

Math 2283 - Honors Logic

Midterm - 2018.10.22

Name: _____

Potentially Useful Information:

Tautological Sentences:

- (1) $\sim(p \vee q) \leftrightarrow \sim p \wedge \sim q$
- (2) $\sim(p \wedge q) \leftrightarrow \sim p \vee \sim q$
- (3) $p \vee q \leftrightarrow \sim(\sim p \wedge \sim q)$
- (4) $p \wedge q \leftrightarrow \sim(\sim p \vee \sim q)$
- (5) $(p \rightarrow q) \leftrightarrow \sim p \vee q$
- (6) $(p \wedge q) \rightarrow p$
- (7) $(p \wedge q) \rightarrow q$
- (8) $(p \wedge q) \leftrightarrow (q \wedge p)$
- (9) $p \wedge T \leftrightarrow p$ (Here T is any true sentence)
- (10) $p \vee F \leftrightarrow p$ (Here F is any false sentence)
- (11) $\forall x, y, z P(x, y, z) \rightarrow \forall x, y P(x, y, x)$

Class Properties:

- $$x \in K' \xleftrightarrow{def} \sim x \in K$$
- $$x \in K \cup L \xleftrightarrow{def} x \in K \vee x \in L$$
- $$x \in K \cap L \xleftrightarrow{def} x \in K \wedge x \in L$$

Relation Properties:

- R is symmetric $\xleftrightarrow{def} \forall x, y \in K xRy \rightarrow yRx$
- R is reflexive $\xleftrightarrow{def} \forall x \in K xRx$
- R is transitive $\xleftrightarrow{def} \forall x \in K xRy \wedge yRz \rightarrow xRz$

Point distribution

Problem	Points Total	Points Earned
0(a)	10	
0(b)	10	
0(c)	10	
1	30	
2(a)	20	
2(b)	20	
3	50	
4	50	
5	10	
Total	200	

