Algebra 2

Ch. 7 Handout 7.5

Solving Square Roots and Other Radical Equations

Radical Equation

Pull

is an equation that has a variable in a radicand or has a variable with a fractional exponent

* When you solve radical Equation you must Isolate the Radical first

1. Solve $-10+\sqrt{2x+1}=-5$. Check for extraneous solutions.

$-10+\sqrt{2x+1}=-5$

$+10 \qquad +10$

$(\sqrt{2x+1})^2=(5)^2$

$(\sqrt{2x+1})(\sqrt{2x+1})=25$

$2x+1=25$

$-1 \quad -1$

$\frac{2x}{2}=\frac{24}{2}$

$\boxed{x=12}$

Check

$-10+\sqrt{2\cdot 12+1}=-5$

$-10+\sqrt{25}=-5$

$-10+5=-5$ ✓

2. Solve $\sqrt{x+2}-3=2x$. Check for extraneous solutions.

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

$+3 \quad +3$

$(\sqrt{x+2})^2=(2x+3)^2$ $6x+6x$

$(\sqrt{x+2})(\sqrt{x+2})=(2x+3)(2x+3)$

$x+2=4x^2+12x+9$

$-x \quad -2 \quad -x \quad -2$

$0=4x^2+11x+7$

$0=(4x+7)(x+1)$

$4x+7=0 \quad x+1=0$

$4x=-7$

$x=-7/4$; $x=-1$

$x=-\frac{7}{4}$

$\sqrt{-\frac{7}{4}+\frac{8}{4}}-3=2(-\frac{7}{4})$

$\sqrt{\frac{1}{4}}-3=-7/2$

$\frac{1}{2}-\frac{6}{2}=-\frac{7}{2}$

$-\frac{5}{2} \neq -\frac{7}{2}$

$x=-1$

$\sqrt{-1+2}-3=2(-1)$

$\sqrt{1}-3=-2$

$1-3=-2$

3. Solve $2\sqrt{(x+3)^3} = 54$. Check for extraneous solutions.

$$\frac{2\sqrt{(x+3)^3}}{2} = \frac{54}{2}$$

$$\left(\sqrt{(x+3)^3}\right)^2 = (27)^2$$

$$\sqrt[3]{(x+3)^3} = \sqrt[3]{27^2}$$

$$x+3 = \left(\sqrt[3]{27}\right)^2$$

$$x+3 = 3^2$$

$$x+3 = 9$$

$$-3 \quad -3$$

$$\boxed{x = 6}$$

$$2\sqrt{(6+3)^3} = 54$$

$$2\left(\sqrt{9}\right)^3 = 54$$

$$2 \cdot 3^3 = 54$$

$$2 \cdot 27 = 54$$

4. Solve $(x+1)^{\frac{2}{3}} - 16 = 0$. Check for extraneous solutions.

$(x+1)^{\frac{2}{3}} = 16$

$\left(\sqrt[3]{(x+1)^2}\right)^3 = (16)^3$

$\sqrt{(x+1)^2} = \pm\sqrt{16^3}$ 4^3

$x+1 = \pm 64$

$x = -1 \pm 64$

$x = -1 + 64 = 63$

$x = -1 - 64 = -65$

$\sqrt[3]{(-65+1)^2} = 16$

$(\sqrt[3]{-64})^2 = 16$

$(-4)^2 = 16$

$\sqrt[3]{(63+1)^2} = 16$

$\sqrt[3]{64^2} = 16$

$x = 63, x = -65$

5. Solve $(x+1)^{\frac{2}{3}} - (9x+1)^{\frac{1}{3}} = 0$. Check for extraneous solutions.

6. Solve $\sqrt{3x+2} - \sqrt{2x+7} = 0$. Check for extraneous solutions

7. Solve $\sqrt{x+10}+\sqrt{3-x}=5$. Check for extraneous solutions.

Assignment:

Day 1: pg 394 1-13 all, 15-20 all