Quiz 4: October 30, 2018

Left Neighbor: ________________ Right Neighbor: ________________

Name: ______________________ Student ID: ______________________

Section TA: ____

This is a closed book quiz

TABLE 1 Rules of Inference.

Rule of Inference	*Tautology*	*Name*
p $p \to q$ $\therefore q$	$[p \wedge (p \to q)] \to q$	Modus ponens
$\neg q$ $p \to q$ $\therefore \neg p$	$[\neg q \wedge (p \to q)] \to \neg p$	Modus tollens
$p \to q$ $q \to r$ $\therefore p \to r$	$[(p \to q) \wedge (q \to r)] \to (p \to r)$	Hypothetical syllogism
$p \vee q$ $\neg p$ $\therefore q$	$[(p \vee q) \wedge \neg p] \to q$	Disjunctive syllogism
p $\therefore p \vee q$	$p \to (p \vee q)$	Addition
$p \wedge q$ $\therefore p$	$(p \wedge q) \to p$	Simplification
p q $\therefore p \wedge q$	$[(p) \wedge (q)] \to (p \wedge q)$	Conjunction
$p \vee q$ $\neg p \vee r$ $\therefore q \vee r$	$[(p \vee q) \wedge (\neg p \vee r)] \to (q \vee r)$	Resolution

1. **(4 points total)** Perform a formal proof (as we learned in class, using the Rules of Inference on the front of this sheet) that if $H_1 = \neg p \vee r$, $H_2 = \neg q \vee r$, and $H_3 = p \vee q$, then $H_1 \wedge H_2 \wedge H_3 \rightarrow r$

2. **(6 points total)** Perform a formal proof (as we learned in class, using the Rules of Inference on the front of this sheet) that if $H_1 = (d \vee s) \rightarrow p$, $H_2 = c \rightarrow \neg p$, $H_3 = \neg c \rightarrow e$, and $H_4 = \neg e$ then $H_1 \wedge H_2 \wedge H_3 \wedge H_4 \rightarrow \neg d$