

Logaritmos

$$\textcircled{1} \lg \sqrt[4]{4 \sqrt{2}} = \lg 2^2 \cdot 2^{\frac{1}{4}} = \lg 2^{\frac{9}{4}} = \boxed{\frac{9}{4} \lg 2}$$

$$\begin{aligned} \textcircled{2} \lg \sqrt[3]{0.16} &= \lg \sqrt[3]{\frac{16}{100}} = \lg \frac{\sqrt[3]{16}}{\sqrt[3]{100}} = \lg \sqrt[3]{16} - \lg \sqrt[3]{100} \\ &= \frac{1}{3} \lg 16 - \frac{1}{3} \lg 100 = \frac{1}{3} \lg 2^4 - \frac{1}{3} \lg 10^2 = \\ &= \frac{4}{3} \lg 2 - \frac{2}{3} \lg 10 = \boxed{\frac{4}{3} \lg 2 - \frac{2}{3}} \end{aligned}$$

$$\begin{aligned} \textcircled{3} \lg \frac{\sqrt[3]{9}}{3} &= \lg \sqrt[3]{9} - \lg 3 = \frac{1}{3} \lg 3^2 - \lg 3 = \left(\frac{2}{3} - 1\right) \lg 3 \\ &= \boxed{-\frac{1}{3} \lg 3} \end{aligned}$$

$$\begin{aligned} \textcircled{4} \lg \sqrt{0.6} &= \lg \sqrt{\frac{6}{10}} = \lg \sqrt{6} - \lg 10 \\ &= \frac{1}{2} \lg 2 \cdot 3 - \lg 10 = \boxed{\frac{1}{2} \lg 2 + \frac{1}{2} \lg 3 - 1} \end{aligned}$$

$$\begin{aligned} \textcircled{5} \lg \frac{\sqrt[3]{5}}{4} &= \lg \sqrt[3]{5} - \lg 4 = \frac{1}{3} \lg 5 - 2 \lg 2 = \\ &= \frac{1}{3} \lg \frac{10}{2} - 2 \lg 2 = \frac{1}{3} \lg 10 - \frac{1}{3} \lg 2 - 2 \lg 2 \\ &= \frac{1}{3} + \left(-\frac{1}{3} - 2\right) \lg 2 = \frac{1}{3} - \frac{7}{3} \lg 2 \end{aligned}$$

$$\begin{aligned} \textcircled{6} \lg \sqrt[4]{0.12} &= \lg \sqrt[4]{\frac{12}{100}} = \lg \sqrt[4]{2^2 \cdot 3} - \lg \sqrt[4]{100} \\ &= \frac{1}{4} [2 \lg 2 + \lg 3] - \frac{1}{4} \lg 10^2 \\ &= \frac{2}{4} \lg 2 + \frac{1}{4} \lg 3 - \frac{2}{4} \lg 10 \\ &= \boxed{\frac{1}{2} \lg 2 + \frac{1}{4} \lg 3 - \frac{1}{2}} \end{aligned}$$

$$\textcircled{7} \quad \log_3 (2x-1) - \log_3 2 = 2$$

$$\log_3 \frac{2x-1}{2} = 2 \rightarrow \frac{2x-1}{2} = 3^2 \rightarrow \frac{2x-1}{3} = 9 \rightarrow 2x-1 = 27$$

$$\rightarrow 2x = 28 \rightarrow \boxed{x = 14}$$

$$\textcircled{8} \quad \log_2 (x-3) + 2 \log_2 3 = 2$$

$$\log_2 (x-3) + \log_2 3^2 = 2 \rightarrow \log_2 (x-3) + \log_2 9 = 2 \rightarrow$$

$$\log_2 (x-3) \cdot 9 = 2 \rightarrow \log_2 (9x-27) = 2 \rightarrow 9x-27 = 2^2$$

$$\rightarrow 9x-27 = 4 \rightarrow 9x = 31 \rightarrow x = \frac{31}{9}$$

$$\textcircled{9} \quad 2 \log_3 x - \frac{1}{2} \log_3 16 = 2 + \log_3 2 + \log_3 (x^2+1)$$

Solusi

$$\log_3 x^2 - \log_3 16^{\frac{1}{2}} = \log_3 2 + \log_3 (x^2+1) = 2$$

$$\log_3 \frac{x^2}{4 \cdot 2 \cdot (x^2+1)} = 2 \rightarrow \frac{x^2}{8(x^2+1)} = 2 \rightarrow$$

$$x^2 = 16x^2 + 16 \rightarrow -15x^2 = 16 \rightarrow x^2 = \frac{-16}{15}$$

$$\rightarrow x = \pm \sqrt{\frac{-16}{15}} \Rightarrow \text{Solusi imajiner}$$

$$\textcircled{10} \quad \log_5 (x^2-2) - 2 \log_5 x = \frac{1}{2} \log_5 9 + 2 \log_5 2$$

Solusi

$$\log_5 (x^2-2) - \log_5 x^2 = \log_5 9^{\frac{1}{2}} + \log_5 2^2$$

$$\log_5 (x^2-2) - \log_5 x^2 = \log_5 3 + \log_5 4$$

$$\log_5 \frac{(x^2-2)}{x^2} = \log_5 3 \cdot 4 \rightarrow \frac{x^2-2}{x^2} = 12 \rightarrow$$

$$x^2-2 = 12x^2$$

$$-11x^2 = 2$$

$$x = \pm \sqrt{\frac{-2}{11}}$$

$$(11) \begin{cases} \lg_3 (2x+1) + \frac{1}{2} \lg_3 4 = 1 \\ 2^{x+1} \sqrt[3]{4^{y+2}} = 8 \end{cases}$$

Solucii

$$\lg_3 (2x+1) + \lg_3 4^{\frac{1}{2}} = 1 \quad \left| \quad \lg_3 (2x+1) + \lg_3 2 = 1 \right.$$

$$2^{x+1} \cdot (2^2)^{\frac{y+2}{3}} = 2^3 \quad \left| \quad 2^{x+1} \cdot 2^{\frac{2y+4}{3}} = 2^3 \right.$$

$$\lg_3 (2x+1) + 2 = 1 \quad \left| \rightarrow 4x + 2 = 3 \right.$$

$$2^{x+1} + \frac{2y+4}{3} = 2^3 \quad \left| \quad x+1 + \frac{2y+4}{3} = 3 \right. \rightarrow$$

$$4x = 3 - 2 \quad \left| \quad 4x = 1 \rightarrow x = \frac{1}{4} \right.$$

$$3x + 3 + 2y + 4 = 9 \quad \left| \quad 3x + 2y = 2 \right.$$

$$3 \cdot \left(\frac{1}{4}\right) + 2y = 2$$

$$\frac{3}{4} + 2y = 2 \rightarrow 3 + 8y = 8$$

$$8y = 5$$

$$y = \frac{5}{8}$$

$$x = \frac{1}{4}$$

$$y = \frac{5}{8}$$

$$(12) \begin{cases} \lg_x (y-2) - \lg_x y = 1 \\ \lg_2 (2x-y) - \lg_2 3 = 0 \end{cases}$$

Solucii

$$\lg_x \frac{(y-2)}{y} = 1 \quad \left| \quad \frac{y-2}{y} = x \right. \quad \left| \quad y-2 = xy \right.$$

$$\lg_2 \frac{(2y-2)}{3} = 0 \quad \left| \quad \frac{2y-2}{3} = 2^0 = 1 \right. \quad \left| \quad 2y-2 = 3 \right.$$

$$2y = 5$$

$$y = \frac{5}{2}$$

$$xy = y-2$$

$$x \cdot \frac{5}{2} = \frac{5}{2} - 2 \rightarrow \frac{5x}{2} = \frac{5-4}{2}$$

$$\rightarrow 5x = 1$$

$$x = \frac{1}{5}$$

$$x = \frac{1}{5}$$

$$y = \frac{5}{2}$$