

Math 112 Homework for Tuesday, Week 2

1. Let  $A, B \subseteq U$ . Prove the following statements:

(a)  $(U \setminus A) \cap (U \setminus B) = U \setminus (A \cup B)$

(the intersection of the complements is the complement of the union)

(b) If  $U = A \cap B$ , then  $A = B = U$

2. Prove that  $\{y \in \mathbb{R} : y = x^3 \text{ for some } x \in \mathbb{R}\} = \mathbb{R}$ .

3. Compute

$$\bigcup_{k \in \mathbb{N}^+} (0, 1/k).$$

Prove your answer.