Physics Name: _____

Spreadsheet Analysis

Use your projectile spreadsheet to solve the problems below. Do work on a blank piece of paper.

1. Find the maximum height and range for a football kicked at a 37° angle with a speed of 39.3 m/s. Is this a realistic kick?

2. How high will a bullet fired from the ground at 56° with a speed of 1,250 ft/s travel? How far will it go if it is fired from 5.5 ft above the ground (eye level)?

3. What is the range of a cannonball fired horizontally with a speed of 43.3 m/s from the side of a ship that is 15 ft above the surface of the water?

4. Redo #1 above with the values of acceleration of gravity on the Moon (g = 1.67 m/s/s); on Jupiter (g = 23.0 m/s/s).

5. In the lab, you launch a projectile at 4.95 m/s, at an angle of 79°, from a height of 118 cm.

   a.) Find the range of the shot. Change the angle to 11° what do you notice?
   b.) Redo the problem with an initial velocity of 4.45 m/s (about 10% difference) to see what difference that small change in velocity will make. What is the % difference from your previous answer?
   c.) Redo the problem from an initial height of 120 cm (about 10% difference). What is the new range? What is the % difference the previous range?
   d.) Redo the problem with an angle of 81° (about a 10% difference). What is the new range? What is the % difference between this answer and your first answer?
   e.) Study your results from a through d, which initial condition was the biggest factor in your projectile launch lab?

6. Find the range and hang time of a soccer ball kicked from the ground at an angle of 21° with a initial speed of 26.1 m/s. Now change the angle to 69° how do your answers compare?

7. Find the angle that yields a **maximum range** for a projectile launched with a speed of 16.6 m/s from a height of 15.5m. Is it what you expected?

8. Evil K'Nevil (a stunt man from the 70's) rides a motor cycle at 95 mph off a ramp of angle 30°. If the ramp end is 10 ft above the ground how far will he go? Will he clear 20 busses that are 10 feet wide each? What angle/speed combo would give him a SAFE jump (you may want to be conservative).

Extensions:

1. Check your lab calculations with your spreadsheet. Take your data and change the initial speed, the height, and the angle by reasonable amounts for the equipment used in the lab. Determine how much these errors in measuring would effect your data.

2. Check your *Homework Set* answers with your spreadsheet.