Assignment #1 for **Mathematics for Economists**
Economics 362M, Spring 2010

Due date: Tue. Jan. 26.

Readings: January 19 and 21, CSZ, Ch. 1, 2.1 - 4.

   This week, we will see the logical structures of formal arguments. This structure will be in everything we do for the rest of the course, so you will have plenty of chances to see it in action. In particular we will look at:

   (1) statements as sets and subsets as implication;
   (2) ands/ors/nots as intersections/unions/complements;
   (3) indicator functions and sets;
   (4) the logical Quantifiers, "for all" and "there exists," and
   (5) the First Fundamental Theorem of Welfare Economics.

   We will also introduce the basic notations that we will use for those parts of set theory that you will have seen, at least implicitly, before: products, relations, correspondences, and functions.
From Chapter 1.3: 1.3.3 (p. 7), 1.3.5 & 7 (p. 8).

A. (With apologies to Lewis Carroll) We let X, the "universe of discourse," be the set of people. We define $B \subset X$ as the set of babies, $I \subset X$ as the set of illogical people, D the set of despised people, and M the set of people who can manage a crocodile.

1. Express the following three statements as subset relations.
   (a) All babies are illogical.
   (b) Nobody is despised who can manage a crocodile.
   (c) Illogical persons are despised.
2. Express the same three statements as implications, using notation from Chapter 1.
3. Prove that if the three statements are true, then no baby can manage a crocodile.

From Chapter 2.2: 2.2.5 & 7 (p. 19).
From Chapter 2.3: 2.3.13 & 14 (p. 25).
From Chapter 2.4: 2.4.4 & 10 (p. 27).

   On p. 7, there is a typographical error that can be fixed in two ways. First, "*Another proof of Theorem 1.3.1*" could be changed to "*Another proof of Theorem 1.3.2.3*" and then change all unions to intersections and vice versa in equations (1.2) and (1.3). Second, one could change the right-hand side of (1.2) to $1_A + 1_B \cdot 1_C - 1_A \cdot 1_B \cdot 1_C$ and change the right-hand side of (1.3) to $[(1_A + 1_B) - 1_A \cdot 1_B] \cdot [(1_A + 1_C) - 1_A \cdot 1_C]$, and then expand these to show that they are equal.

Assignment #2 for **Mathematics for Economists**
Economics 362M, Spring 2010

Due date: Tue. February 2.

Readings: January 26 and 28, CSZ, Ch. 2.5.
From Chapter 2.5: 2.5.3 & 5 (p. 29), 2.5.7 & 8 (p. 30), 2.5.18 (p. 33).