Section 1.4

Solving Radical Equations; Equations Quadratic in Form; Solve Equations by Factoring

RADICAL EQUATIONS

- When the variable in an equation occurs under a square root, cube root, etc., the equation is called a **radical equation**.
- To solve a radical equation, isolate the most complicated radical on one side and then eliminate it by raising each side to a power equal to the index of the radical.
- After solving, there may apparent solutions which are not solutions to the original equation. These are called **extraneous solutions**.
- ***Always check all answers when solving radical equations.***

EQUATIONS THAT ARE QUADRATIC IN FORM

An equation is called **quadratic in form** if there is a substitution, say u, that transforms the equation into one of the form

$$au^2 + bu + c = 0, \quad a \neq 0$$

EXAMPLES:

1. $x^6 - 9x^3 + 8 = 0$ can be transformed into $u^2 - 9u + 8 = 0$ by letting $u = x^3$.
2. $4(x+1)^4 - 37(x+1)^2 + 9 = 0$ can be transformed in $4u^2 - 37u + 9 = 0$ by letting $u = (x+1)^2$.

SOLVE EQUATION BY FACTORING

There are other equations, besides quadratic equations, that can be solved by factoring.

One common example is **factoring by grouping**. This technique is best illustrated by an example.

EXAMPLE: Solve $x^3 - 3x^2 - 4x + 12 = 0$