

6-7 Radical Equations and Inequalities

- solve equations involving radicals
- solve inequalities involving radicals

Solving radical equations - 1 radical

- isolate the radical
- square, cube, etc. both sides of the equation to "undo" the root.
- solve for the variable.
- CHECK YOUR ANSWERS for extraneous solutions!

1. $9 + \sqrt{x-1} = 15$

$$\cancel{(\sqrt{x-1})} = \cancel{(6)}^2$$

$$x-1 = 36$$

$$x = 37$$

2. $(2y-1)^{\frac{1}{3}} - 3 = 4$

$$\cancel{(2y-1)}^{\frac{1}{3}} = \cancel{(7)}^3$$

$$2y-1 = 343$$

$$2y = 344$$

$$y = 172$$

Solving radical equations - more than 1 radical

- isolate one of the radicals
- square, cube, etc. both sides of the equation.
- simplify, clean-up
- isolate the remaining radical and repeat process.
- CHECK YOUR ANSWERS!!!!

$$\sqrt{\quad} + \sqrt{\quad}$$

3. $\sqrt{x-12} + 2 = \sqrt{x}$

$$x-12 = 4 - 2\sqrt{x} - 2\sqrt{x} + x$$

$$x-12 = 4 - 4\sqrt{x} + x$$

$$\frac{-16}{-4} = \frac{-4\sqrt{x}}{-4}$$

$$(4)^2 = (\sqrt{x})^2$$

4. $\sqrt[3]{2x-7} = \sqrt[3]{x+2}$

$$2x-7 = x+2$$

$$x = 9$$

Solving radical inequalities

- solve inequality using equation techniques.
- domain restrictions: even index radicals CANNOT be negative.
- determine the domain of the variable. (**radicand ≥ 0**)
- plot solutions on number line, overlap is the solution.
- write solution from number line.

1. $\sqrt{3x-6}+4 \leq 7$

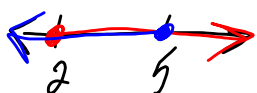
$$3x-6 \geq 0 \quad \sqrt{3x-6}+4 \leq 7$$

$$3x \geq 6 \quad (\sqrt{3x-6}) = (3)^2$$

$$x \geq 2 \quad 3x-6 \leq 9$$

$$3x \leq 15$$

$$x \leq 5$$



$$\{x \mid 2 \leq x \leq 5\}$$

$$[2, 5]$$

2. $\sqrt[4]{x+5} \geq 2$

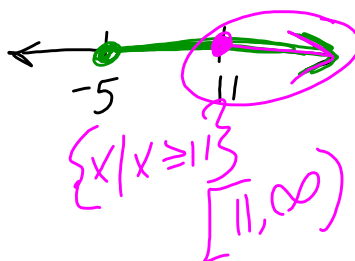
$$x+5 \geq 0$$

$$x \geq -5$$

$$(\sqrt[4]{x+5}) = (2)^4$$

$$x+5 \geq 16$$

$$x \geq 11$$



$$\{x \mid x \geq 11\}$$

$$[11, \infty)$$

$$\sqrt{x} + \sqrt{x+3} \leq 2$$

P. 433,
24-60 by 4's

