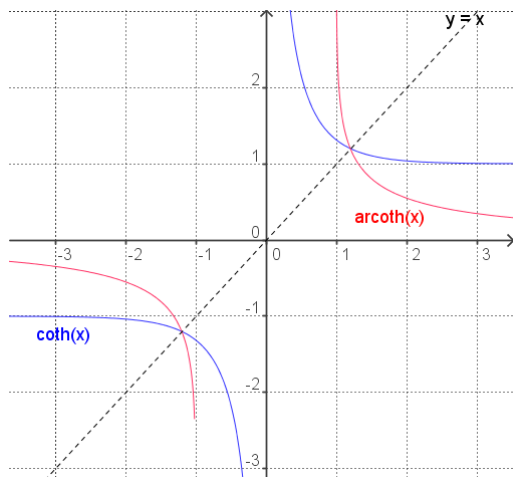
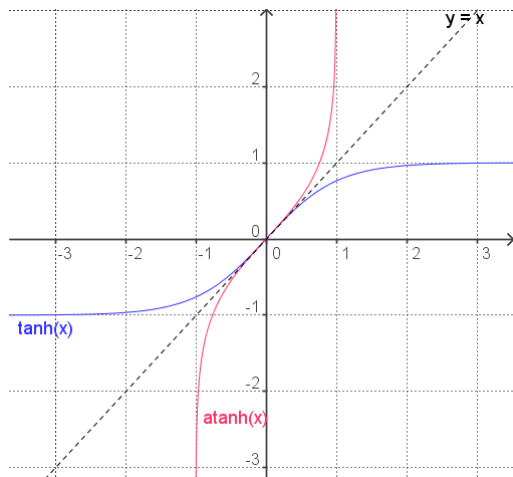
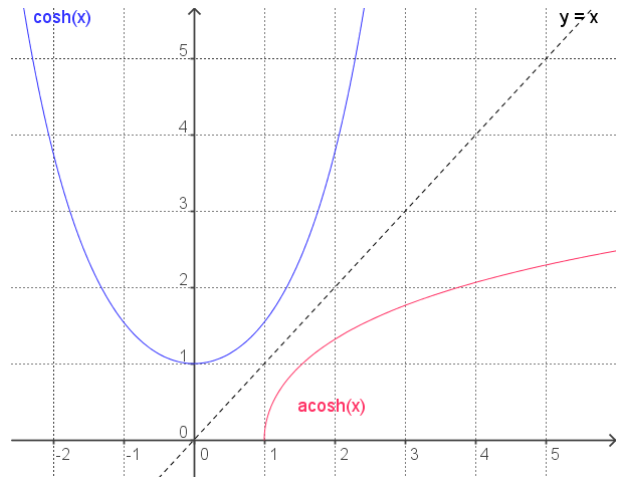
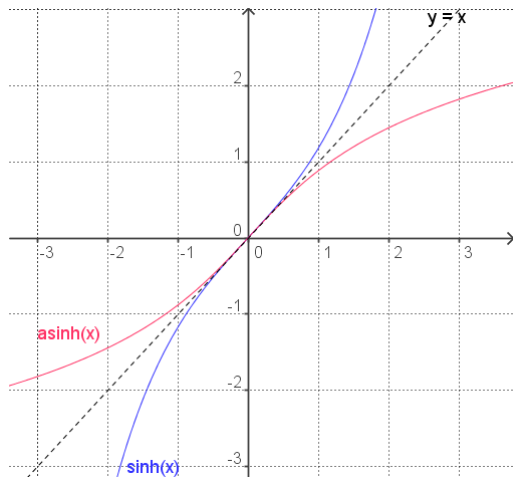


# Hyperbelfunktionen und Areefunktionen



## Es gelten folgende Formeln:

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

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

$$\tanh(x) = \frac{e^x - e^{-x}}{e^x + e^{-x}}$$

$$\coth(x) = \frac{e^x + e^{-x}}{e^x - e^{-x}} = \frac{1}{\tanh(x)} \quad ; x \neq 0$$

## Umkehrfunktionen (Area):

$$\operatorname{arsinh}(x) = \ln(x + \sqrt{x^2 + 1}) \quad ; \text{ alle } x$$

$$\operatorname{arcosh}(x) = \ln(x + \sqrt{x^2 - 1}) \quad ; x \geq 1$$

$$\operatorname{artanh}(x) = \frac{1}{2} \ln\left(\frac{1+x}{1-x}\right) \quad ; -1 < x < 1$$

$$\operatorname{arcoth}(x) = \frac{1}{2} \ln\left(\frac{1+x}{x-1}\right) \quad ; |x| > 1$$

## Reihenentwicklung des artanh:

$$\operatorname{artanh}(x) = x + \frac{x^3}{3} + \frac{x^5}{5} + \frac{x^7}{7} + \dots$$