Completing the Square

If $x^2 + bx$ is a binomial, then by adding $\left(\frac{b}{2}\right)^2$, which is the square of half the coefficient of x, a perfect square trinomial will result. That is, $x^2 + bx + \left(\frac{b}{2}\right)^2 = \left(x + \frac{b}{2}\right)^2$.

To Solve a Quadratic Equation by Completing the Square

1) If necessary, divide or multiply both sides of the equation so that the leading coefficient (the coefficient of x^2) is 1.
2) If necessary, isolate the constant term on one side of the equation.
3) Find the constant that completes the square of the polynomial and add this constant to both sides. Rewrite the polynomial as the square of a binomial.
4) Use the Square Root Property to find the solutions of the equation.

Example 3: Determine the constant that should be added to the binomial so that it becomes a perfect square trinomial. Then write and factor the trinomial.

Example 4: Solve each equation by completing the square.