Name _____

Due: Beginning of Class Monday May 31, 2010.

Hand in hard copy. Staple all pages.

1. Find truth values for the propositional variables A, B, and C such that the truth value of the following wff is false.

$$(A \lor B \rightarrow C) \land A \rightarrow (C \rightarrow B)$$

$A =$ _____ $B =$ _____ $C =$ _____

2. Use basic equivalences to prove the following equivalence.

$$\neg \left((\neg A \land B) \lor (A \land \neg B) \right) \equiv (\neg A \land \neg B) \lor (A \land B)$$

3. Use basic equivalences to prove that the following wff is a tautology. In other words, show the wff is equivalent to true.

$$\neg B \land (A \rightarrow B) \rightarrow \neg A$$

4. Demonstrate the use of Quine's method to find out whether the following wff is a tautology, a contradiction, or a contingency.

$$(A \rightarrow B) \rightarrow (A \lor C \rightarrow B \lor \neg C)$$

5. Given the truth function f defined by the following table:

A	B	f(A,B)
true	true	true
true	false	false
false	true	false
false	false	true

a. Write $f(A, B)$ in CNF (conjunctive normal form).

b. Write $f(A, B)$ in DNF (disjunctive normal form).

6. Find a DNF and a CNF for the following wff. (Full normal form is not
required.)

$$(A \rightarrow B) \rightarrow (C \rightarrow D)$$

7. Find a full DNF for the following wff.

$$A \rightarrow (B \vee \neg C)$$