NOME:

RA:

LISTA 10

(1)

1	$\forall x \; F(x) \rightarrow P(x)$	
2	$F('AMOR')$	
3	$F('AMOR') \rightarrow P('AMOR')$	IU 1
4	$P('AMOR')$	MP 2,3
5	$\exists x \; P(x)$	GE 4

(2)

1	$\forall x \; F(x) \rightarrow V(x) \vee R(x)$	
2	$F('AMOR')$	
3	$\sim R('AMOR')$	
4	$F('AMOR') \rightarrow V('AMOR') \vee R('AMOR')$	IU 1
5	$V('AMOR') \vee R('AMOR')$	MP 2,4
6	$V('AMOR')$	SD 3,5
7	$\exists x \; V(x)$	GE 7

(3)

1	$\exists x \; F(x) \wedge R(x)$	
2	$\forall x \; F(x) \wedge R(x) \rightarrow P(x)$	
3	$F_K \wedge R_K$	IE 1
4	F_K	SIMP 3
5	R_K	SIMP 3
6	$\exists x \; F(x)$	GE 4
7	$\exists x \; R(x)$	GE 5
8	$F_K \wedge R_K \rightarrow P_K$	IU 2
9	P_K	MP 3,8
10	$\forall x \; P(x)$	GU 9,

(4)

1	$\exists x \; F(x) \wedge V(x)$	
2	$\exists x \; F(x) \wedge R(x)$	
3	$F('amon')$	
4	$F('amon') \wedge V('amon')$	$\exists E 1$
5	$F('amon') \wedge R('amon')$	$\exists E 2$
6	$\exists_x F(x)$	$\exists E 3$

(5)

1	$\exists x \; F(x) \wedge V(x) \wedge E(x)$	
2	$\forall x \; F(x) \wedge E(x) \rightarrow C(x)$	
3	$\forall x \; F(x) \wedge C(x) \rightarrow D(x)$	
4	$Fa \wedge Va \wedge Ea$	$\exists E 1$
5	$Fa \wedge Ea \rightarrow Ca$	$\forall E 2$
6	$Fa \wedge Ca \rightarrow Da$	$\forall E 3$
7	$Fa \wedge Ea$	SIMP 4
8	Ca	MP 5, 7
9	Fa	SIM 4
10	$Fa \wedge Ca$	CONJ 8, 9
11	Da	MP 6, 10
12	$\exists x \; Dx$	$\exists E 11$

(7)

SIMP	
SIMP	
$\exists E 1$	
$\forall E 2$	
MP 3, 4	
$\exists E 5$	

(8)

ERRO NA LINHA 3 //

(9) ERRO NA LINHA 1 //

(10) $\forall x(P(x)) \rightarrow \forall x(P(x) \vee Q(x))$

1	$\forall x(P(x))$	
2	Pa	$\forall E$ 1
3	$Pa \vee Qa$	Conj 2
4	$\forall x(Px \vee Qx)$	GU 3 //

(11) $\forall x\, Px \wedge \exists x\, Qx \rightarrow \exists x(Px \wedge Qx)$

$\forall x\, P(x) \wedge \exists y\, Qy \rightarrow \exists y(Py \wedge Qy)$

?

(12) $\exists x \exists y\, P(x,y) \rightarrow \exists y \exists x\, P(x,y)$

SÃO EQUIVALENTES

(15)

1	$\exists x\, Px \wedge Fy$	
2	$\forall x\, Fx \rightarrow Dx$	
3	$Pa \wedge Fa$	$\exists E$ 1
4	$Fa \rightarrow Da$	$\forall E$ 2
5	Fa	SIMP 3
6	Da	MP 4,5
7	Pa	SIMP 3
8	$Pa \wedge Da$	CONJ 6,7
9	$\exists x\, Px \wedge Dx$	GE 8

(16)

1	$\forall x \forall y \quad Cx \wedge \partial y \rightarrow Mxy$	
2	Cs	
3	$\exists x \quad Sx \wedge \sim Msx$	
4	$Sa \wedge \sim Msa$	$\exists E\, 3$
5	$\forall x \; Cx \wedge \partial a \rightarrow Mxa$	$\exists U\, 1$
6	$Cs \wedge \partial a \rightarrow Msa$	$\exists U\, 5$
7	$\sim Msa$	SIMP 4
8	$\sim Cs \vee \sim \partial a$	MT 6,7
9	$\sim \partial a$	SD 2,8
10	$\exists x \sim \partial x$	GES

(17)

1	$\exists x \quad Ax \wedge \sim Mx$	
2	$\forall x \quad Ox \rightarrow Mx$	
3	$\forall x \quad Ox \vee Lx$	
4	$Aa \wedge \sim Ma$	$\exists E\, 1$
5	$Oa \rightarrow Ma$	$\exists U\, 2$
6	$Oa \vee La$	$\exists U\, 3$
7	Aa	SIMP 4
8	$\sim Ma$	SIMP 4
9	$\sim Oa$	MT 5,8
10	La	SD 6,9
11	$Aa \wedge La$	CONJ 7,10
12	$\exists x \; Ax \wedge Lx$	GE 11

(18)

1	$\forall x\ Mx \rightarrow Ix \vee Gx$	
2	$\forall x\ Gx \wedge Ax \rightarrow Fx$	
3	$\sim Ij \wedge Aj$	
4	$Mj \rightarrow Ij \vee Gj$	$\forall$U 1
5	$Gj \wedge Aj \rightarrow Fj$	$\forall$U 2
6	$\sim Mj \vee Ij \vee Gj$	MQ 4
7	$\sim Ij$	SIMP 3
8	$\sim Mj \vee Gj$	SD 6,7
9	$\sim Gj \vee \sim Aj \vee Fj$	MQ 5
10	Aj	SIMP 3
11	$\sim Gj \vee Fj$	SD 9, 10
12	$Mj \rightarrow Gj$	MQ 8
13	$Gj \rightarrow Fj$	MQ 11
14	$Mj \rightarrow Fj$	ST 12, 13

(19)

1	$\forall x \forall y\ Ex \wedge Cxy \rightarrow Dy$	
2	$\exists x \exists y\ Gx \wedge Cxy$	
3	$Ea \wedge Cab$	I$\exists$ 2, I$\exists$ 2
4	$Ga \wedge Cab \rightarrow Db$	$\forall$U 1, $\forall$U 1
5	Db	MP 3, 4
6	$\exists x Dx$	G$\exists$ 5

(20)

1	$\forall x \exists y\ Cx \rightarrow Txy$	
2	$\forall x \forall y\ Txy \rightarrow Dxy$	
3	Cm	
4	$\forall x\ Cx \rightarrow Txa$	I$\exists$ 1
5	$Cm \rightarrow Tma$	$\forall$U 4
6	$Tma \rightarrow Dma$	$\forall$U 2, $\forall$U 2
7	$Cm \rightarrow Dma$	SH 5, 6
8	Dma	MP, 3 7
9	$\exists x\ Dmx$	G$\exists$ 9

(24)

1	$\exists x \forall y \quad Ax \wedge Rxy$	
2	$\forall x \forall y \quad Rxy \rightarrow Ixy$	
3	$\forall y \quad Aa \wedge Ray$	$\exists E 1$
4	$Aa \wedge Rab$	$\exists E 3$
5	$Rab \rightarrow Iab$	$\exists E 2, \exists E 2$
6	Rab	SIMP 4
7	Iab	MP 5, 6
8	Aa	SIMP 4
9	$Aa \wedge Iab$	CONJ 7, 8
10	$\exists x \forall y \; Ax \wedge Ix$	~~$\exists I$ 9, $\exists I$ 9~~