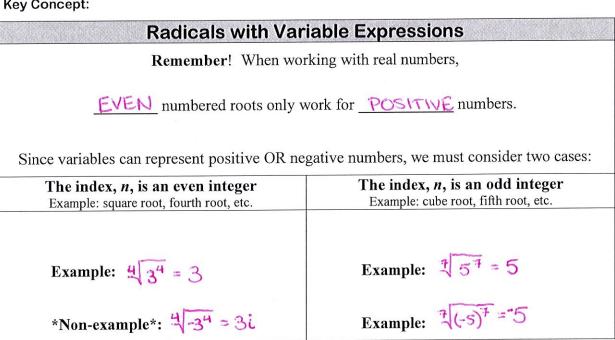
Section:	3 – 2 Apply Properties of Rational FUNctions
Essential	How are the properties of rational exponents
Question	related to the properties of integer exponents?

Key Vocab:

Simplest Radical Form	Radicand has no perfect <i>n</i> th power factors Denominator is rationalized
	Same index AND same radicand Examples: $5\sqrt[4]{2}$ and $3\sqrt[4]{2}$
Like Radicals	$3\sqrt[3]{y}$ and $7\sqrt[3]{y}$
	Note: You must have <i>like radicals</i> in order to order or subtract radicals

Key Concept:



Show:

Ex 1: Use the properties of rational exponents to simplify the expression.

a.
$$12^{1/8} = 2^{5/6}$$

b. $(5^{1/3} = 7^{1/4})^3$

c. $(2^6 = 4^6)^{-1/6}$

$$= 12^{(1/8 + 5/6)}$$

$$= 12^{(3/24 + 26/24)}$$

$$= 5^{1} \cdot 7^{3/4}$$

Ex 1 continued: Use the properties of rational exponents to simplify the expression.

d.
$$\frac{10}{10^{2/5}}$$

= $10^{(1-2/5)}$

= $10^{(5/5 - 2/5)}$

= $8^{5/4}$

= $10^{3/5}$

f. $\left(\frac{20^{1/2}}{5^{1/2}}\right)^3$

= $(8^{3/4})^5$

= $(8^{3/4})^5$

= $(3^3)^{5/4}$

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Ex 2: The ratio of the magnitudes of two earthquakes with magnitudes m_1 and m_2 (as measured on the Ritcher scale) is given by the equation $r = \frac{10^{m_1}}{10^{m_2}}$. The table gives the magnitudes of some of the largest earthquakes that have occurred in the U.S. How many times stronger was the 1964 quake in Alaska than the 1812 quake in Missouri?

$$r = \frac{10^{9.2}}{10^{7.9}} = 10^{(9.2-7.9)} = 10^{1.3} \approx 20$$

$$\frac{181}{190}$$

$$\frac{195}{196}$$

Year	State	Magnitude
1812	MO	7.9
1906	CA	7.7
1958	AK	8.3
1964	AK	9.2

Ex 3: Use the properties of radicals to simplify the expression.

a.
$$\sqrt[3]{125} \sqrt[3]{8}$$

b.
$$\frac{\sqrt[5]{96}}{\sqrt[5]{3}}$$

Ex 4: Write the expression in simplest form.

b.
$$\frac{\sqrt[4]{10}}{\sqrt[4]{27}}$$

Ex 5: Simplify the expression.

a.
$$7\sqrt[5]{12} - \sqrt[5]{12}$$

b.
$$4(9^{2/3})+8(9^{2/3})$$

$$= 12^{3}\sqrt{(3^{2})^{2}}$$

d.
$$\sqrt[3]{5} + \sqrt[3]{40}$$

c.
$$\sqrt[3]{81} - \sqrt[3]{24}$$





Ex 6: Simplify the expression. Assume all variables are positive.

(a)
$$\sqrt[4]{625}z^{12}$$
 $\sqrt[4]{625}z^{12}$
 $\sqrt[4]{25}z^{12}$
 $\sqrt[4]$

b.
$$(32m^5n^{30})^{1/5}$$

$$= 3a^{1/5}m^{5/5}n^{3/5}$$

$$= \sqrt{32}m^{6}$$

$$= \sqrt{32}m^{6}$$

Ex 7: Write the expression in simplest form. Assume all variables are positive.

(a)
$$\sqrt[6]{\frac{r^6}{s^{18}}}$$

$$\frac{\sqrt[6]{r^6}}{\sqrt[6]{s^{18}}} = \frac{r}{s^{18}} = \frac{r}{s^3}$$

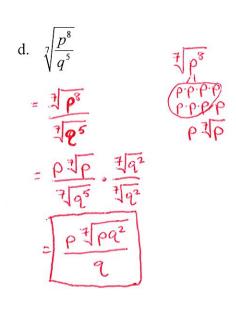
b.
$$\frac{56ab^{3/4}}{7a^{5/6}c^{-3}}$$

$$= 8 a^{(6/6-5/6)}b^{3/4}c^{3}$$

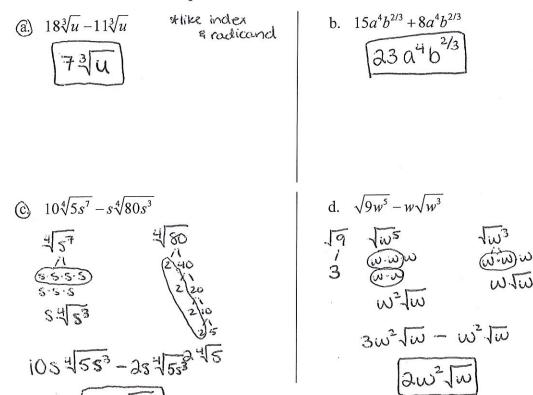
$$= 8a^{1/4}b^{3/4}c^{3}$$

(c.
$$\sqrt[3]{6x^4y^9z^{14}}$$

36 $\sqrt[3]{x^4}$ $\sqrt[3]{y^9}$ $\sqrt[3]{z^{14}}$
40esn't $\sqrt[3]{x}$ $\sqrt[3]{x}$ $\sqrt[3]{x^9}$ $\sqrt[3]{x^2}$ $\sqrt[$



Ex 8: Perform the indicated operation. Assume all variables are positive.



Closure:

• Explain how to rationalize the denominator for a cube root. How is it different than rationalizing the denominator for a square root? How is it the same?