Name: _____ Date: _____

Quadratic Equations Class: **Algebra**

Topic: Solving Quadratic Equations by Completing the Square

Methods for solving Quadratic Functions

1)
2)
3)
4)

Another method for solving quadratic equations is _____. In this method, a constant is added to the expression $x^2 + bx$ so that $x^2 + bx + c$ is a perfect square trinomial.

Completing the Square

Words To complete the square for an expression of the form $x^2 + bx$, follow these steps.

Step 1: Find one-half of b, the coefficient of x.
Step 2: Square the result from Step 1.
Step 3: Add the result from Step 2 to $x^2 + bx$.

Factor the resulting expression as the square of a binomial.

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

Model_ Completing the Square		
Example #1 Solve the following quadratic using completing the square. $x^2 + 2x - 48 = 0$	Example #2 Solve the following quadratic using completing the square. $x^2 + 8x - 3 = 17$	Example #3 Solve the following quadratic using completing the square. $x^2 - 7x + 12 = 0$

CFU_Think-Pair-Share

Which equation has the same solution as $x^2 - 6x - 12 = 0$?

1) $(x+3)^2 = 21$
2) $(x-3)^2 = 21$
3) $(x+3)^2 = 3$
4) $(x-3)^2 = 3$

When solving the equation $x^2 - 8x - 7 = 0$ by completing the square, which equation is a step in the process?

1) $(x-4)^2 = 9$
2) $(x-4)^2 = 23$
3) $(x-8)^2 = 9$
4) $(x-8)^2 = 23$

Guided Practice_ Completing the Square

Example #1
Solve the following quadratic using completing the square.

$x^2 + 10x = 200$

Example # 2
Solve the following quadratic using completing the square.

$2x^2 + 12x = 18$

Example # 3
Solve the following quadratic using completing the square.

$4x^2 + 4x - 4 = 0$

CFU_ Think-Pair-Share

Example # 1

Solve the following quadratic using completing the square.

$x^2 + 10x + 7 = 0$

Answer: _____

Example # 2

Solve the following quadratic using completing the square.

$X^2 - 9x = 1$

Answer: _____

Example # 3

Solve the following quadratic using completing the square.

$3x^2 + 6x = 18$

Answer: _____

Example # 4

Solve the following quadratic using completing the square.

$2x^2 - 16x + 12 = 0$

Answer: _____

Independent Practice

1 Which step can be used when solving $x^2 - 6x - 25 = 0$ by completing the square?

1) $x^2 - 6x + 9 = 25 + 9$
2) $x^2 - 6x - 9 = 25 - 9$
3) $x^2 - 6x + 36 = 25 + 36$
4) $x^2 - 6x - 36 = 25 - 36$

2 When solving the equation $x^2 - 8x - 7 = 0$ by completing the square, which equation is a step in the process?

1) $(x-4)^2 = 9$
2) $(x-4)^2 = 23$
3) $(x-8)^2 = 9$
4) $(x-8)^2 = 23$

3 Which equation has the same solution as $x^2 - 6x - 12 = 0$?

1) $(x+3)^2 = 21$
2) $(x-3)^2 = 21$
3) $(x+3)^2 = 3$
4) $(x-3)^2 = 3$

4 Which equation has the same solutions as $x^2 + 6x - 7 = 0$?

1) $(x+3)^2 = 2$
2) $(x-3)^2 = 2$
3) $(x-3)^2 = 16$
4) $(x+3)^2 = 16$

5 If $x^2 = 12x - 7$ is solved by completing the square, one of the steps in the process is

1) $(x-6)^2 = -43$
2) $(x+6)^2 = -43$
3) $(x-6)^2 = 29$
4) $(x+6)^2 = 29$

6 If $x^2 + 2 = 6x$ is solved by completing the square, an intermediate step would be

1) $(x+3)^2 = 7$
2) $(x-3)^2 = 7$
3) $(x-3)^2 = 11$
4) $(x-6)^2 = 34$

7 The method of completing the square was used to solve the equation $2x^2 - 12x + 6 = 0$. Which equation is a correct step when using this method?

1) $(x-3)^2 = 6$
2) $(x-3)^2 = -6$
3) $(x-3)^2 = 3$
4) $(x-3)^2 = -3$

8 What are the roots of the equation $x^2 + 4x - 16 = 0$?

1) $2 \pm 2\sqrt{5}$
2) $-2 \pm 2\sqrt{5}$
3) $2 \pm 4\sqrt{5}$
4) $-2 \pm 4\sqrt{5}$

9 What are the solutions to the equation $x^2 - 8x = 10$?

1) $4 \pm \sqrt{10}$
2) $4 \pm \sqrt{26}$
3) $-4 \pm \sqrt{10}$
4) $-4 \pm \sqrt{26}$

10 What are the solutions to the equation $x^2 - 8x = 24$?

1) $x = 4 \pm 2\sqrt{10}$
2) $x = -4 \pm 2\sqrt{10}$
3) $x = 4 \pm 2\sqrt{2}$
4) $x = -4 \pm 2\sqrt{2}$

11 Which value of k will make $x^2 - \frac{1}{4}x + k$ a perfect square trinomial?

1) $\frac{1}{64}$
2) $\frac{1}{16}$
3) $\frac{1}{8}$
4) $\frac{1}{4}$

12 Brian correctly used a method of completing the square to solve the equation $x^2 + 7x - 11 = 0$. Brian's first step was to rewrite the equation as $x^2 + 7x = 11$. He then added a number to both sides of the equation. Which number did he add?

1) $\frac{7}{2}$
2) $\frac{49}{4}$
3) $\frac{49}{2}$
4) 49

13 When directed to solve a quadratic equation by completing the square, Sam arrived at the equation $\left(x - \frac{5}{2}\right)^2 = \frac{13}{4}$. Which equation could have been the original equation given to Sam?

1) $x^2 + 5x + 7 = 0$
2) $x^2 + 5x + 3 = 0$
3) $x^2 - 5x + 7 = 0$
4) $x^2 - 5x + 3 = 0$