

What's Going On?

Checking In

Minds on

Applying the Basics

Action!

Simplifying Exponential Expressions

Consolidation

Big Question

Learning Goal - I will be able to simplify algebraic expressions involving powers and radicals.

Minds on**L.G.L.**

Simplify. Express answer in rational form with positive exponents.
Show, and explain, all of your work!

$$\left(\frac{(x^{18})^{-\frac{1}{6}}}{\sqrt[5]{243x^{10}}} \right)^{0.5}$$

$$\begin{aligned}
 & \left(\frac{(x^{18})^{-\frac{1}{6}}}{\sqrt[5]{243x^{10}}} \right)^{0.5} \\
 = & \left(\frac{(x^{18})^{-\frac{1}{6}}}{243^{\frac{1}{5}} x^{\frac{10}{5}}} \right)^{\frac{1}{2}} \\
 = & \left(\frac{x^{-\frac{18}{6}}}{3x^2} \right)^{\frac{1}{2}} \\
 = & \left(\frac{x^{-3}}{3x^2} \right)^{\frac{1}{2}} \\
 = & \left(\frac{1}{3} x^{-5} \right)^{\frac{1}{2}} \\
 = & \left(\frac{1}{3x^5} \right)^{\frac{1}{2}} \\
 = & \frac{1}{\sqrt{3x^5}} \\
 = & \frac{1}{\sqrt{3x^5}}
 \end{aligned}$$

Action!

Practice Quiz

$$5^{-4}$$

$$= \frac{1}{5^4}$$

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

$$(-9^4)^{-1}$$

$$= -9^{-4}$$

$$= -\frac{1}{9^4}$$

$$[(7^{-3})^{-2}]^{-2}$$

$$= (7^6)^{-2}$$

$$= 7^{-12}$$

$$= \frac{1}{7^{12}}$$

$$\frac{(5^3)^{-2}}{5^{-6}}$$

$$= \frac{5^{-6}}{5^{-6}}$$

$$= 5^0$$

$$\left(3^{-2} (3^3)\right)^{-2}$$

$$= (3^1)^{-2}$$

$$= 3^{-2}$$

$$= \frac{1}{3^2}$$

$$8^{\frac{2}{3}} \left(8^{\frac{1}{3}} \right)$$

$$= 8^{\frac{3}{3}}$$

$$= 8^1$$

$$\frac{9^{-\frac{1}{5}}}{9^{\frac{2}{3}}}$$

$$= 9^{-\frac{1}{5} - \frac{2}{3}}$$

$$= 9^{-\frac{3}{15} - \frac{10}{15}}$$

$$= 9^{-\frac{13}{15}}$$

$$= \frac{1}{9^{\frac{13}{15}}}$$

$$10^{-\frac{4}{5}} \left(10^{\frac{1}{15}} \right) \div 10^{\frac{2}{3}}$$

$$= 10^{-\frac{4}{5} + \frac{1}{15} - \frac{2}{3}}$$

$$= 10^{-\frac{12}{15} + \frac{1}{15} - \frac{10}{15}}$$

$$= 10^{-\frac{21}{15}}$$

$$= \frac{1}{10^{\frac{21}{15}}}$$

$$= \frac{1}{10^{\frac{7}{5}}}$$

$$y^{10} (y^4)^{-3}$$

$$= y^{10} (y^{-12})$$

$$= y^{-2}$$

$$= \frac{1}{y^2}$$

$$\frac{w^4 (w^{-3})}{(w^{-2})^{-1}}$$

$$= \frac{w^1}{w^2}$$

$$= w^{-1}$$

$$= \frac{1}{w^1}$$

$$\frac{(b^{-7})^{-2}}{b(b^{-5})b^9}$$

$$= \frac{b^{14}}{b^{1-5+9}}$$

$$= \frac{b^{14}}{b^5}$$

$$= b^9$$

$$\frac{m^2 n^2}{(m^3 n^{-2})^2}$$

$$= \frac{m^2 n^2}{m^6 n^{-4}}$$

$$= m^{2-6} n^6$$

$$= \frac{n^6}{m^4}$$

$$\left(\frac{(ab)^{-1}}{a^2 b^{-3}} \right)^{-2}$$

$$= \left(\frac{a^{-1} b^{-1}}{a^2 b^{-3}} \right)^{-2}$$

$$= \frac{a^2 b^2}{a^{-4} b^6}$$

$$= a^6 b^{-4}$$

$$= \frac{a^6}{b^4} .$$

$$\frac{p^{-5}(r^3)^2}{(p^2r)^2(p^{-1})^{-2}}$$

$$= \frac{p^{-5}r^6}{p^4r^2 \cdot p^2}$$

$$= \frac{p^{-5}r^6}{p^6r^2}$$

$$= p^{-11}r^4$$

$$= \frac{r^4}{p^{11}}$$

$$\left(\frac{(x^3 y)^{-1} (x^4 y^3)}{(x^2 y^{-3})^{-2}} \right)^{-1}$$

$$= \left(\frac{(x^{-3} y^{-1})(x^4 y^3)}{(x^{-4} y^6)} \right)^{-1}$$

$$= \left(\frac{x^1 y^2}{x^{-4} y^6} \right)^{-1}$$

$$= (x^5 y^{-4})^{-1}$$

$$= x^{-5} y^4$$

$$= \frac{y^4}{x^5}$$

Consolidation

Practice Practice!