Physics 151
Fall 2012
Homework Assignments

- HW #6 - Due October 5.
  
  Mastering Physics: 6 problems from chapter 5.
  
  Written Question 5.54: A 23 kg child goes down a straight slide inclined at 38° above horizontal. The child is acted on by his weight, the normal force from the slide, kinetic friction, and a horizontal rope exerting a 30 N force as shown in figure P5.54. How large is the normal force of the slide on the child?

- HW #5 - Due September 28.
  
  Mastering Physics: 11 problems from chapters 4 and 5.
**Written Question 4.50:** A student draws the flawed free-body diagram shown in Figure P4.50 to represent the forces acting on a car traveling at constant speed on a level road. Identify the errors in the diagram, then draw a correct free-body diagram for this situation.

**Incorrect diagram!**

**Written Question 5.58:** A 77 kg sprinter is running the 100 m dash. At one instant, early in the race, his acceleration is 4.7 m/s².

a. What total force does the track surface exert on the sprinter? Assume his acceleration is parallel to the ground. Give your answer as a magnitude and angle with respect to the horizontal.

b. The force is applied to one foot (the other foot is in the air), which for a fraction of a second is stationary with respect to the track surface. Because the foot is stationary, the net force on it must be zero. Thus the force of the lower leg bone on the foot is equal but opposite to the force of the track on the foot. If the lower leg bone is 60° from horizontal, what are
the components of the leg’s force on the foot in the directions parallel and perpendicular to the leg? (Force components perpendicular to the leg can cause dislocation of the ankle joint.)

- HW #4 - Due September 14.

**Mastering Physics:** 7 problems from chapter 3.

**Written Question 3.4:** For the motion diagram shown:

(a) Is the object’s average speed between points 1 and 2 greater than, less than, or equal to its average speed between points 0 and 1? Explain how you can tell.

(b) Find the average acceleration vector at point 1 of the three-point motion diagram.

![Motion Diagram]

**Written Question 3.69:** A tennis player hits a ball 2.0 m above the ground. The ball leaves his racquet with a speed of 20 m/s at an angle of 5.0° above the horizontal. The horizontal distance to the net is 7.0 m, and the net is 1.0 m high. Does the ball clear the net? If so, by how much? If not, by how much does it miss the net?
• HW #3 - Due September 7.

**Mastering Physics:** 6 problems from chapter 2.

**Written Question, 2.74:** A rocket is launched straight up with constant acceleration. Four seconds after liftoff, a bolt falls off the side of the rocket. The bolt hits the ground 6.0 s later. What was the rocket’s acceleration?

• HW #2 - Due August 31.

**Mastering Physics:** 7 problems from chapters 1 and 2.

**Written Question, 1.39:** A ball rolls along a smooth horizontal floor at 10 m/s, starts up a 20° ramp, stops after some distance, and then rolls back down. Draw the motion diagram showing the ball’s velocity vectors from its initial position until it begins to roll back down the ramp.

**Written Questions, 1.44:** For the motion diagram shown, write a one or two sentence "story" about a real object that has this motion. Your story should talk about people or objects by name and say what they are doing. Problems 34 through 40 of chapter 1 in the textbook are examples of motion short stories.
• HW #1 - Due August 24.

**Mastering Physics:** Nine introductory questions about Mastering Physics.

**Written Questions:** None.