

MTH 28.5 LECTURE NOTES (Ojakian)

Topic 30: Solving Radical Equations

OUTLINE

References: 8.6

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