Math 206 — Quantifiers

Problem 1. Write the following statements symbolically.

a. If x is a real number, then it is an integer.

b. There is an integer x that is non-negative.

c. The equation $x^2 + 1 = 0$ has a rational solution.

d. For every real number x, there is a real number y such that $x < y$.

e. There is a real number y such that $x < y$ for all $x \in \mathbb{R}$.

f. If x is a positive real number, then $x > 4$ or $x < 6$.

Problem 2. Negate the statements in the previous problem. Decide which is true for each: the original statement or its negation.

Problem 3. Consider the following statements. Rephrase them in words and decide whether either is true.

a. $\forall n \in \mathbb{Z}, \exists m \in \mathbb{Z}, m = n + 5$

b. $\exists m \in \mathbb{Z}, \forall n \in \mathbb{Z}, m = n + 5$