

Show all work. Arithmetic expressions do not need to be simplified in your final answer.

1. **(7 points)** Given the equation $e^y = x + xy$, determine $\frac{dy}{dx}$ by implicit differentiation.
2. **(6 points)** Find the derivative with respect to x of the expression $x\sqrt{1 + e^x}$.
3. **(7 points)** If $y = \tan\left(\frac{x^2+1}{x^3+1}\right)$, calculate $\frac{dy}{dx}$.
4. **(2 point bonus)** Presuming that the function f is invertible, find a formula on the back of this page for the derivative of the function f^{-1} in terms of the functions f , f' , and f^{-1} .