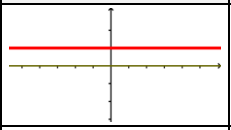
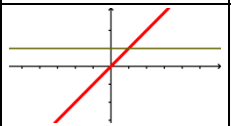
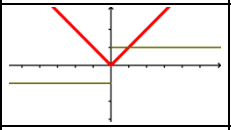
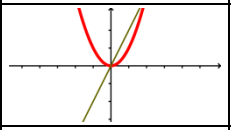
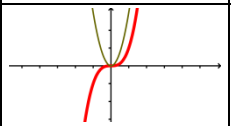
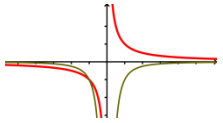
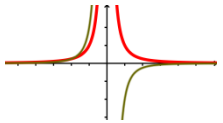
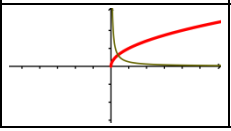
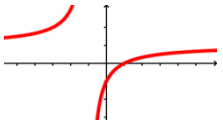
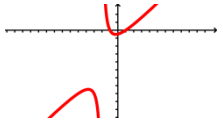
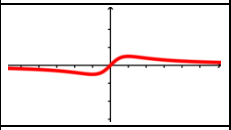
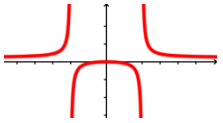
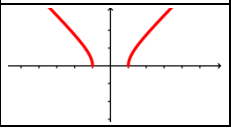
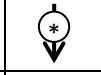
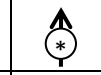
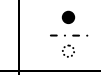
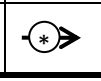
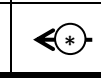
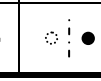
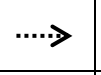
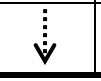
FUNKTIONEN - TABELLE 1

$y = f(x)$ **Funktionsname** **Potenz**	**Beispiel**	**Erste Ableitung**	**Graph**	$\mathbb{D}$ **Definitionsbereich** $\mathbb{W}$ **Wertebereich** x_0 **Nullstellen**	**Pole (+Verhalten)** **Asymptoten**	**Grenzwerte** $\lim_{x\to\infty} y(x)$	 $\lim_{x\to-\infty} y(x)$	**Symmetrie**	**Extrema** **Wendepunkte**
$\boxed{y = q}$ **Konstante Funktion** (n=0)	$y = 1$	$y' = 0$		$\mathbb{D} = \mathbb{R}$ $\mathbb{W} = 1$ $x_0 = \{\ \}$	–	$y \to 1$	$y \to 1$	gerade	–
$\boxed{y = m * x + q}$ **Lineare Funktion** (n=1)	$y = x$	$y' = 1$		$\mathbb{D} = \mathbb{R}$ $\mathbb{W} = \mathbb{R}$ $x_0 = 0$	–	$y \to \infty$	$y \to -\infty$	ungerade	–
$\boxed{y = \lvert x\rvert}$ **Betragsfunktion** (n=1)	$y = \lvert x\rvert$	$y' = 1, -1$		$\mathbb{D} = \mathbb{R}$ $\mathbb{W} = \mathbb{R}_0^+$ $x_0 = 0$	–	$y \to \infty$	$y \to \infty$	gerade	$x_{randmin} = 0$
$\boxed{y = ax^2 + bx + c}$ **Quadratische Funktion** (n=2)	$y = x^2$	$y' = 2x$		$\mathbb{D} = \mathbb{R}$ $\mathbb{W} = \mathbb{R}_0^+$ $x_0 = 0$	–	$y \to \infty$	$y \to \infty$	gerade	$x_{min} = 0$
$\boxed{y = ax^3 + bx^2 + cx + d}$ **Polynom 3ter Ordnung** (n=3)	$y = x^3$	$y' = 3x^2$		$\mathbb{D} = \mathbb{R}$ $\mathbb{W} = \mathbb{R}$ $x_0 = 0$	–	$y \to \infty$	$y \to -\infty$	ungerade	$x_{wend} = 0$
$\boxed{y = \frac{1}{x}}$ **Kehrwert Funktion** (n=-1)	$y = \frac{1}{x}$	$y' = -x^{-2}$		$\mathbb{D} = \mathbb{R}\backslash 0$ $\mathbb{W} = \mathbb{R}\backslash 0$ $x_0 = \{\ \}$	$x_{pol} = 0$ $\lim_{x\to0^+} \infty$ $\lim_{x\to0^-} -\infty$ $y_{assy}(x) = 0$	$y \to 0$	$y \to 0$	ungerade	–
$\boxed{y = \frac{1}{x^2}}$ **Kehrwert Funktion 2-Grades** (n=2)	$y = \frac{1}{x^2}$	$y' = -2x^{-3}$		$\mathbb{D} = \mathbb{R}\backslash 0$ $\mathbb{W} = \mathbb{R}^+$ $x_0 = \{\ \}$	$x_{pol} = 0$ $\lim_{x\to0^+} \infty$ $\lim_{x\to0^-} \infty$ $y_{assy}(x) = 0$	$y \to 0$	$y \to 0$	gerade	–
$\boxed{y = \sqrt{x} = x^{\frac{1}{2}}}$ **Wurzel Funktion** (n=0.5)	$y = \sqrt{x}$	$y' = \frac{1}{2}x^{-\frac{1}{2}}$		$\mathbb{D} = \mathbb{R}_0^+$ $\mathbb{W} = \mathbb{R}_0^+$ $x_0 = 0$	–	$y \to \infty$	–	–	$x_{randmin} = 0$

FUNKTIONEN - TABELLE 2

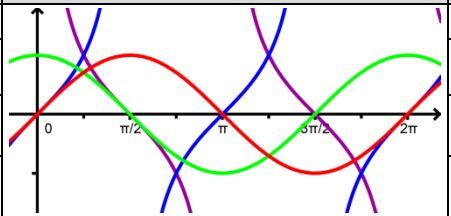
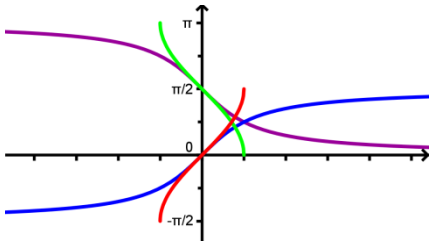
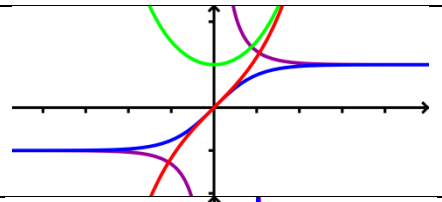
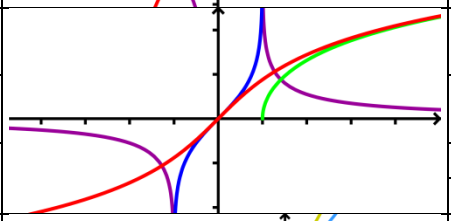
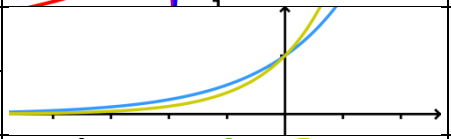
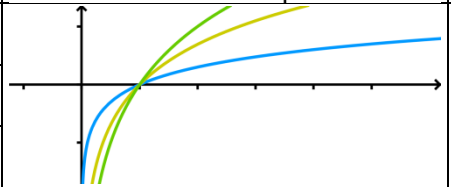
$y = \frac{x}{x}$ $(n = 1/1)$	$y = \frac{x-1}{x+1}$	$y' = \frac{2}{(x+1)^2}$		$\mathbb{D} = \mathbb{R}\backslash\{-1\}$ $\mathbb{W} = \mathbb{R}\backslash\{1\}$ $x_0 = 1$	$x_{pol} = -1$ $\lim_{x\to -1^+} y(x) = -\infty$ $\lim_{x\to -1^-} y(x) = \infty$ $y_{assy}(x) = 1$	$y \to 1$	$y \to 1$	–	–
$y = \frac{x^2}{x}$ $(n = 2/1)$	$y = \frac{x^2-1}{x+2}$	$y' = \frac{x^2+4x+1}{(x+2)^2}$		$\mathbb{D} = \mathbb{R}\backslash\{-2\}$ $\mathbb{W} = \mathbb{R}\backslash\{-1 < x < 1\}$ $x_0 = 1, -1$	$x_{pol} = -2$ $\lim_{x\to -2^+} y(x) = \infty$ $\lim_{x\to -2^-} y(x) = -\infty$ $y_{assy}(x) = x - 2$	$y \to \infty$	$y \to -\infty$	–	
$y = \frac{x}{x^2}$ $(n = 1/2)$	$y = \frac{x}{x^2+1}$	$y' = \frac{-x^2+1}{(x^2+1)^2}$		$\mathbb{D} = \mathbb{R}$ $\mathbb{W} = \cdots$ $x_0 = 0$	–	$y \to 0$	$y \to 0$	ungerade	$x_{max} = 1$ $x_{min} = -1$ $x_{wend} = 0$
$y = \frac{x^2}{x^2}$ $(n = 2/2)$	$y = \frac{x^2}{4x^2-16}$	$y' = \frac{-2x}{(x^2-4)^2}$		$\mathbb{D} = \mathbb{R}\backslash\{2, -2\}$ $\mathbb{W} = \cdots$ $x_0 = 0$	$x_{pol} = \{2, -2\}$ $\lim_{x\to 2^+} \infty$ $\lim_{x\to -2^+} -\infty$ $\lim_{x\to 2^-} -\infty$ $\lim_{x\to -2^-} \infty$ $y_{assy}(x) = {}^1/_4$	$y \to \frac{1}{4}$	$y \to \frac{1}{4}$	gerade	$x_{lok\ max} = 0$
$y = \sqrt{x^2}$ $\left(n = 2^{\frac{1}{2}}\right)$	$y = \sqrt{x^2-1}$	$y' = \frac{x}{\sqrt{x^2-1}}$		$\mathbb{D} = \mathbb{R}\backslash\{-1 < x < 1\}$ $\mathbb{W} = \mathbb{R}_0^+$ $x_0 = \{1, -1\}$	–	$y \to \infty$	$y \to \infty$	gerade	$x_{randmin} = \{1, -1\}$

Streckung	$*$		< 1	> 1	minus
$y \to ay$	m	a			
$x \to bx$		b			

Translation	$+$		< 0	> 0
$x \to x + c$	q	c		
$y \to y + d$		d		

y-Achsen Schnittpunkt
Exponent: x^n

FUNKTIONEN - TABELLE 3

$y = f(x)$	Beispiel	Erste Ableitung	Graph	$\mathbb{D}$ Definitionsbereich	$\mathbb{W}$ Wertebereich	x_0 Nullstellen	Symmetrie
Trigonometrische Funktionen $y = A * \sin(\omega x + \varphi) + d$ $y = A * \cos(\omega x + \varphi) + d$ $y = A * \tan(\omega x + \varphi) + d$ $y' = A * \cot(\omega x + \varphi) + d$	$y = \sin(x)$	$y' = \cos(x)$		$\mathbb{D} = \mathbb{R}$	$\mathbb{W} = -1 \leq y \leq 1$	$x_0 = \{k * \pi\}$	ungerade
	$y = \cos(x)$	$y' = -\sin(x)$		$\mathbb{D} = \mathbb{R}$	$\mathbb{W} = -1 \leq y \leq 1$	$x_0 = \left\{\frac{\pi}{2} + k * \pi\right\}$	gerade
	$y = \tan(x)$	$y' = \frac{1}{\cos^2 x}$		$\mathbb{D} = \mathbb{R} \backslash \left\{\frac{\pi}{2} + k * \pi\right\}$	$\mathbb{W} = \mathbb{R}$	$x_0 = \{k * \pi\}$	ungerade
	$y = \text{cotan(x)}$	$y' = -\frac{1}{\sin^2 x}$		$\mathbb{D} = \mathbb{R} \backslash \{k * \pi\}$	$\mathbb{W} = \mathbb{R}$	$x_0 = \left\{\frac{\pi}{2} + k * \pi\right\}$	ungerade
Arkus-Funktionen $y = \sin^{-1} x$ $y = \cos^{-1} x$ $y = \tan^{-1} x$ $y = \cot^{-1} x$	$y = \sin^{-1}(x)$	$y' = \frac{1}{\sqrt{1 - x^2}}$		$\mathbb{D} = -1 \leq x \leq 1$	$\mathbb{W} = -\frac{\pi}{2} \leq y \leq \frac{\pi}{2}$	$x_0 = 0$	ungerade
	$y = \cos^{-1}(x)$	$y' = -\frac{1}{\sqrt{1 - x^2}}$		$\mathbb{D} = -1 \leq x \leq 1$	$\mathbb{W} = 0 \leq y \leq \pi$	$x_0 = 1$	–
	$y = \tan^{-1}(x)$	$y' = \frac{1}{1 + x^2}$		$\mathbb{D} = \mathbb{R}$	$\mathbb{W} = -\frac{\pi}{2} \leq y \leq \frac{\pi}{2}$	$x_0 = 0$	ungerade
	$y = \cot^{-1}(x)$	$y' = -\frac{1}{1 + x^2}$		$\mathbb{D} = \mathbb{R}$	$\mathbb{W} = 0 \leq y \leq \pi$	–	–
Hyperbel-Funktionen $y = \sinh x$ $y = \cosh x$ $y = \tanh x$ $y = \coth x$	$y = \sinh x$	$y' = \cosh x$		$\mathbb{D} = \mathbb{R}$	$\mathbb{W} = \mathbb{R}$	$x_0 = 0$	ungerade
	$y = \cosh x$	$y = \sinh x$		$\mathbb{D} = \mathbb{R}$	$\mathbb{W} = 1 \leq y \leq \infty$	–	gerade
	$y = \tanh x$	$y' = \frac{1}{\cosh^2 x}$		$\mathbb{D} = \mathbb{R}$	$\mathbb{W} = -1 < y < 1$	$x_0 = 0$	ungerade
	$y = \coth x$	$y' = -\frac{1}{\sinh^2 x}$		$\mathbb{D} = \mathbb{R} \backslash \{0\}$	$\mathbb{W} = \mathbb{R} \backslash \{-1 \leq y \leq 1\}$	–	ungerade
Area-Funktionen $y = \sinh^{-1} x$ $y = \cosh^{-1} x$ $y = \tanh^{-1} x$ $y = \coth^{-1} x$	$y = \sinh^{-1} x$	$y' = \frac{1}{\sqrt{x^2 + 1}}$		$\mathbb{D} = \mathbb{R}$	$\mathbb{W} = \mathbb{R}$	$x_0 = 0$	ungerade
	$y = \cosh^{-1} x$	$y' = \frac{1}{\sqrt{x^2 - 1}}$		$\mathbb{D} = 1 \leq x$	$\mathbb{W} = 0 \leq y$	$x_0 = 1$	–
	$y = \tanh^{-1} x$	$y' = y' = \frac{1}{1 - x^2}$		$\mathbb{D} = -1 \leq x \leq 1$	$\mathbb{W} = \mathbb{R}$	$x_0 = 0$	ungerade
	$y = \coth^{-1} x$			$\mathbb{D} = \mathbb{R} \backslash \{-1 \leq y \leq 1\}$	$\mathbb{W} = \mathbb{R} \backslash \{0\}$	–	ungerade
Exponential-Funktionen $y = q^x$ $y = e^x$	$y = 2^x$	$y' = \ln 2 * 2^x$		$\mathbb{D} = \mathbb{R}$	$\mathbb{W} = 0 < y$	$x_0 = 1$	–
	$y = e^x$	$y' = e^x$					
Logarithmus-Funktionen $y = log_{10} x$ $y = log_2 x$ $y = ln x$	$y = \log x$	$y' = \frac{1}{\ln 10 * x}$		$\mathbb{D} = 0 < x$	$\mathbb{W} = \mathbb{R}$	$x_0 = 1$	–
	$y = \log_2 x$	$y' = \frac{1}{\ln 2 * x}$					
	$y = ln x$	$y' = \frac{1}{x}$					