Conditions

How can I find a parabolic function that mimics a hyperbolic one? How would I find the parabolic function for the hyperbolic function y=5cosh(x/5)?

Solution

Here we must use the Taylor series, and then take theirs part to 2nd degree.

For the hyperbolic cosine the Taylor series is:

$$\cosh(x) = 1 + x2/2! + x4/4! + \cdots$$

Hence,

$$5\cosh x/5 = 5(1 + (x/5)2/2! + \cdots)$$

A close approximation to this function in some neighborhood of 0 is:

$$y = 5 + \frac{x^2}{10}$$