RYERSON UNIVERSITY
MTH 714 LAB#1
DAY: SEPTEMBER 11, 2008

1. Construct a formation tree and the truth table for

$$F = \neg(p \leftrightarrow \neg(q \wedge \neg p))$$

2. For what values of atoms p, q, r will the following formulas be false?

   (a) $A = ((p \rightarrow (q \wedge r)) \rightarrow (\neg q \rightarrow \neg p)) \rightarrow \neg p$

   (b) $B = (p \vee q) \rightarrow ((\neg p \wedge q) \vee (p \wedge \neg q))$

3. Find a formula A containing three atoms p, q, and r, with the following property: for every assignment

$$v : \{p, q, r\} \rightarrow \{T, F\}$$

   changing any of the values of $v(p)$, $v(q)$, $v(r)$ will also change $v(A)$.

4. Show that any formula A, which is not an atom, and which uses $\neg$ and $\leftrightarrow$ as its only connectives has the following property: the number of rows in the truth table for A in which $v(A) = T$ is even. (In fact, the number of rows in which $v(A) = F$ is also even)