

Name _____

Points (20) _____

Intermediate Logic

Homework #30
(Due: 5/21/2013)

Read pages 150-158 in the *Intermediate Logic* text and complete the exercises.

Exercise 34 (p. 152): Decompose the negation of the biconditional of the two propositions to determine if they are equivalent. Write YES if they are and NO if they are not. Include line numbers and justifications, and recover at least one set of truth values which show non-equivalence.

1. $P \quad P \vee (P \bullet Q)$

2. $P \quad P \bullet (P \vee Q)$

3. $P \supset Q \quad Q \supset P$

4. $P \supset Q \quad \sim Q \supset \sim P$

Exercise 35 (pp. 157-158): Use truth trees to determine the validity of the following arguments. If an argument is found to be invalid, recover at least one set of truth values which demonstrate the invalidity.

1. $A \supset B \quad B \supset C \quad \sim C \quad \therefore \sim A$

2. $D \supset E \quad F \supset E \quad \therefore D \vee F$

3. $(G \bullet H) \supset I \quad H \quad \therefore G \supset I$

4. If an axe was found in the safe then the butler put it there. If the butler put it there then he was guilty of the crime. If he was guilty then he would be distressed. He was not distressed. Either an axe was found in the safe or the safe was empty. Therefore the safe was empty.
(A, B, C, D, E)

5. If you studied logic then if you did not learn logic then you will not know how to do this problem. If you did not learn logic but you are brilliant then you will know how to do this problem. You know how to do this problem. Thus you either studied logic or you are brilliant. (S, L, K, B)

Cranium Calisthenics

Back at the palace of Scheherazade*... "How about a logic puzzle," asked the king.

"Very well. Hassan was a good friend of Ali and Ahmed. The following facts are true about them: 1) Either Ali or Ahmed is the oldest of the three; and 2) Either Hassan is the oldest or Ali is the youngest. Who is the oldest and who is the youngest?" (Why?)



* From *The Riddle of Scheherazade and Other Puzzles*, Smullyan. Knopf, 1997.