Practice Problem Class:

1. A bird is flying due east. Its distance from a tall building is given by $x(t)$ = (1.0 m/s^3) t^3 − (10.0 m/s) t + 100.0 m.
   Is the bird flying with constant acceleration? What is the instantaneous velocity and instantaneous acceleration of the bird when t = 5 s?
2. Trace the motion of the bird in the above problem.
3. Show that for a projectile motion the maximum range covered is equal to four times of its maximum height attained. (Rmax=4H).
4. An elevator cab that weighs 27.8 kN moves upward. What is the tension in the cable if the cab's speed is (i) increasing at a rate of 1.22 m/s^2 and (ii) decreasing at a rate of 1.22 m/s^2 ?
5. A force acts on a block weighing 45 N. The block is initially at rest on a plane inclined at angle θ = 15° to the horizontal. The positive direction of the x axis is up the plane. Between block and plane, the coefficient of static friction is μs = 0.50 and the coefficient of kinetic friction is μk = 0.34. In unit-vector notation, what is the frictional force on the block from the plane when $\vec{P}$ is −5.0 N.
6. Solve the above problem for μs = 0.11 and $\vec{P}$ is 5.0 N.