

Math 112 Homework for Tuesday, Week 2

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

(a) The intersection of the complements is the complement of the union:

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

(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

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

Prove your answer.