

# NOTES: COMPLETING THE SQUARE

DAY 15

Textbook Chapter 4.7

**OBJECTIVE:** Today you will learn about how to factor by completing the square!

## SOLVING QUADRATIC EQUATIONS (Completing the Square A=1)

Step 1: Arrange the equation in the form  $Ax^2 + Bx = C$

$$x^2 + 10x - 3 = 0$$

Step 2: Determine what value for the third term will make the trinomial a perfect square.

Step 3: Add that value to both sides.

Step 4: Simplify (write the trinomial as a binomial squared).

Step 5: Take the square root of both sides.  
(remember the  $\pm$ )

Step 6: Solve for x (often there are 2 solutions)

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2. Solve by completing the square.

$$x^2 - 4x = 2x + 35$$

## SOLVING QUADRATIC EQUATIONS (Completing the Square $A \neq 1$ )

Step 1: Divide both sides by the GCF.

$$3x^2 - 6x + 12 = 0$$

Step 2: Arrange the equation in the form  $Ax^2 + Bx = C$

Step 3: Determine what value for the third term  
will make the trinomial a perfect square.  
Then Add that value to both sides.

Step 5: Simplify (write the trinomial as a binomial squared).

Step 6: Take the square root of both sides.  
(remember the  $\pm$ )

Step 7: Solve for x (often there are 2 solutions)

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## CONVERT Standard Form to Vertex Form

Step 1: Factor out the coefficient (2) from the first two terms.

$$y = 2x^2 + 8x - 5$$

Step 2: Complete the square inside the parentheses.

Step 3: Distribute.

Step 4: Simplify.

# PRACTICE: SOLVING EQUATIONS

DAY 15

BY COMPLETING THE SQUARE

1.  $x^2 + 10x = -23$

2.  $x^2 + 2x = -17$

3.  $2x^2 - 12x = -14$

4.  $4x^2 + 16x = -12$

CONVERT TO VERTEX FORM (by completing the square)

5.  $y = 2x^2 + 16x - 7$

6.  $y = 3x^2 - 12x + 8$

# SOLVING QUADRATIC EQUATIONS: COMPLETING THE SQUARE

**SOLUTIONS = X-INTERCEPTS = ROOTS = ZEROS**

STANDARD FORM	$y = x^2 - 2x - 8$	$y = x^2 - 6x - 1$	$y = -2x^2 - 12x - 10$
<p>CONVERT TO VERTEX FORM</p> <p>(complete the square)</p>	<p>Vertex: (     ,     )</p>	<p>Vertex: (     ,     )</p>	<p>Vertex: (     ,     )</p>
<p>SOLVE</p> <p>(find the zeros)</p>			
<p>Solve by graphing</p> <p>1 1 2 4 3 9 4 16</p>			