S 145

1)

$A_0 = 2000 \qquad q = 1{,}02 \qquad n = 10$ Jahre (viertel)

Zinsperioden

$A(x) = 2000 \cdot 1{,}02^{x} \qquad A(x) = 2000 \cdot 1{,}02^{4x}$

$A(40) = 2000 \cdot 1{,}02^{40} \qquad A(10)\ 2000 \cdot 1{,}02^{40}$

$A(\ldots) = 4.416$

2)

$A(10) = 4.416 = 2000 \cdot q^{10} \quad | : 2000 \quad \sqrt[10]{\ }$

$\sqrt[10]{\frac{4.416}{2000}} = q \approx 1{,}08$

c) $K(x) = 9.750,88 = 2000 \cdot 1,02^{4x}$ $\quad | :2000$

$$\frac{9750,88}{2000} = 1,02^{4x} \quad | \log$$

$$\log 4,875 = \log 1,02^{4x} = 4x \cdot \log 1,02$$

$$\log_{1,02} 4,875$$

$$\frac{1}{4} \cdot \frac{\log 4,875}{\log 1,02} = x$$

$x = 20$ Jahre

2) 1000 Liter $= A_0$; $q = 0{,}95$; $x =$ Woche

a) $10^6\,cm^3$

$$A(x) = 10^6\,cm^3 \cdot 0{,}95^x$$

$$A(52) = 10^6 \cdot 0{,}95^{52} \approx 69.440\,cm^3$$

b) $0{,}5 = 0{,}95^x$ | log

$$\log \tfrac{1}{2} = \log 0{,}95^x = x \cdot \log 0{,}95$$

$$x = \frac{\log \tfrac{1}{2}}{\log 0{,}95} = 13{,}5 \text{ Wochen}$$

$x = 94{,}5$ Tage $\Rightarrow$ 95 Tage

3)

$$5\cdot\log(2x) + 4\cdot\log\overset{1/2}{\sqrt{0{,}5x}} - \overset{1/2}{0{,}5}\cdot\log(16x^4) - 2\cdot\log(\overset{1/4}{0{,}25})$$

LOG

$$\log(2x)^5 + \log\left(\sqrt{\tfrac{1}{2}x}\right)^4 - \log(16x^4)^{1/2} - \log\left(\tfrac{1}{4}\right)^2$$

Potenz

$$\log(32x^5) + \log\left(\tfrac{1}{4}x^2\right) - \log(4x^2) - \log(1/16)$$

LOG

$$\log\frac{32x^5\ \ \tfrac{1}{4}\,x^2}{4x^2\ \ \underset{1/4}{1/16}}$$

Potenz

$$\log(32x^5) = 5\cdot\log(2x)$$

4) $$2\cdot\ln(3a^2) - 6\cdot\ln\sqrt[3]{2a^4} + \tfrac{1}{3}\cdot\ln\left[27(a^2)^6\right] - 4\cdot\ln\left(\frac{2}{a}\right)$$

$$\ln(3a^2)^2 - \ln\left(\sqrt[3]{2a^4}\right)^6 + \ln\left[27a^{12}\right]^{1/3} - \ln\left(\frac{2}{a}\right)^4$$

$$\ln(9a^4) - \ln(4a^8) + \ln(3\cdot a^4) - \ln\left(\frac{16}{a^4}\right)$$

$$\ln\ \frac{9a^4 \quad 3a^4 \quad a^4}{4a^8 \quad 16} = \ln\left(\frac{27a^4}{64}\right)$$

1) $\log {}^{1}/_{100} - \sqrt{e}^{\ln 4} + 4^{ld 3} - 2 \cdot ld\, {}^{1}/_{4}$

$\log 10^{-2} - e^{1/2 \cdot \ln 4} + 2^{2 \cdot ld 3} - 2 \cdot ld\, 2^{-2}$

$-2 - e^{\ln 4^{1/2}} + 2^{ld\, 3^2} - 2 \cdot (-2)$

$-2 - 2 + 9 + 4 = 9$

2) $\rightarrow 5$ $\quad 100^{\log 3} - \ln ({}^{1}/_{e^2}) + {}^{1}/_{2}\, ld\, 16 - e^{-3 \ln 1/2}$

$(10^2)^{\log 3} - \ln (e^{-2}) + {}^{1}/_{2}\, ld\, 2^4 - e^{\ln (1/2)^{-3}}$

$10^{2 \cdot \log 3} - (-2) + {}^{1}/_{2} \cdot 4 - e^{\ln 2^3}$

$9 + 2 + 2 - 8 = 5$

$$1$$

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

$$\tfrac{1}{8} - 6\cdot\ln e^{-1/3} + \tfrac{1}{4}\,ld\,2^6 - \tfrac{1}{2}\log 10^{-3} + e^{\frac{1}{3}\ln 27}$$

$$\tfrac{1}{8} + 2 + \tfrac{3}{2} + \tfrac{3}{2} + 3 = 8\tfrac{1}{8}$$

4) $$\left(\tfrac{1}{\sqrt{e}}\right)^{\ln 1/9} + 100^{\log \frac{1}{2^{-2}}} - 16^{\frac{1}{2}ld\,4} + 2\cdot\log 0{,}001 - 3\ln\tfrac{1}{e^3}$$

$$+\tfrac{1}{4}\,ld\,\tfrac{1}{256}$$

$$e^{-\frac{1}{2}\ln 1/9} + 10^{2\cdot\log 2^2} - 2^{2\,ld\,4} + 2\log 10^{-3} - 3\ln e^{-3} + \tfrac{1}{4}\,ld\,2^{-8}$$

$$3 + 16 - 16 - 6 + 9 - 2$$

$$4$$