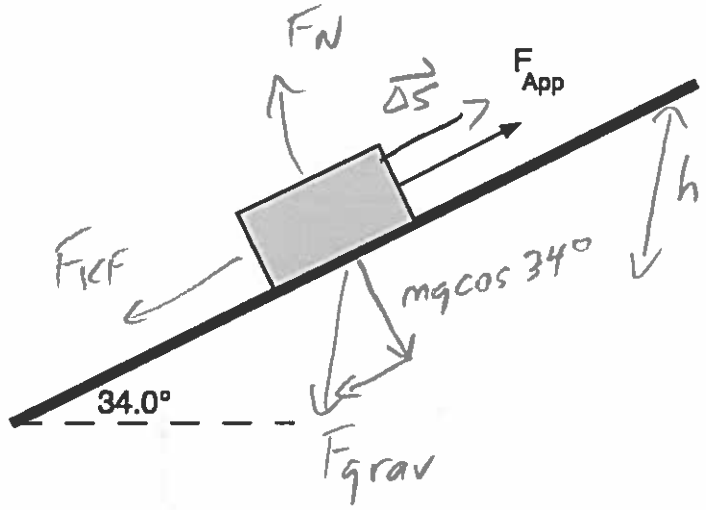
Physics 10154 - Quiz 6A

A 12.4-kg block, starting from rest, is pulled up a rough inclined surface by an applied force of 103 Newtons directed parallel to the incline. After the block has travelled 2.17 meters up the incline, its speed is 3.13 m/s.

a) Determine the work done by the force of kinetic friction in this problem.
b) Determine the coefficient of kinetic friction between the block and the surface.



$h = \Delta s \sin 34°$

$\Sigma F_\perp = F_N - mg\cos 34 = 0$

$F_N = mg\cos 34$

$W_N = 0$

$W_{App} = F_{App} \cdot \Delta s = (103)(2.17) = 223.51 \text{ J}$

$W_g = -mgh = -mg\Delta s\sin 34° = -147.46 \text{ J}$

$W_{KF} = ?$

$\Delta K = \frac{1}{2}mv^2 - \frac{1}{2}mv_0^2 = 60.74 \text{ J}$

$\Sigma W_F = 0 + 223.51 - 147.46 + W_{KF} = 60.74$

$\boxed{W_{KF} = -15.3 \text{ J}}$

$W_{KF} = \mu_K F_N \Delta s \cos 180° = -\mu_K (mg\cos 34)(2.17) = -15.3$

$\mu_K = \frac{-15.3}{-218.62} = \boxed{.0700}$