

Projectile Motion Formulas

The most commonly used projectile motion formula is $h(t) = -\frac{1}{2}gt^2 + v_0t + h_0$ where

g = gravity, v_0 = initial velocity, and h_0 = initial height.

When you are working in feet/time, gravity is 32 feet/second.

When you are working in meters/second, gravity is 9.8 meters/second.

Please read every scenario carefully. Then answer the following questions.

1. A rocket is launched from atop a 101-foot cliff with an initial velocity of 116 feet/second. 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 second.

2. A ball is thrown upward from a height of 15 feet with initial upward velocity of 5 feet/second. Use the quadratic formula to find out how long will it take for the ball to hit the ground?

3. You are trying to dunk a basketball. You need to jump 2.5 feet 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?

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4. An amateur rocketry club is holding a competition. A rocket is launched from the ground with an initial velocity of 315 feet/second. If there is a cloud cover at 1000 feet, determine how long the rocket is out of sight.