MAT131 Fall 2022 Paper HW 3

Due the week of September 12 – September 16. For all problem sets, students are allowed to work together. However, the final answer you turn in must be based on your own understanding and must be in your words. Per university policy, all instances of suspected academic dishonesty will be referred to the academic judiciary.

Problem 1. For each whole number n, explain why there exists x with $(2n-1)\pi/2 < x < (2n+1)\pi/2$ such that $\tan(x) = x$.

Problem 2. For all $x \in (0, \infty)$, define $f(x) = (1+x)^{1/x}$. Write a table of values of $f(x)$ for $x = 1, 10, 100, 1000$, and guess $\lim_{x\to\infty} f(x)$. If the limit exists, explain why it must be ≥ 1.