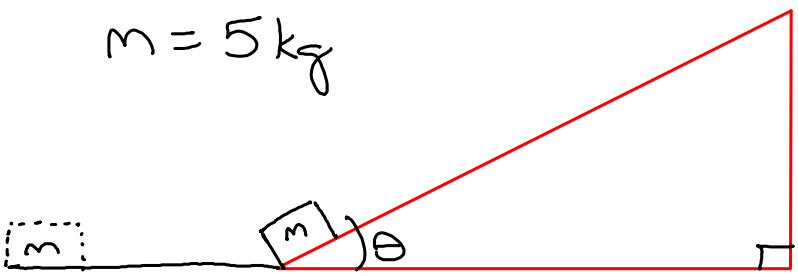
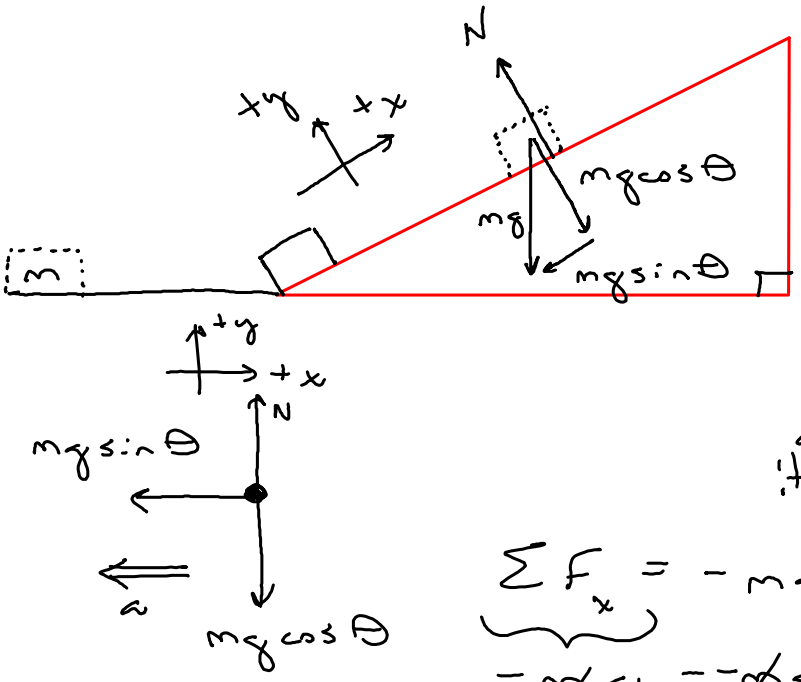


A block slides on a frictionless flat surface at 10 m/s. It then encounters a frictionless incline elevated 20° above the horizontal. How far up the incline does it travel before it changes direction? How long does this take?



A block slides on a frictionless flat surface at 10 m/s. It then encounters a frictionless incline elevated 30° above the horizontal. How far up the incline does it travel before it changes direction?

$$\underbrace{\Sigma F_x}_{-ma} = -mg\sin\theta$$

$$-ma = -mg\sin\theta$$

$$a = g\sin\theta = (9.8\ m/s^2)\sin 30^\circ$$

$$= 3.350\ m/s^2$$

be careful... $\vec{a} = -3.350\ m/s^2\,\hat{x}$

so... $a = -3.350\ m/s^2$ and $v_0 = +10\ m/s$

$$a = \frac{\cancel{v} - v_0}{t} \Rightarrow \boxed{t = \frac{-v_0}{a}}$$

$$= \frac{-10\ m/s}{-3.350\ m/s^2} = \boxed{2.983\ s}$$

$$x = \frac{\cancel{v^2} - v_0^2}{2a} = \frac{-(10\ m/s)^2}{2(-3.350\ m/s^2)} = \boxed{14.916\ m}$$

$$x = v_0 t + \tfrac{1}{2} a t^2 = \left(10\ \tfrac{m}{s}\right)(2.583) + \tfrac{1}{2}\left(-3.352\ \tfrac{m}{s^2}\right)(2.583\ s)^2$$

$$= 14.916\ m$$

FRICTION: A simple case

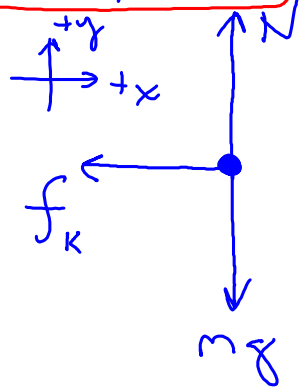
a child kicks a block such that its initial velocity is v_0.

Kinetic friction: "moving" friction

$f_K \equiv$ force of kinetic friction

$\mu_K \equiv$ coefficient of kinetic friction

$$f_K = \mu_K N$$



$$\Sigma F_y = N - mg$$

$$0 = N - mg$$

$$N = mg$$

$$\Sigma F_x = -f_K$$

$$-ma_x = -\mu_K N$$

$$\cancel{m} a_x = \mu_K \cancel{m} g \Rightarrow a_x = \mu_K g$$

let's say $\mu_K = 0.2$

$$a_x = (0.2)(9.8\ m/s^2)$$

$= 1.96\ m/s^2$

$$\vec{a} = -1.96\ m/s^2\ \hat{x}$$

Thursday, February 04, 2010
10:53 AM

HOMEWORK

- Scan that's due 5FEB10
- finish PEARSON
- HRW Chapter 6 PROBLEMS
  #'s 3, 4, 7
  (5) (2) (7)