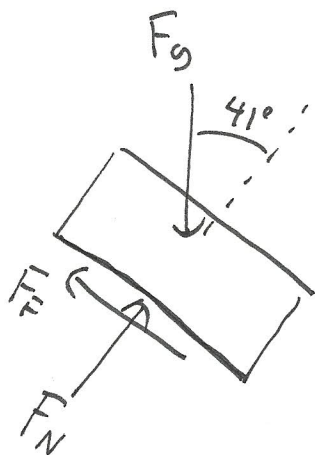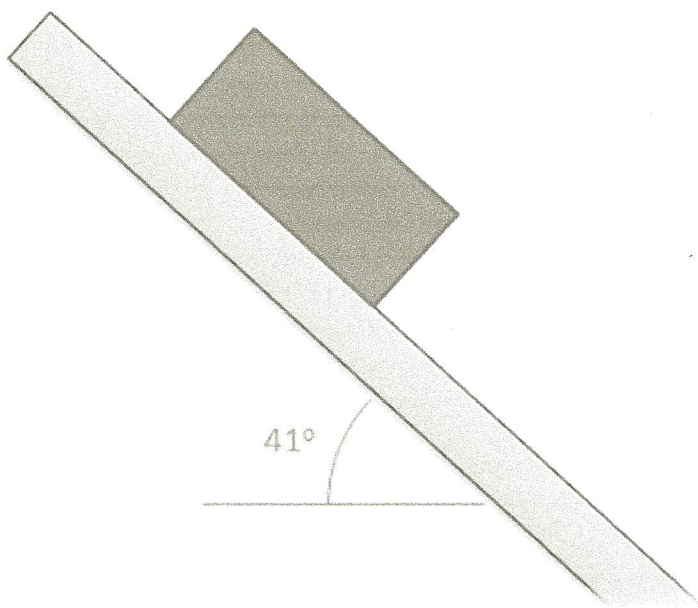## Question 3:

A plastic box is sitting on a steel beam. One end of the steel beam is slowly raised, increasing the angle of the surface until the box begins to slip. If the box begins to slip when the beam is at an angle of 41 degrees, what is the static coefficient of friction between the steel beam and the plastic box?

41°

F_g

41°

F_F

F_N

just before slipping

$$\Sigma F_x = F_g \sin(41) - F_F = 0$$

$$\Sigma F_y = F_N - F_g \cos(41) = 0$$

$$F_F = (M_s) F_N$$

$$F_s = \frac{F_F}{\sin(41)} = \frac{(M_s)(F_N)}{\sin(41)}$$

$$F_s = \frac{F_N}{\cos(41)}$$

$$\frac{(M_s)F_N}{\sin(41)} = \frac{F_N}{\cos(41)}$$

$$M_s = \frac{\sin(41)}{\cos(41)} = \tan(41)$$

$$\boxed{M_s = .87}$$