<u>Radical Expressions</u>

Review:

Simplify $\sqrt{8}$ and $\sqrt{48}$

$6\sqrt{75} + 2\sqrt{48} - 5\sqrt{3}$

When taking a root higher than 2, the number gets written in front of the radical.

<u>Example #1:</u>

Simplify: $\sqrt[4]{16}$

Simplify: $\sqrt[5]{64}$

<u>Example #2:</u>

Simplify: $\sqrt[3]{x^7}$

Simplify: $\sqrt[3]{27x^{12}y^5}$

Simplify: $\sqrt[4]{x^{12}y^5}$

Simplify: $\sqrt[3]{125x^8y^3}$

A <u>rational exponent</u> is an exponent that can be expressed as $\frac{m}{n}$, where m and n are integers and $n \neq 0$.

- m is the power and n is the root

Rewrite with rational exponents.

$\sqrt[4]{16}$

$\sqrt[3]{x^7}$

$\sqrt[5]{64}$

$\sqrt[4]{x^{12}y^5}$

Consider the expression $(4)^{5/2}$. Does it matter which exponent we compute first? Discuss.

Simplify $8^{2/3}$

Simplify $27^{2/3}$

Simplify: $\left(16x^7y^6\right)^{1/2}$

Simplify:

$$\left(\frac{49yk^3}{36x^2}\right)^{1/2}$$

<u>Reminder:</u> We want to rationalize all denominators.

$$\frac{\mathbf{2}}{\sqrt{\mathbf{5}}}$$

$$\frac{\mathbf{4}}{\sqrt{\mathbf{8}}}$$

$$\frac{\mathbf{3}}{\sqrt{\mathbf{50}}}$$

$$\frac{\sqrt{\mathbf{2}}-\sqrt{\mathbf{3}}}{\sqrt{\mathbf{8}}}$$

$$\frac{\mathbf{24}}{\mathbf{2}\sqrt{\mathbf{48}}}$$

<u>Solving Radical Equations</u>

A **<u>radical equation</u>** contains a variable within a radical.

- Radical equations can be solved by raising both sides of an equation to a power

Think about it: Solve $\sqrt{x} = 7$

<u>Example #1:</u>

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

Example #2:

$$5 + \sqrt{x + 1} = 16$$

You try: **Solve** $\mathbf{6\sqrt{x + 10} = 42}$

Example #3:

$$\mathbf{(3x - 1)^{1/5} = 2}$$

Example #4:

$$4x^{3/4} - 5 = 27$$

You try: $\mathbf{\frac{1}{3}(x + 6)^{3/2} = 9}$

Example #5**:**

$$\sqrt{7x+2} = 3\sqrt{3x-2}$$

You try**:**

$$\sqrt[3]{x+6} = 2\sqrt[3]{x-1}$$

**** Raising each side of an equation to an even power may introduce extraneous solutions.**

Example #6**:**

$$\sqrt{-3x+33} = 5-x$$

You try:

$$\sqrt{8x+12} = x+3$$