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

Some Practice Problems for Test #5

I. Derivations.

1.
1. $Ab \vee Bc$
2. $(\forall x)\sim Bx$ / $(\exists x)Ax$

2.
1. $(\forall x)(Rx \supset Ox)$
2. $(\exists x)\sim Ox$
3. $(\forall x)(\sim Rx \supset Px)$ / $(\exists x)Px$

3.
1. $(\forall x)(Fx \supset Gx)$
2. $(\forall y)(Gy \supset Hy)$ / $(\forall z)(\sim Hz \supset \sim Fz)$

4.
1. $(\exists x)(Ax \cdot Bx) \supset (\forall x)\, Dx$
2. $\sim Da$ / $(\forall x)(Ax \supset \sim Bx)$

5.
1. $(\forall y)[Ay \supset (\sim By \supset Dy)]$
2. $\sim Ba$ / $Aa \supset Da$

6.
1. $(\forall x)(Qx \supset \sim Px)$ / $(\exists x)Px \supset \sim(\forall x)Qx$

7.
1. $(\forall x)[Ax \supset (Bx \cdot Dx)]$
2. $(\forall x)[(Ax \cdot Dx) \supset Ex]$
3. $(\forall x)(Ex \supset \sim Dx)$ / $\sim Aa$

8.
1. $(\forall x)(Ax \supset Bx)$
2. $(\forall x)[Bx \supset (Ax \supset \sim Fx)]$
3. $(\forall x)[(\sim Cx \cdot Dx) \supset Fx]$ / $(\forall x)[Ax \supset (Cx \vee \sim Dx)]$

9.
1. $(\exists x)Gx \supset (\forall x)(Fx \supset Dx)$
2. $(\exists x)(Gx \cdot \sim Dx)$ / $\sim(\forall x)Fx$

10.
1. $(\exists x)Qx \supset (\forall x)(Rx \supset Sx)$
2. $(\forall x)\sim Qx \supset (\exists x)Sx$
3. $(\forall x)\, Rx$ / $(\exists x)Sx$

II. Invalidity. Demonstrate the invalidity of each of the following arguments. Provide a counterexample.

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

2.
1. $(\forall x)(Fx \supset Gx)$
2. $(\exists x)Fx$ / $(\forall x)(\sim Gx \supset \sim Ex)$

3.
1. $(\forall x)[(Px \cdot Qx) \supset Rx]$
2. $(\exists x)(Qx \cdot \sim Rx)$
3. $(\exists x)(Px \cdot \sim Rx)$ / $(\exists x)(\sim Px \cdot \sim Qx)$