Algebra 1: 6.2 Radicals and Rational Exponents

Vocab:

Radicals/Roots: $\sqrt{\square}$ ← this symbol is a root or Radical.

$\sqrt{4}$: "square root of 4"

Even if you don't see it. There is an understood 2 there.

$\sqrt[3]{8}$: "cube root of 8." $\sqrt[4]{16}$: "Fourth root of 16"

Rational Exponent: a Power that is a fraction

Rational: a fraction.

Ex: $4^{2/3}$

Evaluating Higher Roots:

Explain how you know the square root of 16 is 4.

$\sqrt[2]{16} = 4$ b/c $4 \cdot 4 = 16$

2 times

This has to be the same # twice

What do you think the Cube root of 8 is?

$\sqrt[3]{8} = 2$ b/c $2 \cdot 2 \cdot 2 = 8$

3 times

What is the fourth root of 81?

$\sqrt[4]{81} = \boxed{3}$

4 of them

$\boxed{3} \cdot \boxed{3} \cdot \boxed{3} \cdot \boxed{3} = 81$

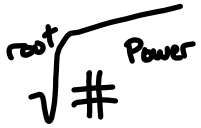
This is why $\sqrt[4]{81} = 3$

Common numbers for roots...

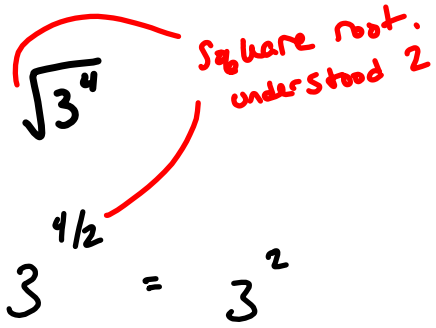
$\sqrt{\ }$		$\sqrt[3]{\ }$		$\sqrt[4]{\ }$
$\sqrt{1}=1$	$\sqrt{36}=6$	$\sqrt[3]{1}=1$	$\sqrt[3]{216}=6$	$\sqrt[4]{1}=1$
$\sqrt{4}=2$	$\sqrt{49}=7$	$\sqrt[3]{8}=2$	$\sqrt[3]{343}=7$	$\sqrt[4]{16}=2$
$\sqrt{9}=3$	$\sqrt{64}=8$	$\sqrt[3]{27}=3$	$\sqrt[3]{512}=8$	$\sqrt[4]{81}=3$
$\sqrt{16}=4$	$\sqrt{81}=9$	$\sqrt[3]{64}=4$	$\sqrt[3]{729}=9$	$\sqrt[4]{256}=4$
$\sqrt{25}=5$	$\sqrt{100}=10$	$\sqrt[3]{125}=5$	$\sqrt[3]{1000}=10$	$\sqrt[4]{625}=5$

Converting Radicals & Rational Exponents:

All radicals can be converted to rational exponents. Here's how...



If the base is already raised to a power, you can still convert it.



Evaluate the following...

- $16^{1/4}$

↓

convert to Radical form.

$\sqrt[4]{16}$

then evaluate

$\sqrt[4]{16} = \boxed{2}$

$9^{5/2}$

↓

convert

$\sqrt{9^5}$

You choose! Either do the root first or the power first.

we are doing the root first b/c $\sqrt{9} = 3$

$3^5 = \boxed{243}$

↑

on calculator

$\sqrt[3]{-125}$

$\square \cdot \square \cdot \square = -125$

$-5 \cdot -5 \cdot -5 = -125$

$\sqrt[3]{-125} = \boxed{-5}$

Think about $\sqrt{-9}$. "what # times itself is -9"

if you try to take the square root (or any Even root) of a negative #, you can't.*

There are No Real solutions to problems like this.

Homework:

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