Hyperbolic functions are defined in terms of the exponential function. Many relations among hyperbolic functions are similar to corresponding relation among trigonometric functions. You can find information on hyperbolic functions in Section 3.11 of our text.

For your report, start by stating the definitions of \( \cosh x \) and \( \sinh x \) and then write an exposition that includes the following elements.

1. Use the definitions of \( \cosh x \) and \( \sinh x \) to prove the identity \( \cosh^2 x - \sinh^2 x = 1 \).

2. Use the definition of \( \cosh x \) to determine the derivative of \( \cosh x \). Include relevant plots to illustrate this derivative.

3. Using the fact that \( \frac{d}{dx}[\sinh x] = \cosh x \) to determine the derivative of \( \sinh^{-1} x \). Find an expression that gives the derivative of \( \sinh^{-1} x \) in terms of algebraic operations (as opposed to transcendental operations such as trigonometric, exponential, and logarithmic functions).