Math 2 U2.6 Solve Quadratics by Completing the Square Name: _____

Some quadratic equations in the form of $ax^2 + bx + c = 0$ can be solved easily by factoring. For example, the equation $x^2 + 6x - 16 = 0$ can be factored easily to $(x+8)(x-2) = 0$ to give solutions of $x = -8$ *and* $x = 2$ $\{-8, 2\}$ "Set Notation"

When a quadratic equation cannot be factored using integers, you have two options. You can use the quadratic formula or you can use a method called **completing the square**. When a = 1, completing the square is the way to go (when a >1, use the quadratic formula).

Example 1: Solve $x^2 + 8x - 10 = 0$ by completing the square. b/c a=1, this quadratic cannot be factored!

Always works!

Since it cannot be factored using integers, Write the equation in the form $ax^2+bx+c=0$ → $ax^2+bx=-c$.	$x^2 + 8x - 10 = 0$ $+10 \quad +10$ $x^2+8x = 10$ * DOES NOT HAVE TO BE = TO ZERO!
Find $\frac{1}{2}$ of b and add the square of that number $\left(\frac{b}{2}\right)^2$ to both sides of the equation	Think $b=8$ $\frac{b}{2} = 4$ and $(4)^2 = 16$ $x^2 + 8x = 10$ $x^2 + 8x + 16 = 10 + 16$ * Simplify Right SIDE! *
The left side is now a perfect square trinomial (PST), so factor it. FACTOR LEFT SIDE AND WRITE IT AS A PERFECT SQUARE. ie: $(x)^2$	PST → $x^2+8x+16 = 26$ $(x+4)(x+4) = 26$ $(x+4)^2 = 26$
Find the square root of each side. Remember, the right side will need $\pm$. ie: $x^2 \to \sqrt{x^2} = x$ $(x-5)^2 \to \sqrt{(x-5)^2} = x-5$	$(x+4)^2 = 26$ $\sqrt{(x+4)^2} = \pm\sqrt{26}$ $x+4 = \pm\sqrt{26}$ $-4 \quad -4$ * ✓ TO SEE IF RADICAL CAN BE SIMPLIFIED!
Solve for x	$x = -4 \pm \sqrt{26}$ $\{-4 \pm \sqrt{26}\}$