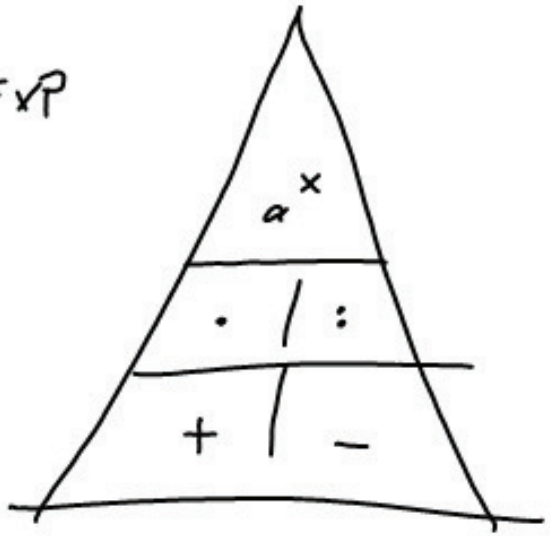
$a^x = b \iff x = \log_a b$

$(x^2)^3 = x^{2\cdot 3} = x^6$ | EXP

$x^2 \cdot x^3 = x^{2+3} = x^5$

$\frac{x^5}{x^2} = x^{5-2} = x^3$




$2 \cdot \ln 3 = \ln 3^2$

$\ln 8 - \ln 2 = \ln \frac{8}{2} = \ln 4$

LOG

$\ln 3 + \ln 2 = \ln(3 \cdot 2) = \ln 6$

$\frac{x^{-n}}{1} = \frac{1}{x^n}$ $\quad x^{1/n} = \sqrt[n]{x}$

$\frac{1}{3^{-2}} = 9$

$-\frac{1}{2} \ln x = \ln\left(\frac{1}{\sqrt{x}}\right)$

$x^{-1/2} = (\sqrt{x})^{-1} = \frac{1}{\sqrt{x}}$

$$2 \cdot x^{-\frac{2}{3}} = 2 \cdot x^{-1 \cdot 2 \cdot \frac{1}{3}} = 2 \cdot \left((x^{-1})^2\right)^{\frac{1}{3}} = 2 \cdot \sqrt[3]{(x^{-1})^2}$$

$$\downarrow$$

$$2 \cdot \sqrt[3]{\left(\frac{1}{x}\right)^2}$$

$$\downarrow$$

$$2 \cdot \sqrt[3]{\frac{1}{x^2}}$$

$$\downarrow$$

$$\frac{2}{\sqrt[3]{x^2}}$$

$$-2 \cdot \ln \frac{1}{x} + 4 \cdot \ln \sqrt{x} - 2 \cdot \ln x^2$$

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

$$\ln x^2 + \ln x^2 - \ln x^4$$

$$\ln x^2 \cdot x^2 - \ln x^4$$

$$\ln x^4 - \ln x^4$$

$$\ln \frac{x^4}{x^4} = \ln 1 = 0$$

$$\log_{10}(-100) = y$$

$$10^y = -100$$

1) $3 \cdot \log x - 4 \cdot \log \frac{2}{x} - \frac{1}{3} \cdot \log (x^2)^6 = \frac{2}{3} \log 27 + \frac{1}{2} \log x^4 - 2 \log 6$

$\log x^3 - \log \left(\frac{2}{x}\right)^4 - \log \left((x^2)^6\right)^{\frac{1}{3}} = \log 27^{\frac{2}{3}} + \log (x^4)^{\frac{1}{2}} - \log 6^2$

$\left(\sqrt[3]{27}\right)^2$

$\log x^3 - \log \left(\frac{16}{x^4}\right) - \log (x^4) = \log 9 + \log x^2 - \log 36$

$\log \frac{x^3}{\frac{16}{x^4} \cdot x^4} = \log \frac{9 x^2}{36}$ $\quad \uparrow 10^x$

$\frac{x^3}{16} = \frac{x^2}{4} \quad | \cdot 16 : x^2$

$x = 4$

$\frac{x^3}{x^2} = \frac{16}{4}$

b) $3 \cdot \ln 4 - 0{,}5 \cdot \ln \frac{16}{x^4} + 2 \cdot \ln 8 = 1{,}5 \ln x^4 - 8 \ln \sqrt[4]{\frac{1}{x}} - 2 \cdot \ln \frac{1}{4}$

$\ln 2^6 - \ln \frac{2^2}{x^2} + \ln 2^6 = \ln x^6 - \ln \frac{1}{x^2} - \ln \frac{1}{2^4}$

$\ln \frac{2^6 \cdot 2^6}{\frac{2^2}{x^2}} = \ln \frac{x^6}{\frac{1}{x^2} \quad \frac{1}{2^4}}$

$\frac{2^{12} \cdot x^2}{2^2} = \frac{x^6 x^2 2^0}{\uparrow}$

$4^3 = (2^2)^3 = 2^{2 \cdot 3} = 2^6$

$2^{10} \cdot x^2 = x^8 \cdot 2^4$

$2^6 = x^6$

$x = 2$