

Last Name _____

First Name _____

Student number _____

MIE 200F - Quiz number 3 - October 5/98
quiz duration = 20 minutes

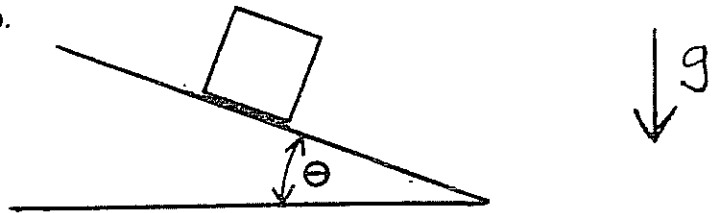
A block of mass 8 kg is sliding down a slope that is inclined at an angle θ . Find the maximum value of θ for which the block will slow down, and eventually stop.

$$g = 9.81 \text{ m/s}^2$$

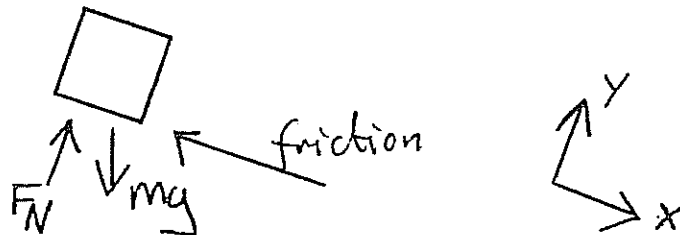
$$\mu_k = 0.25$$

$$\mu_s = 0.35$$

$$\text{mass} = 8 \text{ kg}$$



Answer



(a) Sum of normal forces = 0
 $\Rightarrow F_N = mg \cos \theta$

(b) sliding body \Rightarrow kinetic friction = $\mu_k F_N$

(c) At max value of θ , $\Sigma F_x = 0$ *

$$-\mu_k F_N + mg \sin \theta = 0$$

$$\cancel{mg} \sin \theta = (\mu_k)(\cancel{mg} \cos \theta)$$

$$\mu_k = \tan \theta = 0.25$$

$$\theta = \tan^{-1}(0.25) \approx 14^\circ$$

10

6

(-3 if you thought this was a static problem!)