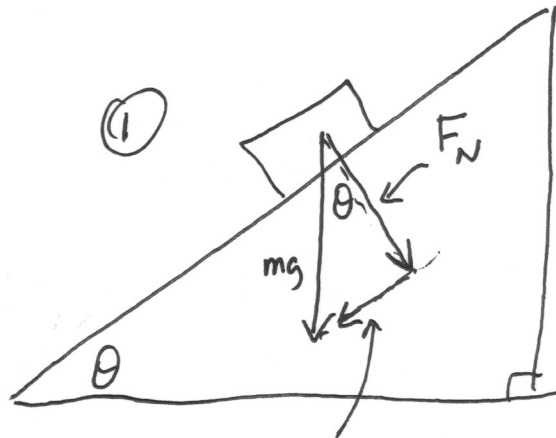
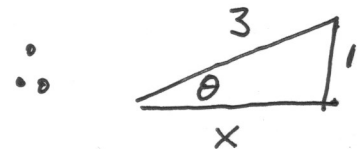


A mass of 0.50 kg rests on a rough plane. The coefficient of friction between the mass and the plane is $\frac{1}{\sqrt{2}}$, and the plane is inclined at an angle θ to the horizontal such that the $\sin \theta = 1/3$. Investigate the motion of the mass when it experiences a force of 6.0 N up the plane along a line of greatest slope.



$$\mu = \frac{1}{\sqrt{2}} \checkmark$$

$$\sin \theta = \frac{1}{3} \checkmark$$



$$\therefore x^2 + 1 = 9$$

$$x = \sqrt{8} = 2\sqrt{2}$$

$$\therefore \cos \theta = \frac{2\sqrt{2}}{3}$$

(3)

$$F_d = mg \sin \theta$$

$$= (0.5)(9.8)(1/3)$$

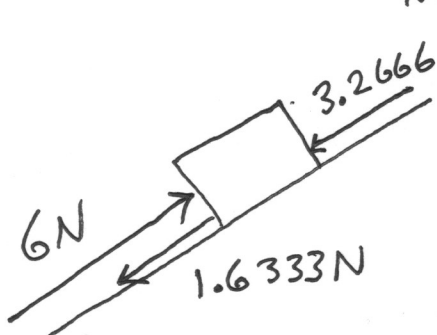
$$= \underline{1.6333 \text{ N}}$$

(4)

$$F_f = \mu \underbrace{mg \cos \theta}_{F_N}$$

$$= \mu (0.5)(9.8) \frac{2\sqrt{2}}{3}$$

$$= \frac{1}{\sqrt{2}} (0.5)(9.8) \frac{2\sqrt{2}}{3} = \underline{3.2666}$$



(5)

$$F_{\text{net}} = 6 - 3.2666 - 1.6333$$

$$= \underline{1.1 \text{ N}}$$

(6)

$$\therefore F_{\text{net}} = ma$$

$$1.1 = 0.5a$$

$$a = 2.2 \text{ m/s}^2 \text{ up incline}$$