Bellwork

1. What does it mean to take the square root of something?

   Finding the #/expression that when mult. by itself = the #/expression under the radical.

2. What does it mean to take the cube root of something?

   Finding the #/expression that when mult. by itself 3 times = the #/expression under the radical.

3. What's the cube root of something cubed? (Ex: Find the cube root of x^3.) $\sqrt[3]{x^3} = x$

Radical Form to Rational Exponent Form

Given a Radical Expression:

This is an expression that is a square root, cube root, or higher root.

Solution becomes a Rational Exponent:

This is an expression that will be contained in parentheses with an exponent that is a fraction.

General Properties

$$\sqrt[n]{a^m} = a^{\frac{m}{n}}$$

$$\sqrt[n]{(a^c b^d)^m} = (a^c b^d)^{\frac{m}{n}}$$

NOTE: **If there is no number for the n, Then the number is a 2.**

Examples

1. $\sqrt[3]{(a^3b)}$

$(a^3b)^{\frac{1}{3}}$

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

$(x^5y^3)^{\frac{1}{2}}$

More Examples

3. $\sqrt[7]{b^6}$

$b^{\frac{6}{7}}$

4. $\sqrt[5]{(-6y^2)^2}$

$(-6y^2)^{2/5}$

More Examples

5. $\sqrt[4]{(-1y^4z^3)^2}$

$(-1y^4z^3)^{2/4}$

$(-1y^4z^3)^{1/2}$

6. $\sqrt[8]{\left(\frac{10m^2n^3}{p^8}\right)^5}$

$\left(\frac{10m^2n^3}{p^8}\right)^{5/8}$

More Examples

7. $\dfrac{1}{\sqrt{(2a^3)}}$

$\dfrac{1}{(2a^3)^{1/2}}$

$(2a^3)^{-1/2}$

8. $\dfrac{2}{\sqrt[6]{(3x)^5}}$

$\dfrac{2}{(3x)^{5/6}}$

$2(3x)^{-5/6}$