8 - Canonische

Normale und nicht normale Form

$\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ $\quad x^2+y^2=r^2$

$\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$ $\quad y=\frac{1}{x}$

Transformation Verfahren

$\sin\frac{\pi}{2}=1$ $\quad \sin\frac{\pi}{4}=\frac{1}{\sqrt{2}}$ $\quad \sin\frac{\pi}{6}=\frac{1}{2}$

Transformation Hyperbel

$\cosh(x)=\frac{e^x+e^{-x}}{2}$ $\quad \sinh(x)=\frac{e^x-e^{-x}}{2}$

Transformation Hyperbel Funktion

$\cosh(x)=\cosh(-x)$

$\sinh(x)=-\sinh(-x)$

Transformation Hyperbel Identität

$\cosh^2(x)-\sinh^2(x)=1$

Kurvenlänge

Allgemein $\quad L=\int_a^b\sqrt{1+f'(x)^2}\,dx$

Kreis $\quad L=2\pi r$

Ellipse $\quad L\approx\pi\cdot\left(3(a+b)-\sqrt{(3a+b)(a+3b)}\right)$

Berechnung für die Ellipse ausreichend.

Hyperbel $\quad L=\int_a^b\sqrt{1+\left(\frac{x}{\sqrt{x^2-1}}\right)^2}\,dx$

Parabel $\quad L=\int_a^b\sqrt{1+(2ax+b)^2}\,dx$

Parabel Kurvenlänge $\quad L=\frac{1}{2}\left(\sqrt{1+4a^2}+\frac{\ln(2a+\sqrt{1+4a^2})}{2a}\right)$

Kreis und Ellipse

Kreis $\quad x^2+y^2=r^2$

Ellipse $\quad \frac{x^2}{a^2}+\frac{y^2}{b^2}=1$

Kreis $\quad$ Mittelpunkt $(0,0)$

Ellipse $\quad$ Mittelpunkt $(0,0)$

Brennpunkte $\quad$ Kreis: $(0,0)$ Ellipse: $(\pm\sqrt{a^2-b^2},0)$

Parabel Brennpunkt $\quad F=\left(\frac{1}{4a},\frac{b^2-4ac}{4a}\right)$

Hyperbel

$\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$

Hyperbel $\quad$ Mittelpunkt $(0,0)$

Brennpunkte $\quad (\pm\sqrt{a^2+b^2},0)$

Asymptoten $\quad y=\pm\frac{b}{a}x$

Parabel $\quad$ Brennpunkt $F=\left(\frac{1}{4a},\frac{b^2-4ac}{4a}\right)$

Parabel Leitgerade $\quad y=-\frac{b^2-4ac+1}{4a}$

Kurvenpunkt Parabel, das zwei Brennpunkte

Brennpunkte

Kreis/Ellipse $\quad$ $\sqrt{a^2-b^2}$ $\quad$ Hyperbel $\quad$ $\sqrt{a^2+b^2}$

$\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$

$\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$ $\quad \frac{x^2}{a^2}+\frac{y^2}{b^2}=\frac{a^2+b^2}{a^2}$

$\frac{x^2}{a^2}+\frac{y^2}{b^2}=\frac{a^2+b^2}{a^2}$ $\quad \frac{x^2}{a^2}-\frac{y^2}{b^2}=1$

$x^2+y^2=r^2$ $\quad \frac{x^2}{a^2}+\frac{y^2}{b^2}=1$

$x^2+y^2=\left(\sqrt{a^2+b^2}\right)^2$ $\quad \frac{x^2}{a^2}+\frac{y^2}{b^2}=1$

Ellipse

Transformation

$\cos\alpha=\frac{\sin(\alpha)\cos(\beta)+\cos(\alpha)\sin(\beta)}{\sin(\alpha)\sin(\beta)+\cos(\alpha)\cos(\beta)}$

Arcus Funktion

Bogen $\quad \alpha$

Kreis $\quad \sin\alpha=\frac{y}{r}$

Berechnung für die Umkehrung gesucht.

Arcussinus $\quad \arcsin(\sin\alpha)=\alpha$

Maximum $\quad \arcsin(\sin\alpha)=\alpha$ $\quad$ Maximum

Minimum $\quad \arcsin(\sin\alpha)=-\frac{\pi}{2}$

$\sin\alpha=y\Rightarrow\alpha=\arcsin y$

Transformation

$\sin(\alpha+\frac{\pi}{2})=\cos\alpha$ $\quad \sin(\alpha+\pi)=\sin(\alpha)$

Arcus Funktion Graphen

$\sin(\alpha+\frac{\pi}{2})=\cos\alpha$ $\quad \sin(\alpha+\pi)=-\sin\alpha$

$\sin(\alpha+\frac{\pi}{2})=\cos\alpha$ $\quad \sin(\alpha+\pi)=\sin\alpha$

$\sin(\alpha+\frac{\pi}{2})=\cos\alpha$ $\quad \sin(\alpha+\pi)=-\sin\alpha$

Arcus Funktion Ableitung

Ableitung $\quad \frac{\sin\alpha+\cos\alpha}{\sin\alpha-\cos\alpha}=\frac{\sin\alpha+\cos\alpha}{\sin\alpha-\cos\alpha}$ $\quad \frac{\sin\alpha-\cos\alpha}{\sin\alpha-\cos\alpha}$

$\sin\alpha+\cos\alpha$ $\quad \sin\alpha-\cos\alpha$

$\sin\alpha+\cos\alpha$ $\quad \sin\alpha-\cos\alpha$

$\sin\alpha+\cos\alpha$ $\quad \sin\alpha-\cos\alpha$

Ableitung $\quad \frac{\sin\alpha+\cos\alpha}{\sin\alpha-\cos\alpha}=\frac{\sin\alpha+\cos\alpha}{\sin\alpha-\cos\alpha}$ $\quad \frac{\sin\alpha-\cos\alpha}{\sin\alpha-\cos\alpha}$

$\sin\alpha+\cos\alpha$ $\quad \sin\alpha-\cos\alpha$

$\sin\alpha+\cos\alpha$ $\quad \sin\alpha-\cos\alpha$

$\sin\alpha+\cos\alpha$ $\quad \sin\alpha-\cos\alpha$

Arcus Funktion Ableitung

$\sin\alpha=\frac{\sin\alpha+\cos\alpha}{\sin\alpha-\cos\alpha}$ $\quad \sin\alpha=\frac{\sin\alpha+\cos\alpha}{\sin\alpha-\cos\alpha}$

$\sin\alpha=\frac{\sin\alpha+\cos\alpha}{\sin\alpha-\cos\alpha}$ $\quad \sin\alpha=\frac{\sin\alpha+\cos\alpha}{\sin\alpha-\cos\alpha}$

$\sin\alpha=\frac{\sin\alpha+\cos\alpha}{\sin\alpha-\cos\alpha}$ $\quad \sin\alpha=\frac{\sin\alpha+\cos\alpha}{\sin\alpha-\cos\alpha}$

Arcus Funktion

$\sin\alpha=\frac{\sin\alpha+\cos\alpha}{\sin\alpha-\cos\alpha}$ $\quad \sin\alpha=\frac{\sin\alpha+\cos\alpha}{\sin\alpha-\cos\alpha}$

$\sin\alpha=\frac{\sin\alpha+\cos\alpha}{\sin\alpha-\cos\alpha}$ $\quad \sin\alpha=\frac{\sin\alpha+\cos\alpha}{\sin\alpha-\cos\alpha}$

$\sin\alpha=\frac{\sin\alpha+\cos\alpha}{\sin\alpha-\cos\alpha}$ $\quad \sin\alpha=\frac{\sin\alpha+\cos\alpha}{\sin\alpha-\cos\alpha}$

Arcus

$\sin\alpha=\frac{\sin\alpha+\cos\alpha}{\sin\alpha-\cos\alpha}$ $\quad \sin\alpha=\frac{\sin\alpha+\cos\alpha}{\sin\alpha-\cos\alpha}$

$\sin\alpha=\frac{\sin\alpha+\cos\alpha}{\sin\alpha-\cos\alpha}$ $\quad \sin\alpha=\frac{\sin\alpha+\cos\alpha}{\sin\alpha-\cos\alpha}$

$\sin\alpha=\frac{\sin\alpha+\cos\alpha}{\sin\alpha-\cos\alpha}$ $\quad \sin\alpha=\frac{\sin\alpha+\cos\alpha}{\sin\alpha-\cos\alpha}$

Arcus

$\sin\alpha=\frac{\sin\alpha+\cos\alpha}{\sin\alpha-\cos\alpha}$ $\quad \sin\alpha=\frac{\sin\alpha+\cos\alpha}{\sin\alpha-\cos\alpha}$

$\sin\alpha=\frac{\sin\alpha+\cos\alpha}{\sin\alpha-\cos\alpha}$ $\quad \sin\alpha=\frac{\sin\alpha+\cos\alpha}{\sin\alpha-\cos\alpha}$

$\sin\alpha=\frac{\sin\alpha+\cos\alpha}{\sin\alpha-\cos\alpha}$ $\quad \sin\alpha=\frac{\sin\alpha+\cos\alpha}{\sin\alpha-\cos\alpha}$

Arcus

$\sin\alpha=\frac{\sin\alpha+\cos\alpha}{\sin\alpha-\cos\alpha}$ $\quad \sin\alpha=\frac{\sin\alpha+\cos\alpha}{\sin\alpha-\cos\alpha}$

$\sin\alpha=\frac{\sin\alpha+\cos\alpha}{\sin\alpha-\cos\alpha}$ $\quad \sin\alpha=\frac{\sin\alpha+\cos\alpha}{\sin\alpha-\cos\alpha}$

$\sin\alpha=\frac{\sin\alpha+\cos\alpha}{\sin\alpha-\cos\alpha}$ $\quad \sin\alpha=\frac{\sin\alpha+\cos\alpha}{\sin\alpha-\cos\alpha}$

Arcus

$\sin\alpha=\frac{\sin\alpha+\cos\alpha}{\sin\alpha-\cos\alpha}$ $\quad \sin\alpha=\frac{\sin\alpha+\cos\alpha}{\sin\alpha-\cos\alpha}$

$\sin\alpha=\frac{\sin\alpha+\cos\alpha}{\sin\alpha-\cos\alpha}$ $\quad \sin\alpha=\frac{\sin\alpha+\cos\alpha}{\sin\alpha-\cos\alpha}$

$\sin\alpha=\frac{\sin\alpha+\cos\alpha}{\sin\alpha-\cos\alpha}$ $\quad \sin\alpha=\frac{\sin\alpha+\cos\alpha}{\sin\alpha-\cos\alpha}$

Arcus