

# MTH 28 LECTURE NOTES (Ojakian)

## Topic 17: Solving Radical Equations

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### OUTLINE

References: 8.6

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#### 1. Doing the same thing to both sides of an equation

**PROBLEM 1.** We typically solve equations by “**doing the same thing to both sides of the equation**”, i.e. applying the same function to both sides of an equation. For example: Adding 5 to both sides of an equation, or squaring both sides of an equation.

**Does it always work? (consider the example of squaring).**

**PROBLEM 2.** Solve each (note that the second one is the result of squaring both sides of the first)

(a)  $x - 3 = 7$

(b)  $(x - 3)^2 = 49$

#### 2. Radical Equations and “false” solutions

Strategy:

- (a) Isolate the radical
- (b) Raise to appropriate power to remove radical.
- (c) Check all solutions at the end! (if raise to even power; otherwise - safe!)
- (d)

**Theorem 1.** (Root-then-Power Identity)  $(\sqrt[n]{A})^n = A$  (if  $A \geq 0$ )

**PROBLEM 3.**

i.  $\sqrt{x} - 1 = 3$

ii.  $\sqrt{x} + 2 = -2$

iii.  $10\sqrt[3]{x} - 1 = -21$

iv.  $\sqrt{x - 2} + 4 = 1$

v.  $\sqrt[5]{x + 3} + 1 = 0$