Linguistics 280: Problem Set 2

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Instructions. *Complete these problems by the start of class on Friday, August 13, 2010. All submitted work must be your own.*

Problem 1. Construct a truth table for each of the following sentences:

$$\neg((A \wedge B) \rightarrow C) \tag{1}$$
$$(A \rightarrow (B \rightarrow C)) \tag{2}$$
$$(\neg A \vee (\neg B \vee C)) \tag{3}$$
$$((A \rightarrow B) \rightarrow \neg(A \wedge \neg B)) \tag{4}$$
$$(\neg(\neg A \vee B) \wedge \neg(A \wedge \neg B)) \tag{5}$$

Now answer the following questions about these sentences:

a. Which one is a tautology?

b. Which one is a contradiction?

c. Which two are equivalent?

d. Which two are mutually inconsistent?

Problem 2. Assume the following translation key from English to PL:

P Evelyn eats Powdermilk biscuits.

S Evelyn travels to St. Paul.

C Clarence goes with Evelyn.

W Wally goes with Evelyn.

E Evelyn travels to the cities.

Use this key to represent the following English sentences in PL:

a. Unless Clarence and Wally go with her, Evelyn won't travel to the cities.

b. Evelyn will travel to the cities only if she eats Powdermilk biscuits, and if she travels to the cities, Clarence will go with her.

c. It's not true that if Evelyn doesn't eat Powdermilk biscuits she won't travel to the cities.

d. For Evelyn to travel to St. Paul, it's not necessary that Clarence and Wally go with her.

e. If Evelyn travels to the cities, she will travel to St. Paul, but she will go to the cities just in case she eats Powdermilk biscuits.

Problem 3. Assume the same translation key from Problem 2 and give an English sentence corresponding to each sentence of PL below:

a. $((P \leftrightarrow E) \wedge (C \vee W))$

b. $S \rightarrow P$

c. $((C \vee W) \vee \neg S)$

d. $\neg(E \rightarrow C)$

e. $(((E \wedge C) \vee (E \wedge W)) \wedge \neg(C \wedge W))$