



Name \_\_\_\_\_

Points (20) \_\_\_\_\_

## Intermediate Logic

### Homework #19

(Due: 2/26/2013)

Read pages 57-65 in the *Intermediate Logic* text and complete the exercises.

**Exercise 13** (pages 61-62) [Tip: You might find it helpful to highlight/label each proposition.]

Determine the validity of the following arguments using the shorter truth-table method. Use the constants given in order of appearance in the argument to symbolize each proposition.

1. If I study for my test tonight then I am sure to pass it, but if I watch TV then I will get to see my favorite show. So if I study for the test and watch TV, then I will either pass the test or I will see my favorite show. (S, P, W, F)

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2. If Caesar had been a benevolent king, then all Romans would have received their full rights under the law. The Roman Christians were persecuted for their faith. If all Romans had received their full rights, then Roman Christians would not have been persecuted. Therefore, Caesar was not a benevolent king. (B, R, P)

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3. If I promise to feed the dog and bathe it, and if I promise to clean up after the dog's messes, then my mother will let me keep it. If promising to clean up after the dog's messes implies that mother will let me keep the dog, then if I pay for the dog with my own money then I will be allowed to name it myself. I will pay for the dog with my own money. Therefore, if I promise to feed the dog then I will be allowed to name it myself. (F, B, C, K, P, N)\*

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4. If the book of Hebrews is Scripture then it was written by Paul or Apollos. If Paul wrote anonymously to the Hebrews then he wrote anonymously in some of his letters. If Hebrews was written by Paul then he wrote anonymously to the Hebrews. Paul did not write anonymously in any of his letters. The book of Hebrews is Scripture. Therefore Hebrews was written by Apollos. (S, P, A, H, L)

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\* This one is a little tricky. Write your compound proposition out **FIRST**, then check your work before you finish the table. The symbolized proposition is shown on the Cranium Calisthenics Hints page of the website.

5. If you sin apart from the law then you will perish apart from the law, but if you sin under the law then you will be judged by the law. If you sin, then you either sin apart from the law or you sin under the law. You do sin. Therefore you will either perish apart from the law or you will be judged by the law. (A, P, U, J, S)

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6. If you obey the law then you will not be condemned. You have not obeyed the law. You will be condemned. (O, C)

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7.  $\underline{p \therefore \sim p \vee q}$       8.  $\underline{p \supset q \therefore \sim q \supset \sim p}$       9.  $\underline{p \supset q \quad \sim q \therefore p \equiv q}$

10.  $\underline{p \supset (q \supset r) \quad q \therefore r \supset p}$       11.  $\underline{p \supset (\sim q \supset r) \quad p \therefore \sim r \supset q}$

12.  $\underline{(p \supset q) \bullet [(p \bullet q) \supset r] \quad p \supset (r \supset s) \therefore p \supset s}$

### Exercise 14 (page 65)

Use the shorter truth-table method to determine the validity of the following arguments. Most of these (but not all) will require you to guess a truth value.

1.  $\underline{p \equiv q \quad q \equiv r \therefore p \equiv r}$

2.  $\underline{p \vee q \therefore p \bullet q}$

$$3. \underline{p \supset q \quad q \equiv r \quad \therefore p \supset r}$$

$$4. \underline{(p \supset q) \vee (r \supset s) \quad p \vee r \quad \therefore p \supset r}$$

$$5. \underline{p \vee q \quad \sim[q \bullet (r \supset p)] \quad \therefore \sim(p \equiv q)}$$

$$6. \underline{p \supset (q \supset r) \quad q \supset (p \supset r) \quad \therefore (p \vee q) \supset r}$$

## **Cranium Calisthenics**

The Lady or the Tiger?\* - The Fifth Trial: The same rules apply to the fifth trial as those of the fourth.

By way of review, in the left-hand room (Room I), if a lady is in it, then the sign on the door is true, but if a tiger is in it, the sign on the door is false. In the right-hand room (Room II), the situation is the opposite: a lady in the room means the sign on the door is false, and a tiger in the room means the sign is true. Again, each room contains either a lady or a tiger. It is possible that both rooms contain ladies or both rooms contain tigers, or that one room contains a lady and the other a tiger.

<b>I</b>
AT LEAST ONE ROOM CONTAINS A LADY

<b>II</b>
THE OTHER ROOM CONTAINS A LADY

After the king explained the above rules to the prisoner, he pointed to the signs. Which room should the prisoner pick, and why?



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