

Phil 225 -- Symbolic Logic
HW 8 -- Due 4/6/12

1) Derive the last sentence from the others as premises.

- a) $(x)(\exists y)Fxy$
 $(x)(y)(Fxy \rightarrow Gyy)$
 $(x)(y)(Fxy \rightarrow Fyx)$

 $(x)Gxx$
- b) $(\exists x)(y)Fxy$

 $(y)(\exists x)Fxy$

2) One of the sentences (a) and (b) is a consequence of the given sentences, and one is not. Identify clearly which one is a consequence, and give a derivation of it from the others as premises. For the one that is not a consequence, show that it is not by giving an appropriate interpretation.

- $(x)(y)(Fxy \rightarrow Gy)$
 $(x)(Gx \rightarrow \neg Hxx)$
 $(\exists x)Hxx$

- (a) $(\exists x)(y)\neg Fyx$ (b) $(x)(\exists y)Fxy$

3) Try your best to take $(y)(\exists x)Fxy$ as a premise and to derive $(\exists x)(y)Fxy$ from it. Then show exactly where your attempted derivation is incorrect.

4) Derive the last from the others without using rule T.

- (a) $P \rightarrow \neg (S \wedge \neg T)$
 $\neg P \rightarrow \neg S$
 $\neg T$

 $\neg S$
- (b) $\neg [R \vee (\neg S \rightarrow \neg T)]$
 $\neg [(R \rightarrow S) \rightarrow \neg (\neg R \rightarrow \neg Q)]$

 $\neg Q$