1) $\left[a^2\left(a^4\, a^{3/2}\, a^{1/3}\right)^{1/2}\right]^{1/3} = a^{2/3}\, a^{2/3}\, a^{1/4}\, a^{1/18}$

$$= a^{\frac{24+24+9+2}{36}} = a^{59/36} = \sqrt[36]{a^{59}}$$

2) $\dfrac{\cancel{3}(2x^{-2}y^{-3})^2}{\cancel{4}(3a^3b^{-2})^3} \cdot \dfrac{\overset{2}{\cancel{8}}(3a^4b^{-3})^2}{\underset{3}{\cancel{9}}(2x^{-1}y^{-2})^3}$

3) $\dfrac{42x^7}{\sqrt[4]{x^{-15}}}$

$$\frac{2\; 4 \cdot x^{-4} \cdot y^{-6} \cdot \cancel{9} \cdot a^8 \cdot b^{-6}}{3\; \underset{3}{\cancel{27}}\; a^9\; b^{-6}\; \cancel{8}\; x^{-3}\; y^{-6}}$$

$$\frac{x^{-4}\, a^8}{9\, a^9\, x^{-3}} = \frac{x^{-1}\, a^{-1}}{9} = \frac{1}{9ax}$$

3) $$\frac{\dfrac{42}{x^{10/n}}}{\dfrac{x^{\frac{4n-6}{2n}}}{x^{\frac{2\cdot(3-2n)}{n}}}} \cdot \left(\frac{x^{\frac{2n+5}{n}}}{x^{\frac{6-n}{n/2}}} \right)^2$$

$$\frac{42}{x^{10/n}} \cdot \frac{x^{\frac{6-4n}{n}}}{x^{\frac{2n-3}{n}}} \cdot \frac{x^{\frac{4n+10}{n}}}{x^{\frac{24-4n}{n}}}$$

$$42 \cdot x^{\frac{6-4n+4n+10-10-2n+3-24+4n}{n}} = 42\, x^{\frac{2n-15}{n}}$$

$$42x^{\frac{2n}{n}-\frac{15}{n}} = \frac{42\cdot x^2}{\sqrt[n]{x^{15}}}$$

Warum Logarithmus?

$A \cdot q^{ZEIT} = E$

1) K_0 ; $p = 6\%$ $K_{n} = 2 \cdot K_0$

$K_0 \cdot 1{,}06^{n} = 2 \cdot K_0 \quad | : K_0$

$1{,}06^{n} = 2$

Wachstums-faktor

$q > 1$

2) Radioaktives Jod $T_{1/2} = \underline{1}$ Jahr

100g J $t = $ 75g

$100g \cdot 0{,}5^{t} = 75g \quad | : 100$

$0{,}5^{t} = 0{,}75$

Zerfalls-faktor

$|q| < 1$

1) $2 \cdot \log(a+b) - \log(b+a) + 0{,}5 \cdot \log 16$

2) $\log \sqrt{\frac{x^3 \cdot y}{a+b}} = \log \frac{x^{3/2} \cdot y^{1/2}}{(a+b)^{1/2}}$

3) $3 \cdot \log x^2 - 1/4 \log \cancel{1/8}_{x} + 2 \cdot \log x^{-12} = 32$

$\log_{10} x^{-16} = 32$

$10^{32} = x^{-16}$

$10^{-2} = x$

$0{,}01 = x$

1) $\log \frac{(a+b)^2 \cdot 4}{(a+b)} = \log(4a+4b)$

2) $3/2 \log x + 1/2 \log y - 1/2 \log(a+b)$

3) $\log x^6 - \log 1/x^2 + \log^{-24} = \log \frac{x^6 \; x^{-24}}{1/x^2} = \log x^{-16}$

$$\log_{10} x^{-16} = 32$$

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

$$10^{32} = x^{-16} \qquad \big| \uparrow^{-1/16}$$

$$\left(10^{32}\right)^{-1/16} = x^{1}$$

$$10^{-2} = x$$

$$x = 1/100 = 0{,}01$$

1) $\log \frac{1}{100} - \left(\sqrt{e}\right)^{\ln 4} + 4^{\mathrm{ld}\, 3} - 2\, \mathrm{ld}\, 0{,}25$

2) $100^{\log 3} - \ln \frac{1}{e^2} + 0{,}5\, \mathrm{ld}\, 16 - e^{-3 \ln \frac{1}{2}}$

3) $\left(\frac{1}{8}\right)^{\mathrm{ld}\, 2} - 6 \ln \frac{1}{\sqrt[3]{e}} + \frac{1}{4}\, \mathrm{ld}\, 64 - \frac{1}{2} \log \frac{1}{1000} + \left(\sqrt[3]{e}\right)^{\ln 27}$

1) $\log 10^{-2} - e^{\frac{1}{2} \cdot \ln 4} + 2^{2 \cdot \mathrm{ld}\, 3} - \mathrm{ld}\left(2^{-2}\right)^2$

$-2 - 2 + 9 - (-4) = 9$

2) $10^{2 \cdot \log 3} - \ln e^{-2} + \mathrm{ld}\left(2^4\right)^{\frac{1}{2}} - e^{\ln\left(\frac{1}{2}\right)^{-3}}$

$10^{\log 3^2} - \ln e^{-2} + \mathrm{ld}\, 2^2 - e^{\ln 2^3}$

$9 - (-2) + 2 - 8 = 5$

3) $\left(\frac{1}{8}\right)^{ld\,7} - 6\ln\frac{1}{\sqrt[3]{e}} + \frac{1}{4}\,ld\,64 - \frac{1}{2}\log\frac{1}{1000} + \sqrt[3]{e}^{\,\ln 27}$

$2^{-3\,ld\,7} - \ln\left(e^{-1/3}\right)^{6} + ld\left(2^{6}\right)^{1/4} - \log\left(10^{-3}\right)^{1/2} + e^{1/3\ln 27}$

$2^{ld\,7^{-3}} - \ln e^{-2} + ld\,2^{3/2} - \log 10^{-3/2} + e^{\ln 3}$

$\frac{1}{8} - (-2) + \frac{3}{2} + \frac{3}{2} + 3 = 8\frac{1}{8}$