

Name _____

Points (20) _____

Intermediate Logic

Homework #29

(Due: 5/14/2013)

Read pages 140-149 in the *Intermediate Logic* text and complete the exercises.

Exercise 32 (p. 144-145): Using the method of truth trees, determine the consistency of the following sets of propositions. Recover the truth values for all consistent sets.

1. $\{ A \supset B, (A \bullet B) \supset C, \sim(A \bullet C), A \}$ Hint: each step need not have more than one branch.

2. $\{ D \equiv (E \supset F), \sim D \bullet E, D \equiv F \}$

3. $\{ G \supset H, G \vee I, \sim H, \sim(I \bullet \sim G) \}$

4. $\{ \sim(J \equiv K), K \supset (\sim L \vee M), L \bullet \sim(K \bullet M) \}$ Hint: give yourself plenty of room and watch details!

Exercise 33 (pages 148-149): For this exercise you may omit line numbers and justifications! ☺

Decompose each of the following compound propositions to determine if it is a *self-contradiction*. Write “Yes” if it is or “No” if it is not.

1. $\sim P \bullet (P \bullet Q)$

2. $P \bullet \sim(P \bullet Q)$

3. $(P \supset P) \supset (Q \bullet \sim Q)$

4. $(P \bullet Q) \equiv \sim(P \vee Q)$

Decompose the negation of each of the following compound propositions to determine if it is a *tautology*. Write “Yes” if it is or “No” if it is not.

1. $\sim (P \vee Q) \supset \sim (P \bullet Q)$

2. $\sim (P \bullet Q) \supset \sim (P \vee Q)$

3. $(P \supset Q) \vee (Q \supset P)$

4. $\sim (P \bullet \sim Q) \equiv (Q \vee \sim P)$

Cranium Calisthenics

On the island of Knights, Knaves, and Normals, knights always tell the truth, knaves always lie, and those called *normal* can either lie or tell the truth (and sometimes one and sometimes the other).

One Day I visited this island and met two inhabitants, A and B. I already knew that one of them was a knight and the other was normal, but I didn't know which was which. I asked A whether B was normal, and he answered me, either yes or no. I then knew which was which.

Which of the two is normal? * How do you know?



* *The Lady or the Tiger? And Other Logic Puzzles*, by Raymond Smullyan. Random House, Inc. 1982.