Projectile Project

Name______________________

Date_______________

You will take a data set and determine the quadratic equations for a particular balloon launch of your choosing. You will then graph the equation. The goal of the project is to calculate the maximum height of the ball and the time at which it reached that maximum height. Here are a few things that might help you.

- We will assume no air resistance. That means that the initial horizontal velocity stays constant throughout the flight.
- $gravity = -32\ \frac{ft}{sec^2} = -9.81\frac{m}{sec^2}$
- Can you figure out the vertical initial velocity if you know the horizontal velocity using special triangles or trigonometry?

In your project you will be required to answer the following questions.

- What is the average horizontal velocity of the ball? What is the initial velocity? (Assume initial horizontal velocity = average horizontal velocity).
- What is the initial vertical velocity of the balloon? (use special triangles or trigonometry). Do this using the horizontal velocity you calculated from the distance and the time. Also do this using the velocity determined by the speed gun.
- What is the initial height of the balloon?
- What is the equation that models the flight of the balloon? Those on the right hand side of the room, please make this calculation using the horizontal velocity. Those on the left-hand side of the room, please make this calculation using the measured velocity of the balloon (hypotenuse).
- What is the maximum height of the balloon?
- At what time did the ball reach its maximum height?

You may do your calculations in metric or English units. You will be graded on the following criteria.

_____ **Math:** I show all my properly completed work and label it correctly. I use the correct terms to show I understand how the math works.

_____ **Strategy**: I show all the steps I used to solve the problem. I show an accurate graph of height vs. time that simulates the flight of the ball. The graph is properly labeled (with units) and titled. The graph is either beautifully drawn or completed using an app such as TI-Nspire.

_____ **Explanation:** I write what I did and why I did it. I explain all parts of diagrams or pictures I used.

_____ **Extra Work:** You know the drill. It must be mathematical and it must relate to projectiles.