# Unit 7 Lesson 17: Applying the Quadratic Formula (Part 1)

## 1 No Solutions for You! (Warm up)

**Student Task Statement**

Here is an example of someone solving a quadratic equation that has no solutions:

$$(x + 3)^2 + 9 = 0$$
$$(x + 3)^2 = \text{-}9$$
$$x + 3 = \pm\sqrt{\text{-}9}$$

1. Study the example. At what point did you realize the equation had no solutions?

2. Explain how you know the equation $49 + x^2 = 0$ has no solutions.

## 2 The Potato and the Pumpkin

**Student Task Statement**

Answer each question without graphing. Explain or show your reasoning.

1. The equation $h(t) = -16t^2 + 80t + 64$ represented the height, in feet, of a potato $t$ seconds after it has been launched.

    a. Write an equation that can be solved to find when the potato hits the ground. Then solve the equation.

    b. Write an equation that can be solved to find when the potato is 40 feet off the ground. Then solve the equation.

2. The equation $g(t) = 2 + 23.7t - 4.9t^2$ models the height, in meters, of a pumpkin $t$ seconds after it has been launched from a catapult.

    a. Is the pumpkin still in the air 8 seconds later? Explain or show how you know.

    b. At what value of $t$ does the pumpkin hit the ground? Show your reasoning.

# 3 Back to the Framer

## Student Task Statement

1. In an earlier lesson, we tried to frame a picture that was 7 inches by 4 inches using an entire sheet of paper that was 4 inches by 2.5 inches. One equation we wrote was $(7 + 2x)(4 + 2x) = 38$.

    a. Explain or show what the equation $(7 + 2x)(4 + 2x) = 38$ tells us about the situation and what it would mean to solve it. Use the diagram, as needed.
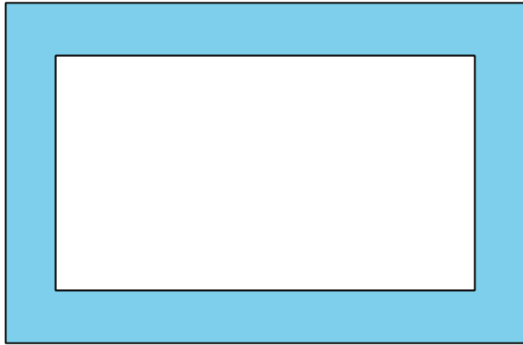
    b. Solve the equation without graphing. Show your reasoning.

2. Suppose you have another picture that is 10 inches by 5 inches, and are now using a fancy paper that is 8.5 inches by 4 inches to frame the picture. Again, the frame is to be uniform in thickness all the way around. No fancy framing paper is to be wasted!

    Find out how thick the frame should be.