Warm-up

1. Solve: $\frac{1}{3}x - 5(2x + 4) = 10$ $25^{2/3}$

2. What is another way to write $25^{1/2}$

$\sqrt{25}$ $\sqrt[3]{25}$

3. What does is mean to be a perfect square? List a few examples of perfect squares. 4, 9, 16, 25...

Objective:

Today we will:

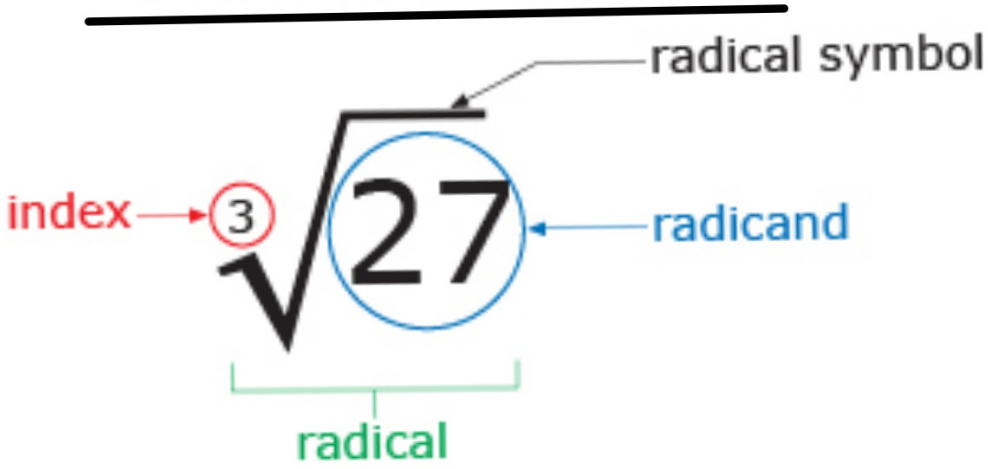
- Simplify Radicals
- Add and subtract Radicals

Agenda:

- Warm-Up and Unit 1 Intro
- Radical notes/examples
- Lesson Check
- Independent Practice

Unit 1

Parts of a Radical



* If there is no number for the index, it is a square root

Simplifying Radicals

- Find the highest perfect square factor of the radicand
- Split into two radicals
- Simplify the perfect square radical

Ex. 1 $\sqrt{50}$

$\sqrt{25}\sqrt{2}$

$5\sqrt{2}$

Ex. 2 $\sqrt{32}$

$\sqrt{16}\sqrt{2}$

$4\sqrt{2}$

$\sqrt{4}\sqrt{8}$

$2\sqrt{8}$

$2\sqrt{4}\sqrt{2}$

$=4\sqrt{2}$

Ex. 3 $3\sqrt{108}$

$3\sqrt{36}\sqrt{3}$

$18\sqrt{3}$

4
9
16
25
36
49
64
81
100

Higher Index?

- Same Steps, except use perfect cubes, perfect 4's, 5's,etc.

Ex. 1 $\sqrt[3]{81}$

$\sqrt[3]{27}\ \sqrt[3]{3}$

$3\sqrt[3]{3}$

8
27
64
125

Ex. 2 $\sqrt[3]{500}$

$\sqrt[3]{125}\ \sqrt[3]{4}$

$5\sqrt[3]{4}$

Ex. 3 $\sqrt[3]{128}$

$\sqrt[3]{64}\cdot\sqrt[3]{2}$

$4\sqrt[3]{2}$

8
27
64
125

Ex. 4 $\sqrt[4]{80}$

$\sqrt[4]{16}\ \sqrt[4]{5}$

$2\sqrt[4]{5}$

16
81
256
625

Ex. 5 $\sqrt[5]{486}$

$\sqrt[5]{243}\ \sqrt[5]{2}$

$3\sqrt[5]{2}$

32
243
1024

Radicals with variables

- Simplify number of radicand the same way
- List variable in groups that match the index
- Pull out as many whole groups as possible

Ex. 1 $\sqrt[2]{18x^4y^5}$

$\sqrt{9}\ \sqrt{2xxxxyyyyy}$

$3x^2y^2\sqrt{2y}$

$\sqrt{9}\ \sqrt{2x^2x^2y^2y^2y}$

$3x^2y^2\sqrt{2y}$

Ex. 2 $\sqrt[2]{147x^7y^6z^2}$

$\sqrt{49}\ \sqrt{3xxxxxxyyyyyyzz}$

$7x^3y^3z\sqrt{3x}$

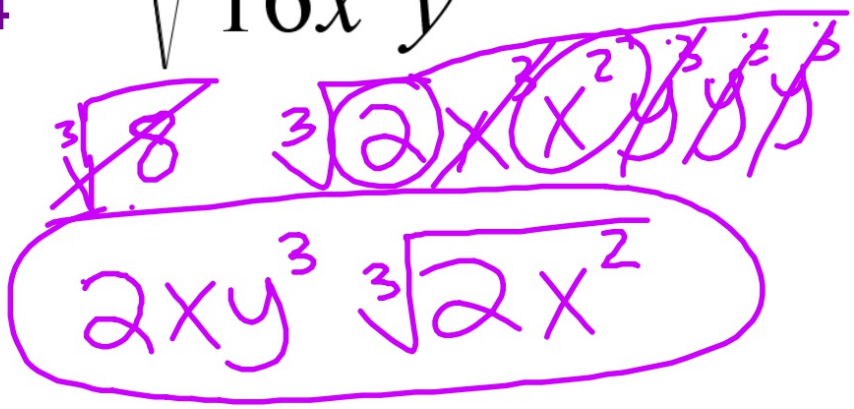
Ex. 3 $\sqrt{75x^5y^8}$

$5x^2y^4\sqrt{3x}$

$13x^6z\sqrt{5xyz}$

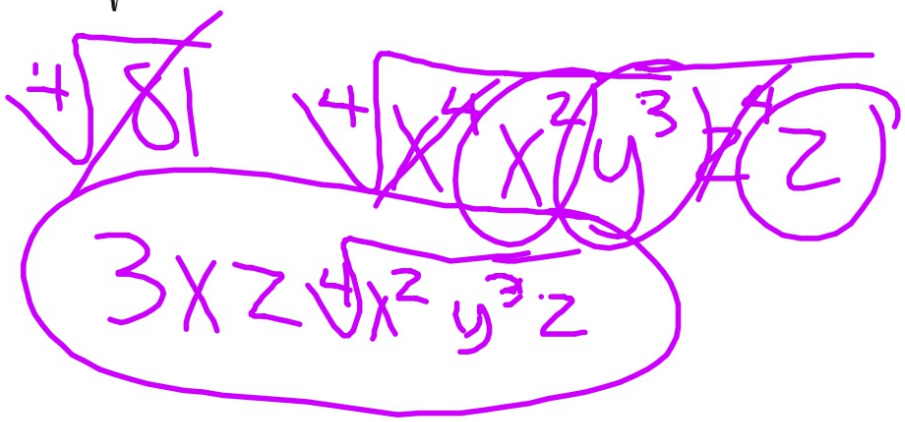
$\sqrt{845x^{13}yz^3}$

Ex. 4 $\sqrt[3]{16x^5y^9}$



$2xy^3\sqrt[3]{2x^2}$

Ex. 5 $\sqrt[4]{81x^6y^3z^5}$



$3xz\sqrt[4]{x^2y^3z}$

Adding and Subtracting Radicals

**Can only add/sub radicals that have the same index and radicand!!

Steps

- Simplify each radical seperately
- Combine coeffiecients with a common radical

Ex. 1 $4\sqrt{13} + 7\sqrt{13}$

$11\sqrt{13}$

Ex. 2 $9\sqrt[3]{5x} - 12\sqrt[3]{5x} + 3\sqrt{5x}$

$-3\sqrt[3]{5x} + 3\sqrt{5x}$

Ex. 3 $\sqrt{27}+\sqrt{48}$

$\sqrt{9}\sqrt{3} \quad | \quad \sqrt{16}\sqrt{3}$

$3\sqrt{3} + 4\sqrt{3}$

$7\sqrt{3}$

Ex. 4 $4\sqrt{72}+3\sqrt{200}$

$4\sqrt{36}\sqrt{2} + 3\sqrt{100}\sqrt{2}$

$24\sqrt{2} + 30\sqrt{2}$

$54\sqrt{2}$

Ex. 5 $4\sqrt{63} - \sqrt{175}$

$6\sqrt{832} - 7\sqrt{637}$

Ex. 6 $2\sqrt[3]{24} + \sqrt[3]{32}$

Wrap-Up

- What are the parts of the radical?
- What are the steps for simplifying radicals?
- How do we add or subtract radicals?
- Why should radical expressions be simplified?