Name: _____ **Unit 8:** Quadratic Equations

Date: _____ **Bell:** _____ **Homework 14:** Projectile Motion

1. When a cannonball is fired, the equation of its pathway can be modeled by $h = -16t^2 + 128t$.

a) Find the maximum height of the cannonball.

b) Find the time it will take for the cannonball to reach the ground.

2. When Joey dives off a diving board, the equation of his pathway can be modeled by $h = -16t^2 + 15t + 12$.

a) Find Joey's maximum height.

b) Find the time it will take for Joey to reach the water.

3. A toy rocket is launched from a platform that is 48 feet high. The rocket's height above the ground is modeled by $h = -16t^2 + 32t + 48$.

a) Find the maximum height of the rocket.

b) Find the time it will take for the rocket to reach the ground.

4. At the end of the school year, Rachel and Amber threw their Algebra textbooks off the top of a 12-story building. The equation of the pathway of each book is given below. By how many seconds does Rachel's textbook beat Amber's textbook to the ground?

Rachel: $h = -16t^2 + 36t + 160$ Amber: $h = -16t^2 + 50t + 160$

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5. April shoots an arrow upward at a speed of 80 feet per second from a platform 25 feet high. The pathway of the arrow can be represented by the equation $h = -16t^2 + 80t + 25$, where h is the height and t is the time in seconds. What is the maximum height of the arrow?

A. 80 feet
B. 90 feet
C. 125 feet
D. 140 feet

6. A rock is dropped from bridge 320 feet above a river. The pathway that the rock takes can be modeled by the equation $h = -16t^2 + 320$. How long will it take the rock to reach the river?

A. 2.5 sec
B. 3.5 sec
C. 3.8 sec
D. 4.5 sec

7. Natalie found a tennis ball outside a tennis court. She picked up the ball and threw it over the fence into the court. The path of the ball can be represented by the equation $h = -16t^2 + 18t + 5$.

a. Find the maximum height of the tennis ball. **b.** How long will it take to reach the ground?

8. A circus acrobat is shot out of a cannon with an initial upward speed of 50 ft/s. The equation for the acrobat's pathway can be modeled by the equation $h = -16t^2 + 50t + 4$.

a. Find the maximum height of the acrobat. b. How long will it take to reach the ground?