Homework 3: Proofs with Quantifiers (Due 2/17/2021)

*Assignments should be **stapled** and written clearly and legibly.*

1. §1.2, #8, 9(c), (d), 10, 11.
2. §1.4, #11.
3. Prove that for every integer b, there exists a positive integer a such that $|a - |b|| \leq 1$.
4. Prove that for every positive real number e, there exists a positive real number d such that if x is a real number with $|x| < d$, then $2|x| < e$.
5. Prove that for every positive real number ϵ, there exists a natural number N such that if $n > N$, then $\dfrac{1}{n^2+1} < \epsilon$.
6. (Challenge) Give an explicit bijection $f : [0, 1) \to (0, 1)$.