Section 2.5

Additional Equations: Other Techniques for Solving Equations

Solving by Factoring: Factoring can be used to solve many types of equations. Always begin by Factoring Completely. Then, set each factor equal to zero.

Example 1: Find all the solutions of $x^3 = x$.

Example 2: Find all solutions to $x^3 + 3x^2 + 2x + 6 = 0$

Equations involving radicals: If an equation involves a square root (also called a radical), you must isolate the radical, square both sides, and solve the remaining equation. Be certain to check your answers!

Extraneous Solutions: In a radical solution, you may "create" additional answers that are not correct. These must be rejected!

Example 3: Find all solutions to $\sqrt{x+8} - 2 = x$

Example 4: Find all solutions to $\sqrt{3x+1} - 1 = x$

Solving by Substitution: When a function looks, "almost" quadratic, you may want to solve it by relating it to another function.

For example, consider the equation $x^{10} - x^5 - 6 = 0$

If the exponents go "full amount → half amount → nothing" then you can rewrite as a quadratic. Let $u = x^5$, *then*

$$x^{10} - x^5 - 6 = 0 \rightarrow u^2 - u - 6 = 0$$

Example 5: Solve the following equation $x^{1/2} + 2x^{1/4} - 15 = 0$