Practice Midterm 2

1. A car travels on a curved bank at an angle θ such that friction is not required to keep the car from sliding down the bank. Determine the angle θ if the car has mass 1500 kg and travels at 30 m/s on a road with radius of curvature 50m.

2. The lunar module could make a safe landing if its vertical velocity at impact is 3.0 m/s or less. Suppose that you want to determine the greatest height h at which the pilot could shut off the engine and still make a safe landing if the velocity of the lander relative to the surface of the moon is a) zero, b) 2.0 m/s downward, c) 2.0 m/s upward. Determine h in each case. The gravitational acceleration on the surface of the moon is g=1.62 m/s^2.

3. Consider a sattelite in a circular orbit around the earth. What is the ratio of the escape velocity to the orbital velocity?

4. A particle moves with momentum $\vec{p}$. What is its kinetic energy?

Solutions will be posted at `http://tonic.physics.sunysb.edu/~thomas` on sunday.