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 $|a - |b|| \leq 1$.

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. Give an explicit bijection $f : [0, 1) \to (0, 1)$.