Lesson 4.6 Warm Up

1. Describe the transformation of $f(x) = 1/2|\ x - 2| - 3$ to $g(x) = -2\ |\ x - 4\ | + 2$.

2. A rocket's path can be modeled by $f(x) = -16x^2 + 200x$ where $f(x)$ is the height of the rocket after x seconds.

a. What is the maximum height of the rocket?

b. How long is the rocket in the air?

Lesson 4.6 Completing the Square

Essential Understanding: Completing a perfect square trinomial allows you to factor the completed trinomial as the square of a binomial.

Ex. Solve: $4x^2 + 10 = 46$

Ex. Solve: $7x^2 - 10 = 25$

1 Solve (separate your answers by a comma--leave your answer in exact form):

$2x^2 + 9 = 13$

2 Solve (separate your answers with a comma):

$4x^2 + 12 = 4$

Ex. While designing a house, an architect used windows like the one shown. What are the dimensions of the window if it has 2766 square inches of glass?

3 The lengths of the sides of a rectangular window have the ratio 1.6 to 1. The area of the window is 2822.4 square inches. What are the window dimensions? (separate dimensions with 'x' and do not include labels)

Completing the Square: You can form a perfect square trinomial from $x^2 + bx$ by adding $(b/2)^2$.

$$x^2 + bx + (b/2)^2 = (x + b/2)^2$$

Ex. What value completes the square for $x^2 - 10x$?

Ex. What value completes the square for $x^2 + 6x$?

4 What value completes the square for:

$x^2 + 10x$

Key Concept Solving an Equation by Completing the Square

1. Rewrite the equation in the form $x^2 + bx = c$. To do this, get all terms with the variable on one side of the equation and the constant on the other side. Divide all the terms of the equation by the coefficient of x^2 if it is not 1.
2. Complete the square by adding $\left(\frac{b}{2}\right)^2$ to each side of the equation.
3. Factor the trinomial.
4. Find square roots.
5. Solve for x.

Ex. Solve $3x^2 - 12x + 6 = 0$

Ex. Solve $2x^2 - x + 3 = x + 9$

Ex. Solve $3x^2 + 18x - 3 = 0$

5 Solve (type your answer in exact form):

$x^2 - 12x + 7 = 0$

Ex. What is $y = x^2 + 4x - 6$ in vertex form? Name the vertex and y-intercept.

Ex. What is $y = x^2 + 3x - 6$ in vertex form? Name the vertex and y-intercept.