Math 2 Name _____

Quadratics Date _____ Per _____

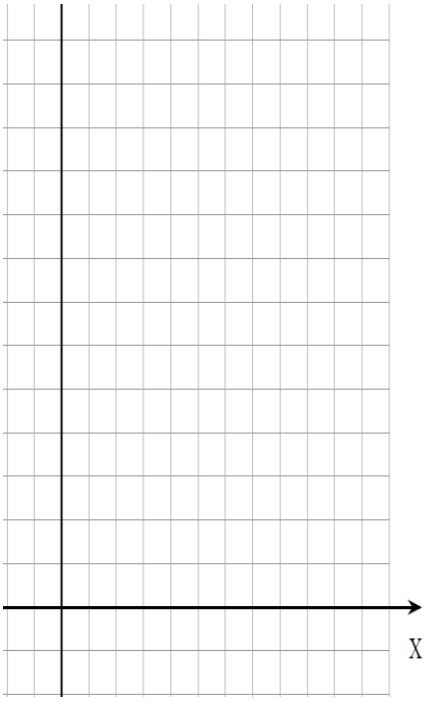
1. Suppose a compressed air cannon fires a pumpkin straight up into the air from a height of 35 feet and provides an initial velocity of 75 feet per second. What function rule would combine these conditions and the effects of gravity to give a relation between the pumpkin's height h in feet and its flight time t in second?

a. Using your function rule from above find the height of the pumpkin after 2 seconds of flight.

b. Using your function rule from above find the height of the pumpkin after 5 seconds of flight.

2. Suppose that you were able to use a ranging tool that records the height of a flying pumpkin every half second from the time it left cannon. A sample of the data for one pumpkin launch appears in the following table. Plot the data on a graph and find the values for h_0 and v_0 that model the path of the pumpkin.

Time in Seconds	0	0.5	1.0	1.5	2.0	2.5	3.0
Distance in Feet	10	30	45	50	45	35	15



3. Use a calculator that offers quadratic curve fitting to find a quadratic model for the sample data pattern. Compare that automatic curve-fit to what you found with your own experimentation.

4. The pumpkin's height in feet t seconds after it is launched will still be given by $h = h_0 + v_0 t - 16t^2$. It is fairly easy to measure the initial height (h_0) from which the pumpkin is launched, but it is not easy to measure the initial upward velocity (v_0).

a. Suppose that a pumpkin leaves a cannon at a point 15 feet above the ground. Using a stopwatch, you record that the pumpkin hits the ground after 5.5 seconds of flight. Using this information find the initial upward velocity of the pumpkin.

b. Write the function rule for the path of the pumpkin.

c. How high in the air is the pumpkin after 2 seconds? 4 seconds?

5. The opening of a cannon is 30 feet above the ground. The daredevil, who is shot out of the cannon, reaches a maximum height of 32 feet after about 0.4 seconds. Use this information to answer the following questions.

a. Find the initial upward velocity of the daredevil.

b. Write an equation that models the path of the daredevil's flight.

c. What is the height of the daredevil after 1 second?