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Professor Boady

Homework 3

1.

Construct a proof for the argument: $\therefore \forall xFx \vee \neg\forall xFx$

1	$\neg(\forall xFx \vee \neg\forall xFx)$	
2	$\forall xFx$	
3	$\forall xFx \vee \neg\forall xFx$	$\vee$I 2
4	$\bot$	$\neg$E 1, 3
5	$\neg\forall xFx$	$\neg$I 2–4
6	$\forall xFx \vee \neg\forall xFx$	$\vee$I 5
7	$\bot$	$\neg$E 1, 6
8	$\forall xFx \vee \neg\forall xFx$	IP 1–7

NEW LINE NEW SUBPROOF

☺ Congratulations! This proof is correct.

2.

Construct a proof for the argument: $\forall x(Fx \rightarrow Gx), \exists xFx \therefore \exists xGx$

1	$\forall x(Fx \rightarrow Gx)$	
2	$\exists xFx$	
3	$\quad Fc$	
4	$\quad Fc \rightarrow Gc$	$\forall$E 1
5	$\quad Gc$	$\rightarrow$E 3, 4
6	$\quad \exists xGx$	$\exists$I 5
7	$\exists xGx$	$\exists$E 2, 3–6

NEW LINE NEW SUBPROOF

Congratulations! This proof is correct.

CHECK PROOF START OVER

3.

Proof:

Construct a proof for the argument: $\forall x(\neg Mx \vee Ljx)$, $\forall x(Bx \rightarrow Ljx)$, $\forall x(Mx \vee Bx) \therefore \forall xLjx$

1	$\forall x(\neg Mx \vee Ljx)$	
2	$\forall x(Bx \rightarrow Ljx)$	
3	$\forall x(Mx \vee Bx)$	
4	$\neg Mc \vee Ljc$	∀E 1
5	$Bc \rightarrow Ljc$	∀E 2
6	$Mc \vee Bc$	∀E 3
7	Ljc	
8	$\neg Mc$	
9	Bc	
10	Ljc	→E 5, 9
11	Mc	
12	$\perp$	¬E 8, 11
13	Ljc	X 12
14	Ljc	∨E 6, 9–10, 11–13
15	Ljc	∨E 4, 7–7, 8–14
16	$\forall xLjx$	∀I 15

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Congratulations! This proof is correct.

4.

Construct a proof for the argument: $Pa \vee Qb$, $Qb \rightarrow b = c$, $\neg Pa \therefore Qc$

1	$Pa \vee Qb$	
2	$Qb \rightarrow b = c$	
3	$\neg Pa$	
4	Pa	
5	$\perp$	$\neg$E 3, 4
6	Qb	X 5
7	$b = c$	$\rightarrow$E 2, 6
8	Qc	=E 6, 7
	click to edit	
9	Qb	
10	$b = c$	$\rightarrow$E 2, 9
11	Qc	=E 9, 10
12	Qc	$\vee$E 1, 4–8, 9–11

NEW LINE NEW SUBPROOF

Congratulations! This proof is correct.

5.

Proof:

Construct a proof for the argument: $\forall x \forall y(Rxy \rightarrow x = y) \therefore Rab \rightarrow Rba$

1	$\forall x \forall y(Rxy \rightarrow x = y)$	
2	$\forall y(Ray \rightarrow a = y)$	∀E 1
3	$(Rab \rightarrow a = b)$	∀E 2
4	Rab	
5	$a = b$	→E 3, 4
6	Rbb	=E 4, 5
7	Rba	=E 5, 6
8	$Rab \rightarrow Rba$	→I 4–7

NEW LINE NEW SUBPROOF

☺ Congratulations! This proof is correct.