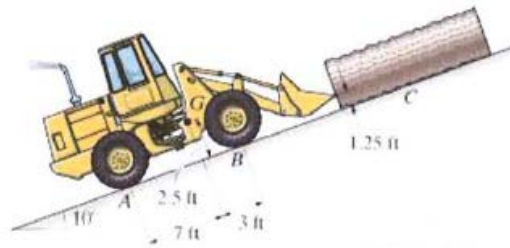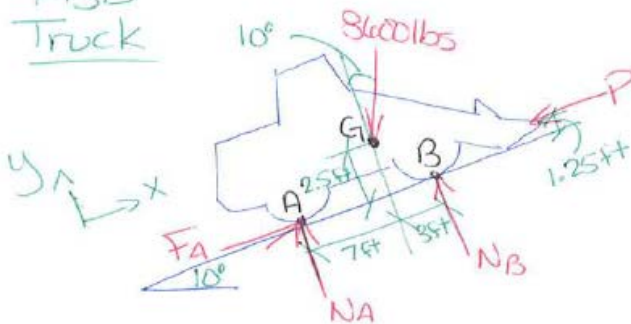**Problem 3 – Friction I**

The truck has GVW of 8600 lbs and a center of gravity at *G*. Determine the greatest weight of the log that can be pushed up the incline. The coefficient of static friction between the log and the ground is $\mu_s = 0.70$, and between the rear wheels of the tractor and the ground is $\mu'_s = 0.55$. The front wheels are free to roll. Assume the engine can develop enough torque to cause the rear wheels to slip.
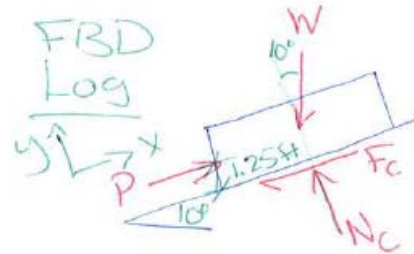

FBD
Truck

$\varepsilon \sum M_B = 0 = (8600\cos10°)(3)$
$+(8600\sin10°)(2.5) + P(1.25)$
$- N_A(10)$
$29042.6 + 1.25P - N_A(10) = 0$
$\sum F_x = 0 = F_A - 8600\sin10° - P$
$0.55 N_A - 1493.4 - P = 0$

$N_A = 2929 lbs \uparrow$ 2 eqns
$P = 117.5 lbs$ 2 unks

FBD
Log

$\sum F_y = 0 = N_c - W\cos10°$
$\sum F_x = 0 = P - W\sin10° - F_c$
$117.5 - W\sin10° - 0.7 N_c$

2 eqns 2 unks

$N_c = 1341 lbs \uparrow$

$W = 136 lbs \downarrow$