Name: _____

4.2.D1 – Modeling with Quadratic Functions

Past due on: _____ Period: _____

1. For a science competition, students must design a container that prevents an egg from breaking when *dropped* from a height of 50 feet.
   a. Write a vertical motion model that represents this situation.
   b. How long does the container take to hit the ground?

2. A cliff diver dives off a cliff 40 feet above water.
   a. Write a vertical motion model that represents this situation.
   b. How long is the diver in the air?

3. In a football game, a defensive player jumps up to block a pass by the opposing team's quarterback. The player bats the ball downward with his hand at an initial velocity of -50 feet per second when the ball is 7 feet above the ground.
   a. Write a vertical motion model that represents this situation.
   b. How long do the defensive player's teammates have to intercept the ball before it hits the ground?

4. You throw a ball to your friend. The ball leaves your hand 5 feet above the ground and has an initial velocity of 50 feet per second. Your friend catches the ball when it falls to a height of 3 feet.
   a. Write a vertical motion model that represents this situation.
   b. How long is the ball in the air?

5. A toy rocket is launched vertically from ground level with an initial velocity of 128 feet per second.
   a. Write a vertical motion model that represents this situation.
   b. When will the rocket be 112 feet above the ground?
   c. When does the rocket reach its maximum height?
   d. Identify a reasonable range for the given scenario.

6. While marching, a drum major tosses a baton into the air at an initial velocity of 32 feet per second from a height of 6 feet and then catches it.
   a. Write a vertical motion model that represents this situation.
   b. How high does the baton go?

7. A science class designed a ball launcher and tested it by shooting a tennis ball straight up with an initial velocity of 144 feet per second from the top of a 15-story building (160 feet).
   a. Write a vertical motion model that represents this situation.
   b. What is the maximum height of the ball?
   c. Identify a reasonable domain for the given scenario.