Name:_____ **Date:**_____

Bellwork!

1. What is the positive solution of the equation $x^2 = 2x + 35$? Solve by factoring.

2. What is the positive solution of the equation $x^2 - 3x = 1$? Solve by using a table or by graphing. If necessary, round your answer to the nearest hundredth.

Lesson 4 – 6 **Date:_____**

AGENDA

Bellwork:

Homework Review:

Lesson: Completing the Square

Objective: To solve equations and rewrite functions by completing the square.

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

Problem 1 Solving by Finding Square Roots
Problem 2 Determining Dimensions
Problem 3 Solving a Perfect Square Trinomial Equation
Problem 4 Completing the Square
Problem 5 Solving by Completing the Square
Problem 6 Writing in Vertex Form

Teacher Directed: Problems 1, 2, 3, 4, 5, 6

Student Centered: Lesson Quiz

Homework: Problem Set G "select problems"

4-6 Completing the Square

You can solve an equation that contains a perfect square by finding square roots. The simplest of this type of equation has the form $ax^2 = c$.

Problem 1 Solving by Finding Square Roots

What is the solution of each equation?

A $4x^2 + 10 = 46$

B $3x^2 - 5 = 25$

Got It? **1.** What is the solution of each equation?

a. $7x^2 - 10 = 25$

b. $2x^2 + 9 = 13$

Problem 2 Determining Dimensions

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

Step 1 Find the area of the window.

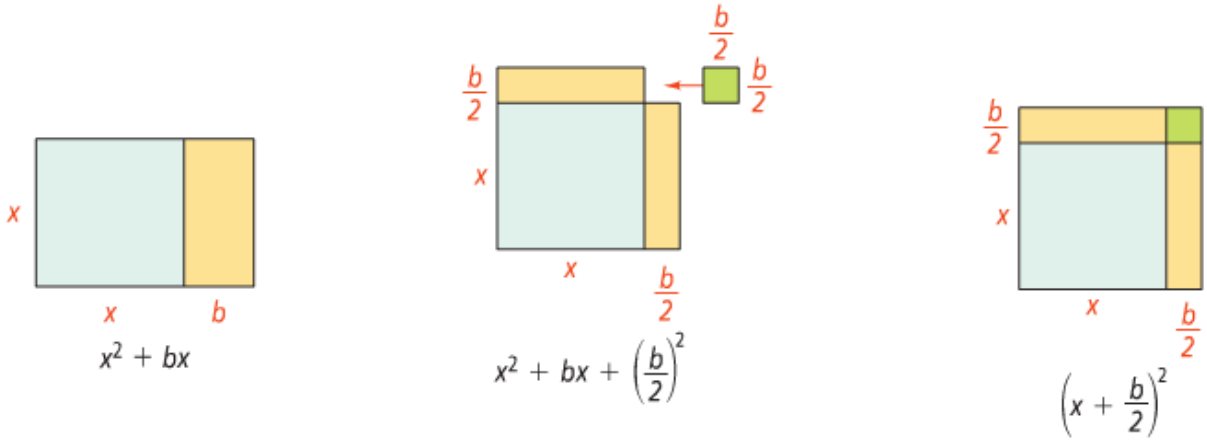
Step 2 Solve for x.

Problem 3 Solving a Perfect Square Trinomial Equation

What is the solution of $x^2 + 4x + 4 = 25$?

Got It? **3.** What is the solution of $x^2 - 14x + 49 = 25$?

If $x^2 + bx$ is not part of a perfect square trinomial, you can use the coefficient b to find a constant c so that $x^2 + bx + c$ is a perfect square. When you do this, you are **completing the square**. The diagram models this process.



Key Concept Completing the Square

You can form a perfect square trinomial from $x^2 + bx$ by adding $\left(\frac{b}{2}\right)^2$.

$$x^2 + bx + \left(\frac{b}{2}\right)^2 = \left(x + \frac{b}{2}\right)^2$$

Problem 4 Completing the Square

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

Got It? **4. a.** What value completes the square for $x^2 + 6x$?

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.

Problem 5 Solving by Completing the Square

What is the solution of $3x^2 - 12x + 6 = 0$?

Got It? **5.** What is the solution of $2x^2 - x + 3 = x + 9$?

Problem 6 Writing in Vertex Form

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

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

Name:_____ **Date:**_____

4-6 Lesson Quiz

1. What is the solution of $6x^2 = 42$?

2. A rectangle is constructed on a semicircle so that the length equals the diameter. The rectangle is 3 times as long as it is wide. The total area of this figure is 750 in.^{2}. Find the approximate dimensions of the rectangle.

3. What is the solution of $x^2 - 14x + 49 = 4$?

4. Complete the square: $x^2 - 8x + \square$.

5. Solve $x^2 - 10x + 22 = 0$.

6. Do you UNDERSTAND? Explain the process of rewriting $y = x^2 + 2x + 26$ in vertex form.

4-6 Completing the Square

You can solve an equation that contains a perfect square by finding square roots. The simplest of this type of equation has the form $ax^2 = c$.

Problem 1 Solving by Finding Square Roots

What is the solution of each equation?

A $4x^2 + 10 = 46$

B $3x^2 - 5 = 25$

Got It? **1.** What is the solution of each equation?

a. $7x^2 - 10 = 25$

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Got It? **3.** What is the solution of $x^2 - 14x + 49 = 25$?

Key Concept Completing the Square

You can form a perfect square trinomial from $x^2 + bx$ by adding $\left(\frac{b}{2}\right)^2$.

$$x^2 + bx + \left(\frac{b}{2}\right)^2 = \left(x + \frac{b}{2}\right)^2$$

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

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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.
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What is the solution of $3x^2 - 12x + 6 = 0$?

Got It? **5.** What is the solution of $2x^2 - x + 3 = x + 9$?

Problem 6 Writing in Vertex Form

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

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