Reading Questions from Chapter 4:
1. What objects can exert a force? 2. Is a force a vector or a scalar quantity? 3. What can you say about the forces that are required for an object to move at a constant velocity? 4. What can you say about the forces that are required for an object to remain at rest? 5. What is the difference between mass and weight? 6. What is the idea or concept that connects Newton’s second law with the kinematic equations? 7. Describe precisely what is meant by the net force on an object? 8. What is the result of a non-zero net force acting on an object? 9. If one object is pushing a second object with a certain force, with what force does the second object push back on the first? 10. Are there any exceptions to your answer to question nine? What if one object is you and the other object is a car you are pushing? 11. Is the normal force always equal to the weight of an object? Why or why not? 12. What is the difference between the coefficient of static friction, and the coefficient of kinetic friction? 13. How are vector components used when solving problems on an incline? Final Question (must be answered to receive any credit on the reading assignment): What is one thing from the reading that you didn’t understand or need clarified?

Additional Homework Problems (not Reading Questions)
(These problems must be solved using all the steps in The Competent Problem Solver)

Problem A: After a frustrating semester in physics, you decide it is time to move to the Colorado Rockies, build a log cabin, and become a ski instructor for the rest of your life. The land you are going to build the cabin on has a long, smooth hill with the site for the house on top of the hill. You will pull the logs up the hill by means of a rope attached to a winch. You need to buy a rope for this purpose, so you need to know how strong the rope must be. (Stronger ropes cost more and ski instructors don’t make a lot of money). You know that the logs have a maximum mass of 200 kg. You measure that the hill is at an angle of 30 degrees with respect to the horizontal, and the coefficient of kinetic friction between the log and the hill is 0.90. When pulling a log up the hill you will make sure the rope stays parallel to the surface of the hill and the acceleration of the log is never more than 0.80 m/s². How strong a rope should you buy?

Problem B: While visiting a friend in San Francisco you decide to drive around the city. You turn a corner and are going up a steep hill. Suddenly, a boy runs out on the street chasing a ball. You slam on the brakes and skid to a stop leaving a 50 foot long skid mark on the street. The boy calmly walks away, but a policeman watching you gives you a ticket for speeding as he points out that the speed limit is 25 mph. After calming down, you examine the situation more closely. You determine that the street makes an angle of 20 degrees with the horizontal and that the coefficient of static friction between your tires and the street is 0.80. The coefficient of kinetic friction is 0.60. Your car’s manual states that the mass of the car is 1570 kg. You have a mass of 60 kg. Witnesses say that the boy had a mass of about 20 kg and took 3.0 seconds to cross the 15 foot wide street. Will you fight the ticket?