

Phil 225 -- Symbolic Logic
HW 10 -- Due 4/20/12

- 1) For each of (a), (b), and (c), identify clearly whether it is a consequence of the given sentences. Prove your answer with either a derivation or an interpretation.

- (1) $(\exists x)(y)[Fxy \wedge (\exists z)Gzx]$
(2) $(x)(y)(z)[(Gxy \wedge Fyz) \rightarrow Gxz]$
(3) $(x)(y)(Gyx \rightarrow Gxy)$

- (a) $(\exists x)(y)Gyx$
(b) $(\exists x)(y)Fyx$
(c) $(x)(y)(Fxy \rightarrow Fyx) \rightarrow (x)(y)Gxy$

- 2) Identify each of the following as valid, inconsistent, or neither. Support your answer with clearly identified, appropriate proofs or interpretations.

- (a) $(x)[Fx \rightarrow (\exists y)(Gy \vee Fy)]$
(b) $(\exists x)(y)(Fxy \leftrightarrow \neg Fyy)$
(c) $[(x)Fx \vee (x)Gx] \rightarrow (x)(Fx \rightarrow Gx)$

- 3) Derive the last sentence from the others without using rule T.

- $(P \leftrightarrow \neg Q) \rightarrow R$
 $\neg P \rightarrow (P \vee Q)$
 $(S \wedge Q) \rightarrow \neg Q$
S

R