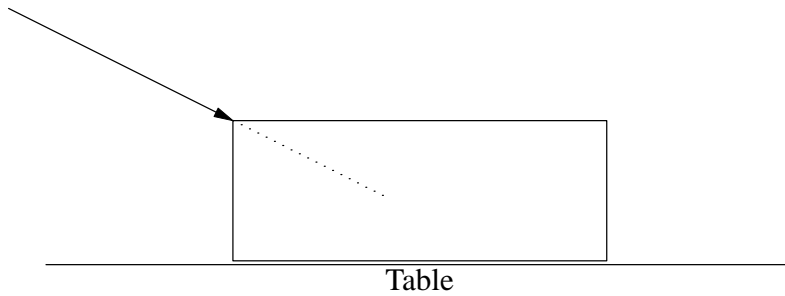3. (25 pts.) A student pushes a 1.2 kg block across a horizontal table by leaning down and pushing on it with a force of 3.5 N at an angle of 35° *below* the horizontal. The coefficient of kinetic friction between the block and the table is 0.15N.

                              Table
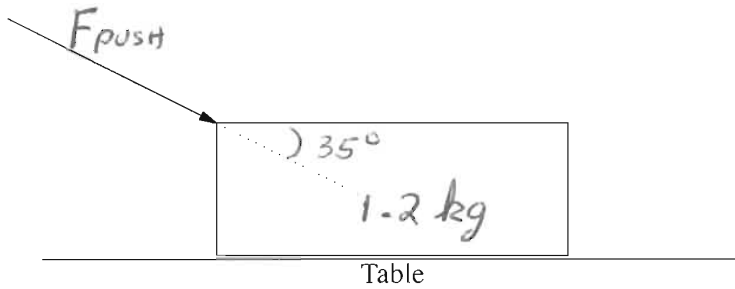
   a.   (5 pts.) Draw a carefully-labeled free-body diagram. Label each force clearly.

   b.   (10 pts.) What is the normal force exerted on the block by the table?
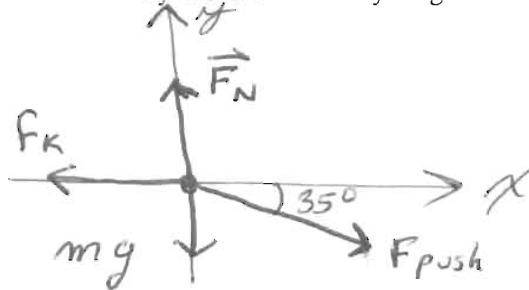
   c.   (10 pts.) What is the acceleration of the block?

3. (25 pts.) A student pushes a 1.2 kg block across a horizontal table by leaning down and pushing on it with a force of 3.5 N at an angle of 35° *below* the horizontal. The coefficient of kinetic friction between the block and the table is 0.15 ..

[See Ch. 4 #28; Friction Lab]

Table

a. (5 pts.) Draw a carefully-labeled free-body diagram. Label each force clearly.

b. (10 pts.) What is the normal force exerted on the block by the table?

$$\Sigma F_y = ma_y$$

$$F_N + F_p \sin(-35°) - mg = 0$$

$$F_N = mg - F_p \sin(-35°)$$

$$F_N = (1.2)(9.8) - (3.5)(-0.5736)$$

$$\boxed{F_N = 13.77 N}$$

c. (10 pts.) What is the acceleration of the block?

$$\Sigma F_x = ma_x$$

$$F_{push} \cos(-35°) - f_k = ma_x$$

$$F_{push} \cos(-35°) - \mu_k F_N = ma_x$$

$$2.867 - 2.066 = 1.2 a_x$$

$$\boxed{0.668 \tfrac{m}{s^2} = a_x}$$