

Homework 5

1. Find the derivative of $f : (1, \infty) \rightarrow \mathbb{R}$, $f(x) = (\ln x)^{\ln x}$.
2. Find the derivative of $f : (0, \infty) \rightarrow \mathbb{R}$, $f(x) = x^{x^x}$.
3. Prove that for every real number x , $e^x \geq x + 1$.
4. Find all positive real solutions to the equation $2^x = x^2$.
5. Show that for every positive numbers a, b , and positive integer n , one has $a^n + (n - 1)b^n \geq nab^{n-1}$.