

Homework Handout 5: 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. $(x)\{[Px \cdot (y)\sim Vxy] \supset (z)\sim Gxz\}$