Math 120 Intermediate Algebra
Solving Radical Equations

**Always start by isolating the radical and check for extraneous solutions.**

Defn A **radical equation** is an equation in which the variable appears in a radicand.

Examples: \( \sqrt{2x} + 1 = 5 \) \( \sqrt{a} - 2 = 7 \) \( 4 - \sqrt{3x + 1} = \sqrt{6 - x} \)

The Principle of Powers
If \( a = b \), then \( a^n = b^n \) for any exponent \( n \).
Warning: The converse is not true.

**Ex 1** Solve.

a) \( \sqrt{7x - 3} = 5 \)

b) \( \sqrt{2x} - 1 = 2 \)

c) \( \sqrt{x} - 2 + 4 = 7 \)

d) \( 3x^{1/2} + 12 = 9 \)

e) \( \sqrt[3]{y} = -4 \)

f) \( \sqrt[4]{2x + 3} - 5 = -2 \)

g) \( x = \sqrt{x - 1} + 3 \)

h) \( \sqrt{2t - 7} = \sqrt{3t - 12} \)

i) \( \sqrt{6x + 7} - \sqrt{3x + 3} = 1 \)

**Ex 2** If \( g(x) = \sqrt{x} + \sqrt{x - 5} \), find any \( x \) for which \( g(x) = 5 \).