

Intermediate Logic

Homework #17

(Due: 2/12/2013)

Read pages 38-46 in the *Intermediate Logic* text and complete the exercises.

Exercise 8 (from pages 41-42 of the text).

1. Fill-in the following truth table to determine the truth values for the exclusive *or*. The truth values for p and q are filled out for you.

p	q	$(p \vee q)$	$(p \cdot q)$	$\sim(p \cdot q)$	$(p \vee q) \cdot \sim(p \cdot q)$
T	T				
T	F				
F	T				
F	F				

2. Determine the truth values for $\sim(J \cdot R)$ and $\sim J \cdot \sim R$ to prove that they are different. The initial J and R should follow the same pattern as p and q in problem one.

J	R	$\sim J$	$\sim R$	$(J \cdot R)$	$\sim(J \cdot R)$	$\sim J \cdot \sim R$

3. Write sentences in English corresponding to the two compound propositions in problem five, using *Joe is a student* for J and *Rachel is a student* for R .

$\sim(J \cdot R)$ _____

$\sim J \cdot \sim R$ _____

Determine the truth value for each compound proposition. Assume that propositions A and B are true, X and Y are false. Circle T if the entire compound proposition is true. Circle F if it is false. Use the space at the right for showing any work (tables) if you wish.

4. $\sim A \vee B$ T F

5. $X \vee \sim B$ T F

6. $\sim(A \vee B)$ T F

7. $(A \cdot X) \vee (B \cdot Y)$ T F

8. $\sim[X \vee (Y \cdot \sim A)]$ T F

Identify the truth value of each of the following sentences by circling T or F.

9. Jonah was a prophet or Isaiah was a prophet. T F
10. Jeremiah was not a prophet but Isaiah was a prophet. T F
11. It is not true that both Jeremiah was a prophet and Isaiah was not a prophet. T F
12. Jonah was not a prophet or both Jeremiah and Isaiah were not prophets. T F
13. A false proposition is not true. T F
14. It is false that a true proposition is not false. T F
15. It is true that it is false that a true proposition is not false. T F

Exercise 9 (from page 46 of the text)

1. Develop the truth table for the compound proposition $\sim p \vee q$ on the line below.

p	q	$\sim p$	$\sim p \vee q$
T	T		
T	F		
F	T		
F	F		

2. To what compound proposition is $\sim p \vee q$ equivalent? _____

If A, B, and C represent true propositions and X, Y and Z represent false propositions, determine whether the following compound propositions are true or false and circle the appropriate letter.

3. $A \supset B$ T F
4. $B \supset Z$ T F
5. $X \supset C$ T F
6. $(A \supset B) \supset Z$ T F
7. $X \supset (Y \supset Z)$ T F
8. $(A \supset Y) \vee (B \supset \sim C)$ T F
9. $[(X \supset Z) \supset C] \supset Z$ T F
10. $[(A \bullet X) \supset Y] \supset [(X \supset \sim Z) \vee (A \supset Y)]$ T F

If S represents *I will go swimming* and C represents *The water is cold*, symbolize the following:

11. If the water is not cold, then I will go swimming. _____

12. I will go swimming if the water is cold. _____



Define the following logical operator as explained in the text.

- Conditional –

Cranium Calisthenics

The Lady or the Tiger?*

The Third Trial: The king explained that, again, the signs were either both true or both false.

Here are the signs:

I
EITHER A TIGER IS
IN THIS ROOM OR
A LADY IS IN THE
OTHER ROOM

II
A LADY IS IN THE
OTHER ROOM

Does the first room contain a lady or a tiger? What about the other room? Explain your answer!

(Reminder: each room contains either a lady or a tiger; there are no empty rooms.)



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