Section 7.2: Rational Exponents

Radical Notation

- If n is a positive integer and $b^n = a$, then $b = \sqrt[n]{a} = a^{\frac{1}{n}}$ (assuming $\sqrt[n]{a}$ is a real number).
- The expression $\sqrt[n]{a}$ is called a radical or radical expression.
- The symbol $\sqrt[n]{}$ is a radical sign.
- **n** is called the index.
- **a** is called the radicand.

About the index n:

For any integer n > 1, we define $a^{\frac{1}{n}}$ to be the nth root of a, or $\sqrt[n]{a}$.

The General Form $a^{\frac{m}{n}}$

If n is a positive integer, m is any integer, and $a^{\frac{1}{n}}$ is a real number, then

$$a^{\frac{m}{n}} = (a^{\frac{1}{n}})^m = (am)^{\frac{1}{n}}$$

In radical notation:

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

Example 1: Use radical notation to write the expression. Simplify if possible.