

1 Grenzwerte

$$\begin{aligned}\lim_{x \rightarrow 0} \frac{\sin x}{x} &= 1 \\ \lim_{x \rightarrow 0} \frac{e^x - 1}{x} &= 1 \\ \lim_{h \rightarrow 0} \frac{e^{x_0+h} - e^{x_0}}{h} &= e^{x_0} \\ \sum_{n=0}^{\infty} (-1)^n \frac{(-1)^{n+1}}{n} &= \log 2 \\ \cos x &= \sum_{n=0}^{\infty} (-1)^n \frac{x^{2n}}{(2n)!} \\ \sin x &= \sum_{n=0}^{\infty} (-1)^n \frac{x^{2n+1}}{(2n+1)!}\end{aligned}$$
$$\begin{aligned}\cosh x &= \frac{1}{2}(e^x + e^{-x}) = \sum_{n=0}^{\infty} \frac{x^{2n}}{(2n)!} \\ \sinh x &= \frac{1}{2}(e^x - e^{-x}) = \sum_{n=0}^{\infty} \frac{x^{2n+1}}{(2n+1)!} \\ e^x &= \sum_{n=0}^{\infty} \frac{x^n}{n!} = \lim_{n \rightarrow \infty} \left(1 + \frac{x}{n}\right)^n \\ \sum_{n=0}^{\infty} (-1)^n \frac{x^{n+1}}{n+1} &= \log(1+x) \quad x \in (-1, 1) \\ \sum_{n=0}^{\infty} x^n &= \frac{1}{1-x} \quad (x \in (-1, 1)) \\ 0, \bar{3} &= \sum_{n=1}^{\infty} \frac{3}{(10)^n}\end{aligned}$$

2 Zusammenhänge

$$\begin{aligned}(\cos x)^2 + (\sin x)^2 &= 1 \\ (\cosh x)^2 - (\sinh x)^2 &= 1 \\ \tan x &= \frac{\sin x}{\cos x} \\ \tanh x &= \frac{\sinh x}{\cosh x} \\ (x+y)^n &= \sum_{k=0}^n \binom{n}{k} x^{n-k} y^k\end{aligned}$$

3 Ableitungen

$$\begin{aligned}(\sin x)' &= \cos x \\ (\cos x)' &= -\sin x \\ (\tan x)' &= \frac{1}{\cos^2 x} \\ (\sinh x)' &= \cosh x \\ (\cosh x)' &= \sinh x\end{aligned}$$
$$\begin{aligned}(\arcsin x)' &= \frac{1}{\sqrt{1-x^2}} \\ (\arccos x)' &= -\frac{1}{\sqrt{1-x^2}} \\ (\arctan x)' &= \frac{1}{1+x^2}\end{aligned}$$
$$(\log x)' = \frac{1}{x}$$

4 Werte

$$\begin{array}{lll}\arctan(0) = 0 & \sin(0) = 0 & \cos(0) = 1 \\ \arctan(1) = \frac{\pi}{4} & \sin\left(\frac{\pi}{2}\right) = 1 & \cos\left(\frac{\pi}{2}\right) = 0\end{array}$$