Name _____ Hour _____

Tennis Ball Lab

10 pts: Due at the end of the hour!

Purpose: Projectile motion is involved in all types of sports. In this lab you will be using physics to Understand the flight of a tennis ball out of a tennis ball launcher.

Data: Take as a class

Part I: Given the time and the Δx, **determine the velocity (V)** of the tennis ball as it leaves the launcher.

Δx= _20.9____ and full Δt= ____1.30_____

1. Solve V_x
2. Solve V_{iy} (use Δt at ½ way point!)
3. Solve V

Each group should work at a separate table in the commons for Part II.

Part II: Given a new angle (our angle = __28__°) and the velocity you just calculated, determine where you should stand to catch the tennis ball. Make sure to use the GUE. Everyone needs the problem worked out with all work shown. When you are all ready, let your teacher know, and you will try it!

1. Solve Vx and Viy
2. Solve Δt at the ½ way point
3. Solve for Δx using the full Δt

Mrs. B's initials

OK

***Let Mrs. B know when you are ready, and you will try to catch it! I will Fire 3 balls at you....someone needs to catch 1.**

You may not move your feet!

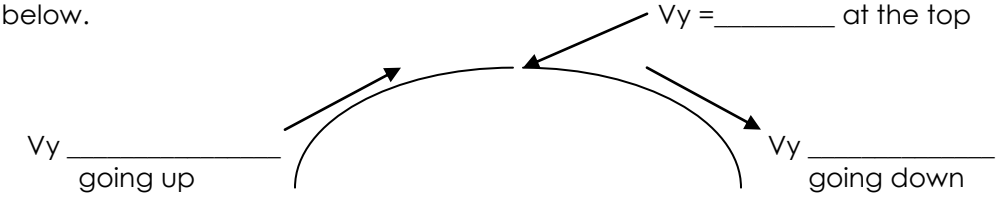
If you catch 3/3, you each will receive a sticker☺

Name _____ Hour _____

Questions after the lab:

1. What happens to the horizontal velocity (v_x) during the flight of the ball? **WHY**?

2. What happens to the vertical velocity (v_y) throughout the ball's flight? Label on the **sketch** below.



3. a) You throw a baseball and it lands 80 meters away 3.2 seconds later. How fast (v) did you throw it in **mph**? ***Show your work!*** (Find Vx and Viy first, then V!) (66 mph)

b) What was the maximum height of the ball during its flight? *(12.5 m)*

c) At what angle was the baseball thrown?

Challenge Problem: Solve this by the end of the hour for a sticker. Show all work!

Let's say Mrs. B took the tennis ball launcher to the roof which is 30 **feet** high (change this to meters!) and shot it off the edge at 17.5 m/s at 38° N of E. What would be the **velocity of the ball** right before it hit the ground? (Find Vx and Viy, then Δt and Δy. Add the Δy's together and use $V_f^2 = V_i^2 + 2a\Delta y$ to find Vf at bottom)