

6/3/2010

Quiz #5

Name: _____

key

Show all work clearly and in order. Please box your answers. 10 minutes.

1. Show: There exist sets A and B such that $|A \setminus B| \neq |A| - |B|$.

Consider : $A = \{1, 2\}$
 $B = \{2, 3\}$

Observe : $|A \setminus B| = 1$
 $|A| - |B| = 2 - 2 = 0$

Note: There are many possible answers.

2. Show: There exist sets A and B such that $A \cup B = A \cap B$.

Consider : $A = \emptyset$
 $B = \emptyset$

observe : $A \cup B = \emptyset \cup \emptyset = \emptyset$
 $A \cap B = \emptyset \cap \emptyset = \emptyset$

Note: There are many possible answers.

3. Let A and B be arbitrary sets in some universe \mathcal{U}

- (a) Show: $A \cap B \subseteq A$.

Let $x \in A \cap B$.
 so $x \in A$ and $x \in B$.
 In particular $x \in A$.
 Therefore $A \cap B \subseteq A$.

- (b) Show: $A \subseteq A \cup B$.

Let $x \in A$.
 so $x \in A$ or $x \in B$.
 Therefore $x \in A \cup B$.
 Hence $A \subseteq A \cup B$.