Assignment #3  
Physics 253 (Mureika)  
Due: Tuesday 20 September 2005

Answer all problems with complete solutions. Homework which gives only the final answer with no indication of how it was obtained will receive a 0. Solutions must be written clearly, and steps must be explained. Assignment will be marked on a pass/fail basis.

1. Book problem 2-3.30. An arrow is shot vertically upward and then 2.00 s later passes the top of a tree 40.0 m high. How much longer will it travel upward, and how high will it go?

2. Book problem 2.47. A car traveling at 25.0 m/s crashes into a brick wall. The front 1.00 m of the car crumples before the wreck stops moving. Find the acceleration of the driver (who also moves 1 m before coming to rest), assuming it is uniform.

3. In class we worked on problems involving free fall, and we considered three cases. These were: letting an orange drop straight down, throwing it straight down with a velocity of \( v_i = -6 \) m/s, and throwing the orange up with a velocity of +10 m/s. Sketch velocity versus time and acceleration versus time graphs for each of the three cases. Does the initial velocity affect the acceleration?

4. Find the position and velocity of a particle at \( t = 2.00 \) s if the particle is initially moving in the \(+x\)-direction at a speed of 20.0 m/s and experiences an acceleration of 4.0 m/s\(^2\) in the \(-y\) direction.