Løsningsforslag – ekstraoppgaver 3

Oppgave 1

a)

Alternativ 1:

[1]	(1)	$(\forall x)(Rx \supset -Gx)$	P
[2]	(2)	$(\forall y)(By \vee Gy)$	P
[3]	(3)	$(\forall x)\, Rx$	P
[1]	(4)	$Rx \supset -Gx$	1, UI
[2]	(5)	$Bx \vee Gx$	2, UI
[3]	(6)	Rx	3, UI
[1,3]	(7)	$-Gx$	4,6 mp
[1,2,3]	(8)	Bx	5,7 v-elim
[1,2,3]	(9)	$(\forall y)\, By$	8, UG

Alternativ 2:

[1]	(1)	$(\forall x)(Rx \supset -Gx)$	P
[2]	(2)	$(\forall y)(By \vee Gy)$	P
[3]	(3)	$(\forall x)\, Rx$	P
[1]	(4)	$Rx \supset -Gx$	1, UI
[2]	(5)	$Bx \vee Gx$	2, UI
[3]	(6)	Rx	3, UI
[1,2,3]	(7)	Bx	4,5,6 TF
[1,2,3]	(8)	$(\forall y)\, By$	8, UG

b)

[1]	(1)	$(\forall x)(Hx \supset Gx)$	P	
[2]	(2)	Ha	P	
[1]	(3)	$Ha \supset Ga$	1, UI	
[1,2]	(4)	Ga	2,3 mp	(eller TF)
[1,2]	(5)	$(\exists x)\, Gx$	4, EG	

c)

[1]	(1)	$(\forall x)(\forall y)(Mxa \supset Fay)$	P
[1]	(2)	$(\forall y)\ \ Mba \supset Fay$	1, UI
[1]	(3)	$Mba \supset Fab$	2, UI
[1]	(4)	$(\forall y)(Mya \supset Fay)$	3, UG

d)

[1]	(1)	$(\forall x)(\forall y)(Gxy \supset Fy)$	P	
[1]	(2)	$(\forall y)Gay \supset Fy$	1, UI	
[1]	(3)	$Gab \supset Fb$	2, UI	
[4]	(4)	$-Fb$	P	
[1,4]	(5)	$-Gab$	3,4 TF	(eller mt)
[1,4]	(6)	$(\forall x)-Gxb$	5, UG	
[1]	(7)	$-Fb \supset (\forall x)-Gxb$	[4](6) D	
[1]	(8)	$(\exists y)(-Fy \supset (\forall x -Gxy))$	7, EG	

Oppgave 2

a)

[1]	(1)	$(\exists x)(\forall y)Fxy$	P	
[1,2]	(2)	$(\forall y)Fay$	(1)a EII	
[1,2]	(3)	Fab	(2) UI	
[1,2]	(4)	$(\exists x)Fxb$	(3) EG	
[1,2]	(5)	$(\forall y)(\exists x)Fxy$	(4) UG	
[1]	(6)	$(\forall y)(\exists x)Fxy$	[2](5) EIE	

b)

[1]	(1)	$(\forall x)(\forall y)Lxy$	P	
[2]	(2)	$(\exists x)(\forall y)(Lxy \supset Gxy)$	P	
[2,3]	(3)	$(\forall y)(Lay \supset Gay)$	(2)a EII	
[1]	(4)	$(\forall y)Lay$	1, UI	
[2,3]	(5)	$Lab \supset Gab$	3, UI	
[1]	(6)	Lab	4, UI	
[1,2,3]	(7)	Gab	5,6 TF	
[1,2,3]	(8)	$(\forall y)Gay$	7, UG	(OK, for b er ikke fri i noen
[1,2,3]	(9)	$(\exists x)(\forall y)Gxy$	8, EG	av premissene til ln. 7)
[1,2]	(10)	$(\exists x)(\forall y)Gxy$	[3](9) EIE	

c)

[1]	(1)	$(\exists x)(\forall y)Gxy$	P
[2]	(2)	$(\forall y)(\forall x)(Gyx \supset Fxy)$	P
[1,3]	(3)	$(\forall y)Gay$	(1)a EII
[1,3]	(4)	Gab	3, UI
[2]	(5)	$(\forall x)(Gax \supset Fxa)$	2, UI
[2]	(6)	$Gab \supset Fba$	5, UI
[1,2,3]	(7)	Fba	4,6 TF
[1,2,3]	(8)	$(\exists x)Fbx$	7, EG
[1,2,3]	(9)	$(\forall y)(\exists x)Fyx$	8, UG
[1,2]	(10)	$(\forall y)(\exists x)Fyx$	[3](9) EIE

Oppgave 3

Mange muligheter, deriblant:

a) UD: {a,b}
F: {a}
G: {b}
H: {a,b}

b) UD: {a,b,c}
G: {a}
F: {b}
H: {b} Viktig her er at de som er G ikke må være F eller H

c) UD: {a,b,c}
F: {a}
G: {<a,b>, <c,a>}