Philosophy 240: Symbolic Logic
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Some Practice Problems for Test #5

I. Derivations.

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

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

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

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

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

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

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

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

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

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

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

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

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

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