

Math Logic
Homework #5 (Chapter 11)

1. Prove each of the following, *using the soundness theorem*. I don't want you to do this by considering interpretations directly; I want you to produce refutations. You may use your intuitions to decide when a finite set of quantifier free sentences is unsatisfiable.

- a) $\{\exists x(Fx \& Gx), \forall x(Gx \rightarrow \sim Hx)\} \vdash \exists x[x=x \& (Fx \& \sim Hx)]$
- b) $\{\exists x Lbx \rightarrow \forall x Lxb, \sim Lbb\} \vdash \sim Lba$
- c) $\{\exists y(Gy \& \forall z Kyz), \forall y(Fy \rightarrow \sim \forall z Kyz)\} \vdash \exists y(Gy \& \sim Fy)$