Assignment IV, FYSE 130
Fall 2014
Due 9/12/14 at start of class

Remember, work out and submit your answers on a separate piece of paper, and organize the solutions carefully!

1. Back in 1971, Astronaut Al Shepard hit a golf ball on the surface of the moon. It was awkward for him to hit the ball (with his space-suit on, it is hard to get a decent swing), but he estimated the ball went 200-400 yards anyway. Assume you are able to hit a golf-ball 250 yards on Earth. How far could you hit it under identical conditions on the moon? (g on the moon is about 1.62 meters per second squared).

2. A volleyball player spikes a volleyball. The ball is spiked at a speed of 60 miles per hour. The ball is struck 9.5 feet above the ground, and is hit at an angle 50 degrees below the horizontal. Assume air resistance is ignorable (though this is really quite questionable in the case of a volleyball).

   a) How long does the opposing player have to dig the ball before it hits the ground?

   b) Assuming the ball was hit right at the net, how far horizontally from the net will the ball hit the ground?

3. A baseball batter hits a ball that comes off the bat at an angle of 32 degrees. The ball is moving at 43 m/s as it leaves the bat. You may assume the batter hits the ball from ground level.

   a) Assuming no air resistance, how far from the batter would this hit land? Leave your answer in feet. (You'll get an unrealistically large answer; that's because air resistance really isn't totally negligible here).

   b) The center field fence is 420 feet from home plate. The fence is twenty feet tall. Assuming no air resistance, will this baseball clear the fence for a home-run? (Support your answer with calculations.) (This isn't that easy to do).