

MAT 215: PROBLEM SET 1

DUE THURSDAY FEBRUARY 3

Reading: Abbot Sections 1.1-1.6.

Problem 1: Write in English the following logical statements:

- (i) $\forall x, y \in \mathbb{N}, (x > y) \implies (x \geq y)$.
- (ii) $\forall x \in \mathbb{Q}, \exists y \in \mathbb{N}, ((xy) \in \mathbb{N}) \wedge (\forall z \in \mathbb{N}, z < y \implies zx \notin \mathbb{N})$.

Problem 2: Let P and Q be statements.

- (i) Show that the following two statements have the same truth value: $(\sim P) \vee (\sim Q)$ and $\sim (P \wedge Q)$.
- (ii) Give a statement in terms of P, Q, \sim, \wedge and \vee that has the same truth value as $P \implies Q$.

From Abbot: Exercises 1.2.2, 1.2.3, 1.2.7, 1.2.8, 1.2.9, 1.2.12.