

NOTES: QUADRATIC Applications

Vertical Motion Model

$$h = -16t^2 + vt + s$$

ending height

velocity

time in seconds

starting height

What Points Should I Find on the Graph?

(x, y)

maximum height, y, of golf ball after x seconds

(x, y) At what time, x, did the object reach a height, y, of 10 feet?

(x, y) At what time, x, will the ball hit the ground?

Application Problems

1. A golf ball is hit from the ground with an initial velocity of 100 feet per second. The equation $h = -16t^2 + 100t$ gives the height of the ball after t seconds.



- a. What is the maximum height of the ball?

- b. At what time will the ball reach its maximum height?

- c. How long will it take for the ball to reach the ground?

2. At the last fourth of July celebration, Caleb fired fireworks vertically into the air at an initial velocity of 75 feet per second. The equation for the height, h , of the firework after t seconds can be modeled by $h(t) = -16t^2 + 75t$.



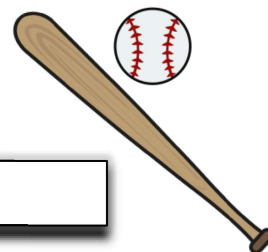
- a. At what time will the firework reach its maximum height?

- b. At what time was the firework 20 feet above the ground?

Application Problems Continued

c. How long will it take for the firework to reach the ground?

3. A baseball is thrown from the stands onto the field that is 20 feet below. The ball's height above the ground is modeled by $h(t) = -16t^2 + 28t + 20$.



a. What is the maximum height of the baseball?

b. After how many seconds will the ball reach the ground?

c. What will the height of the ball be after 1.5 seconds?