

## Intermediate Logic

## Homework #20

(Due: 3/5/2013)

Read pages 66-71 in the *Intermediate Logic* text and complete the exercises.

**Exercise 15** (page 68)

Using the shorter truth-table method, determine the consistency of the following proposition sets. With problems 6 and 7, use the constants given.

1.  $\underline{p \quad \sim p \supset r}$       2.  $\underline{\sim\sim p \quad \sim p \bullet q}$       3.  $\underline{p \supset q \quad p \quad \sim q}$

4.  $\underline{p \vee q \quad \sim p}$       5.  $\underline{p \equiv q \quad q \equiv r \quad p \quad \sim r}$

6. Mr. Copia owns a Porche and a mansion. *If he doesn't own a mansion then he either owns a Porche or it's my imagination.* It's your imagination. (P, M, I)

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7. If I learn grammar or logic then I can use rhetoric. *If you can't use rhetoric then you learn grammar and logic.* (G, L, R)

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**Exercise 16** (page 71)

Using the shorter truth-table method, determine the equivalence of each pair of propositions.

1.  $\underline{\sim(p \bullet q) \quad \sim p \vee \sim q}$       2.  $\underline{p \supset q \quad p \supset (p \bullet q)}$

3.  $\underline{p \vee (p \supset q) \quad q \supset p}$       4.  $\underline{p \quad p \vee (p \bullet q)}$

5. If Christ's righteousness is not imputed to you then you are condemned. *Either Christ's righteousness is imputed to you or you are condemned.*

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6. Are the following two propositions equivalent?

$$[(\sim p \bullet r) \vee (q \bullet r)] \quad \underline{\hspace{2cm}} \quad [(p \supset q) \bullet r]$$

## 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
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<b>II</b> THE OTHER ROOM CONTAINS A LADY
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After the king explained the above rules to the prisoner, he pointed to the signs. Which room should the prisoner pick, and why?



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