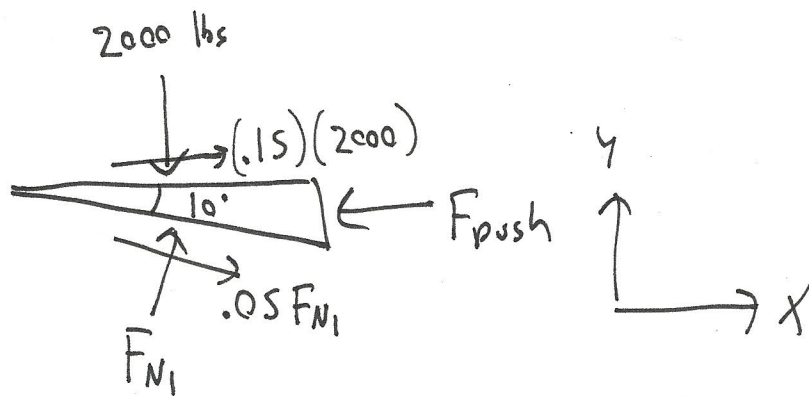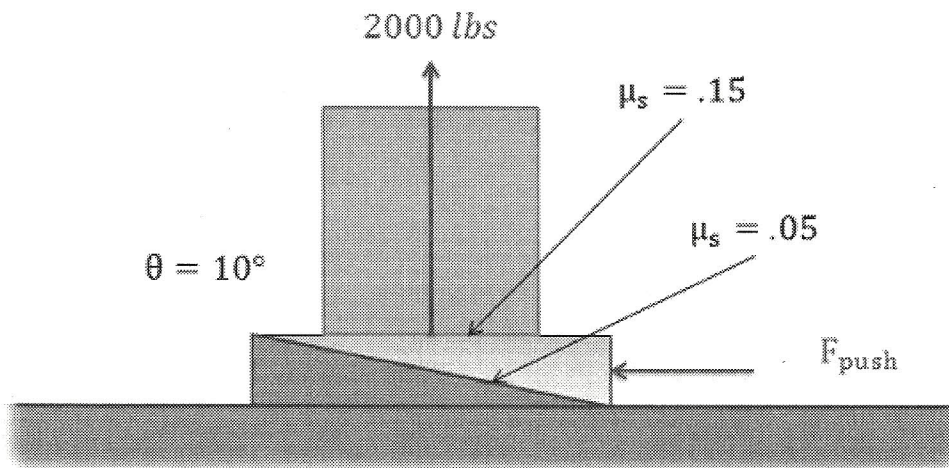## Question 2:

A wedge as shown below is being used to lift the corner of the foundation of a house. How large must the pushing force be to exert a one ton (2000 lb) lifting force?

2000 *lbs*

$\mu_s = .15$

$\mu_s = .05$

$\theta = 10°$

F_{push}

2000 lbs

$(.15)(2000)$

10°

F_{push}

$.05 F_{N_1}$

F_{N_1}

y

x

$$\Sigma F_x = (.15)(2000) + F_{N_1} \sin(10) + .05 F_{N_1} \cos(10) - F_{push} = 0$$

$$\Sigma F_y = F_{N_1} \cos(10) - .05 F_{N_1} \sin(10) - 2000 = 0$$

$$F_{N_1} = \frac{2000}{\cos(10) - .05 \sin(10)}$$

$$F_{N_1} = 2048.9 \text{ lbs}$$

$$F_{push} = (.15)(2000) + (2048.9)\sin(10) + (.05)(2048.9)\cos(10)$$

$$\boxed{F_{push} = 756.7 \text{ lbs}}$$