Advanced Algebra w/ Trig
6.6 Solving Radical Equations

Name:

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

Solve the following radical equations for $x$. Be sure to check for extraneous solutions!

**1.** $(\sqrt{2x})^2 = 4^3$

$2x = 64$

$\frac{2x}{2} = \frac{64}{2}$

$x = 32$

check:

$\sqrt{2(32)} \stackrel{?}{=} 4$

$\sqrt{64} = 4$

$4 = 4$ ✓

**2.** $(\sqrt{x+1})^2 = (\sqrt{2x-7})^2$

$x + 1 = 2x - 7$

$-x \quad -x$

$1 = x - 7$

$+7 \quad +7$

$8 = x$

check

$\sqrt{8+1} \stackrel{?}{=} \sqrt{2(8)-7}$

$\sqrt{9} \stackrel{?}{=} \sqrt{9}$

$3 = 3$ ✓

**3.** $(\sqrt[3]{3x-6})^3 = 3^3$

$3x - 6 = 27$

$+6 \quad +6$

$3x = 33$

$\frac{3x}{3} = \frac{33}{3}$

$x = 11$

Check

$\sqrt[3]{33-6} \stackrel{?}{=} 3$

$\sqrt[3]{27} \stackrel{?}{=} 3$

$3 = 3$ ✓

**4.** $2 + \sqrt{3x+7} = 6$

$-2 \quad -2$

$(\sqrt{3x+7})^2 = 4^2$

$3x + 7 = 16$

$3x = 9$

$x = 3$

$\sqrt[4]{2x-4}$

**5.** $((2x-4)^{\frac{1}{4}})^4 = (-2)^4$

$2x - 4 = 16$

$2x = 20$

~~$x = 10$~~

extraneous

no real solution

check:

$(2(10)-4)^{1/4} \stackrel{?}{=} -2$

$16^{1/4} = -2$

$\sqrt[4]{16} = -2$

$2 \neq -2$

**6.** $4 - (1-7x)^{\frac{1}{3}} = 0$

$-4 \quad -4$

$\frac{-(1-7x)^{1/3}}{-1} = \frac{-4}{-1}$

$[(1-7x)^{1/3}]^3 = 4^3$

$1 - 7x = 64$

$-1 \quad -1$

$-7x = 63$

$x = -9$

Check

$x = -9$

Check

$4 - (1 - 7(-9))^{1/3} \stackrel{?}{=} 0$

$4 - (64)^{1/3} = 0$

$4 - 4 = 0$ ✓

**7.** $\sqrt{3x-2} = \sqrt{x-4}$

**8.** $\sqrt{3x+2} = 5\sqrt{x-7}$

**9.** $\sqrt{x-1} = 4\sqrt{x+1}$

**10.** $\sqrt{x-4} - 1 = 5$