

Mathematics 16100
Problem Set #3
Due October 19, 2006

1. Let C be the set of rational numbers, and give $<$ its usual meaning in this context. What is the set of limit points of the set

$$\left\{ \frac{1}{m} + \frac{1}{n} \mid m, n \in \mathbb{N} \right\}?$$

2. Write down negations of the following statements. Don't simply preface them with phrases like "It is not the case that ..."

- (a) Every book is interesting, and some books are long.
- (b) Every human being has exactly one pet, and that pet is a dog.

3. Prove or disprove the following statements concerning three arbitrary sets A, B, C .

- (a) $(A \cup B) \cup C = A \cup (B \cup C)$
- (b) $(A \setminus B) \cap C = (A \cap C) \setminus B$
- (c) $A \setminus (B \cup C) = (A \setminus B) \cap (A \setminus C)$
- (d) $A \setminus (B \cap C) = (A \setminus B) \cup (A \setminus C)$