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

$\log 1 = 0$ ✓

$\log_a 1 = x$

$\iff a^x = 1 \qquad x = 0 \qquad a^0 = 1$

1) $\log (x-y)^3 + \log (x+y) - \log [(x-y)^4]^{1/2}$

$$\log \frac{(x-y)^3 \cdot (x+y)}{(x-y)^2} = \log (x-y) \cdot (x+y)$$

$$= \log (x^2 - y^2)$$

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

$$\ln \frac{4x^2 \cdot x^2 \quad \frac{16}{x^4}}{8} = \ln 8$$

3) $$\log \frac{x^{3/5} \cdot y^{2/5}}{3^{1/5} \quad (x+y^2)^{1/5}} = \log x^{3/5} + \log y^{2/5} - \log 3^{1/5} - \log (x+y^2)^{1/5}$$

$$3/5 \log x + 2/5 \log y - 1/5 \log 3 - 1/5 \log (x+y^2)$$

4)

$$\ln \frac{2^3 \cdot (a-25)^{3/2}}{(c^2)^3 \cdot (d^{1/4})^3}$$

$$\ln 8 + \ln (a-25)^{3/2} - \ln c^6 - \ln d^{3/4}$$

$$3\ln 2 + \tfrac{3}{2} \ln (a-25) - 6 \ln c - \tfrac{3}{4} \ln d$$

5)

$$(2^4)^{\operatorname{ld}\sqrt{3}} + (10^3)^{\log 3} - (e^{1/4})^{2\ln 25} - \ln\left((e^{-1})^2\right)^2 - \log 10^{-2}$$

$$+ \operatorname{ld}(2^{-3})^3 = 2^{4\cdot\operatorname{ld}\sqrt{3}} + 10^{3\log 3} - e^{1/2 \ln 25} - \ln e^{-4} \cancel{- \log 10^{-2}} \cancel{+ \operatorname{ld} 2^{-9}}$$

$$- \log 10^{-2} + \operatorname{ld} 2^{-9}$$

$$2^{\operatorname{ld}\sqrt{3}^4}$$

$$2^{\operatorname{ld} 3^2}$$

$$9 + 27 - 5 - (-4) - (-2) - 9 = 28$$

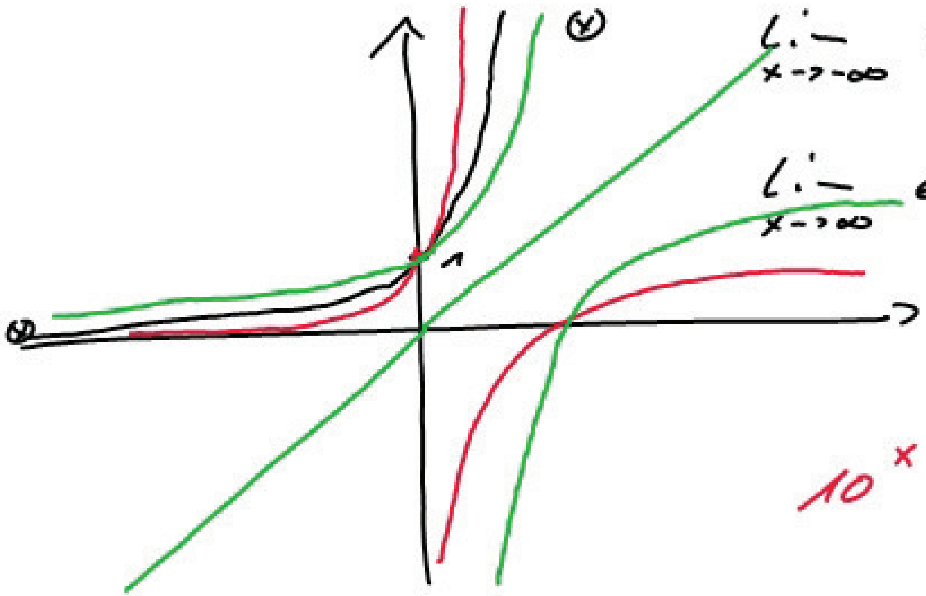
6) $e^{4\cdot \ln 2} + 1/10 \,\mathrm{ld}\, 2^{10} - \log (10^4)^{1/2} + (10^{-2})^{\log 1/3} - (2^{-3})^{-\mathrm{ld} 3}$
$+ \ln (e^{-1/3})^6$

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

$16 + \underline{1} - 2 + \underbrace{(1/3)^{-2}}_{9} \underline{-\ 27} - 2$

$\Rightarrow -5$

$\ln x \Longleftrightarrow e^x$



$$\lim_{x \to -\infty} e^x = e^{-\infty} = \frac{1}{e^{\infty}} = \frac{1}{\infty} = 0$$

$$\lim_{x \to \infty} e^x = e^{\infty} = \infty$$

10^x $\quad$ 2^x

$f(x) \Rightarrow$ y-Koordinate

$f'(x) \Rightarrow$ Steigung

$f''(x) \Rightarrow$ Krümmung

$$f(x) = e^x$$

$$f'(x) = e^x$$

$^2/_x = 2\cdot x^{-1}$

1) $\mathbb{D} = \mathbb{R}^+$

$$\log x^3 - \log\left(2\cdot x^{-1}\right)^4 - \log\left(x^{12}\right)^{1/3} = \log(27)^{2/3} + \log(x^4)^{1/2} - \log 6^2$$

$$\log \frac{x^3}{16\, \underbrace{x^{-4}\cdot x^4}_{1}} = \log \frac{9\cdot x^2}{36} \quad \Big|\, 10^x$$

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

$$x = 4 \qquad \mathbb{L} = \{4\}$$