



Learning Goals

- ◆ Simplify expressions with rational exponents.
- ◆ Write rational powers using radicals.

A rational exponent is an exponent written as a fraction.

You can write each n th root using a rational exponent. If n is an integer greater than 1, then $\sqrt[n]{a} = a^{\frac{1}{n}}$

Write each radical as a power.

1. $\sqrt[3]{7}$
 $7^{\frac{1}{3}}$

2. $\sqrt[5]{x}$
 $x^{\frac{1}{5}}$

3. \sqrt{y}
 $y^{\frac{1}{2}}$

Write each power as a radical.

1. $8^{\frac{1}{4}}$
 $\sqrt[4]{8}$

2. $z^{\frac{1}{6}}$
 $\sqrt[6]{z}$

3. $m^{\frac{1}{7}}$
 $\sqrt[7]{m}$

Converting between Radical Form and Rational Exponent Form

$$\sqrt[i]{x^e} = x^{\frac{e}{i}}$$

Think “EOI” – Exponent over Index”

Write each expression in radical form. Show your work and simplify your answer, if possible.

1. $4^{\frac{3}{2}}$

$$\sqrt{4^3} = \sqrt{64} = 8$$

or

$$(\sqrt{4})^3 = 2^3 = 8$$

2. $5^{\frac{3}{4}}$

$$\sqrt[4]{5^3} = \sqrt[4]{125}$$

3. $x^{\frac{4}{5}}$

$$\sqrt[5]{x^4}$$

4. $y^{\frac{2}{3}}$

$$\sqrt[3]{y^2}$$

Write each expression in rational exponent form. Show your work and simplify your answer, if possible.

1. $(\sqrt[4]{2})^3$

$$2^{\frac{3}{4}}$$

2. $(\sqrt{5})^4$

$$5^{\frac{4}{2}} = 5^2 = 25$$

3. $(\sqrt[5]{x})^8$

$$x^{\frac{8}{5}}$$

4. $(\sqrt[5]{y})^{10}$

$$y^{\frac{10}{5}} = y^2$$