

Extending the Laws of Exponents

Converting: Radicals – Exponentials

Definition If p denotes an integer, r is a positive integer, and b a positive real number, then we define:

$$b^{\frac{p}{r}} = (\sqrt[r]{b})^p, \quad \rightarrow \quad b^{\frac{\text{exponent}}{\text{index}}}$$

Example Rewrite $\sqrt[3]{x^2}$ as an exponential
 $x^{\frac{\text{exponent}}{\text{index}}} = x^{\frac{2}{3}}$

Example Rewrite as $y^{\frac{4}{5}}$ as a radical
4 is the exponent, 5 is the index, $\sqrt[5]{y^4}$

Rewrite the following in exponential notation, do not simplify.

1. $\sqrt{x^3}$

1a. $\sqrt[5]{y^3}$

2. $\sqrt[4]{b^3}$

2a. $\sqrt[3]{x^2}$

3. $\sqrt[2]{b^1}$

3a. \sqrt{b}

4. $\sqrt[2]{b^3c^5}$

4a. $\sqrt[3]{x^5y^2}$

5. $\sqrt{x^4z^3}$

5a. $\sqrt{xyz^3}$

6. $\sqrt[2]{25xy^3}$

6a. $\sqrt[3]{27x^3y^6}$