

## Unit 2 Day 3 Min/MAX Quadratic Applications - HOMEWORK

Solve these application problems. To find **min/max**...use the vertex.

- An arrow is shot upward with an initial velocity of 64 feet per second. The height of the arrow  $h(t)$  in terms of the time  $t$  since the arrow was released is  $h(t) = -16t^2 + 64t$ .
  - What is the maximum height the arrow achieves? \_\_\_\_\_
  - How many seconds did it take to reach its maximum height? \_\_\_\_\_
- In 1940, Emanuel Zacchini of Italy was fired a record distance of 175 feet from a cannon while performing in the US. Suppose his initial velocity was 80 feet per second. The  $y$  can be represented by the function  $y = -16x^2 + 80x$ , where  $x$  represents the number of seconds that have passed.
  - How long after he was shot out of the cannon did he reach his maximum height? \_\_\_\_\_
  - What was his maximum height? \_\_\_\_\_
  - How high was he after 3 seconds? \_\_\_\_\_
- You throw a ball in the air, and the path of the ball is described by the following formula:  
 $h = -16t^2 + 32t + 2$ , where  $h$  is the height in feet, and  $t$  is time in seconds.
- What is the maximum height the ball will reach? \_\_\_\_\_
  - What is the height of the ball after 2 seconds? \_\_\_\_\_
  - How long does it take to reach the maximum height? \_\_\_\_\_
- During a chemistry experiment students are testing the path of a cork as it popped off a bottle. They determine the formula for the cork flying through the air to be:  $h(t) = -16t^2 + 20t + 0.5$ , where  $h$  is the height in feet, and  $t$  is time in seconds.
  - When will the cork reach its maximum height? \_\_\_\_\_
  - What is the maximum height? \_\_\_\_\_
  - What is the height of the cork after 0.5 seconds
- The owner of a company that produces handcrafted music stands hires a consultant to help set the selling price for the product. The consultant analyzed the production costs and consumer demand for the stands and arrives at a function for the profit.  $P(x) = -0.3x^2 + 75x - 2000$ , where  $x$  represents the selling price of the stands.
  - At what price should the stands be sold to earn maximum profit? \_\_\_\_\_
  - According to the function, what is the maximum profit that the company can make? \_\_\_\_\_

### Answer Bank

4    96    18    125    64    2687.50    2    6.5    2    100    1.27    2.5    6.75