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<u>**Objective**</u>: **Simplifying Radicals**

<u>**Homework RX1**</u> **– NYA p.619 #1 – 12, 72, 79**

Do Now: Simplify

1. 2x + 5x	2. (9xy)(–4x)	3. –10y ● 5y² ● 3y

<u>**Exam Prep**</u>: **Which of the following is equivalent to x^6?**

A) $x^2 ● x^3$ B) $x^4 ● x ● x$ C) $x^3 + x^3$ D) $(x^3)^3$

Yes, I'm a chicken, but I hang out with The Doctor and Abe Lincoln.

Think of simplifying radicals as a game and you will be okay.

<u>**Exploration**</u>: **True or False**   *Hint: Use perfect squares that divide evenly.*

$\sqrt{x + y} = \sqrt{x} + \sqrt{y}$		True or False
$\sqrt{xy} = \sqrt{x}\sqrt{y}$		True or False
$\sqrt{x - y} = \sqrt{x} - \sqrt{y}$		True or False
$\sqrt{\dfrac{x}{y}} = \dfrac{\sqrt{x}}{\sqrt{y}}$		True or False

Results

	GOOD			BAD	
Mult	$\sqrt{x}\sqrt{y} = \sqrt{xy}$		Add	$\sqrt{x} + \sqrt{y} \neq \sqrt{x+y}$	
Div	$\dfrac{\sqrt{x}}{\sqrt{y}} = \sqrt{\dfrac{x}{y}}$		Sub	$\sqrt{x} - \sqrt{y} \neq \sqrt{x-y}$	

Rules for Simplifying Radicals

A radical is simplified when both of the following are true:
- **The numbers *under* the radical sign (radicands) have no square *factors***
- **The number of radical signs in the expressions is as small as possible**

Hints

1. **Look for *perfect square factors* in *numbers* and *variables***
2. **Check <u>your solution</u> for simplest form using the rules**

Numbers

Original	Factored	Simplified
$\sqrt{24}$	$\sqrt{4}\,\sqrt{6}$	$2\sqrt{6}$
$\sqrt{18}$	$\sqrt{9}\,\sqrt{2}$	$3\sqrt{2}$
$\sqrt{30}$	**No Perfect Square Factors**	$\sqrt{30}$
$\sqrt{48}$	$\sqrt{4}\,\sqrt{12}$ **Best Choice?**	$2\sqrt{12}$ **NOT DONE**
$2\sqrt{12}$	$2\sqrt{4}\sqrt{3} \ \rightarrow \ 2 \bullet 2\sqrt{3}$	$4\sqrt{3}$
$5\sqrt{18}$	$5\,\sqrt{9}\,\sqrt{2}$	$5 \bullet 3\sqrt{2} \ \rightarrow \ 15\sqrt{2}$

Practice

1. $\sqrt{20}$	2. $6\sqrt{75}$	3. $2\sqrt{14}$
4. $6\sqrt{16}$	5. $\sqrt{32}$	6. $10\sqrt{19}$

Quick Refresh: Exponent Product Law	$x^3 \bullet x^7 = x^{10}$

Variables

Original	Original	Factored	Simplified
EVEN	$\sqrt{x^6}$	**Perfect** ☺	x^6
EVEN	$\sqrt{y^{14}}$	**Perfect** ☺	y^7
ODD	$\sqrt{z^9}$	$\sqrt{z^8}\sqrt{z}$ ← **1st Power**	$z^4\sqrt{z}$
ODD	$\sqrt{k^{13}}$	$\sqrt{k^{12}}\sqrt{k}$	$k^6\sqrt{k}$

Practice

1. $\sqrt{h^4}$	2. $\sqrt{x^{11}}$	3. $\sqrt{p^{20}}$
4. $\sqrt{c^{600}}$	5. $\sqrt{w^{43}}$	6. $\sqrt{m}$

Mixed Problem

$4\sqrt{12w^5xy^{10}z^3}$	**Original**
$4\sqrt{4}\sqrt{3}\sqrt{w^4}\sqrt{w}\sqrt{x}\sqrt{y^{10}}\sqrt{z^2}\sqrt{z}$	**Separate and Factor**
$4 \bullet 2\sqrt{3}\quad w^2\sqrt{w}\sqrt{x}\quad y^5\quad z\sqrt{z}$	**Square Root**
$8w^2y^5z\sqrt{3wxz}$	**Organize**

Mixed Practice

1. $5\sqrt{x^5y^{10}z}$	2. $\sqrt{100ab^7c^{20}d^8}$	3. $7\sqrt{18y^{10}z}$