Physics I (PHYS 200): PS 2

Reading:

HRW Chapter 5: As I mentioned in class our approach to mechanics differs from the book. We discuss Newtonian force laws *before* vectors. So chapter 5 mentions vectors, which we haven't addressed yet. The good news is that little in chapter 5 depends on vectors. *For now* skip Checkpoint 1, equation (5-2) and the sample problems 5.02,5.03,5.04, and 5.05. The rest of the chapter doesn't require knowledge of vectors. (Looking ahead we will discover that forces and accelerations are "vectorial", that is have direction.)

HRW Chapter 3: We start on vectors Monday. Please read this chapter before next week (starting September 9).

Problems:

Due in class Friday, September 13.

(1) HRW Chapter 2 Problem 72
(2) Derive $v^2 = v_o^2 + 2a(x - x_o)$, which is valid when acceleration is constant.
(3) HRW Chapter 5 Question 7 For more on the history of the Hyatt walkway collapse here's a link to wikipedia's page.
(4) HRW Chapter 5 Problem 25
(5) HRW Chapter 5 Problem 29
(6) HRW Chapter 5 Problem 43
(7) HRW Chapter 5 Problem 51
(8) HRW Chapter 5 Problem 58
(9) HRW Chapter 5 Problem 93
(10) A person jumps from a tree, starting 3.5 m from the ground. Bending knees, the person's torso decelerates over 0.70 m when landing. If the torso has a mass of 43 kg find (a) the velocity on landing, assuming that $v_o = 0$ m/s and (b) the average force exerted by the person's legs on the torso.
(11) A whale native to upstate New York starts from rest at a position $x = 0.0$ at clock time $t = 0.0$. A short time later, $t = 5.0s$, the whale is observed to have velocity $v = +11.0$ m/s and position $x = +55.0$ cm. Was the acceleration constant? Explain your reasoning. Can you find the acceleration?
(12) Two air tracks sit side by side. One is level. The other has an incline increasing to the right. Gliders start on the left end of each track. On the level track the glider has an initial velocity of 0.75 m/s. On the inclined track, the glider starts off with a velocity of 1.2 m/s. On the same plot, sketch the velocity vs. time plots for the two gliders. Do they ever have the same velocity? Explain.