CE 3201

Homework #2

1. Vehicle #1 skidded 150 feet and crashed into vehicle #2. Vehicle #2 was parked when vehicle #1 struck it, and test skids indicated that the coefficient of friction on this pavement was 0.80. It was further estimated that vehicle #1 was traveling at 40 mph at the moment it struck vehicle #2. (1) What was the speed of vehicle #1 at the beginning of the skid marks? (2) Assuming that the reaction time of the driver of vehicle #1 was 1.0 seconds and that he locked the wheels of vehicle #1 at the end of this time, how far was vehicle #1 from vehicle #2 at the point of perception? (3) How far did vehicle #1 skid during the first 0.5 seconds of skidding? (4) What was the speed of vehicle #1 after 1.0 seconds of skidding? (5) If vehicle #1 finally came to a complete stop 20 feet past the point of collision, what was its rate of deceleration? (6) How much time passed between the time of collision and vehicle #1 coming to a stop?

2. The combined weight of a bicycle and its rider is 190 lb, and when the rider is on the bike, their frontal area is 5.4 square feet, with a drag coefficient of 1.2. The coefficient of rolling resistance can be taken to be a constant for all speeds, equal to 0.008. If the cyclist is coasting down a 6% grade, what is the maximum speed attained?

3. Problem 3.26, p. 90, MKW