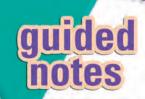**NAME**

Module 17   Simplifying Radical Expressions
Lesson 1   Simplifying Radicals

Lesson Objectives

- Simplify square root expressions.
- Simplify cube root expressions.

a is a square root of *b* if $\underline{a^2 = b}$.

$\sqrt{}$ means the $\underline{\textbf{nonnegative (principal)}}$ square root.

Product Property for Square Roots:

For nonnegative numbers *a* and *b*, $\underline{\sqrt{a \cdot b} = \sqrt{a}\sqrt{b}}$.

For a square root expression to be simplified, the $\underline{\textbf{radicand}}$

must contain no perfect $\underline{\textbf{square}}$ factors other than

$\underline{\textbf{one}}$.

The square root of a $\underline{\textbf{negative}}$ number is not a real number.

(1) Simplify: $\sqrt{63}$ $\underline{\mathbf{3\sqrt{7}}}$

(2) Simplify: $\sqrt{80}$ $\underline{\mathbf{4\sqrt{5}}}$

(3) Simplify: $\sqrt{-8}$ $\underline{\textbf{not a real number}}$

a is a cube root of *b* if $\underline{a^3 = b}$.

For $\sqrt[n]{a}$, *n* is the $\underline{\textbf{index}}$ and *a* is the $\underline{\textbf{radicand}}$.

The cube root of a number has the same sign as $\underline{\textbf{that number}}$.

Product Property for Cube Roots:

For any numbers *a* and *b*, $\underline{\sqrt[3]{a \cdot b} = \sqrt[3]{a}\sqrt[3]{b}}$.

For a cube root expression to be simplified, the $\underline{\textbf{radicand}}$

must contain no perfect $\underline{\textbf{cube}}$ factors other than

$\underline{\textbf{one}}$.

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4 ▶ Simplify: $\sqrt[3]{128}$ **$4\sqrt[3]{2}$**

5 ▶ Simplify: $\sqrt[3]{-500}$ **$-5\sqrt[3]{4}$**

$\sqrt{x^2} =$ **$|x|$**

$\sqrt[3]{x^3} =$ **x**