Math 300A&B   Introduction to Mathematical Reasoning   Fall 2009
Assignment #7: Due Wednesday, 11/25/09

Part I:

1. For each of the following sets, write a precise membership criterion in the following form:
$$x \in \langle \text{name of set} \rangle \Leftrightarrow \dots.$$
   m and n are arbitrary integers.

   Example: $\mathbb{Z}^{\geq}$:

   Membership criterion: $x \in \mathbb{Z}^{\geq} \Leftrightarrow x \in \mathbb{Z}$ and $x \geq 0$.

   (a) $\mathbb{R}^{+}$.

   (b) $\mathbb{R} - \mathbb{Z}^{+}$.

   (c) $\mathbb{R}^{+} - \mathbb{Z}$.

   (d) $\mathbb{R}^{+} \times \mathbb{Z}^{+}$.

   (e) $\mathbb{R}^{+} \cap \mathbb{Z}$.

   (f) $\mathbb{R}^{+} \cup \mathbb{Z}$.

   (g) $\mathbb{Z}^{+} \cap [-400, 400)$.

   (h) $S = \{y \in \mathbb{R} : y^3 - 3y^2 \in \mathbb{Z}\}$.

   (i) $T = \{y^3 - 3y^2 : y \in \mathbb{Z}\}$.

   (j) $\mathcal{P}(\mathbb{Z})$.

2. Eccles, pages 87–88, Exercises 7.7 and 7.8.

3. Eccles, pages 99–100, Exercises 8.1, 8.5.

4. Eccles, page 117, Problem 13.