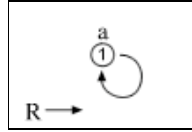


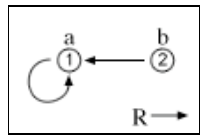
7.8.xa. Exercise answers

1.	$\forall x \neg \forall y \neg Rxy$	a:3
	ⓐ	
	Raa	
3 UI	$\neg \forall y \neg Ray$	4
	Raa	
	○	Raa $\Rightarrow \perp$
	\perp	6
6 RAA	$\neg Raa$	5
	ⓑ	
	(unfinished)	
	$\neg Rab$	5
5 UG+	$\forall y \neg Ray$	4
4 CR	\perp	2
2 RAA	$\neg Raa$	1
1 UG	$\forall x \neg Rxx$	



from the 1st open gap
(the 2nd is not fully developed)

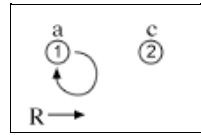
2.	$\forall x \neg \forall y Rxy$	a:2, b:8
	$\forall x Rxa$	a:3, b:9
2 UI	$\neg \forall y Ray$	4
3 UI	Raa	(6)
	•	
6 QED	Raa	5
	(b)	
	$\neg Rab$	
8 UI	$\neg \forall y Rby$	10
9 UI	Rba	(12)
	•	
12 QED	Rba	11
	$\neg Rbb$	
	○	Raa, $\neg Rab, Rba, \neg Rbb \not\Rightarrow \perp$
	\perp	13
13 IP	Rbb	11
	(c)	
	(unfinished)	
	Rbc	11
11 UG+	$\forall y Rby$	10
10 CR	\perp	7
7 IP	Rab	5
5 UG+	$\forall y Ray$	4
4 CR	\perp	1
1 RAA	$\neg \forall x Rxa$	



from the 1st open gap
 gap
 (the 2nd is not fully developed)

3.

	$\forall x \neg \forall y Rxy$	a:3, c:8
	Raa	(6)
3 UI	$\neg \forall y Ray$	4
	•	
6 QED	Raa	5
	(c)	
	$\neg Rac$	
8 UI	$\neg \forall y Rcy$	9
	$\neg Rca$	
	○	Raa, $\neg Rac, \neg Rca \not\Rightarrow \perp$
	\perp	11
11 IP	Rca	10
	$\neg Rcc$	
	○	Raa, $\neg Rac, \neg Rcc \not\Rightarrow \perp$
	\perp	12
12 IP	Rcc	10
	(d)	
	(unfinished)	
	Rcd	10
10 UG+	$\forall y Rcy$	9
9 CR	\perp	7
7 IP	Rac	5
5 UG+	$\forall y Ray$	4
4 CR	\perp	2
2 RAA	$\neg Raa$	1
	(b)	
	(unfinished)	
	$\neg Rab$	1
1 UG+	$\forall x \neg Rax$	



from the 1st and 2nd open gaps (the 3rd and 4th are not fully developed)