

Name: _____ Date: _____

4.5 Quadratic Application Word Problems

1. Jason jumped off of a cliff into the ocean in Acapulco while vacationing with some friends. His height as a function of time could be modeled by the function $h(t) = -16t^2 + 16t + 480$, where t is the time in seconds and h is the height in feet.
 - a. How long did it take for Jason to reach his **maximum** height?
 - b. What was the highest point that Jason reached?
 - c. What was Jason's initial height?

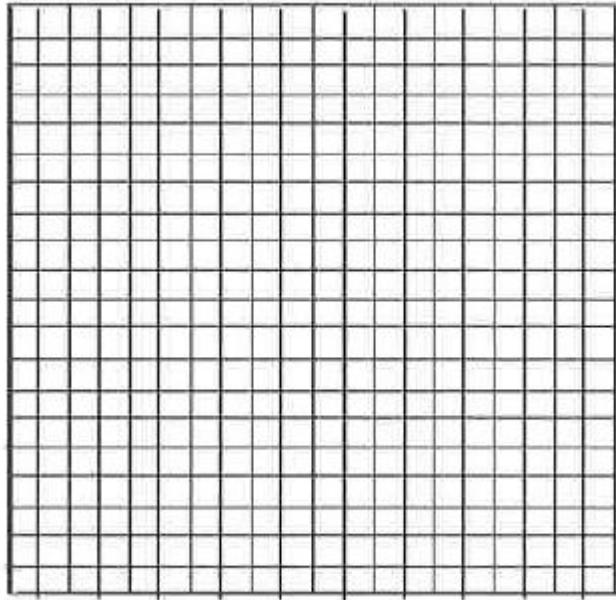
2. If a toy rocket is launched vertically upward from ground level with an initial velocity of 128 feet per second, then its height h , after t seconds is given by the equation $h(t) = -16t^2 + 128t$ (air resistance is neglected)
 - a. How long will it take the rocket to hit its maximum height?
 - b. What is the maximum height?
 - c. How long did it take for the rocket to reach the ground?

3. You are trying to dunk a basketball. You need to jump 2.5 ft in the air to dunk the ball. The height that your feet are above the ground is given by the function $h(t) = -16t^2 + 12t$. What is the maximum height your feet will be above the ground? Will you be able to dunk the basketball?

4. A ball is thrown in the air. The path of the ball is represented by the equation $h(t) = -t^2 + 8t$. Graph the equation over the interval $0 < t < 8$ on the following graph.

- What is the maximum height of the ball?
- How long is the ball above 7 meters?
- Rewrite the equation in vertex form.

height (meters)

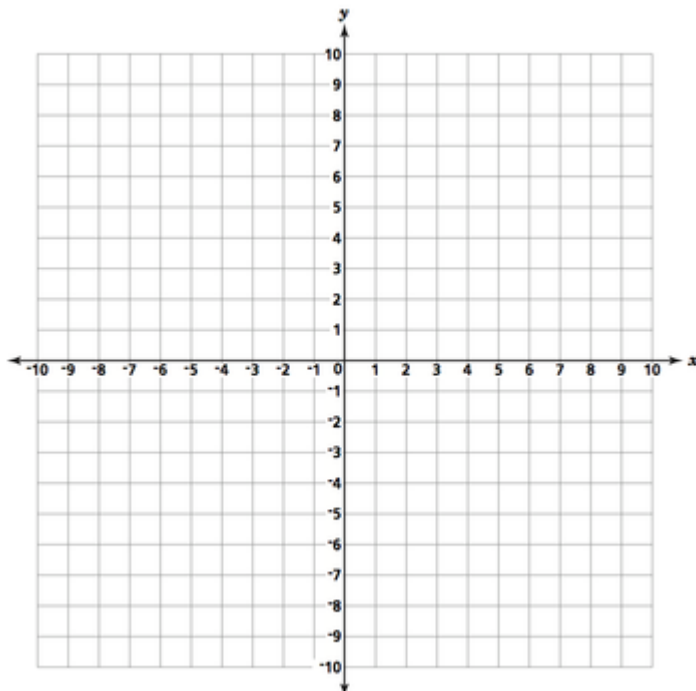


time (seconds)

7. The following equation represents the path of a donut hole being thrown by Mr. London where x represents the time (in seconds) the donut is in the air and y represents the height (in feet) of the donut.

$$y = -x^2 + 4x - 2$$

- Graph the equation to show the path of the donut hole, show at least three points.



b. At what time does the donut reach its **maximum** height?

c. What is the maximum **height** of the donut?

d. Rewrite the equation in vertex form.

5. A small independent motion picture company determines the profit P for producing n DVD copies of a recent release is $P = -0.02n^2 + 3.40n - 16$. P is the profit in thousands of dollars and n is in thousands of units.

a. How many DVDs should the company produce to maximize the profit?

b. What will the maximize profit be?