Physics 2011  
Fall 2008  
Homework #7  
Due Wednesday, 22 October at the BEGINNING of class!

For all of these problems, I would like you to state the problem (in your own words), draw any appropriate figures or diagrams, and state your answers in the form of a complete sentence!

Please make a concerted effort to solve these problems symbolically, leaving numbers out until the very last step! Again, this approach may seem harder at first, but the sooner you adopt this technique the better off you’ll be.

1. Revisit Homework #3: Consider the following situation: you fire a tennis ball off the roof of a building of height $h$, with initial velocity magnitude $v_0$ and angle $\theta$. Show that the final velocity magnitude with which the ball hits the ground is independent of $\theta$. Do this problem within the context of energy conservation by deriving an expression for the final velocity in terms of the problem parameters. This should take about two lines. Ignore air drag.

Book problems:  Chapter 7:  57  
Chapter 8:  6, 17, 28, 43

Extra credit (up to 5 points): Visit the gym some time this week, and pick a cardio machine (i.e. rowing, running, cycling, stairmaster, etc). Document your power output at a few paces, and roughly how long you’re able to maintain them. Estimate the amount of work you do during a particular exercise. Where appropriate, scale the results to make an estimate of what magnitude of force you are applying to the machine. See the example I posted (‘Rowing’) as an example of a fairly thorough analysis. Note: Please turn this in separately from the homework! I will grade these- not the grader.