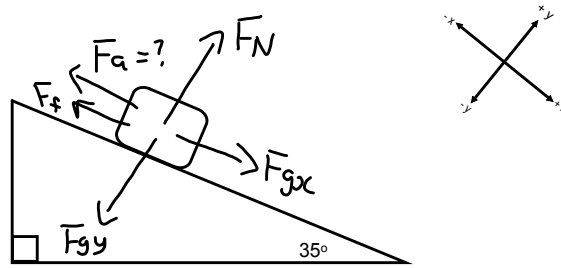


1. A 55 kg block is sliding down an incline. The coefficient of kinetic friction is 0.13 and the incline makes an angle of 35° with the ground. What applied force up the ramp is necessary so the block accelerates with a magnitude of 0.83 m/s^2 down the ramp?



$$F_{netx} = \sum \text{Forces}$$

$$F_{netx} = ma_x$$

$$ma_x = F_a + F_f + F_{gx}$$

$$(55)(0.83) = F_a + F_f + F_{gx}$$

$$F_f = \mu F_N$$

$$\hookrightarrow F_N = F_{gy}$$

$$F_N = mg \cos \theta$$

$$F_N = (55)(9.81) \cos 35$$

$$F_N = 442 \text{ N}$$

$$F_f = (0.13)(442) = \underline{57.5 \text{ N}}$$

$$F_{gx} = mg \sin \theta$$

$$= (55)(9.81) \sin 35 = \underline{309 \text{ N}}$$

$$(55)(0.83) = F_a + (-57.5) + (309)$$

$$45.7 = F_a + 251.5$$

$$\boxed{-206 \text{ N} = F_a}$$

Attachments

ramp-forces-and-motion_en.jar