

**CS 340 Written Homework Assignment #6**  
**Due: Beginning of Class Wednesday May 27, 2009.**

Name \_\_\_\_\_

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

$$(A \vee B \rightarrow C) \wedge A \rightarrow (C \rightarrow B).$$

2. Use basic equivalences to prove the following equivalence.

$$\neg((\neg A \wedge B) \vee (A \wedge \neg B)) \equiv (\neg A \wedge \neg B) \vee (A \wedge B).$$

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

$$\neg B \wedge (A \rightarrow B) \rightarrow \neg A.$$

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

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

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.

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