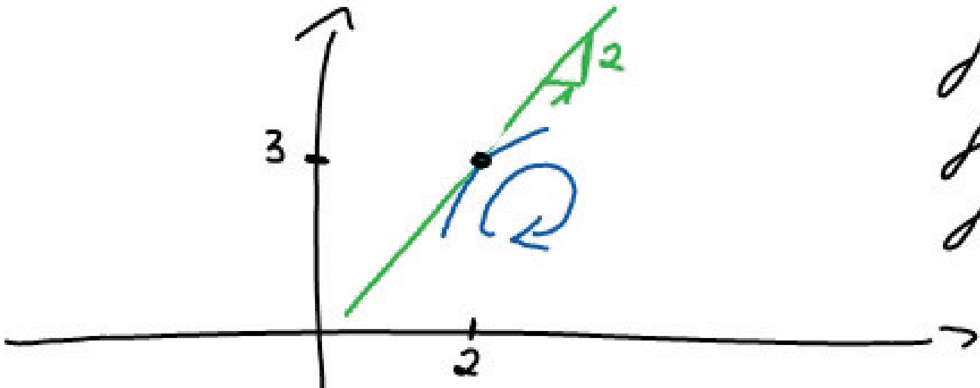
$5^x = 27 \quad | \log$

$x \cdot \log 5 = \log 27 \quad |: \log 5$

$x = \log 27 / \log 5$

$$\boxed{\begin{aligned} a^x &= b \\ x &= \log_a b \end{aligned}}$$



$f(2) = 3$

$f'(2) = 2$ ✓

$f''(2) = -1$

↳ rechts

$\log_3 81 = x \qquad \log_3 3^4 = 4 \cdot \log_3 3 = x$

1) $\lg \frac{1}{100} - \sqrt{e}^{\ln 4} + 4^{\mathrm{ld}\,3} - 2\cdot\mathrm{ld}\,0{,}25$

$\lg 10^{-2} - e^{\frac{1}{2}\cdot\ln 4} + 2^{2\,\mathrm{ld}\,3} - 2\,\mathrm{ld}\,\frac{1}{4}$

$-2 - e^{\ln\sqrt{4}} + 2^{\mathrm{ld}\,3^2} - 2\,\mathrm{ld}\,2^{-2}$

$-2 - 2 + 9 - 2\cdot(-2) = 9$

2) 1

3) $2^{-3\,\mathrm{ld}\,2} - 6\cdot\ln e^{-\frac{1}{3}} + \frac{1}{4}\,\mathrm{ld}\,2^{6} - \frac{1}{2}\lg 10^{-3} + e^{\frac{1}{3}\ln 27}$

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

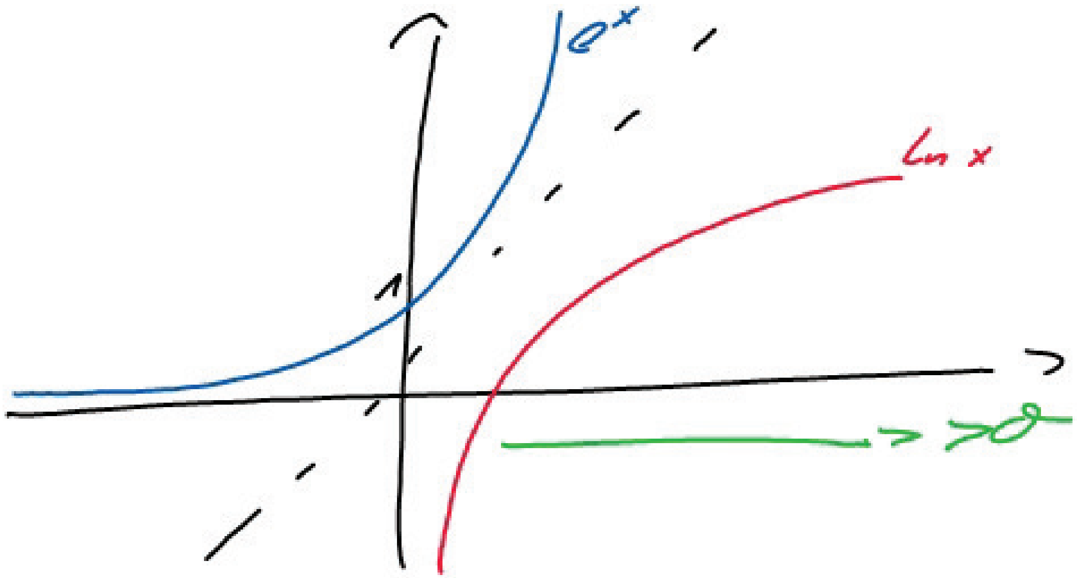
$\frac{1}{8} + 2 + \frac{3}{2} + \frac{3}{2} + 3 = 8\frac{1}{8}$

4)

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

$$e^{\ln\sqrt{9}} + 10^{\log 4^2} - 2^{\mathrm{ld}\,4^2} + 2\cdot(-3) - 3\cdot(-3) + \frac{1}{4}\cdot(-8)$$

$$3 + 16 - 16 - 6 + 9 - 2 = 4$$



$\log(-7) = x$

$10^x = -7$

$\ln(0) = x$

$e^x = 0$

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

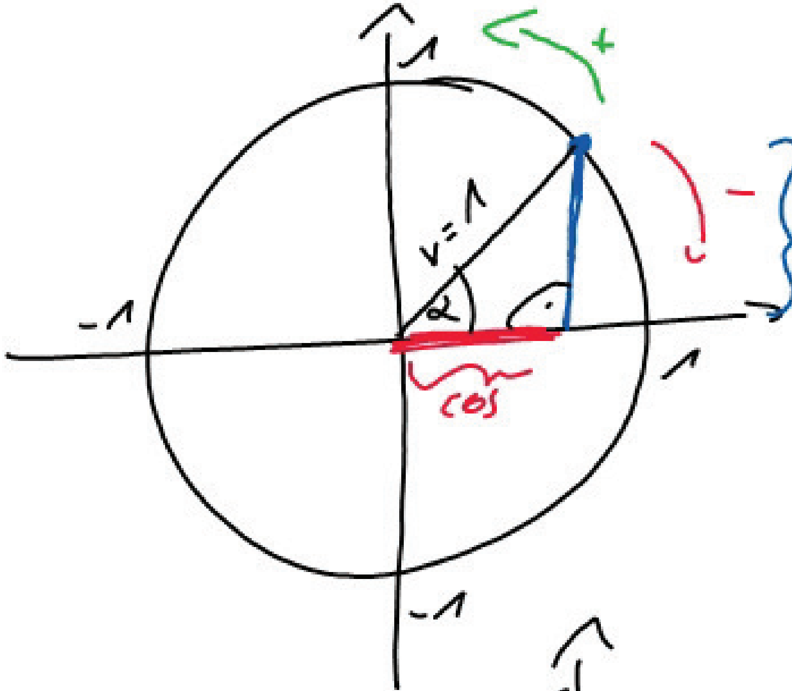
$- \log 6^2$

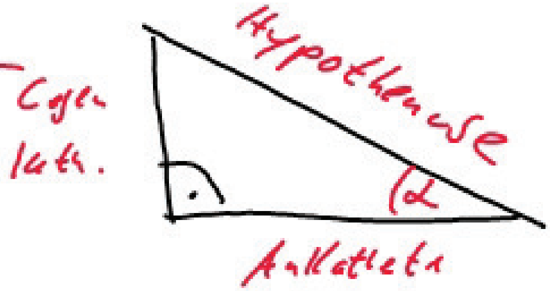
$$\lg \frac{x^3}{16/x^4 \cdot x^4} = \lg \frac{9\ x^2}{6^2} \quad | 10^x$$

$$\frac{x^3}{16} = \frac{9\ x^2}{36} \quad | : x^2 \quad \cdot 16$$

$$x = \frac{1}{4} \cdot 16 = 4$$

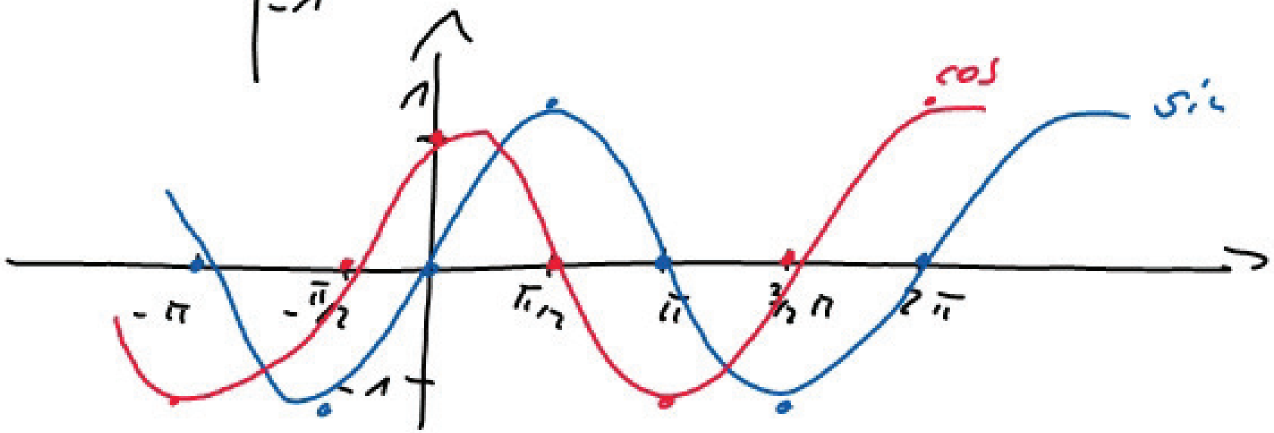
Trigonometrie





$$\sin(\alpha) = \frac{\text{Gegen}}{\text{Hyp}}$$

$$\cos(\alpha) = \frac{\text{Ank}}{\text{Hyp}}$$



$$f(x) = 3\cdot \underbrace{\sin\left(2x + \tfrac{3}{2}\pi\right)} - 7$$

$$\sin(2x)\cdot \underbrace{\cos\left(\tfrac{3}{2}\pi\right)}_{0} + \cos(2x)\cdot \underbrace{\sin\left(\tfrac{3}{2}\pi\right)}_{-1}$$

$$f(x) = -3\cdot \cos(2x) - 7$$

1. Amplituden-/Wertebereich

$$-3\cdot[-1;1]-7 = [-3;3]-7 \Rightarrow y \in [-10;-4]$$

2. Symmetrie:

$$f(x) = f(-x)$$

$$-3\cdot\cos(2x)-7 = -3\cdot\cos(-2x)-7 \quad \left| +7 \quad \cdot\left(-\tfrac{1}{3}\right)\right.$$

$$\cos(2x) = \cos(-2x) \checkmark, \text{ da } \cos(\alpha)=\cos(-\alpha)$$

Periode :

$$P_{NEU} = \frac{2\pi}{2} = \pi$$

$$f(x) = f(x+\pi)$$

$$\Downarrow$$

$$-3 \cdot \cos(2 \cdot (x+\pi)) - 7$$

$$\cos(2x + 2\pi)$$

$$\cos(2x) \cdot \underbrace{\cos(2\pi)}_{1} - \sin(2x) \cdot \underbrace{\sin(2\pi)}_{0}$$

$$-3 \cdot \cos(2x) - 7 = f(x)$$

$$f(x) = 2 \cdot \cos^2(\tfrac{1}{2}x) + 5$$

Wertebereich: $2 \cdot [0;1] + 5 = [0;2] + 5 \Rightarrow y \in [5;7]$

Periode: $P_{neu} = \frac{\pi}{1/2} = 2\pi \qquad f(x) = f(x + 2\pi)$

$$f(x) = 2 \cdot \cos^2(\tfrac{1}{2} \cdot (x + 2\pi)) + 5$$

$$2 \cdot [\underbrace{\cos(\tfrac{1}{2}x + \pi)}]^2 + 5$$

$$\cos(\tfrac{1}{2}x) \cdot \underbrace{\cos(\pi)}_{-1} - \sin(\tfrac{1}{2}x) \cdot \underbrace{\sin(\pi)}_{0}$$

$$2 \cdot [-\cos(\tfrac{1}{2}x)]^2 + 5$$

$$2 \cdot \cos^2(\tfrac{1}{2}x) + 5 \qquad = f(x)$$

$$\cos(y) = \cos(-y)$$

Symmetrie: $f(x) = f(-x)$

$$f(-x) = 2 \cdot \left[\cos\left(-\tfrac{1}{2}x\right)\right]^2 + 5$$

$$2 \cdot \left[\cos\left(\tfrac{1}{2}x\right)\right]^2 + 5$$

$$2 \cdot \cos^2\left(\tfrac{1}{2}x\right) + 5 = f(x)$$