פתרון תרגיל בית 17 – לוגיקה

עמוד 140

תרגיל 1

$1.(x)(Sxi \rightarrow Vxj)$
$2.(x)(Vax \rightarrow Fxh)$
$3.(x)(Fxk \rightarrow\sim Fjx) \ / \therefore Fhk \rightarrow\sim Sai$
$4.Sai \rightarrow Vaj \quad 1,UI$
$5.Vaj \rightarrow Fjh \quad 2,UI$
$6.Fhk \rightarrow\sim Fjh \quad 3,UI$
$7.\sim Fjh \rightarrow\sim Vaj \quad 5,trans$
$8.Fhk \rightarrow\sim Vaj \quad 6,7,HS$
$9.\sim Vaj \rightarrow\sim Sai \quad 4,trans$
$10.Fhk \rightarrow\sim Sai \quad 8,9,HS$

תרגיל 2

$1.(x)(y)((Cx \cdot Ey) \rightarrow Wxy)$
$2.(\exists x)(\exists y)(Cx \cdot \sim Cy \cdot \sim Wxy) \ / \therefore (\exists x)(\sim Cx \cdot \sim Ex)$
$3.(\exists y)(Ca \cdot \sim Cy \cdot \sim Way) \quad 2,EI \ (x \rightarrow a)$
$4.Ca \cdot \sim Cb \cdot \sim Wab \quad 3,EI \ (y \rightarrow b)$
$5.(y)((Ca \cdot Ey) \rightarrow Way) \quad 1,UI \ (x \rightarrow a)$
$6.(Ca \cdot Eb) \rightarrow Wab \quad 5,UI \ (y \rightarrow b)$
$7.\sim Wab \quad 4,simp$
$8.\sim (Ca \cdot Eb) \quad 6,7,MT$
$9.\sim Ca \vee \sim Eb \quad 8,DeM$
$10.Ca \quad 4,simp$
$11.\sim Eb \quad 9,10,DS$
$12.\sim Cb \quad 4,simp$
$13.\sim Cb \cdot \sim Eb \quad 11,12,conj$
$14.(\exists x)(\sim Cx \cdot \sim Ex) \quad 13,EG$

תרגיל 3

$1.(x)(Cx \to Fx) \ / \therefore (x)(y)((Cx \cdot Dyx) \to (\exists z)(Fz \cdot Dyz))$

$2.Cx \cdot Dyx$

$3.Cx \quad 2, simp$

$4.Cx \to Fx \quad 1, UI$

$5.Fx \quad 3,4, MP$

$6.Dyx \quad 2, simp$

$7.Fx \cdot Dyx \quad 5,6, conj$

$8.(\exists z)(Fz \cdot Dyz) \quad 7, EG$

$9.(Cx \cdot Dyx) \to (\exists z)(Fz \cdot Dyz) \quad 2-8, CP$

$10.(y)((Cx \cdot Dyx) \to (\exists z)(Fz \cdot Dyz)) \quad 9, UG$

$11.(x)(y)((Cx \cdot Dyx) \to (\exists z)(Fz \cdot Dyz)) \quad 10, UG$

תרגיל 4

$1.(\exists x)(Px \cdot (y)[\{Sy \cdot (\exists z)(Pz \cdot Lyz)\} \to Lyx])$

$2.(y)(Sy \to (\exists x)(Px \cdot Lyx)) \ / \therefore (\exists x)(Px \cdot (y)(Sy \to Lyx))$

$3.Pa \cdot (y)[\{Sy \cdot (\exists z)(Pz \cdot Lyz)\} \to Lya] \quad 1, EI \ (x \to a)$

$4.(y)[\{Sy \cdot (\exists z)(Pz \cdot Lyz)\} \to Lya] \quad 3, simp$

$5.\{Sy \cdot (\exists z)(Pz \cdot Lyz)\} \to Lya \quad 4, UI$

$6.Sy \to (\exists x)(Px \cdot Lyx) \quad 2, UI$

$7.Sy$

$8.(\exists x)(Px \cdot Lyx) \quad 6,7, MP$

$9.Pb \cdot Lyb \quad 8, EI \ (x \to b)$

$10.(\exists z)(Pz \cdot Lyz) \quad 9, EG$

$11.Sy \cdot (\exists z)(Pz \cdot Lyz) \quad 7,10, conj$

$12.Lya \quad 5,11, MP$

$13.Sy \to Lya \quad 7-12, CP$

$14.(y)(Sy \to Lya) \quad 13, UG$

$15.Pa \quad 3, simp$

$16.Pa \cdot (y)(Sy \to Lya) \quad 15,16, conj$

$17.(\exists x)(Px \cdot (y)(Sy \to Lyx)) \quad 16, EG$