Sec 7-5:

Solving radical equations and equations with rational exponents.

Radical Equation:

An equation where the variable is in the radicand.

Equation with rational exponents:

An equation where a variable or a quantity involving a variable is being raised to a rational exponent.

Take the following steps when solving radical equations

1. Isolate the radical on one side of the equation.
2. Raise both sides of the equation to the power equal to the index of the radical.
3. Finish solving for the variable and check your answer.

Solve. $\sqrt{2x+12} - 6 = x$

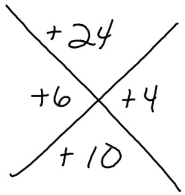
$+6 \quad +6$

$\left(\sqrt{2x+12}\right)^2 = (x+6)^2$

$2x + 12 = x^2 + 12x + 36$

$-2x \quad -12 \qquad -2x \quad -12$

$0 = x^2 + 10x + 24$



$0 = (x+6)(x+4)$

$X = -6, -4$

Take the following steps when solving an equation where a variable or a quantity involving a variable is being raised to a rational exponent.

1. Isolate the term or quantity that is being raised to the rational exponent on one side of the equation.
2. Raise both sides of the equation to the reciprocal power.
3. Finish solving for the variable and check your answer.

Solve. $(3-2x)^{\frac{2}{3}} - 6 = 43$

$+6 \quad +6$

$\left[(3-2x)^{2/3}\right]^{3/2} = (49)^{3/2} \rightarrow (\sqrt{49})^3$

$= (\pm 7)^3$

$= \pm 343$

$3 - 2x = \pm 343$

$-3 \quad -3$

$+343 - 3$

$-343 - 3 = 340, -346$

$\frac{-2x}{-2} = \frac{340}{-2}, \frac{-346}{-2}$

$X = -170, 173$

What is the difference between radical equations and equations with rational exponents?

Really nothing.....rational exponents are radicals!

2. $(5x-6)^{\frac{1}{2}} = x$

This could be written with a radical

$\sqrt{5x-6} = x$

3. $\sqrt[3]{x-7} + 2 = 6$

This could be written with rational exponents

$(x-7)^{\frac{1}{3}} + 2 = 6$

Solve. $5(x-2)^{\frac{3}{2}} + 6 = 141$

$-6 \quad -6$

$\frac{5(x-2)^{3/2}}{5} = \frac{135}{5}$

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

$= (3)^2$

$= 9$

$X - 2 = 9$

$+2 \quad +2$

$X = 11$

Solve. $(2x+3)^{\frac{1}{2}} = (4x-9)^{\frac{1}{2}}$

$\left[(2x+3)^{\frac{1}{2}}\right]^2 = \left[(4x-9)^{\frac{1}{2}}\right]^2$ Square both sides

$2x + 3 = 4x - 9$

$-2x \quad -2x$

$3 = 2x - 9$

$+9 \quad +9$

$\frac{12}{2} = \frac{2x}{2}$

$X = 6$

Solve. $2(x-6)^{\frac{1}{2}} - (x+7)^{\frac{1}{2}} = 0$

$+(x+7)^{1/2}$ $+(x+7)^{1/2}$

move $(x+7)^{\frac{1}{2}}$ to the right side.

$\left[2(x-6)^{1/2}\right]^2 = \left[(x+7)^{1/2}\right]^2$ Square both sides

$4(x-6) = x+7$

$4x-24 = x+7$

$-x \quad -x$

$3x-24 = 7$

$+24 \quad +24$

$\frac{3x}{3} = \frac{31}{3}$

$x = 31/3$

Solve. $2 \cdot \frac{1}{2}(16x-15)^{\frac{1}{2}} = x \cdot 2$

$\left[(16x-15)^{\frac{1}{2}}\right]^2 = (2x)^2$

$16x-15 = 4x^2$

move all terms to the right side

$0 = 4x^2 - 16x + 15$

60, -6, -10, -16 $\Rightarrow$

	$2x$	-3
$2x$	$4x^2$	$-6x$
-5	$-10x$	$+15$

$\Rightarrow 0 = (2x-3)(2x-5)$

$x = \frac{3}{2}, \frac{5}{2}$

You can now finish Hwk #38

Sec 7-5 Due tomorrow

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Problems 6, 7, 17, 23, 28, 39, 40