Radical Operations
Day 1

N.RN.2 Rewrite expressions involving radicals and rational exponents using the properties of exponents. (i.e., simplify and/or use the operations of addition, subtraction, and multiplication, with radicals within expressions limited to square roots).

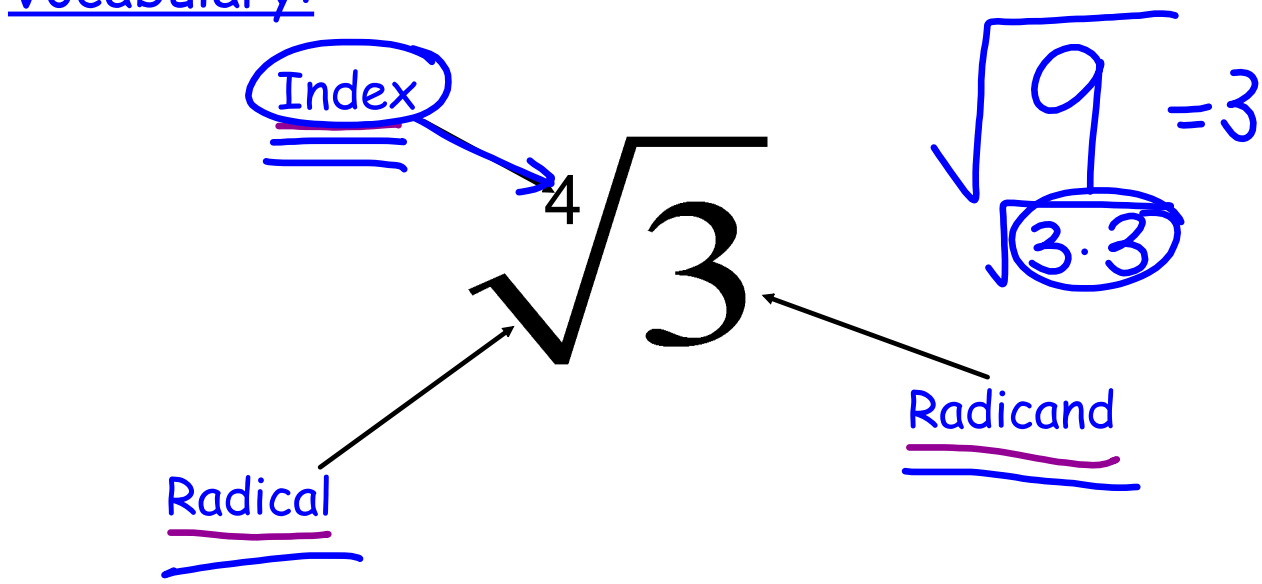
What am I learning today?

How to simplify and multiply radical expressions

How will I show that I learned it?

Multiply 2 square-root expressions, including variables

Vocabulary:



Properties of Radicals:

Product Property: $\sqrt{ab} = \sqrt{a} \cdot \sqrt{b}$

$\sqrt{54} = \sqrt{9} \cdot \sqrt{6} = 3\sqrt{6}$

$54 = 2 \cdot 3$

We use this to both simplify and multiply radicals.

$\sqrt{\frac{3}{4}} = \frac{\sqrt{3}}{\sqrt{4}} = \frac{\sqrt{3}}{2}$

Perfect Squares

1	25	81	169
4	36	100	196
9	49	121	225
16	64	144	

$\sqrt{64} = 8$

Simplifying Radicals (Square Roots):

Step 1: Factor the radicand into its prime factors by using a factor tree.

Step 2: Group same factors in groups of 2.

Step 3: For every group of 2 you have, you have a perfect square. Multiply your pairs back together into one radical and the leftovers into a second radical.

Step 4: Simplify.

Example A.

$\sqrt{24} = \sqrt{4 \cdot 6} = \sqrt{4} \cdot \sqrt{6}$

$= 2\sqrt{6}$

$\sqrt{12 \cdot 2}$

$\sqrt{3 \cdot 4 \cdot 2}$

$\sqrt{3 \cdot 2 \cdot 2 \cdot 2}$

$= 2\sqrt{6 \cdot 4}$

Example B.

$\sqrt{27} = \sqrt{9} \cdot \sqrt{3}$

$= 3\sqrt{3 \cdot 1}$

$\sqrt{9 \cdot 3}$

$\sqrt{3 \cdot 3 \cdot 3}$

Example C. $\sqrt{225} = 15$

$\sqrt{x^5} = \sqrt{x \cdot x^4}$

Example D. $\sqrt{x^5} = \sqrt{x \cdot x \cdot x \cdot x \cdot x}$

Even Exponents are perfect squares $= x^2\sqrt{x}$

$\sqrt{x^{50}} = x^{25}$

Odd Exponents
Odd man out

$\sqrt{x^{33}} = \sqrt{x \cdot x^{32}}$

$= x^{16}\sqrt{x}$

Example E. $\sqrt{108x^5y^4} = \sqrt{36 \cdot 3 \cdot x^4 \cdot x \cdot y^4}$

$6x^2y^2\sqrt{3x}$

$\sqrt{54 \cdot 2}$

$\sqrt{9 \cdot 6 \cdot 2}$

$\sqrt{3 \cdot 3 \cdot 3 \cdot 2 \cdot 2} = 3 \cdot 2$

Example F. $3x\sqrt{18x^4} =$

$3x^1\sqrt{9 \cdot 2 \cdot x^4}$

$\cdot 3 \cdot x^2$

$= 9x^3\sqrt{2}$

1) $\sqrt{36x^5}$

$= \sqrt{36} \cdot \sqrt{x \cdot x^4}$

$6x^2\sqrt{x}$

2) $\sqrt{90x^2y^7}$

$\sqrt{9 \cdot 10 \cdot x^2 \cdot y \cdot y^6}$

$= 3xy^3\sqrt{10y}$

3) $\sqrt{48}$

$\sqrt{16 \cdot 3}$

$= 4\sqrt{3}$

4) $\sqrt{50a^4b^2}$

$\sqrt{25 \cdot 2 \cdot a^4 \cdot b^2}$

$= 5a^2b\sqrt{2}$

HW pgs 6-7 #1-20