Math 300A&B Introduction to Mathematical Reasoning Fall 2009

Assignment #6: Due Wednesday, 11/18/09

Part I:

Some of these problems ask you to prove things about sets. We haven't talked in class about proofs in set theory, but I have told you enough information to get you started, and you can look at the book for examples. If you get confused, wait until Friday and we'll talk about templates for various kinds of set-theoretic proofs.

One important note: Although Eccles suggests using Venn diagrams or truth tables to prove some set-theoretic statements, I don't want you to do that. For all proofs in set theory, you should write paragraph-style proofs following the same conventions as all the other proofs we've done.

1. Decide which of the following statements are true for every set A (no proofs needed).
   (a) $A \in A$.
   (b) $A \subseteq A$.
   (c) $A \subseteq \{A\}$.
   (d) $\{A\} \subseteq A$.
   (e) $A \in \{A\}$.
   (f) $\{A\} \in A$.
   (g) $\emptyset \subseteq A$.
   (h) $\emptyset \in A$.
   (i) $\{\emptyset\} \subseteq A$.
   (j) $\{\emptyset\} \in A$.
2. Eccles, pages 72–73, Exercises 6.1, 6.2, 6.3.
3. Eccles, pages 115–119, Problems 1, 10.