

(2)

$$\begin{aligned}
 & \log_2 56 + 2\log_2 12 - 2\log_2 63 = \\
 & = \log_2 56 + \log_2 12^2 - \log_2 63^2 = \log_2 \frac{56 \cdot 144}{3969} = \\
 & = \log_2 \frac{128}{63} = \log_2 2^7 - \log_2 63 = 7\log_2 2 - \log_2 63 = 7 - \log_2 63 \\
 & = \log_{12} 3 + 4\log_{144} 2 = \log_{12} 3 + 4\log_{12^2} 2 = \log_{12} 3 + \frac{4}{2} \log_{12} 2 = \\
 & = \log_{12} 3 + \log_{12} 2^2 = \log_{12} (3 \cdot 4) = \log_{12} 12 = 1
 \end{aligned}$$

$$\begin{aligned}
 & \frac{1}{2} \log_{\frac{1}{3}} 36 - \log_7 14 - \log_7 21 = \\
 & = \log_{\frac{1}{3}} \sqrt{36} - \log_7 (2 \cdot 7) - \log_7 (3 \cdot 7) = \cancel{\log_3 (2 \cdot 3)} - \log_7 (2 \cdot 7) \\
 & = -\log_3 (2 \cdot 3) - \log_7 2 - \log_7 7 - \log_7 3 - \log_7 7 = \\
 & = -\log_3 2 - \log_3 3 - \log_7 2 - 1 - \log_7 3 - 1 = \\
 & = -\log_3 2 - 1 - \log_7 2 - \log_7 3 - 2 = -(3 + \log_3 2 + \log_7 (3 \cdot 2)) = \\
 & = -(3 + \log_3 2 + \log_7 6)
 \end{aligned}$$

$$\begin{aligned}
 1. a) \frac{\sqrt[3]{9} \cdot 3^5}{15^0 \cdot 27^3 \cdot 3^{\frac{1}{3}}} &= \frac{(3^2)^{\frac{1}{3}} \cdot 3^5}{1 \cdot (3^3)^3 \cdot 3^{\frac{1}{3}}} = \frac{3^{\frac{2}{3}} \cdot 3^5}{3^9 \cdot 3^{\frac{1}{3}}} = \frac{3^{\frac{1}{3}}}{3^4} = 3^{-\frac{11}{3}} = \\
 &= \frac{1}{\sqrt[3]{3^{11}}} = \frac{1}{3^3 \sqrt[3]{3^2}} = \frac{1}{27 \sqrt[3]{9}}
 \end{aligned}$$

$$\begin{aligned}
 5) \frac{2^9 \cdot \sqrt[5]{16} \cdot 8^0}{4^4 \cdot 2^{-\frac{1}{5}}} &= \frac{2^9 \cdot (2^4)^{\frac{1}{5}} \cdot 1}{(2^2)^4 \cdot 2^{-\frac{1}{5}}} = \frac{2^9 \cdot 2^{\frac{4}{5}} \cdot 2^{\frac{1}{5}}}{2^8} = 2^{9-8} \cdot 2^{\frac{4}{5} + \frac{1}{5}} = \\
 &= 2^1 \cdot 2^1 = 2 \cdot 2 = 4
 \end{aligned}$$

$$\begin{aligned}
 6) \frac{\sqrt{8} \cdot 2^7}{9^0 \cdot 4^3 \cdot 2^{-\frac{1}{2}}} &= \frac{(2^3)^{\frac{1}{2}} \cdot 2^7 \cdot 2^{\frac{1}{2}}}{1 \cdot (2^2)^3} = \frac{2^{\frac{3}{2}} \cdot 2^{\frac{1}{2}} \cdot 2^7}{2^6} = 2^{\frac{3}{2} + \frac{1}{2} + 7-6} = \\
 &= 2^{\frac{3}{2}} \cdot 2^1 = 2 \cdot 2 = 4
 \end{aligned}$$

$$\begin{aligned}
 2) \frac{5^7 \cdot \sqrt[4]{125}}{25^2 \cdot 5^{-\frac{1}{4}} \cdot 7^0} &= \frac{5^7 \cdot (5^3)^{\frac{1}{4}} \cdot 5^{\frac{1}{4}}}{(5^2)^2 \cdot 1} = \frac{5^7 \cdot 5^{\frac{3}{4}} \cdot 5^{\frac{1}{4}}}{5^4} = 5^{7-4} \cdot 5^{\frac{3}{4} + \frac{1}{4}} =
 \end{aligned}$$