Problem 1.1 (L1)

a)

b)

c)

Problem 1.2 (L1)

a)

b)

c)

Problem 2 (L.2) Ivan Leung ihleung

My mistake was that I used conditional identity on $p \vee r$ when I should apply double negation law first because without a negation preceding p, I cannot apply conditional identity.

$((i \to j) \vee k) \wedge ((\neg k \to j) \vee (j \to k))$	start
$((\neg i \vee j) \vee k) \wedge ((\neg k \to j) \vee (j \to k))$	conditional identity
$((\neg i \vee j) \vee k) \wedge ((\neg\neg k \vee j) \vee (j \to k))$	conditional identity
$((\neg i \vee j) \vee k) \wedge ((\neg\neg k \vee j) \vee (\neg j \vee k))$	conditional identity
$((\neg i \vee j) \vee k) \wedge ((k \vee j) \vee (\neg j \vee k))$	double negation law
$((\neg i \vee j) \vee k) \wedge (k \vee j \vee (\neg j \vee k))$	associative law
$((\neg i \vee j) \vee k) \wedge (k \vee j \vee \neg j \vee k)$	associative law
$((\neg i \vee j) \vee k) \wedge (k \vee (j \vee \neg j) \vee k)$	associative law
$((\neg i \vee j) \vee k) \wedge (k \vee T \vee k)$	complement law
$((\neg i \vee j) \vee k) \wedge (k \vee k \vee T)$	commutative law
$((\neg i \vee j) \vee k) \wedge ((k \vee k) \vee T)$	associative law
$((\neg i \vee j) \vee k) \wedge (k \vee T)$	idempotent law
$((\neg i \vee j) \vee k) \wedge T$	domination law
$(\neg i \vee j) \vee k$	identity law
$\neg i \vee j \vee k$	associative law
$j \vee \neg i \vee k$	commutative law
$j \vee k \vee \neg i$	commutative law
$k \vee j \vee \neg i$	commutative law
$(k \vee j) \vee \neg i$	associative law
$(\neg\neg k \vee j) \vee \neg i$	double negation law
$(\neg k \to j) \vee \neg i$	conditional identity

The two expressions are logically equivalent

Problem 3 (L.3)

a)

Row #	p	q	$p \to q$	$p \vee q$	$\neg p \to q$	$(p \to q) \vee (\neg p \to q)$	$\neg p \to \neg q$	$(p \vee q) \to (\neg p \to \neg q)$
1	T	T						
2	T	F						
3	F	T						
4	F	F						

b)

Problem 4.1 (L.4)

☐ tautology ☐ not a tautology

Problem 4.2 (L.4)

a)

☐ equivalent ☐ not equivalent

b)

☐ equivalent ☐ not equivalent