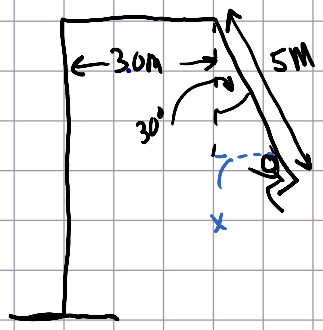
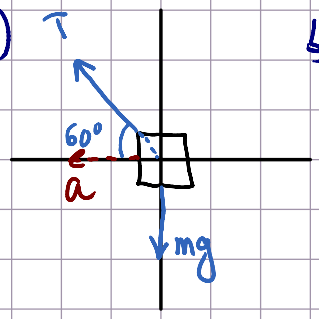
PHYS 1111
Homework 7
Chapter 6 Problems 5, 10
Chapter 7 Problems 2, 8, 19

Sunday, November 06, 2011
12:51 PM



a)



b) $\cos(60^\circ) = \frac{x}{5m}$

$x = (5\,m)\cos(60^\circ) = 2.5$

$v = \frac{2\pi r}{t}$

$t = \frac{2\pi r}{v}$

need v!

$\Sigma F_x = ma$ $\qquad$ $\Sigma F_y = 0$

$-T\cos(60^\circ) = -ma$ $\qquad$ $T\sin(60^\circ) - mg = 0$

$\frac{mg}{\sin(60^\circ)}\cos(60^\circ) = ma$ $\qquad$ $T = \frac{mg}{\sin(60^\circ)}$

c) N_0

$a = \frac{g}{\tan(60^\circ)} = \frac{9.8\,m/s^2}{\tan(60^\circ)}$

$a = 5.658\,m/s^2$

$a = \frac{v^2}{r} \Rightarrow v = \sqrt{ar}$

$v = \sqrt{(5.658\,m/s^2)(5.5m)}$

$v = 5.58\,m/s$

$T = \frac{2\pi(5.5m)}{5.58\,m/s} = 6.19s$

Chapter 6 Problem 10

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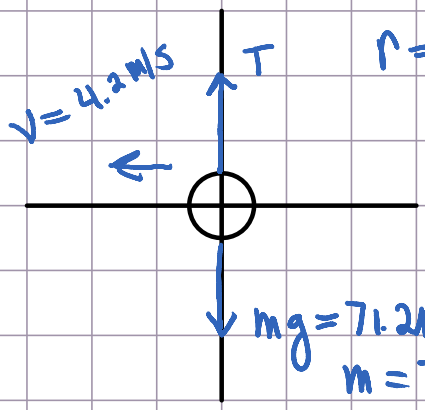

$r = 3.8\,m$

$m = 7.265\,kg$

a) $a = \frac{v^2}{r} = \frac{(4.2\,m/s)^2}{3.8\,m} = 4.64\,m/s^2$

b) $\Sigma F_y = ma$

$T - mg = ma$

$T = mg + ma$

$T = (7.265\,kg)(9.8\,m/s^2 + 4.64\,m/s^2)$

$T = 105\,N$ //

Chapter 7 Problem 2

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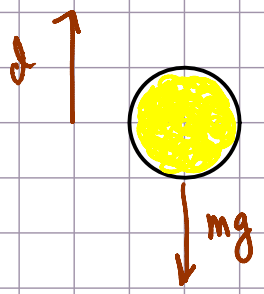

a) $W = Fd\cos\theta$

$W = (mgd)\cos(180^\circ)$

$W = (.058kg)(9.8m/s^2)(12m)(-1)$

$W = -3.51J$

b) $W = Fd\cos\theta$

$W = mgd\cos(0)$

$W = 3.51J$

Chapter 7 Problem 8

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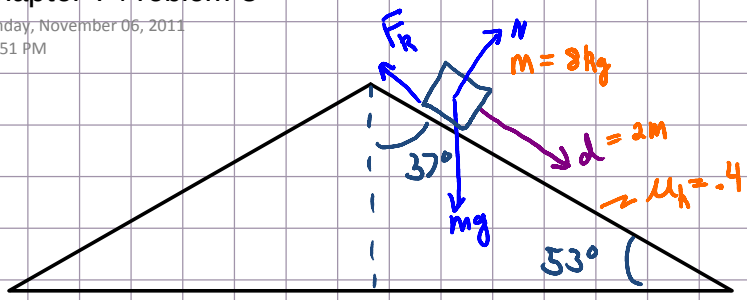

a) $W_f = F \cdot d \cos\theta$

$W_f = \mu_k N d \cos(180°)$

$W_f = -\mu_k [mg \sin(37°)] d$

$W_f = -.4(8kg)(9.8m/s^2)\sin(37°)(2m)$

$W_f = -38J$

b) $W_N = F \cdot d \cos\theta$

$W_N = N \cdot d \cos(90°) = 0$

c) $W_g = Fd\cos\theta$

$W_g = mgd\cos(37°)$

$W_g = (8kg)(9.8m/s^2)(2m)\cos(37°)$

$W_g = 125J$

d) $W_{tot} = W_f + W_N + W_g = 87J$

Chapter 7 Problem 19

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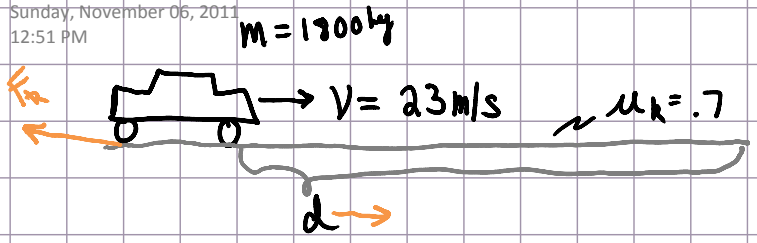

a) $W = \Delta KE$

$F \cdot d \cos\theta = KE_f - KE_i$ ($KE_f \to 0$)

$\mu_k N d \cos(180°) = -\frac{1}{2} m v_i^2$

$+\mu_k mg d = +\frac{1}{2} m v_i^2$

$$d = \frac{v_i^2}{2\mu_k g} = \frac{(23\,m/s)^2}{2(.7)(9.8\,m/s^2)}$$

$d = 38.6\,m$

b) $V \to 2V$ $d \to 4d$

c) Heat.