Sample Solutions to Homework Handout 2: 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. (x)(Ax ⊃ Bx)
    2. Am • An   / Bm • Bn

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

2. 1. (x)(Ax ⊃ Bx)
    2. (x)(Bx ⊃ Cx)   / (x)(Ax ⊃ Cx)

    2. All athletes are brawny. Therefore, all athletes are champions.

3. 1. (x)(Bx ⊃ Cx)
    2. (∃x)(Ax • Bx)   / (∃x)(Ax • Cx)

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

4. 1. (x)(Ax ⊃ Bx)
    2. ~Bm   / (∃x)~Ax

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

5. 1. (x)[Ax ⊃ (Bx ∨ Cx)]
    2. Ag • ~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. (x)[(Ax • Bx) ⊃ Cx]
    2. (∃x)(Bx • ~Cx)   / (∃x)~Ax

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

7. 1. (∃x)Ax ⊃ (x)(Cx ⊃ Bx)
    2. (∃x)(Ax ∨ Bx)
    3. (x)(Bx ⊃ Ax)   / (x)(Cx ⊃ 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.