Date	Name	Grade / Score
		/15

1.   Complete the following Truth Table of the iterated composition $(\sim p \wedge r) \to ((q \leftrightarrow \sim r) \vee p)$.   (5 marks)

p	q	r	$(\sim p \quad \wedge \quad r) \quad \to \quad ((q \quad \leftrightarrow \quad \sim r) \quad \vee \quad p)$
T	T	T	
T	T	F	
T	F	T	
T	F	F	
F	T	T	
F	T	F	
F	F	T	
F	F	F	

2.   Prove the ***De Morgan's Law*** : $\sim (p \vee q) \equiv \sim p \wedge \sim q$.   (4 marks)

3. Let p and q be any statements. Prove that every truth function of the indeterminates p and q is an iterated composition of negation and disjunctions. (Hint : of the sixteen distinct truth functions in the indeterminates p and q, eight are given below; the rest are their negations. (6 marks)

p	q	f_1	f_2	f_3	f_4	f_5	f_6	f_7	f_8
T	T	T	T	T	T	F	T	T	T
T	F	T	T	T	F	T	T	F	F
F	T	T	T	F	T	T	F	F	T
F	F	T	F	T	T	T	F	T	F

Now $f_1 \equiv (\sim p) \vee p$ and $f_2 \equiv p \vee q$.