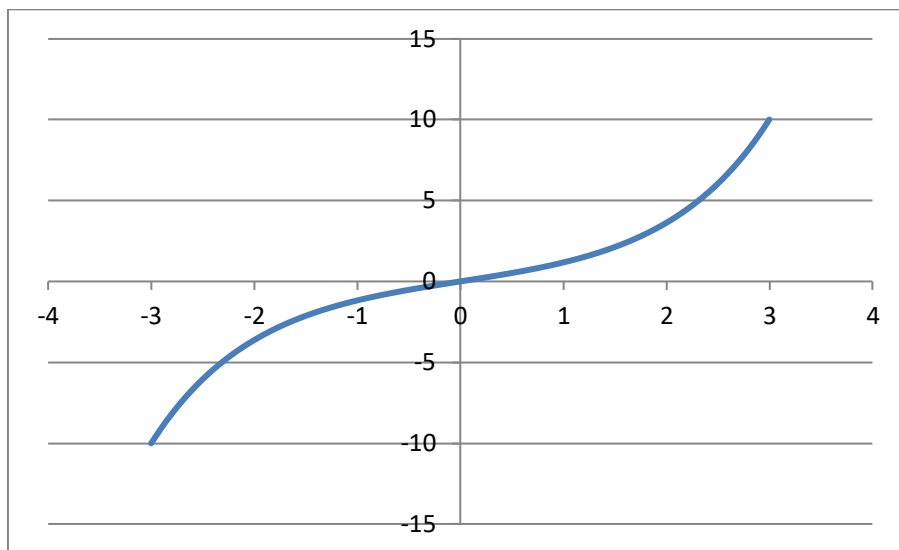# Hyperbolic Functions

The hyperbolic functions[1] are standard functions that can be found on most scientific calculators and spreadsheets. They are also available in some programming languages. They are defined in terms of the exponential functions[2] as follows and their graphs are also illustrated.
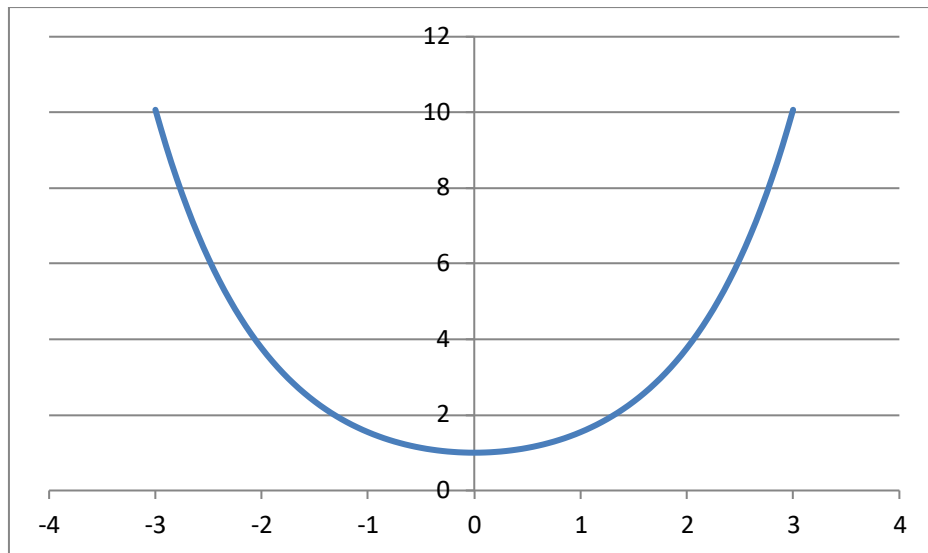
sinh(x)

$$\sinh(x) = \frac{1}{2}(e^x - e^{-x})$$

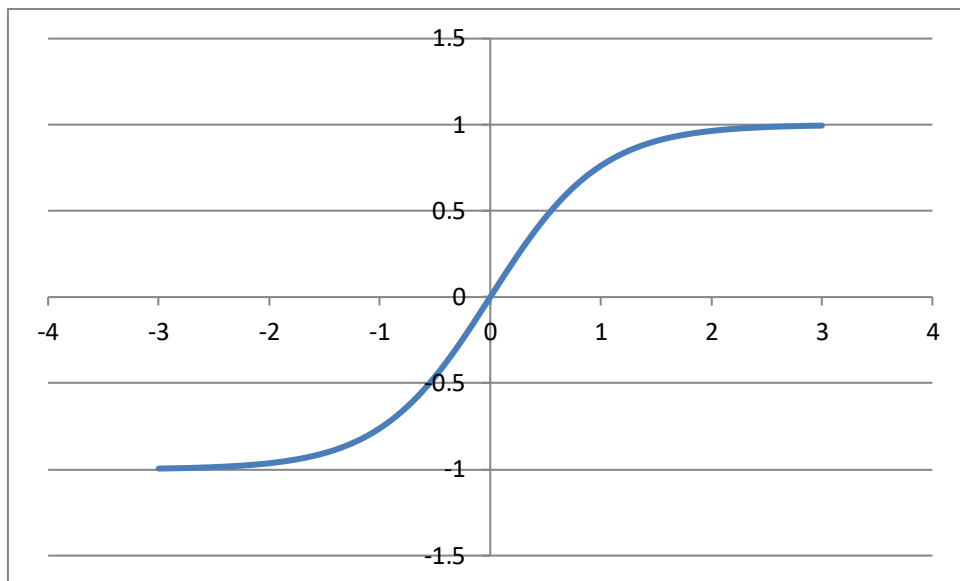

cosh(x)

$$\cosh(x) = \frac{1}{2}(e^x + e^{-x})$$

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[1] Functions
[2] Logarithmic and Exponential Functions

tanh(x)

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

A worksheet on Hyperbolic Functions is provided by Mathcentre[3].

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[3] Hyperbolic Functions (Mathcentre)