Attendance quiz for Lecture 24

Name:

1. For a certain particle, moving in a straight line, the rate of change of the acceleration is 6 $meters/sec^3$. At the very beginning its velocity and acceleration are 0 $meters/sec$ and 0 $meters/sec^2$ respectively. How far from the starting point is the particle after 10 seconds.

Ans.: The particle is at a distance meters from the starting point.

2. A ball is thrown vertically, from the ground up, at a speed of 5 meters per second.

(Assume no air resistance, and Take g to be 10 $meters/sec^2$, rather than the more precised 9.81)

Reminders from physics 101: $F = ma$; The force of gravity of a particle of mass m is mg pointed towards the center of the earth (and hence towards the ground).

(i) Set up a differential equation, and initial conditions, for $x(t)$, its height from the ground until it goes back to the ground.

(ii) How long will it take until it is back to the ground?