

לוגיקה- תרגיל בית מס' 12

עמודים 330-331

.1

1. $(x)(Sx \rightarrow \sim Tx)$
2. $Tg / \therefore \sim Sg$
3. $Sg \rightarrow \sim Tg$ 1, UI
4. $Tg \rightarrow \sim Sg$ 3, trans
5. $\sim Sg$ 4, 2, M.P.

.2

1. $(x)(Rx \rightarrow Nx)$
2. $(\exists x)(Sx \cdot \sim Nx) / \therefore (\exists x)(Sx \cdot \sim Rx)$
3. $Sa \cdot \sim Na$ 2, EI
4. $Ra \rightarrow Na$ 1, UI
5. $\sim Na$ 3, simp.
6. $\sim Ra$ 4, 5, M.T.
7. Sa 3, simp.
8. $Sa \cdot \sim Ra$ 6, 7, conj.
9. $(\exists x)(Sx \cdot \sim Rx)$ 8, EG

.3

1. $(x)(Kx \rightarrow \sim Mx)$
2. $(\exists x)(Ix \cdot Mx) / \therefore (\exists x)(Ix \cdot \sim Kx)$
3. $Ia \cdot Ma$ 2, EI
4. $Ka \rightarrow \sim Ma$ 1, UI
5. Ma 3, simp.
6. $\sim \sim Ma$ 5, D.N.
7. $\sim Ka$ 4, 6, M.T.
8. Ia 3, simp.
9. $Ia \cdot \sim Ka$ 7, 8, conj.
10. $(\exists x)(Ix \cdot \sim Kx)$ 9, EG

.4

1. $(x)(Lx \rightarrow Rx)$
2. $(x)(Rx \rightarrow \sim Mx) / \therefore (x)(Lx \rightarrow \sim Mx)$
3. $Ly \rightarrow Ry$ 1, *UI*
4. $Ry \rightarrow \sim My$ 2, *UI*
5. $Ly \rightarrow \sim My$ 3, 4, *H.S.*
6. $(x)(Lx \rightarrow \sim Mx)$ 5, *UG*

.5

1. $(x)(Mx \rightarrow Yx)$
2. $(\exists x)(Px \cdot Mx) / \therefore (\exists x)(Px \cdot Yx)$
3. $Pa \cdot Ma$ 2, *EI*
4. $Ma \rightarrow Ya$ 1, *UI*
5. Ma 3, *simp.*
6. Ya 4, 5, *M.P.*
7. Pa 3, *simp.*
8. $Pa \cdot Ya$ 6, 7, *conj.*
9. $(\exists x)(Px \cdot Yx)$ 8, *EG*

.6

1. $(x)(Qx \rightarrow Px)$
2. $(\exists x)(Qx \cdot Dx) / \therefore (\exists x)(Px \cdot Dx)$
3. $Qa \cdot Da$ 2, *EI*
4. $Qa \rightarrow Pa$ 1, *UI*
5. Qa 3, *simp.*
6. Da 3, *simp.*
7. Pa 4, 5, *M.P.*
8. $Pa \cdot Da$ 6, 7, *conj.*
9. $(\exists x)(Px \cdot Dx)$ 8, *EG*

.7

1. $(x)(Nx \rightarrow Gx)$
2. $(x)(Gx \rightarrow Mx) / \therefore (x)(Nx \rightarrow Mx)$
3. $Na \rightarrow Ga$ 1, *UI*
4. $Ga \rightarrow Ma$ 1, *UI*
5. $Na \rightarrow Ma$ 3, 4, *H.S.*
6. $(x)(Nx \rightarrow Mx)$ 5, *UG*

.8

1. $(x)(Kx \rightarrow Ax)$
2. $(x)(Px \rightarrow \sim Ax) \quad / \therefore (x)(Kx \rightarrow \sim Px)$
3. $Ka \rightarrow Aa \quad 1, UI$
4. $Pa \rightarrow \sim Aa \quad 2, UI$
5. $Aa \rightarrow \sim Pa \quad 4, trans.$
6. $Ka \rightarrow \sim Pa \quad 3, 5, H.S.$
7. $(x)(Kx \rightarrow \sim Px) \quad 6, UG$

.9

1. $(x)(Tx \rightarrow Ax)$
2. $(x)(Ax \rightarrow Hx) \quad / \therefore (x)(Tx \rightarrow Hx)$
3. $Ta \rightarrow Aa \quad 1, UI$
4. $Aa \rightarrow Ha \quad 2, UI$
5. $Ta \rightarrow Ha \quad 3, 4, H.S.$
6. $(x)(Tx \rightarrow Hx) \quad 5, UG$

.10

1. $(x)(Mx \rightarrow Nx)$
2. $\sim Ns \quad / \therefore \sim Ms$
3. $Ms \rightarrow Ns \quad 1, UI$
4. $\sim Ms \quad 2, 3, M.T.$