Lesson 4.1.5: Solving Basic Quadratic Equations

Targets:

1. I understand how to solve problems involving quadratic equations.

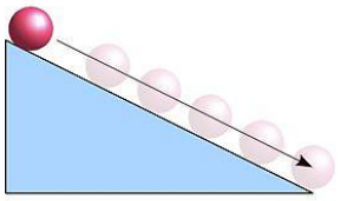
Warm Up:

We have learned a number of ways to solve a quadratic equation. Use the method listed to solve:

Difference of Squares (or square root)	Factoring	GCF
$2 = 4x^2 - 7$	$0 = x^2 - 4x - 21$	$4x^2 + 16x - 58 = -10$

Practice 1

A physics teacher put a ball at the top of a ramp and let it roll down toward the floor. The class determined that the height of the ball could be represented by the equation $h = -16t^2 + 4$, where the height, h, is measured in feet from the ground and time, t, in seconds.



a. What do you notice about the structure of the expression $h = -16t^2 + 4$?

b. What does the 4 represent in the equation?

c. Explain how you would use the equation to determine the time it takes for the ball to reach the floor.

d. How much time would it take for the ball to hit the floor? Did you have 2 solutions when you solved? Which answer is reasonable?

Practice 2

Lord Byron is designing a set of square garden plots so some peasant families in his kingdom can grow vegetables. The minimum size for a plot recommended for vegetable gardening is at least 2 m on each side. Lord Byron has enough space around the castle to make bigger plots. He decides that each side will be the minimum (2 m) plus an additional x m.

a. What expression can represent the area of one individual garden based on the undecided additional length x?

b. There are 12 families in the kingdom who are interested in growing vegetables in the gardens. What equation can represent the total area, A, of the 12 gardens?

c. What would the equation look like if the total area available for the gardens is 300 sq.m.

d. Find both values for x that make the equation in part (c) true (the solution set). What value of x will Lord Byron need to add to the 2 m? What are the dimensions of the square gardens?

Practice 3

Peter is a painter and he wonders if he would have time to catch a paint bucket dropped from his ladder before it hits the ground. He drops a bucket from the top of his 9-foot ladder. The height, h, of the bucket during its fall can be represented by the equation, $h = -16t^2 + 9$, where the height is measured in feet from the ground, and the time since the bucket was dropped, t, is measured in seconds. After how many seconds does the bucket hit the ground? Do you think he could catch the bucket before it hits the ground?

Exit Ticket

1.) A man is about to attempt the world record for the highest jump onto an airbag. The height he is jumping from is 324 feet!! The airbag is obviously very large. The height, h, of the man from the airbag during his fall can be represented by the equation, $h = -16t^2 + 324$, where the height is measured in feet from the airbag, and the time, t, is measured in seconds. How long will it take for the man to hit the airbag?

2.) Mischief is a poodle that competes with her trainer in the agility course. Within the course, Mischief must leap through a hoop. Mischief's jump can be modeled by the equation $h = -16t^2 + 12t$, where h is the height of the leap in feet and t is the time since the leap, in seconds. At what values of t does Mischief start and end the jump?