SM 2

Date: **Section:**

Objective:

If n is a positive integer greater than 1 and $\sqrt[n]{a}$ is a real number then $a^{1/n} = \sqrt[n]{a}$.

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Examples: Write an equivalent expression using radical notation and, if possible, simplify.

a) $25^{1/2}$ b) $64^{1/3}$ c) $\left(xy^2z\right)^{1/6}$

d) $\left(36x^{10}\right)^{1/2}$ e) $2x^{1/4}$ f) $\left(2x\right)^{1/4}$

Examples: Write an equivalent expression using exponential notation.

a) $\sqrt[7]{2xy}$ b) $\sqrt[4]{\frac{ab^3}{7}}$ c) $\sqrt{3z}$ d) $3\sqrt{z}$ e) $\sqrt[5]{xy^2z}$

Positive Rational Exponents

If m and n are positive integers (where $n \neq 1$) and $\sqrt[n]{a}$ exists, then $a^{m/n} = \sqrt[n]{a^m} = \left(\sqrt[n]{a}\right)^m$.

e.g.) $8^{2/3} =$

OR

e.g.) $8^{2/3} =$

Examples: Write an equivalent expression using radical notation and simplify.

a) $t^{5/6}$ b) $9^{3/2}$ c) $64^{2/3}$ d) $\left(2x\right)^{3/4}$ e) $2x^{3/4}$

Examples: Write an equivalent expression using exponential notation.

a) $\sqrt[3]{x^5}$ b) $\sqrt[7]{9^2}$ c) $\left(\sqrt[5]{6n}\right)^3$ d) $6\sqrt[5]{n^3}$ e) $\left(\sqrt[4]{2m}\right)^2$

Negative Rational Exponents

For any rational number m/n, and any nonzero real number $a^{m/n}$, $a^{-m/n} = \frac{1}{a^{m/n}}$.

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Examples: Write an equivalent expression using positive exponents and, if possible, simplify.

a) $49^{-1/2}$ b) $(3mn)^{-2/5}$ c) $7x^{-2/3}$

Rules of Exponents:

Examples: Use the laws of exponents to simplify.

a) $2^{2/5} \cdot 2^{1/5}$ b) $\frac{x^{7/3}}{x^{4/3}}$ c) $\left(19^{2/5}\right)^{5/3}$ d) $x^{1/2} \cdot x^{2/3}$

e) $y^{-4/7} \cdot y^{6/7}$ f) $\frac{z^{3/4}}{z^{2/5}}$ g) $\frac{x^{3/4} \cdot x^{1/6} \cdot y}{y^{1/2}}$ h) $\frac{\left(2x^{2/5}y^{-1/3}\right)^5}{x^2 y}$

Steps To Simplify Radical Expressions:

1. .
2. .
3. .

Examples: Use rational exponents to simplify. Do not use exponents that are fractions in the final answer.

a) $\sqrt[8]{z^4}$

b) $\left(\sqrt[3]{a^2bc^4}\right)^9$

c) $\sqrt{x}\cdot\sqrt[4]{x}$

d) $\sqrt[6]{y^2}\cdot\sqrt[9]{y}$

e) $\dfrac{\sqrt[3]{k}}{\sqrt[7]{k^2}}$

f) $\dfrac{\sqrt[8]{m^4}}{\sqrt[6]{m}}$

g) $\sqrt[4]{\sqrt[5]{x}}$

h) $\sqrt[3]{2}\cdot\sqrt[5]{3}$