

Name: _____

Date: _____

Learning Goal 5.3

Apply order of operations to radical expressions.

Simplify, leaving numbers as radicals in lowest terms. Do not evaluate. Remember your order of operations!

$$\begin{aligned} \text{a. } (25a^4b^2)^{3/2} &= (5a^2b)^3 \\ &= 125a^6b^3 \end{aligned}$$

$$\begin{aligned} \text{b. } (x^3y^{-3/2})(x^{-1}y^{1/2}) &= x^2y^{-2/2} \\ &= \frac{x^2}{y} \end{aligned}$$

$$\begin{aligned} \text{c. } \frac{12x^{-5}y^{5/2}}{3x^{1/2}y^{-1/2}} &= \frac{12y^{5/2}y^{1/2}}{3x^{1/2}x^5} \\ &= \frac{4y^{5/2}y^{1/2}}{x^{1/2}x^5} \\ &= \frac{4y^{6/2}}{x^{11/2}} \\ &= \frac{4y^3}{\sqrt{x^{11}}} \\ &= \frac{4y^3}{x^5\sqrt{x}} \quad \text{*rationalize*} \\ &= \frac{4y^3\sqrt{x}}{x^5x} \\ &= \frac{4y^3\sqrt{x}}{x^6} \end{aligned}$$

$$\begin{aligned} \text{d. } \left(\frac{50x^2y^4}{2x^4y^7}\right)^{1/2} &= \left(\frac{25x^2y^4}{x^4y^7}\right)^{1/2} \\ &= \left(\frac{25y^4}{x^2y^7}\right)^{1/2} \\ &= \left(\frac{25}{x^2y^3}\right)^{1/2} \\ &= \frac{5}{xy^{3/2}} \\ &= \frac{5}{x\sqrt{y^3}} \quad \text{*rationalize*} \\ &= \frac{5\sqrt{y^3}}{xy^3} \end{aligned}$$

$$\text{e. } (s^{-1}t^{1/3})(s^4t^3) = s^3t^{10/3}$$

$$\begin{aligned} \text{f. } \left(\frac{4c^{1/3}}{d^3}\right)^{-3} &= \left(\frac{d^3}{4c^{1/3}}\right)^3 \\ &= \frac{d^9}{64c} \end{aligned}$$

$$\begin{aligned}
 \text{g. } \left(\frac{2x^{-4}y^{-3}}{4x^2y^{-5}}\right)^{-4} &= \left(\frac{4x^2y^{-5}}{2x^{-4}y^{-3}}\right)^4 \\
 &= \left(\frac{2x^2y^{-5}}{x^{-4}y^{-3}}\right)^4 \\
 &= \left(\frac{2x^2x^4y^{-5}}{y^{-3}}\right)^4 \\
 &= \left(\frac{2x^2x^4}{y^5y^{-3}}\right)^4 \\
 &= \left(\frac{2x^2x^4y^3}{y^5}\right)^4 \\
 &= \left(\frac{2x^6y^3}{y^5}\right)^4 \\
 &= \left(\frac{2x^6}{y^2}\right)^4 \\
 &= \frac{16x^{24}}{y^8}
 \end{aligned}$$

$$\begin{aligned}
 \text{h. } \left(\frac{x^6z^{-1/3}}{-125y^{-9}z^{8/3}}\right)^{-1/3} &= \left(\frac{-125y^{-9}z^{8/3}}{x^6z^{-1/3}}\right)^{1/3} \\
 &= \left(\frac{-125z^{8/3}}{x^6y^9z^{-1/3}}\right)^{1/3} \\
 &= \left(\frac{-125z^{8/3}z^{1/3}}{x^6y^9}\right)^{1/3} \\
 &= \left(\frac{-125z^9/3}{x^6y^9}\right)^{1/3} \\
 &= \left(\frac{-125z^3}{x^6y^9}\right)^{1/3} \\
 &= -\frac{5z}{x^2y^3}
 \end{aligned}$$