Homework 3: Proofs with Quantifiers

Assignments should be **stapled** and written clearly and legibly. Problem 6 is optional.

- 1. §1.2, #8, 9(d), 10(c), 11(f).
- 2. §1.4, #11.
- 3. Prove that for every integer b, there exists a positive integer a such that $|a b| \le 1$.
- 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 $\frac{1}{n^2 + 1} < \epsilon$.
- 6. Give an explicit bijection $f:[0,1)\to(0,1)$.