

Example 1: Complete the square to solve $ax^2 + bx + c = 0$

Formula: The Quadratic Formula (MEMORIZE)

a.) The solutions to $ax^2 + bx + c = 0$ for $a \neq 0$ are given by $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Example 2: Solve using the quadratic formula

a.) $3u^2 = 8u - 5$

b.) $x^2 + 6x + 4 = 0$

c.) $v^2 + 13 = 6v$

Method: To solve a quadratic equation

- a.) If the equation can be easily written in the form $ax^2 = p$ or $(x+k)^2 = d$, use the principle of square roots as in Section 8.1.
- b.) If Step (a.) does not apply, write the equation in the standard form $ax^2 + bx + c = 0$.
- c.) Try factoring and using the principle of zero products.
- d.) If factoring seems to be difficult or impossible, use the quadratic formula. Completing the square can also be used, but is usually slower.

Note: The solutions of a quadratic equation can always be found using the quadratic formula. They cannot always be found by factoring.

Example 3: Solve

a.) $4x + x(x-3) = 5$

b.) $25x = 3x^2 + 28$

Example 4: Solve $x^3 + 1 = 0$ (find all solutions).

Example 5: Let $f(x) = \frac{3-x}{4}$ and $g(x) = \frac{1}{4x}$. Find all x for which $f(x) = g(x)$.