

4.7: Completing the Square Notes

“I WILL ...

Solve using Complete the Square.”

I. Completing the Square Method

- A. Put terms with variables on one side and \_\_\_\_\_ onto the other side
  - 1. Make sure the side is in \_\_\_\_\_ order
  - 2. Standard Form, \_\_\_\_\_ where  $a = 1$
- B. Identify the coefficient which is raised to the first power, \_\_\_\_\_ the term by \_\_, and \_\_\_\_\_ the number (it will always be positive)
- C. \_\_\_\_\_ to both sides to the equation
- D. Put the equation into \_\_\_\_\_ form (Vertex Form)
- E. \_\_\_\_\_ both sides and cancel the binomial
- F. Solve for  $x$  and check

II. Vertex Form

- A. Equation:  $y = a(x - h)^2 + k$
- B. The vertex is  $(h, k)$ . Think \_\_\_\_\_
- C.  $a$  is the scalar.
- D. FOIL the problem out. Don't forget to multiply the scalar and factors.

REMINDER: To complete the square, the leading coefficient must be \_\_. Since the  $h$  and  $k$  are on the same side, you will take  $\frac{1}{2}$  of  $b$ , square it, add to the first part and SUBTRACT from the  $k$ .

III. Model Problems

<p>Ex 1: Solve by completing the square, <math>x^2 - 4x + 3 = 0</math></p>	<p>Ex 2: Solve by completing the square, <math>x^2 - 24x + 144 = 100</math></p>	<p>Your Turn: Solve by completing the square, <math>x^2 = 12x - 20</math></p>
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<p>Ex 3: Solve by completing the square,  <math>x^2 - 4x = -2</math></p>	<p>Ex 4: Solve by completing the square,  <math>2x^2 + 12x - 32 = 0</math></p>	
<p>Ex 5: Solve <math>2x^2 - 6x = 5</math> using completing the square</p>	<p>Your Turn: Solve <math>-6x + 2x^2 = -1</math> using completing the square</p>	
<p>Ex 6: Given <math>x^2 + 4x = 5</math>, convert to Vertex Form</p>	<p>Ex 7: Given <math>x^2 - 4x = -13</math>, convert to Vertex Form</p>	<p>Your Turn: Given <math>x^2 - 16x = -2</math>, convert to Vertex Form</p>
<p>Ex 8: Given <math>y = 2x^2 - 8x + 3</math>, convert to Vertex Form</p>	<p>Ex 9: Given <math>9x^2 + 18x = -3</math>, convert to Vertex Form</p>	<p>Your Turn: Given <math>2x^2 + 25 = -6x</math>, convert to Vertex Form</p>
<p>Ex 10: Write a rule in transformation form for the quadratic function with the vertex is at the origin and passes through (2, 12).</p>	<p>Ex 11: Write a rule in transformation form for the quadratic function with the vertex is at the (5, 2) and passes through (4, 5).</p>	<p>Your Turn: Write a rule in transformation form for the quadratic function with the vertex is at the (2, -5) and passes through (3, -11).</p>