p. 16-17 Radical Form/Rational Exponent Form 6.4

Warm-up:

Rational Exponent Form

Radical Form

p. 16

Exploration of Rational Exponents Name:_____

Using your notes and calculator, complete the following table.
Note: When entering a fraction as your exponent in your calculator, you may need place in parentheses.

Expression	Numerical Value	Expression	Numerical Value
$(4)^{\frac{1}{2}}$	2	$\sqrt[2]{4}$	2
$(64)^{\frac{1}{3}}$	4	$\sqrt[3]{64}$	4
$(100)^{\frac{1}{2}}$	10	$\sqrt[2]{100}$	10
$(16)^{\frac{1}{4}}$	2	$\sqrt[4]{16}$	2
$(4)^{\frac{2}{4}}$	2	$\sqrt[4]{4^2}$	2

1. What did you notice about the Numerical Values of the problems in the same rows?

2. What are some similarities between the Expressions in the same row? What is the same? Do you notice a pattern?

3. Given the expression $\sqrt[4]{81}$, what expression using a fractional exponent would yield the same value?

$\sqrt[4]{81}$ ⟷ $(81)^{\frac{1}{4}}$

Radical Form

Rational Exponent Form

Ex)

$8^{\frac{2}{3}}$

The numerator of 2 means you take answer below to the power of 2.

① the denominator of 3 means you are taking 3rd Root of 8.

$\sqrt[3]{8} = 2$

$25^{\frac{3}{2}} = 125$

$4^{\frac{5}{2}}$

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Rational Exponent Form

$$a^{\frac{m}{n}} = \sqrt[n]{a^m} = \left(\sqrt[n]{a}\right)^m$$

Radical Form

Rewrite the expressions from radical form to exponential form. Then simplify completely.

1. $\sqrt[3]{x^4}$ = $(x)^{\frac{4}{3}}$

2. $\sqrt[4]{y^7}$ = $(y)^{\frac{7}{4}}$

3. $\sqrt[5]{z^2}$ = $(z)^{\frac{2}{5}}$

4. $\sqrt[3]{a^2}$ = $(a)^{\frac{2}{3}}$

5. $\sqrt[2]{7x}$ = $(7x)^{\frac{1}{2}}$

6. $\sqrt[2]{7x^3}$ = $7^{\frac{1}{2}}x^{\frac{3}{2}}$

7. $\sqrt[4]{(7x)^3}$ = $(7x)^{\frac{3}{4}}$

8. $\sqrt[3]{(5xy)^6}$ = $(5xy)^{\frac{6}{3}}$ or $(5xy)^2$