

# Math 2283 - Introduction to Logic

Quiz #12 - 2012.09.26

## Solutions

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1. Let  $V$  be defined to be the set of all positive integers.

Answers will vary for each answer, here is an example for each problem:

(a) Construct two sets  $K$  and  $L$ , both of which have in an infinite number of elements, such that  $K$  and  $L$  are disjoint.

Let  $K$  be the set of all positive even integers, and  $L$  be the set of all odd positive integers. Clearly each set is infinite, and they are disjoint.

(b) Construct two sets  $K$  and  $L$ , both of which have in an infinite number of elements, such that  $K \subset L$ .

Let  $K$  be the set of all positive even integers, and  $L$  be the set of all odd positive integers and the number 1. Clearly each element of  $K$  is an element of  $L$ , but not vice versa, due to the number 1.

(c) Construct two sets  $K$  and  $L$ , each with an infinite number of elements, such that  $K$  and  $L$  overlap but are not equal.

Let  $K$  be the set of all odd integers, and  $L$  be the set of all prime numbers. Clearly each is infinite, but they are not the same. For example,  $9 \in K$ , but  $9 \notin L$ . Similarly,  $2 \in L$  and  $2 \notin K$ .