

Daily Quiz

Simplify the following.

A

$$\left(\frac{a^3 b^4}{a^4 b^{-8}}\right)^{-2}$$

$$\left(\frac{b^{4+8}}{a^{4-3}}\right)^{-2}$$

$$\left(\frac{b^{12}}{a^1}\right)^{-2} = \frac{b^{-24}}{a^{-2}}$$

$$\frac{a^2}{b^{24}}$$

B

$$\sqrt{147a^5b^7}$$

M3.L3.2

Simplifying Expressions with Rational Exponents and Radicals

Objective: We will be able to write and simplify radical expression as an expression with rational exponent by using the properties of exponents.

1 Example

Simplify each expression. Assume all variables are positive.

A

$$\sqrt[3]{(xy)^9}$$

$$(xy)^{\frac{9}{3}} = (xy)^3$$

$$x^3 y^3$$

B

$$\sqrt[5]{x} \sqrt[5]{x^2}$$

$$x^{\frac{1}{5}} \cdot x^{\frac{2}{5}}$$

$$x^{\frac{1}{5} + \frac{2}{5}} = x^{\frac{3}{5}}$$

$$x^{\frac{3}{5}} = \sqrt[5]{x^3}$$

2 Example

Simplify each expression. Assume all variables are positive.

A

$$(x^2 y)^2 \sqrt[4]{y^4}$$

$$x^4 y^2 \cdot y^{\frac{4}{4}} = x^4 y^3$$

$$x^{\frac{9}{6}} = \sqrt[6]{x^9}$$

B

$$\sqrt[4]{x^8}$$

$$\frac{\sqrt[4]{x^8}}{\sqrt[4]{x^6}} = \frac{x^{\frac{8}{4}}}{x^{\frac{6}{4}}} = \frac{x^2}{x^{\frac{3}{2}}}$$

$$x^{\frac{4}{4} - \frac{3}{4}} = x^{\frac{1}{4}}$$

$$x^{\frac{2}{4} - \frac{1}{4}} = x^{\frac{1}{2}}$$

$$\sqrt{x}$$

3 Example

find the product

$$\left(\sqrt[3]{a^4 b}\right) \left(\sqrt[3]{a^2 b^2}\right)$$

$$a^{\frac{4}{3}} b^{\frac{1}{3}} \cdot a^{\frac{2}{3}} b^{\frac{2}{3}}$$

$$a^{\frac{4}{3} + \frac{2}{3}} b^{\frac{1}{3} + \frac{2}{3}}$$

$$a^{\frac{6}{3}} b^{\frac{3}{3}}$$

$$a^2 b$$

4 Example

find the product

$$x^2 y^{\frac{2}{3}} \cdot 2x^{\frac{1}{2}} y^{\frac{5}{6}}$$

steps

$$2 x^2 x^{\frac{1}{2}} y^{\frac{2}{3}} y^{\frac{5}{6}}$$

$$2 x^{2+\frac{1}{2}} y^{\frac{2}{3}+\frac{5}{6}}$$

$$2 x^{\frac{4}{2}+\frac{1}{2}} y^{\frac{4}{6}+\frac{5}{6}}$$

$$2 x^{\frac{5}{2}} y^{\frac{9}{6}}$$

$$2 x^{\frac{5}{2}} y^{\frac{3}{2}} \text{ or } 2x^2 y^{\frac{3}{2}}$$

- 1 Re-arrange with like terms.
- 2 use (•) prop. of exponents to combine.
- 3 get common denominators.
- 4 simplify.

5 Example find the product

	steps
a) $(\sqrt{x^3 y^3})(\sqrt[3]{x^2 y^2})$	
① $x^{3/2} y^{3/2} x^{2/3} y^{2/3}$	① Change from radical to exponential form
② $x^{3 \cdot 3/6 + 2 \cdot 2/6} y^{3 \cdot 3/6 + 2 \cdot 2/6}$	② Combine like terms
③ $x^{9/6 + 4/6} y^{9/6 + 4/6}$	③ get common denominator
④ $x^{13/6} y^{13/6}$	④ simplify
or $x^2 y^2 \sqrt[6]{xy}$	