Problem 1: (5 points) If \( \frac{x^2}{9} + \frac{y^2}{4} = 2 \) find \( y'' \) at the point (3,2)

Problem 2: (4 points) Find \( D^{101} \ln(\, + 1) \)

Problem 4: (4 points) Define \( \text{csch} \) in terms of \( e^x \) and \( e^{-x} \) then this definition to prove that \( \frac{d}{dx}(\text{csch} \, x) = -\text{csch} \, x \coth x \)

Problem 4: (7 points) Find \( y' \). DO NOT SIMPLIFY.
(a) \( y = \tanh^{-1} \sqrt{x^2 + 1} \)

(b) \( y = \cot^{-1}(\sin x) \)

(c) \( y = (1 + \cos x)^x \)
Problem 1: (5 points) If \( \frac{x^2}{4} + \frac{y^2}{9} = 2 \) find \( y'' \) at the point (2,3).

Problem 2: (4 points) Find \( D^{100} \ln(x-1) \).

Problem 4: (4 points) Define \( \text{sech} \) in terms of \( e^x \) and \( e^{-x} \) then this definition to prove that \( \frac{d}{dx}(\text{sech}x) = -\text{sech}x \tanh x \).

Problem 4: (7 points) Find \( y' \). DO NOT SIMPLIFY.
(a) \( y = \coth^{-1}\sqrt{x^2+1} \)

(b) \( y = \tan^{-1}(\cos x) \)

(c) \( y = (1+\sin x)^x \)