

Practice Problems for Test #7

I. Translations.

Use the following legend to translate the sentences below.

- Bxy: x is a brother of y
- Fx: x is a feminist
- Gx: x is Greek
- Mxy: x mocks y
- Nx: x is a novel
- Px: x is a philosopher
- Rxy: x is richer than y
- Sxy: x is smarter than y
- Wxy: x wrote y

1. All feminists are philosophers.
2. All Greek feminists are philosophers.
3. Nietzsche mocks all feminists.
4. Nietzsche mocks everything that Plato wrote.
5. Nietzsche mocks everything smarter than him.
6. Nietzsche mocks a thing if it does not mock itself.
7. If one thing is smarter than a second, then the second is not smarter than the first.
8. If all feminist philosophers are richer than some Greek philosopher, then some Greek is smarter than all feminists.
9. Cindy's only brother is Al. Ed writes novels. Al doesn't. So, Ed isn't a brother of Cindy's.
10. If one thing is richer than a second, then the two aren't identical. So, nothing is richer than itself.
11. There are at most two things. Something other than Cindy is happy. So, there are exactly two things.
12. The brother of Cindy is happy. So, Cindy has a brother.
13. Everything is happy, except Cindy and Bud. Al is unhappy. So, Al is either Cindy or Bud.

II. Derivations. Derive the conclusions of each of the following arguments.

1. 1. $(x)(\exists y)(\sim Fx \vee Gy)$ / $(x)Fx \supset (\exists y)Gy$
2. 1. $(x)(\exists y)Fxy \supset (x)(\exists y)Gxy$
 2. $(\exists x)(y)\sim Gxy$ / $(\exists x)(y)\sim Fxy$
3. 1. $(x)[(Fx \vee Gx) \supset (Hx \cdot Kx)]$
 2. $(x)\{(Hx \vee Lx) \supset [(Hx \cdot Nx) \supset Px]\}$ / $(x)[Fx \supset (Nx \supset Px)]$
4. 1. $\sim(\exists x)(Axa \cdot \sim Bxb)$
 2. $\sim(\exists x)(Dxd \cdot Dbx)$
 3. $(x)(Bex \supset Dxd)$ / $\sim(Aea \cdot Dgd)$
5. 1. $(x)(Ax \supset Bx)$ / $(x)[(\exists y)(Ay \cdot Cxy) \supset (\exists z)(Bz \cdot Cxz)]$
6. 1. $(\exists x)(Nx \cdot Wjx \cdot Ix)$
 2. $Nc \cdot Wjc \cdot (x)[(Nx \cdot Wjx) \supset x=c]$ / Ic
7. 1. $Pa \cdot Oa \cdot (y)[(Py \cdot Oy) \supset y=a]$
 2. $Pw \cdot Sw \cdot (y)[(Py \cdot Sy) \supset y=w]$
 3. $(\exists x)(Px \cdot Sx \cdot Ox)$ / $a=w$
8. 1. $(\exists x)\{Mx \cdot Tx \cdot (y)[(My \cdot y \neq x) \supset Hxy]\}$ / $(\exists x)\{Mx \cdot Tx \cdot (y)[(My \cdot \sim Ty) \supset Hxy]\}$
9. 1. $(x)(y)(z)[(Sx \cdot Lx \cdot Sy \cdot Ly \cdot Sz \cdot Lz) \supset (x=y \vee y=z \vee x=z)]$
 2. $(\exists x)(\exists y)(Sx \cdot Lx \cdot Sy \cdot Ly \cdot Rx \cdot Ry \cdot x \neq y)$
 3. $(x)(Rx \supset \sim Cx)$ / $(Sa \cdot Ca) \supset \sim La$