Philosophy 240: Symbolic Logic — Hamilton College
Fall 2011 — Russell Marcus

Sample Solutions to Translating from Predicate Logic

Instructions: Use the given interpretations to translate the following arguments written in predicate logic into natural, English sentences.

Ax: "x is an athlete"
Bx: "x is brawny"
Cx: "x is a champion"
m: "Mary"
g: "Gail"
n: "Ned"

1. 1. $(\forall x)(Ax \supset Bx)$
   2. $Am \bullet An$ / $Bm \bullet Bn$

   1. All athletes are brawny. Mary and Ned are athletes. So, Mary and Ned are brawny.

2. 1. $(\forall x)(Ax \supset Bx)$
   2. $(\forall x)(Bx \supset Cx)$ / $(\forall x)(Ax \supset Cx)$

   2. All athletes are brawny. Everything brawny is a champion. Therefore, all athletes are champions.

3. 1. $(\forall x)(Bx \supset Cx)$
   2. $(\exists x)(Ax \bullet Bx)$ / $(\exists x)(Ax \bullet Cx)$

   3. Everything that's brawny is a champion. There are some brawny athletes. So, there are some athletic champions.

4. 1. $(\forall x)(Ax \supset Bx)$
   2. $\sim Bm$ / $(\exists x)\sim Ax$

   4. All athletes are brawny. Mary isn't brawny. So, something isn't an athlete.

5. 1. $(\forall x)[Ax \supset (Bx \vee Cx)]$
   2. $Ag \bullet \sim Bg$ / Cg

   5. All athletes are either brawny or champions. Gail is an athlete, but she isn't brawny. So, Gail is a champion.

6. 1. $(\forall x)[(Ax \bullet Bx) \supset Cx]$
   2. $(\exists x)(Bx \bullet \sim Cx)$ / $(\exists x)\sim Ax$

   6. All brawny athletes are champions. Some brawny things aren't champions. So, something isn't an athlete.

7. 1. $(\exists x)Ax \supset (x)(Cx \supset Bx)$
   2. $(\exists x)(Ax \vee Bx)$
   3. $(\forall x)(Bx \supset Ax)$ / $(\forall x)(Cx \supset Ax)$

   7. If something is an athlete, then all champions are brawny. Something is either an athlete or brawny. All brawny things are athletes. So, all Champions are athletes.