

$$1.) \log_9 \left(\frac{a^5 b^2}{c^3 d^4} \right) = \log_9 a^5 + \log_9 b^2 - \log_9 c^3 - \log_9 d^4$$

$$5 \log_9 a + 2 \log_9 b - 3 \log_9 c - 4 \log_9 d$$

$$2.) 3 \log_5 x - 9 \log_5 y - 7 \log_5 z$$

$$\log_5 \frac{x^3}{y^9 z^7}$$

$$3.) \ln \left(\frac{\sqrt[3]{x^2+4}}{(\sqrt{x^2-3})(x-1)} \right)$$

$\frac{1}{3} \leftarrow \text{power}$
 $\frac{1}{2} \leftarrow \text{root}$

$$\ln \sqrt[3]{x^2+4} - \ln \sqrt{x^2-3} - \ln(x-1)$$

$$\ln (x^2+4)^{\frac{1}{3}} - \ln (x^2-3)^{\frac{1}{2}} - \ln(x-1)$$

$$\frac{1}{3} \ln(x^2+4) - \frac{1}{2} \ln(x^2-3) - \ln(x-1)$$

$$\log_3 - 5x \oplus \log_3 5 = 4$$

$$\log_3 (-5x)(5) = 4$$

$$\log_{10} 100 = 2$$

$$\log_3 -25x = 4$$

$$10^2 = 100$$

$$3^4 = -25x$$

$$x = -\frac{81}{25}$$

$$\frac{81}{-25} = \frac{-25x}{-25}$$

divisim

$$\log_2 (x+5) - \log_2 x = 5$$

$$\log_2 \frac{x+5}{x} = 5$$

$$2^5 = \frac{x+5}{x}$$

$$32 = \frac{x+5}{x}$$

$$x(32) = \left(\frac{x+5}{x}\right)x$$

$$32 = \frac{x}{x} + \frac{5}{x} \quad x \neq 0$$

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$$32 = 1 + \frac{5}{x}$$

$$32x = x + 5$$

$x \neq 0$

$$\frac{31x}{31} = \frac{5}{31}$$

$$x = \frac{5}{31}$$

$$31 = \frac{5}{x}$$

$$x = \frac{5}{31}$$

$$\log_7 6 - \log_7 (x-2) = \log_7 25$$

$$\log_7 \frac{6}{x-2} = \log_7 25$$

$$\frac{6}{x-2} = 25$$

$$\frac{6}{25} = x-2$$

$$\boxed{x-5} = \boxed{8}$$

$$x-5=8$$

$$\cancel{(x-2)} \left(\frac{6}{\cancel{x-2}} \right) = (25)(x-2)$$

$x \neq 2$

$$\frac{6}{25} = \frac{25(x-2)}{25}$$

$$\frac{6}{25} = x-2$$

$$+2 \quad +2$$

$$x = 2 + \frac{6}{25}$$

$$\frac{50}{25} + \frac{6}{25} = \frac{56}{25} = 2.24$$

$$\frac{1.8 * 12^{4x-8}}{1.8} = \frac{36}{1.8}$$

$$\log 12^{4x-8} = 20$$

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$$\frac{(4x-8) \log 12}{\log 12} = \frac{\log 20}{\log 12}$$

$$4x-8 = \frac{\log 20}{\log 12} + 8$$

$$\frac{4x}{4} = \frac{\frac{\log 20}{\log 12} + 8}{4}$$

$$X = \frac{\frac{\log 20}{\log 12} + 8}{4}$$

$$5^{10k-1} + 1 = 45$$

-1 -1

$$\log 5^{10k-1} = \log 44$$

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$$\frac{(10k-1)(\log 5)}{\log 5} = \frac{\log 44}{\log 5}$$

$$10k-1 = \frac{\log 44}{\log 5} + 1$$

$$\frac{10k}{10} = \frac{\frac{\log 44}{\log 5} + 1}{10}$$

$$k = \frac{\frac{\log 44}{\log 5} + 1}{10}$$