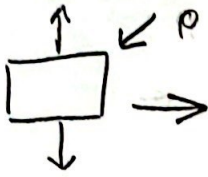
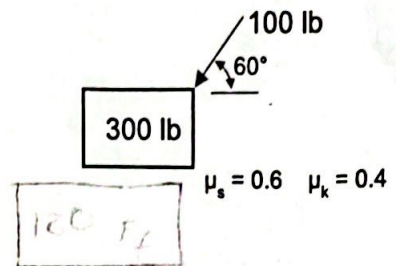


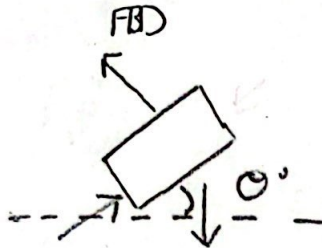
1. Jeremy Pruitt is pushing on a box and it doesn't move. What is the friction force? (FBD required)



$$F_f = P \cos \theta = 50 \text{ lb}$$



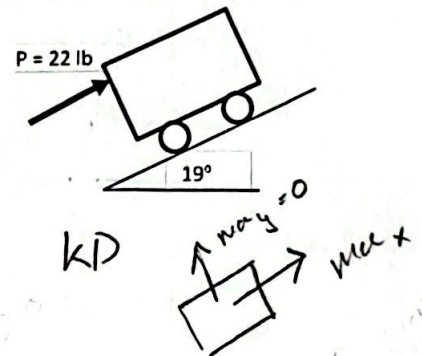
- ② A cart with wheels that roll freely (no friction) is pushed up a hill with force, P . If the cart accelerates at 1.2 ft/s^2 , what is the weight of the cart? (FBD = KD required)



$$P = 22 \text{ lb}$$

$$\theta = 19^\circ$$

$$a = 1.2 \text{ ft/s}^2$$

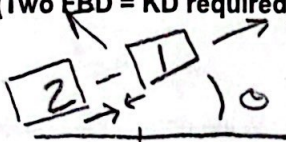


$$P - W \sin \theta = a = 1.2$$

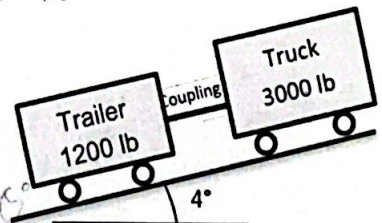
$$P - W = m a_y = 22 - 32.2 = 1.2$$

- ③ A truck is pulling a trailer up a hill. The truck has a tractive force of 500 lb. Determine the force in the coupling between the truck and the trailer. (Two FBD = KD required)

FBD



acceleration = whole system
coupling = trailer

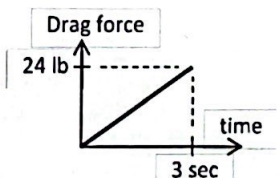
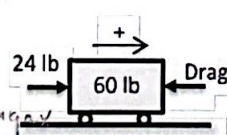
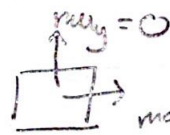
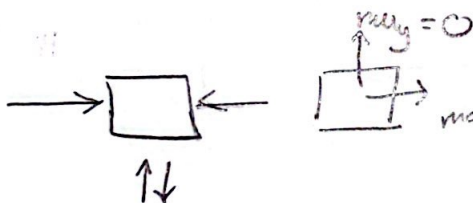


$$a = T_F - W \sin \theta = m a_x$$

$$W = 1200 \text{ lb}$$

$$m a_y = \frac{1200}{32.2} (2.22) + 1200 \sin 4^\circ = 165 \text{ lb}$$

4. A 60 lb cart is moving at $+6 \text{ ft/s}$. A 24 lb constant push force is applied to the cart. There is a drag force that varies as shown. Determine the velocity of the cart after 3 seconds. (FBD = KD required)



$$V_f = 44.64$$

$$\frac{24}{3} (3)$$

$$\frac{60}{32.2} = V_f$$

$$= 20.64$$