8.2 - The Quadratic Formula

Complete the Square

$$ax^2 + bx + c = 0$$

The Quadratic Formula The solutions of $ax^2 + bx + c = 0$, $a \neq 0$, are given by

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}.$$

Must Memorize!

① Solve using the quadratic formula

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

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

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

To Solve a Quadratic Equation

1. 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.
2. If step (1) does not apply, write the equation in the form $ax^2 + bx + c = 0$.
3. Try factoring and using the principle of zero products.
4. If factoring seems to be difficult or impossible, use the quadratic formula. Completing the square can also be used, but is usually slower.

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

② Solve

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

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

c) $x^3 + 1 = 0$

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