

Homework Handout 3: Relational Predicates: Translating to English

Use the following translation key to translate the given formulas into natural English sentences:

Ax: x is silver

Bxy: x belongs to y

Cx: x is a cloud

Cxy: x keeps company with y

Dx: x is a dog

Ex: x is smoke

Fx: x is fire

Fxy: x is fair for y

g: God

Gx: x is glass

Gxy: x gathers y

Hx: x is home

Hxy: x helps y

Ixy: x is in y

Jxy: x is judged by y

Kxy: x is a jack of y

Lx: x is a lining

Lxy: x is like y

Mx: x is moss

Mxy: x is master of y

Px: x is a person

Qx: x is a place

Rx: x rolls

Sx: x is a stone

Tx: x is a trade

Txy: x should throw y

Ux: x is a house

Uxy: x comes to y

Vxy: x ventures y

Wx: x waits

Yx: x is a day

1. $(x)[Dx \supset (\exists y)(Yy \cdot Byx)]$

2. $(x)[(\exists y)(Py \cdot Fxy) \supset (z)(Pz \supset Fxz)]$

3. $(x)[(Rx \cdot Sx) \supset (y)(My \supset \sim Gxy)]$

4. $(x)[(Px \cdot Wx) \supset (y)Uyx]$

5. $(x)[(Px \cdot Hxx) \supset Hgx]$

6. $(x)[Hx \supset (y)(Qy \supset \sim Lyx)]$

7. $(x)\{Cx \supset (\exists y)[(Ay \cdot Ly) \cdot Byx]\}$

8. $(x)[Px \supset (y)(Cxy \supset Jxy)]$

9. $(x)\{Qx \supset [(\exists y)(Ey \cdot Iyx) \supset (\exists z)(Fz \cdot Izx)]\}$

10. $(x)\{[Px \cdot (y)(Ty \supset Kxy)] \supset (z)(Tz \supset \sim Mxz)\}$

11. $(x)\{\{Px \cdot (\exists y)[(Gy \cdot Uy) \cdot Ixy]\} \supset (z)(Sz \supset \sim Txz)\}$

12. $(x)\{[Px \cdot (y)\sim Vxy] \supset (z)\sim Gxz\}$