Hyperbolic functions arose from looking at the area under a hyperbolic curve. They are commonly used when dealing with curves that are catenary, curves created by hanging a rope/cable which is supported only at its two ends. Some examples of catenary curves are a jump rope, the support cables on the golden gate bridge, & the St. Louis Arch.



Ordinate \Or"di\*nate\, n. (Geom.)

 The distance of any point in a curve or a straight line,

 measured on a line called the axis of ordinates or on a line

 parallel to it, from another line called the axis of

 abscissas, on which the corresponding abscissa of the point

 is measured.

 Note: The ordinate and abscissa, taken together, are called

 co["o]rdinates, and define the position of the point

 with reference to the two axes named, the intersection

 of which is called the origin of co["o]rdinates. See

 Coordinate.

We now define the Hyperbolic Functions below.

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And their graphs are given below. Notice that the graph of Sinh(x) can be obtained by addition of ordinates using the exponential functions and . Like wise for Cosh(x) for and .



Many of the identities of the hyperbolic trig. Functions have a corresponding identity.

Ex:



Ex: 5.9.13 Use the value of the given hyperbolic function to find the values of the other hyperbolic functions at x. If .

Taking derivatives of the hyperbolic functions. This is as easy & difficult as taking the derivative of .

Ex: Find Ex: Find

The basic derivatives of the hyperbolic functions are given below.

Ex: 5.9.18 Find the derivative of

Ex: If , find . (Simplify your answer)

Similar to 5.9.33 T / F The function satisfies the differential equation

Some Inverse Hyperbolic Functions and their derivatives and integrals: