New vocabulary =

Quadratics =

Practical =

Crucial =

Free fall =

Trajectory =

Optimizing =

Let's delve into the fascinating world of quadratic functions and their practical applications. In this two-page article, we'll explore how quadratic equations play a crucial role in various fields and provide two thought-provoking questions for high school students.

**Applications of Quadratic Functions**

1. Objects in Free Fall

Quadratic equations find widespread use in science, business, and engineering. One common application involves objects in free fall. Imagine a ball thrown from the top of a building. As gravity accelerates the ball downward, we can model its height using a quadratic equation. For instance:

* A ball is thrown off a building from a height of 200 feet with an initial velocity of -10 feet per second (negative because it's heading toward the ground). The equation **h = -16t² - 10t + 200** describes the ball's height after **t** seconds. How long does it take for the ball to hit the ground?[**1**](https://courses.lumenlearning.com/cuny-hunter-collegealgebra/chapter/applications-of-quadratic-functions/).

2. Determining the Width of a Border

Quadratic equations also come into play when calculating areas. Consider a rectangular garden bed with one side bordered by a fence. If both dimensions (length and width) are expressed in terms of the same variable, we use a quadratic equation. For example:

* You want to create a rectangular garden bed with a fixed amount of fencing material. The equation **A = x(20 - 2x)** represents the area of the garden bed, where **x** is the width. What width maximizes the area? What is the maximum area?[**1**](https://courses.lumenlearning.com/cuny-hunter-collegealgebra/chapter/applications-of-quadratic-functions/).

Remember, quadratic equations are powerful tools that help us understand the world around us. Whether it's predicting the trajectory of a ball or optimizing garden layouts, these mathematical concepts have real-world applications that extend far beyond the classroom.

Questions for High School Students:

1. **Ball in Free Fall**: If a ball is thrown off a 100-foot building with an initial velocity of -15 feet per second, how long does it take for the ball to hit the ground? (Use the equation **h = -16t² - 15t + 100**).
2. **Optimal Garden Bed**: You have 60 feet of fencing material to enclose a rectangular garden bed. What dimensions (length and width) maximize the area? (Use the equation **A = x(60 - 2x)**).

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1 to 3 sentence summary of the article:

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**References**:

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