

Problem Set 4

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Due Oct. 18, 9:30am

For practice problems, see TLB 8.2.E (#1-3) & 8.3.E (#1,4) & 8.4.E (#1, 4)

1 Quantificational Truth, Falsity and Indeterminacy

1. Show that the following sentence is not quantificationally true by constructing a model on which it is false:

$$(\forall x)(Fx \supset (Gx \vee Hx))$$

2. Show that the following sentence is not quantificationally false by constructing a model on which it is true:

$$(\forall x)(Fx \supset (\exists y)Pxy)$$

3. Show that the following sentence is quantificationally indeterminate by constructing a model on which it is true and a model on which it is false:

$$Bab \ \& \ (\forall x)(\forall y)(Bxy \equiv Lxy)$$

2 Quantificational Equivalence and Consistency

4. Show that the following sentences are not quantificationally equivalent by constructing a model on which one is true and the other is false.

$$(\forall x)(Fx \supset Gx), (\forall x)(Fx \equiv Gx)$$

5. Show that the following set is quantificationally consistent by constructing a model on which its members are true:

$$\{(Fa \vee (\forall x) \sim Fx), (\exists x)Fx, (\forall x)(Fx \supset \sim Gx)\}$$

3 Quantificational Validity

For each argument in PL below, determine whether it is quantificationally valid or not. If it is quantificationally valid, explain why. If it is not quantificationally valid, prove it by constructing a model on which the premises are true and the conclusion is false.

6. P1. $(\exists x)(\exists y)(Lxy \ \& \ Gx)$
P2. $(\forall y)(Gy \supset Ty)$
C. $(\exists z)(Tz \ \& \ (\exists x)Lzx)$

7. P1. $(\forall x)(Px \vee (Gx \supset Fx))$
P2. $(\forall x) \sim Px$
P3. $(\exists x)(Gx \ \& \ Fx)$
C. $(\forall x)(Fx \supset Gx)$