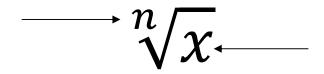
Lesson 1 Simplifying Radical Expressions

Recall:



Recall: Multiplication Property of Radicals:

$$\sqrt[n]{ab} = \sqrt[n]{a} \cdot \sqrt[n]{b},$$

Where n is a natural number, and a and b are real numbers

Examples Simplify the following radicals.

1.
$$\sqrt{50x^7}$$

2.
$$\sqrt[3]{24x^{10}y^3}$$

Similarly to the Multiplication Property of Radicals, we can simplify radicals using the division property of radicals.

Equivalent expressions for any number have the same value.

•
$$\sqrt{\frac{16}{9}}$$
 is equivalent to $\frac{\sqrt{16}}{\sqrt{9}}$ because:

$$\sqrt{\frac{16}{9}} = \sqrt{\frac{4}{3} \cdot \frac{4}{3}} \quad \text{and} \quad \frac{\sqrt{16}}{\sqrt{9}} = \frac{\sqrt{4 \cdot 4}}{\sqrt{3 \cdot 3}}$$
$$= \frac{4}{3}$$
$$= \frac{4}{3}$$

A similar result is true for any index, n.

Division Property of Radicals:

$$\sqrt[n]{\frac{a}{b}} = \frac{\sqrt[n]{a}}{\sqrt[n]{b}}, where \ n \in \mathbb{N} \ and \ a, b, \sqrt[n]{a}, \sqrt[n]{b} \in \mathbb{R}, b \neq 0$$

Examples

3. Write
$$\sqrt[3]{-\frac{40}{81}}$$
 as a mixed radical.

4. Write
$$-2\sqrt[3]{\frac{3}{4}}$$
 as an entire radical

Examples

Simply, if possible. State the permissible values of the variable.

5.
$$\sqrt{5a^2}$$

6.
$$\sqrt{-27b^5}$$

7.
$$\sqrt[4]{7z}$$

8.
$$\sqrt[3]{24x^7}$$