

Math 2283 - Introduction to Logic

Quiz #22 - 2016.03.09

Name: _____

For the following proof, please justify each of the steps given.

Theorem: $(K \cap L)' = K' \cup L'$

Proof:

- (1) $x \in (K \cap L)' \leftrightarrow \sim x \in K \cap L$
- (2) $x \in K \cap L \leftrightarrow (x \in K \wedge x \in L)$
- (3) $\sim x \in K \cap L \leftrightarrow \sim (x \in K \wedge x \in L)$
- (4) $x \in (K \cap L)' \leftrightarrow \sim (x \in K \wedge x \in L)$
- (5) $\sim (x \in K \wedge x \in L) \leftrightarrow \sim x \in K \vee \sim x \in L$
- (6) $x \in (K \cap L)' \leftrightarrow \sim x \in K \vee \sim x \in L$
- (7) $\sim x \in K \leftrightarrow x \in K'$
- (8) $\sim x \in L \leftrightarrow x \in L'$
- (9) $x \in (K \cap L)' \leftrightarrow (x \in K' \vee x \in L')$
- (10) $(x \in K' \vee x \in L') \leftrightarrow x \in K' \cup L'$
- (11) $x \in (K \cap L)' \leftrightarrow x \in K' \cup L'$

□