Name_____ Date_____ Per_____

Quadratic Function Applications

Steps for solving a quadratic applications:

1.) Draw and or label a picture.

2.) Define all variables.

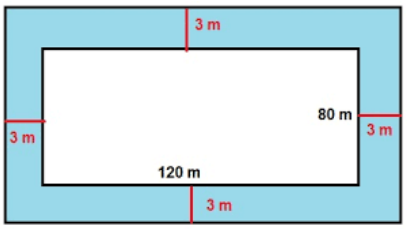
3.) Is a formula needed? Substitute.

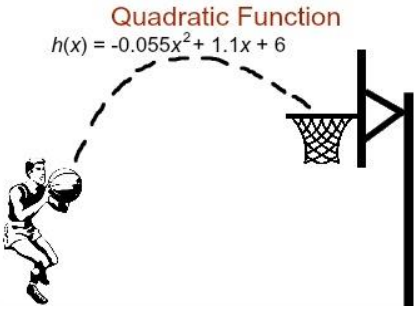
4.) Write equation in standard form.

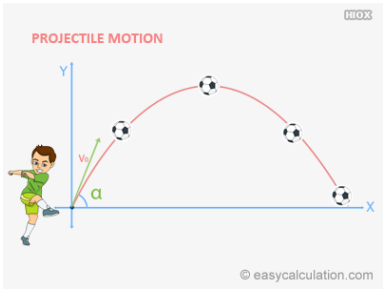
5.) Factor

6.) Set each factor equal to zero and solve. (Eliminate unreasonable answers)

7.) Check answers.







Part 1: Area of a rectangle (landscaping/border/frame)

Mr. Hendra wants to turn a vacant rectangular lot into a community flower garden next to the vegetable garden at PSHS, measuring 8 feet by 12 feet, in an attempt to sell flowers for potential fundraisers. A path of uniform width is to be made around the garden so people can admire the flowers. If the area of the lot is $140ft^2$, find the width of the path surrounding the garden.

Jaylin Lucero's father has to create a beautiful rectangular lawn measuring 8ft by 4ft, which has to be surrounded by a flower bed of uniform width for an important photo shoot for Equestrian Magazine. If the combined area of the lawn and the flower bed has to be $96ft^2$, what is the width of the flower bed?

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Quadratic Function Applications

Part II: Motion (Trajectory) problems with a formula (ball being thrown)

Isabel Martinez throws a tennis ball straight up from a rooftop 384 ft high with an initial speed of 32 ft per second for a Physics project in Mr. Kirby's class. The function: $s(t) = -16t^2 + 32t + 384$ describes the height of the ball above the ground, s(t) in feet, t seconds after she threw it. The ball misses the rooftop on its way down and eventually strikes the ground.

a.) What is the height of the ball after 2 seconds?

b.) What is the maximum height the ball will reach?

c.) How long will it take for the ball to hit the ground?

Ms. Cormier is coaching soccer and kicks a soccer ball to a student across the field at practice. After t seconds, the ball is kicked into the air from the ground level and reaches a height of h feet given by the function: $h(t) = 144t - 16t^2$.

a.) What is the height of the ball after 3 seconds?

b.) What is the maximum height the ball will reach?

c.) After how many seconds will the ball hit the ground?

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Quadratic Function Applications

Part III: Maximum Profit

The profit from selling PSHS theater tickets depends on the ticket price. Using past receipts, we find that the profit can be modeled by the function: $P(x) = -15x^2 + 600x + 60$, where x is the price of each ticket. We want to find the ticket price that gives the maximum profit, and also find that maximum profit.

Each year Palm Springs High School UP club holds a dance to raise funds to help families or children in need. In the past, the profit the club made after paying for the band and other costs has been modeled by the function: $P(t) = -16t^2 + 800t - 4000$, where t represents the ticket price in dollars.

A. What ticket price gives the maximum profit?

B. What is the maximum profit?

C. What ticket price would generate a profit of $5424?