

3

$$\begin{aligned}
 & \frac{x^2 \sqrt[5]{x^3} \sqrt[15]{x^{10}}}{\sqrt[3]{x^4} \sqrt[3]{x^{10}}} = x^2 \sqrt[15]{\frac{x^9 \cdot x^{10}}{x^{20} \cdot x^{50}}} \\
 & = \sqrt[15]{\frac{x^{30} \cdot x^9 \cdot x^{10}}{x^{20} \cdot x^{50}}} = \sqrt[15]{\frac{x^{49}}{x^{70}}} = \sqrt[15]{\frac{1}{x^{21}}} = \sqrt[5]{\frac{1}{x^7}}
 \end{aligned}$$

4. a) $\log_x 7 = -2 \iff x^{-2} = 7 \implies \frac{1}{x^2} = 7$

$$x^2 = \frac{1}{7} \implies \boxed{x = \frac{\sqrt{7}}{7}}$$

b) $\log_x 7 = \frac{1}{2} \iff x^{1/2} = 7 \implies \boxed{x = 7^2 = 49}$

c) $\log_7 x^4 = 2 \iff x^4 = 7^2 \implies \boxed{x = \sqrt{7}}$

e) $\log_2 x = -\frac{1}{2} \iff 2^{-1/2} = x \implies \boxed{x = \frac{1}{\sqrt{2}}}$

$$\boxed{x = \frac{\sqrt{2}}{2}}$$

f) $\log_{\frac{1}{8}} x = \frac{1}{3} \implies \left(\frac{1}{8}\right)^{1/3} = x \implies \boxed{x = \frac{1}{2}}$

5. a) $\log A = \log \left(\frac{x^3 y}{z^5} \right) = 3 \log x + \log y - 5 \log z$

b) $\log \sqrt{x^3 y^5 z^2} = \frac{1}{2} (3 \log x + 5 \log y + 2 \log z)$

$$\textcircled{6} \text{ a) } \lg 7(x+3) = \lg (x-3)$$

$$7(x+3) = x-3$$

$$7x + 21 = x - 3 \Rightarrow 6x = -24$$

$$\boxed{x = -4}$$

No solve

$$\text{b) } \lg \left(\frac{x-3}{x+5} \right) = \lg 8$$

$$\frac{x-3}{x+5} = 8 \Rightarrow x-3 = 8x+40 \Rightarrow$$

$$\Rightarrow 7x = -43 \quad \boxed{x = -\frac{43}{7}} \quad \text{No solve}$$

$$\textcircled{7} \text{ a) } 4\sqrt{18} - 6\sqrt{8} + 8\sqrt{72} =$$

$$= 4 \cdot 3\sqrt{2} - 6 \cdot 2\sqrt{2} + 8 \cdot 3 \cdot 2\sqrt{2} =$$

$$= 12\sqrt{2} - 12\sqrt{2} + 48\sqrt{2} = 48\sqrt{2}$$

$$\text{b) } \frac{2 \sqrt[3]{\sqrt{2^3}}}{\sqrt[4]{2^3}} = \frac{2 \sqrt[6]{2^3}}{\sqrt[4]{2^3}} = \frac{2 \sqrt{2}}{\sqrt[4]{2^3}} = 2 \sqrt[4]{\frac{2^2}{2^3}} =$$

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