

Ex: Quadratic Function Application

Solve graphically. NASA launches a rocket at $t = 0$ seconds. Its height in meters above sea level as a function of time is $h(t) = -4.9t^2 + 310t + 332$. Assume the rocket will splash down into the ocean.

What time will the rocket splash into the ocean?

How high above sea level will the rocket reach?

Name: _____
Date: _____ Period: _____

Quadratic Formula 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. Jason hit the water after how many seconds?

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 $h(t) = -16t^2 + 128t$ (if air resistance is neglected).

- a. How long will it take for the rocket to return to the ground?

- b. After how many seconds will the rocket be 112 feet above the ground?

- c. How long will it take the rocket to hit its maximum height?

- d. What is the maximum height?

3. A rocket is launched from atop a 101 – foot cliff with an initial velocity of 116 ft/s.
- Substitute the values into the vertical motion formula $h(t) = -16t^2 + vt + h_0$. Let $h(t) = 0$
 - Use the quadratic formula to find out how long the rocket will take to hit the ground after it is launched. Round to the nearest tenth of a second.
4. You and a friend are hiking in the mountains. You want to climb to a ledge that is 20 ft. above you. The height of the grappling hook you throw is given by the function $h(t) = -16t^2 - 32t + 5$. What is the maximum height of the grappling hook? Can you throw it high enough to reach the ledge?
5. 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?
6. A diver is standing on a platform 24 ft. above the pool. He jumps from the platform with an initial upward velocity of 8 ft/s. Use the formula $h(t) = -16t^2 + vt + s$, where h is his height above the water, t is the time, v is his starting upward velocity, and s is his starting height. How long will it take for him to hit the water?