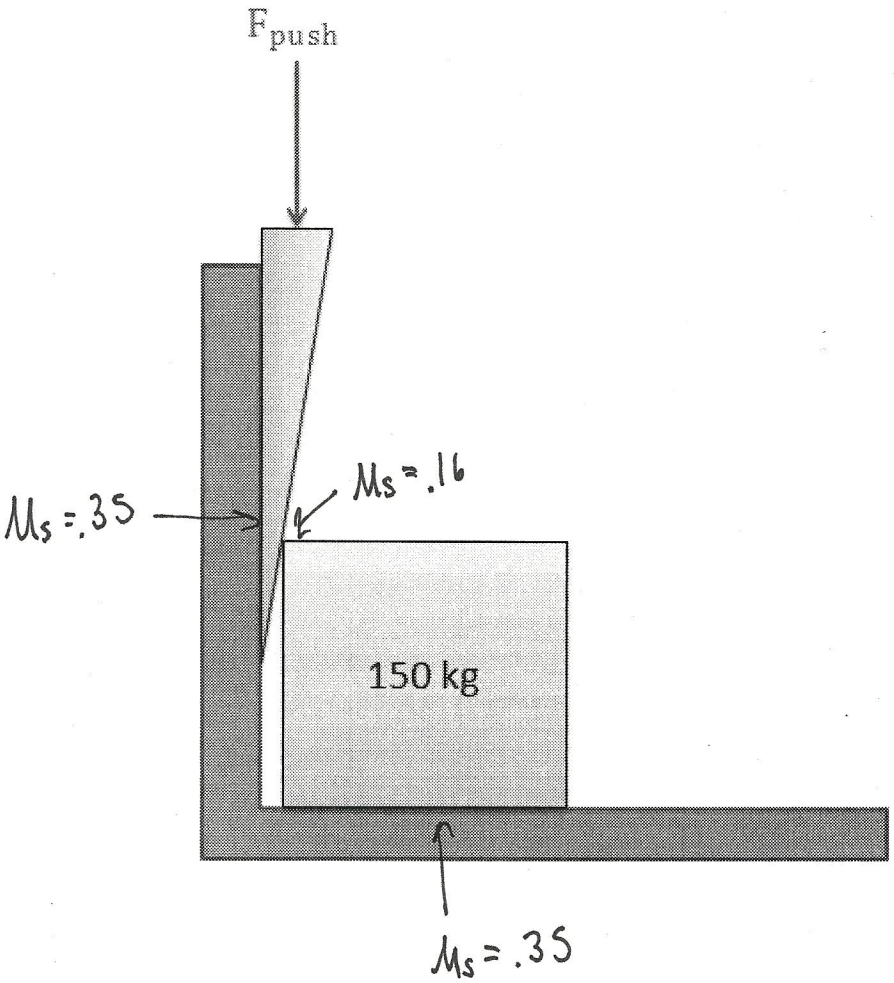
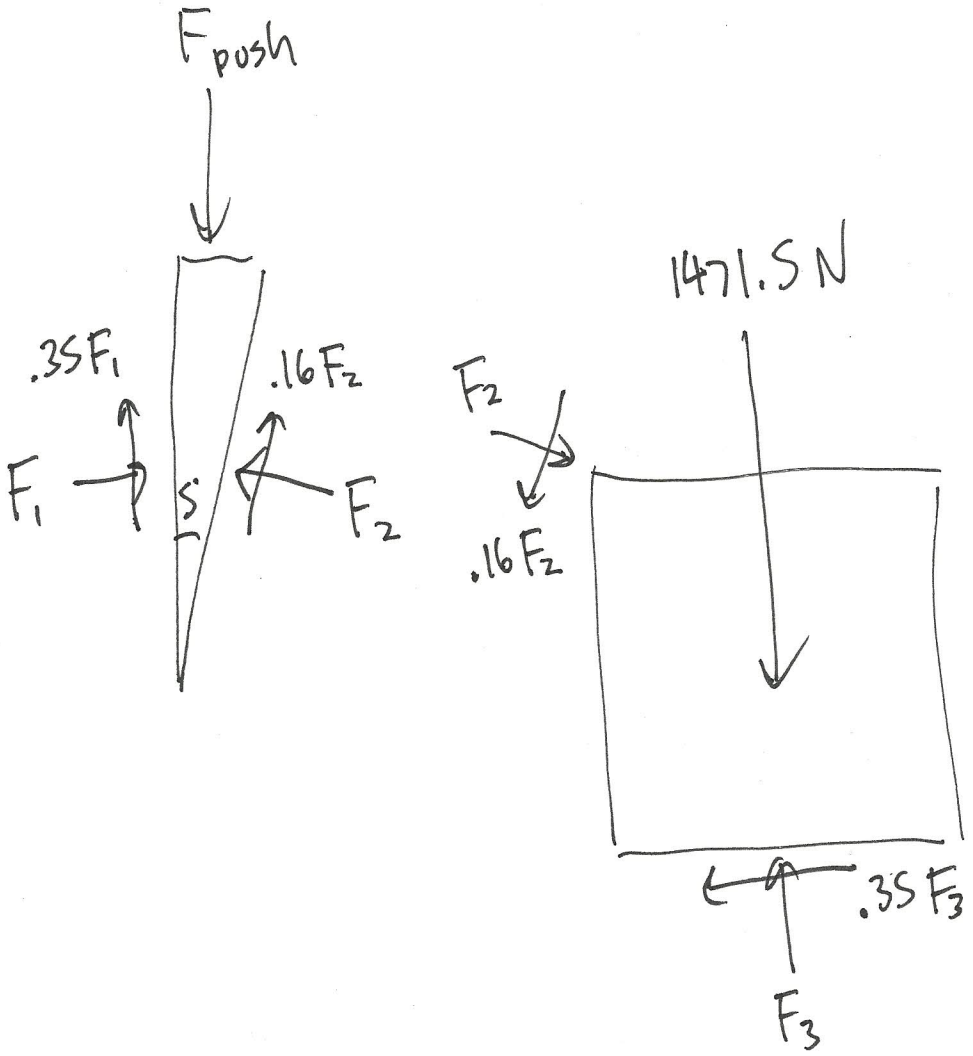
A heavy safe is being pushed away from a wall with a wedge as shown below. Assume the wedge has an angle of 5 degrees, the coefficient of friction (static and kinetic) between the wedge and the safe is .16, and the coefficients of friction (static and kinetic) between the wedge and the wall and the safe and the floor are both .35. What is the pushing force required to move the safe out from the wall?





Box

$$\sum F_x = F_2 \cos(5) - .16 F_2 \sin(5) - .35 F_3 = 0$$

$$\sum F_y = F_3 - F_2 \sin(5) - .16 F_2 \cos(5) - 1471.5 = 0$$

$$.98225 F_2 = .35 F_3$$

$$F_2 = .356 F_3$$

$$F_3 - .247(.356F_3) = 1471.5$$

$$F_3 = 1613.2\ N$$

$$F_2 = .356F_3 = 574.9\ N$$

Wedge

$$\Sigma F_x = F_1 - F_2\cos(5) + .16F_2\sin(5) = 0$$

$$\Sigma F_y = .35F_1 + .16F_2\cos(5) + F_2\sin(5) - F_{push} = 0$$

$$F_1 = 564.6\ N$$

$$F_{push} = 334.3\ N$$