Applications of Quadratic Functions Worksheet

Name _____

Solve each problem as indicated.

1. An object is dropped from the top of a building. The building is 480 feet tall. The function **f(t) = -16t² + 480** gives the height of the object after *t* seconds of falling. How long will it take the object to reach the ground?

2. The initial upward velocity of a volleyball is 6 meters per second when leaving the server's hand 1.5 m above the floor. A model for the vertical motion of a projected object is given by the equation $h = -4.9t^2 + vt + s$, where *h* is the height in meters, *t* is the time in seconds, *v* is the initial velocity in meters per second, and *s* is the starting height of the object in meters. If nobody else touches it, when will it hit the floor?

3. The height in feet of a rocket after t seconds is given by the equation $h(t) = 256t - 16t^2$. After how many seconds will the rocket return to the ground?

4. A rocket is launched with an initial velocity of 107 feet per second from the top of a cliff 63 feet high. Its height is described by $h(t) = -16t^2 + 107t + 63$. How long will the rocket take to hit the ground?

5. A rock is thrown skyward from a cliff. The vertical distance in feet between the ground and the rock *t* seconds after it is thrown can be determined by the equation $d(t) = -16t^2 - 6t + 482$. How long will the rock take to hit the ground?

6. At a baseball training camp, a computer system plots the paths of balls hit during sessions at the batting cage and generates equations for those paths. The path of a ball hit by David is described the equation $h(t) = 48 + 4t - 4t^2$ Find how long it would take the ball to hit the ground in an open field.

7. A baseball throwing machine is being used to help players catch pop flies. The machine shoots the ball straight in the air. The height of the ball after t seconds is found by the function **h(t) = -16t² + 48t + 4**. After approximately how many seconds does the ball reach its maximum height? What is the maximum height the ball reaches?

8. The height in feet of a rocket after t seconds is given by the function **h(t) = -16t² + 256t**. After how many seconds does the rocket reach its maximum height? What is the maximum height?

9. The height (in feet) of a ball thrown by a child is given by: $y = -\dfrac{1}{2}x^2 + 2x + 4$, where x is the horizontal distance (in feet) from where the ball is thrown. How high is the ball when it leaves the child's hand? (find y when x = 0). How high is the ball when it is at its maximum height? How far from the child does the ball land? (x value when y = 0)

10. The path of a diver is given by $y = -\dfrac{4}{9}x^2 + \dfrac{24}{9}x + 12$ where y is the height in feet and x is the horizontal distance from the end of the diving board in feet. What is the maximum height of the dive?

11. Punted Football   The height of a punted football can be modeled with the quadratic equation **h = -0.01x² + 1.18x + 2**. The horizontal distance in feet from the point of impact with the kicker's foot is **x**, and the height of the ball in feet is **h**.

a. Find the vertex of the graph of the function.

b. What is the maximum height of the punt?

c. The nearest defensive player is 5 ft horizontally from the point of impact. How high must the player reach to block the punt?