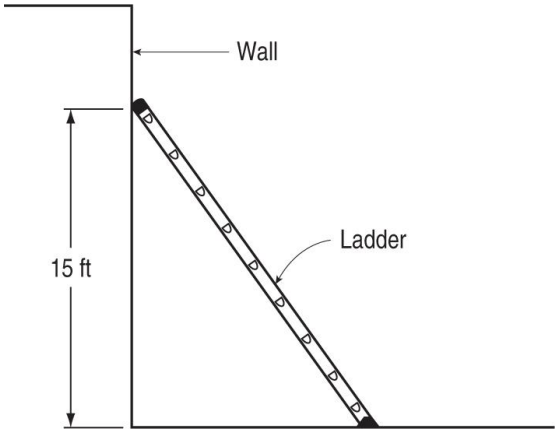
NAME _____ DATE _____ PERIOD _____

Solving Quadratic Equations by Factoring

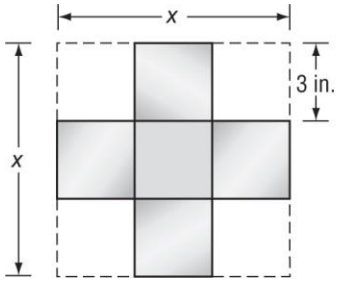
1. MATH GAMES Fiona and Greg play a number guessing game. Greg gives Fiona this hint about his two secret numbers, "The product of the two consecutive positive integers that I am thinking of is 11 more than their sum." What are Greg's numbers?

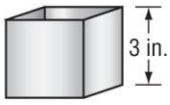
2. LADDERS A ladder is resting against a wall. The top of the ladder touches the wall at a height of 15 feet, and the length of the ladder is one foot more than twice its distance from the wall. Find the distance from the wall to the bottom of the ladder. (*Hint:* Use the Pythagorean Theorem to solve the problem.)



3. GEOMETRY Holly can make an open-topped box out of a square piece of cardboard by cutting 3-inch squares from the corners and folding up the sides to meet. The volume of the resulting box is $\boldsymbol{V = 3x^2 - 36x + 108}$, where x is the original length and width of the cardboard.

a. Factor the polynomial expression from the volume equation.





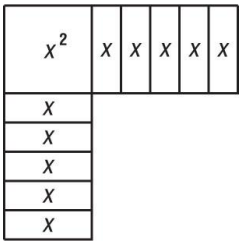
b. What is the volume of the box if the original length of each side of the cardboard was 14 inches?

c. What is the original side length of the cardboard when the volume of the box is 27 in^3?

Solving Quadratic Equations by Completing the Square

4. INTERIOR DESIGN Modular carpeting is installed in small pieces rather than as a large roll so that only a few pieces need to be replaced if a small area is damaged. Suppose the room shown in the diagram below is being fitted with modular carpeting. Complete the square to determine the number of 1 foot by 1 foot squares of carpeting needed to finish the room. Fill in the missing terms in the corresponding equation below.

$x^2 + 10x + \_\_\_\_\_ = (x + \_\_\_\_)^2$



5. FALLING OBJECTS Keisha throws a rock down an old well. The distance d in feet the rock falls after t seconds can be represented by $d = 16t^2 + 64t$. If the water in the well is 80 feet below ground, how many seconds will it take for the rock to hit the water?

Solving Quadratic Equations by Using the Quadratic Formula

6. BUSINESS Tanya runs a catering business. Based on her records, her weekly profit can be approximated by the function $f(x) = x^2 + 2x - 37$, where x is the number of meals she caters. If $f(x)$ is negative, it means that the business has lost money. What is the least number of meals that Tanya needs to cater in order to have a profit?

7. CRAFTS Madelyn cut a 60-inch pipe cleaner into two unequal pieces, and then she used each piece to make a square. The sum of the areas of the squares was 117 square inches. Let x be the length of one piece. Write and solve an equation to represent the situation and find the lengths of the two original pieces.