MATHEMATICS 300 — FALL 1997

Introduction to Mathematical Reasoning

Instructor: H. J. Sussmann

HANDOUT NO. 5. October 30, 1997

INSTRUCTOR'S OFFICE HOURS

Monday and Thursday, 4th period. **Please let the instructor know after class if you are planning to go see him during office hours, so he will not have to stay in his office unless he knows somebody is coming.**

TEACHING ASSISTANT'S OFFICE HOURS

Friday 11:30 - 2:00pm. Hill 101. (The TA's name is David Radnell.)

HOMEWORK ASSIGNMENT NO. 5.

The was due on **Monday, October 27**. For the record, here is the list of problems:

Problems 7a,b, 8a,b,e,m,n,o, 9c,d, 12, 13, 15b,c,e in Pages 94-5-6.

HOMEWORK ASSIGNMENT NO. 6.

Due on **Thursday, November 6**.

Problems 4, 5, 6, 12, 13, 14a,c, 15 in Pages 102-3-4.

OPTIONAL HOMEWORK PROBLEMS

Due any time before Thanksgiving.

(A) Problem 14 in Page 96 and Problem 11 in Page 103.

NOTE: In both problems, the question is the same. The difference is that in Problem 14, Page 96 you are only allowed to use the PMI, and in Problem 11, Page 103 you are asked to do it using the WOP.

We did this problem in class, in great detail, using the PCI. Now I am asking you to prove the same result in two other ways, namely, using the PMI only, and using the WOP.

(Problem (B) is in Page 2.)

(B) Consider the following inferences:

Wine is better than beer
Beer is better than water

Wine is better than water

An "A" grade is better than a "B" grade
A "B" grade is better than a "C" grade

An "A" grade is better than a "C" grade

Harvard is better than Yale
Yale is better than Trenton State College

Harvard is better than Trenton State College

These three inferences —which are obviously valid— appear to be instances of the following general "inference rule"

From

X is better than Y
Y is better than Z

one can go to

X is better than Z

Consider, however, the following instance of the above "rule":

Nothing is better than having a very good education
Being able to read a few words is better than nothing

Being able to read a few words is better than having a very good education

This one doesn't look right, does it?

Formalize these inferences using a first-order predicate calculus, and show in particular that when you formulate the appropriate "inference rule" carefully, and formalize our four examples precisely, then the first three are special cases of the rule but the fourth one is not. (Note: *we did a similar thing in class, and you have a detailed explanation in Handout No. 2, for some inferences involving the predicate "married". This should help you a little bit if you are not sure of exactly what you are supposed to do.*)

There are going to be more optional problems in future handouts.