Notes on HW2, MAA 3200, Fall 2010

Remarks: For 25 points each, I graded 4.3.12b, 5.2.6b, the handout [the TF page], and a general score. These should be written across the top of your first page, and totalled. The average was about 75/100.

For simplicity, I didn't grade 4.6 [recall there was a typo on the hw list]. If you didn't do those, be sure to do them before Exam II. If you eventually do Chs 4.5 AND 4.6, you can show me for *a little* extra credit.

4.3.12b: Standard Proof: Assume R is symmetric. ETS R^{-1} is symmetric. This means [ETS] $(a, b) \in R^{-1} \to (b, a) \in R^{-1}$. Assume $(a, b) \in R^{-1}$. ETS $(b, a) \in R^{-1}$. Since $(a, b) \in R^{-1}$, $(b, a) \in R$ [def of R^{-1}]. So, $(a, b) \in R$ [because R is symmetric], and $(b, a) \in R^{-1}$ [def of R^{-1} again]. Done.

Bad proof [I graded several like this]: Assume R is symmetric. If $(a, b) \in R$ then $(b, a) \in R$. So, $(a, b) \in R^{-1}$ and $(b, a) \in R^{-1}$. So, R^{-1} is symmetric.

The "proof" above does not follow any clear strategy. It contains the same list of formulas as the good proof, but they don't fit together in a logical way.

Alt proof: Assume R is symmetric. By a theorem in this section, $R = R^{-1}$. So, R^{-1} is symmetric.

This proof is OK, and simpler than the standard one above. This kind of proof [using previous theorem(s)] may be harder to find than the "standard" kind we have focused on so far, which rely only on definitions and routine logic. But these become more common as you progress into any advanced topic.