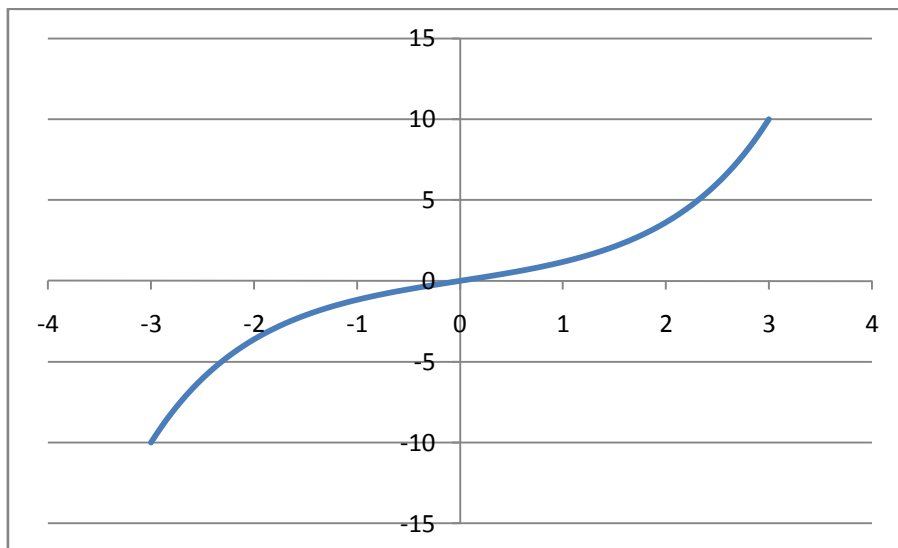


## Hyperbolic Functions

The hyperbolic functions 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 as follows and their graphs are also illustrated.

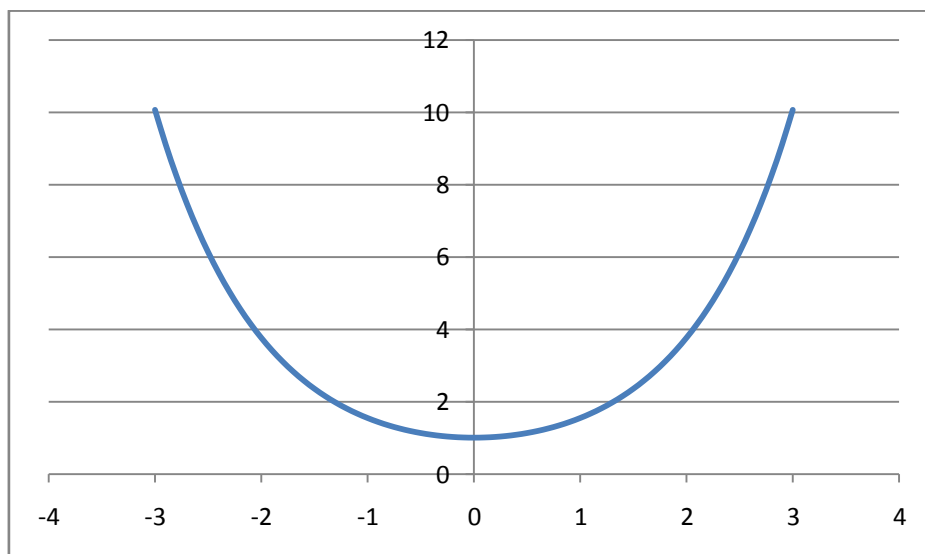
**sinh(x)**

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



**cosh(x)**

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



**tanh(x)**

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

