Physics 113 - November 19, 2013

- Exam 2 is graded – pick up here at end of class today or outside my office later
- Please look over your paper and spend some time evaluating it if you didn't do as well as you'd like

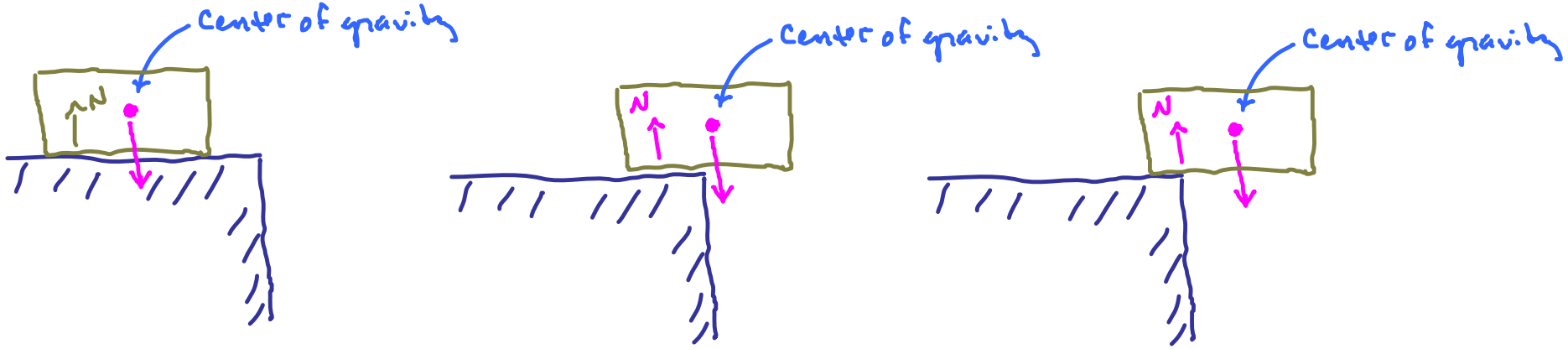
Nothing changes if Nothing changes

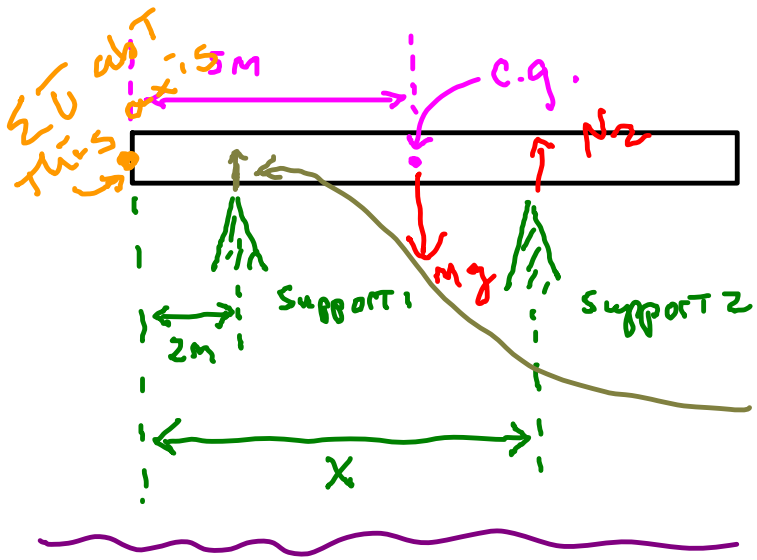
Static Equilibrium

An object is in static equilibrium (Not moving or rotating) if

$$\sum \vec{F} = 0$$

$$\sum \vec{\tau} = 0 \quad \text{(about any axis)}$$





Uniform beam

$m = 12$ kg

length = 10 m

$N_1 = 39.2$ N (given)

beam is in static equilibrium

Where is Support 2 located, i.e. what is x ?

How much weight does it support ?

$\sum \vec{F} = 0$

$\sum F_y = 0$

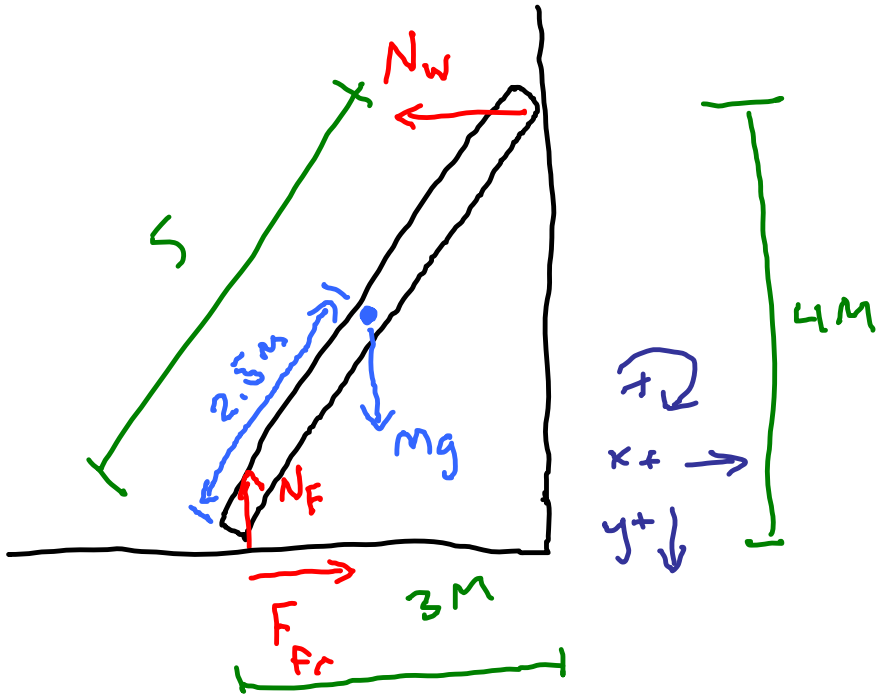
$0 = N_1 + N_2 - mg$

$N_2 = 78.4$ N

$\sum \vec{\tau} = 0$

$0 = -2N_1 + 5mg - xN_2$

$x = 6.5$ meters



Ladder against frictionless wall

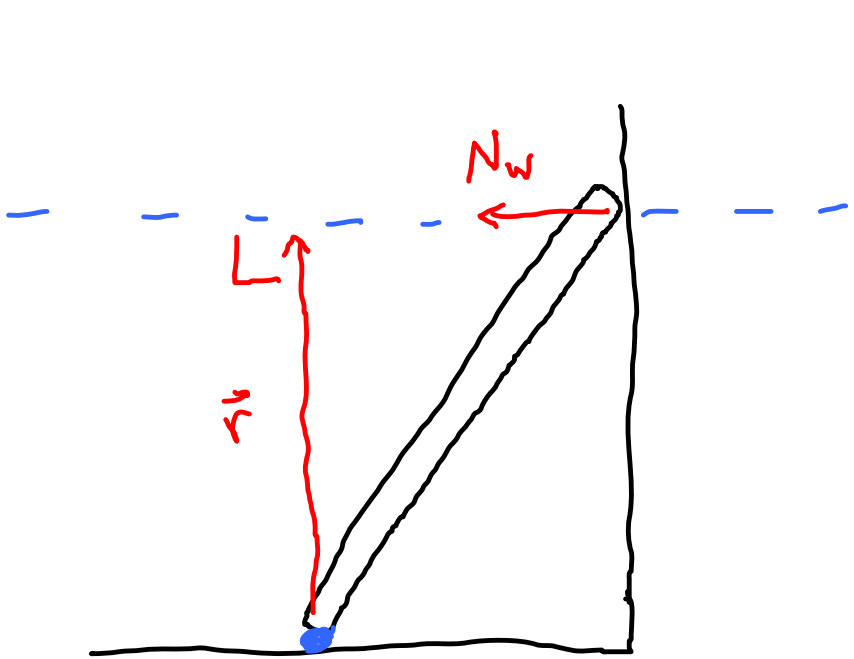
Ladder Weight 60 N

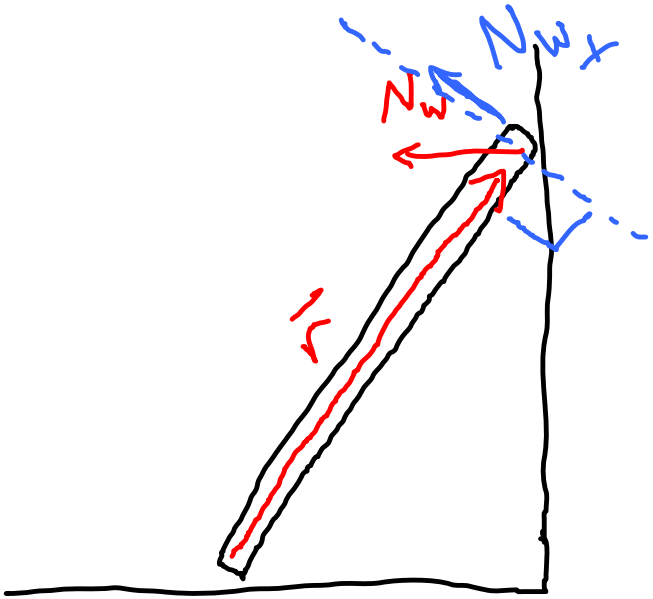
What is Minimum μ_s bet. ladder + Floor such that the ladder does NOT Slip

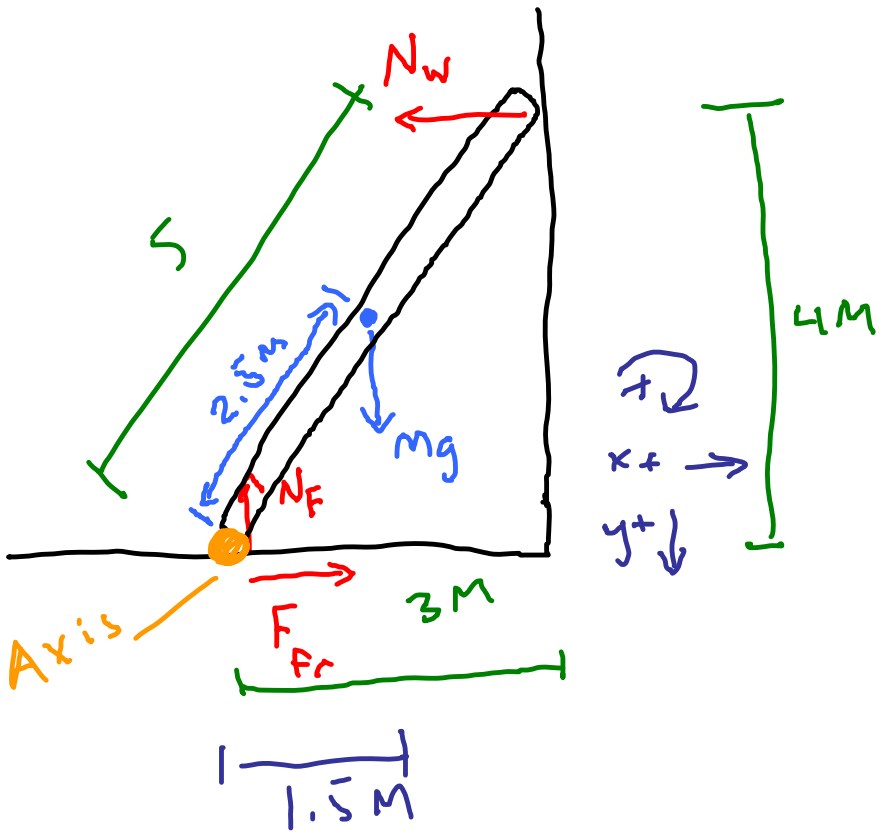
Ladder length = 5 M

$\Sigma F_x = F_{Fr} - N_W = \mu_s N_F - N_W$ → $60\mu_s - N_W = 0$

$\Sigma F_y = mg - N_F$ $\quad mg = N_F$ $\quad N_F = 60\ N$


N_w
L
$\vec{r}$


N_w
N_w
$\vec{r}$



$\Sigma \tau = 0$

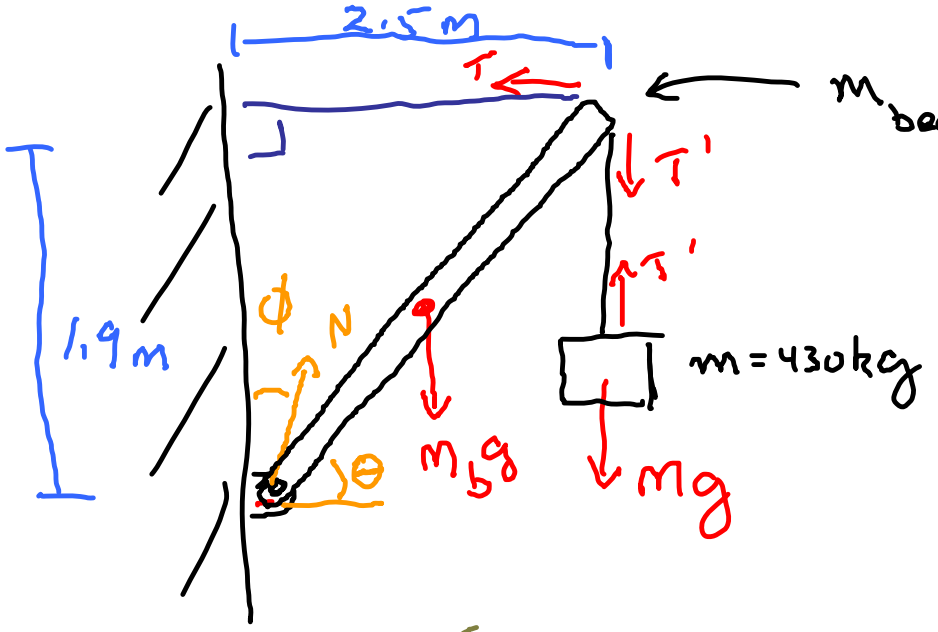
$0 = mg(1.5) - N_W(4)$

Earlier

$60\mu_s - N_W = 0$

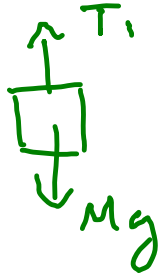
2 eqns 2 unk (N_W, μ_s)

get $\mu_s = 3/8$



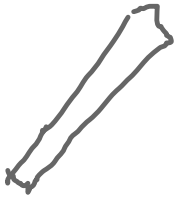
$m_{beam} = 85$ kg

Find T in upper cable



$\Sigma F = 0 = T' - Mg$

$T' = Mg = (430)(9.8)$



$\Sigma F_x \quad + \rightarrow$

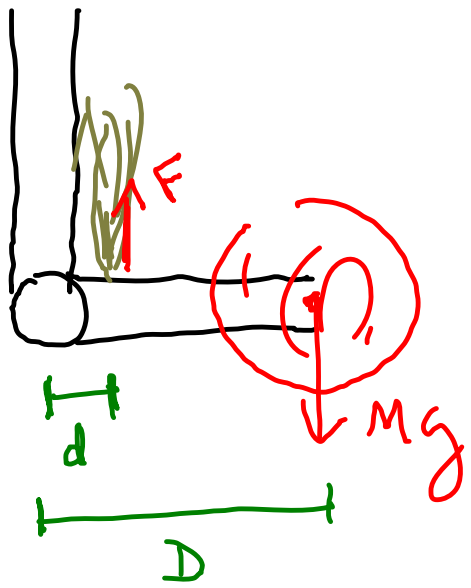
$0 = N \sin\phi - T$

$\Sigma F_y = 0 \quad + \uparrow$

$0 = N\cos\phi - M_b g - T' = 0$

$\Sigma \tau = 0$ (+ ↻)

$0 = (0.5)(2.5) M_b g - T(1.9) + T'(2.5)$



$$\Sigma \tau = 0$$

$$0 = dF - mgD$$

$$dF = mgD$$

Mean 65
Median 68