Completing the Square

The Square Root Property can only be used to solve quadratic equations when the side containing thequadratic expression is a perfect square. However, FEW quadratic equations are perfect squares!

Therefore, we use a method called COMPLETING THE SQUARE to solve these equations!

To complete the square for any quadratic expression of the form $x^2 + bx$, follow the steps below

Step 1 - Find one half of *b*, the coefficient of the *x* term

Step 2 - Square the result of Step One.

Step 3 - Add the result of Step Two to $x^2 + bx$

Example 3 - Complete the Square

Find the value of *c* that makes the expression a perfect square.

$$x^2 + 12x + c$$

Step 1 - Find one half of *b*, the coefficient of the *x* term

Step 2 - Square the result of Step One.

Step 3 - Add the result of Step Two to $x^2 + bx$

$$x^2 + 16x + c$$

Step 1 - Find one half of *b*, the coefficient of the *x* term

Step 2 - Square the result of Step One.

Step 3 - Add the result of Step Two to $x^2 + bx$

Example 4 - Solve an Equation by Completing the Square

$x^2 + 8x - 20 = 0$

$x^2 + 4x - 12 = 0$

Example 5 - Equation with $a \neq 1$

$$3x^2 - 2x - 1 = 0$$

$$2x^2 - 5x + 3 = 0$$

Example 6 - Equations with Complex Solutions

Remember Complex #'s ?
What are they????

$$x^2 + 4x + 11 = 0$$

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