Homework #5

(all questions have equal weight)

1. Enderton: Section 2.4, exercise #4 (pg. 130) [Make sure you write out the entire deduction and not just use the metatheorems to prove that a deduction exists.]

2. Enderton: Section 2.4, Assume x does not occur free in α. Show that there is a deduction (from $\emptyset$) of $(\alpha \to \exists x\beta) \leftrightarrow \exists x(\alpha \to \beta)$. (This is the first part of question 8. You do not need to provide an actual deduction, proving that one exists *using the metatheorems from this Section* suffices. Note that only one direction of the biconditional needs the assumption that x does not occur free in α).

3. Enderton: Section 2.4, exercise #9 (pg. 130)

4. Enderton: Section 2.4, exercise #11 (pg. 130) (Be careful: $(x = y) \to ((y = z) \to (x = z))$ is **NOT** an instance of axiom 6 from page 112. (Why?) You need only show that a deduction exists using the metatheorems in this section.)

5. Enderton: Section 2.4, exercise #16 (pg. 130) (Use the metatheorems here rather than providing a full deduction.)

6. Give a deduction (from $\emptyset$) of $\exists x(\alpha \land \beta) \to (\exists x\alpha \land \exists x\beta)$. (Note: you have just shown in the preceding problem that there must be such a deduction. Can you use the proof of the relevant metatheorem to construct and actual deduction?)

The homework is DUE Friday, February 27 at 10AM in class.