Homework #6

(all questions have equal weight)

1. Enderton #2 (pg. 145)
2. Enderton #4 (pg. 146)
3. Enderton #6 (pg. 146)
4. For each of the following sentences, check whether they are valid or not. If a sentence is valid, show that it has a deduction using meta-theorems from Section 2.4 (your argument must be syntactic, so do not use completeness here). If a sentence is invalid, give a structure where that sentence is false.
   (a) $\exists x(\forall y Qy \to Qx)$
   (b) $(\exists x Px \to \forall y Qy) \to \forall z(Pz \to Qz)$
   (c) $\forall z(Pz \to Qz) \to (\exists x Px \to \forall y Qy)$
   (d) $\exists y \forall x(Pxy \leftrightarrow \neg Pxx)$
5. Enderton #8 (pg. 146)
6. Prove that $\exists x \exists y \exists z[(Pxf(x) \to Pxx) \vee (Pxy \wedge Pyz \wedge \neg Pxz)]$ is finitely valid (i.e., valid on every finite model), but not valid. [Hint: show that a model of the negation of this formula must be infinite]

The homework is DUE Friday, March 6 at 10AM in class.