Phi 270 F04 test 4

Analyze the sentences below in as much detail as possible, providing a key to the non-logical vocabulary you use. *Restate **2** using an unrestricted quantifier.*

1. Sam checked every lock
   answer

2. No one who was in the office answered the call
   [Remember to restate your answer in 2 using an unrestricted quantifier.]
   answer

3. Ralph got the joke if anyone did
   answer

4. Only bestsellers were on every list
   answer

Use derivations to show that the following arguments are valid. You may use any rules.

5.   ∀x Fx
        ∀x ¬ Gx
        ─────────────
        ∀x (Fx ∧ ¬ Gx)
   answer

6.   ∀x (Rxa → ∀y Txy)
     ─────────────────
     ∀x ∀y (Rya → Tyx)
   answer

Use a derivation to show that the following argument is not valid and present a counterexample by describing a structure that divides an open gap. (You may describe the structure either by depicting it in a diagram, as answers in the text usually do, or by giving tables.)

7.   ∀x Rax
        ─────────────
        ∀x (Rxa → Rxx)
   answer

Phi 270 F04 test 4 answers

1. Sam checked every lock
   Every lock is such that (Sam checked it)
   (∀x: x is a lock) Sam checked x
                (∀x: Lx) Csx
   C: [_ checked _]; L: [_ is a lock]; s: Sam

2. No one who was in the office answered the call

No one who was in the office is such that (he or she answered the call)

(∀x: x is a person who was in the office) ¬ x̲ answered t̲h̲e̲ c̲a̲l̲l̲

(∀x: x̲ is a person ∧ x̲ was in t̲h̲e̲ o̲f̲f̲i̲c̲e̲) ¬ Axc

(∀x: Px ∧ Nxo) ¬ Axc

∀x ((Px ∧ Nxo) → ¬ Axc)

A: [_ answered _]; P: [_ is a person]; N: [_ was in _]; c: the call; o: the office

3. Ralph got the joke if anyone did

Everyone is such that (Ralph got the joke if he or she did)

(∀x: x is a person) Ralph got the joke if x did

(∀x: Px) (R̲a̲l̲p̲h̲ got t̲h̲e̲ j̲o̲k̲e̲ ← x̲ got t̲h̲e̲ j̲o̲k̲e̲)

(∀x: Px) (Grj ← Gxj)

(∀x: Px) (Gxj → Grj)

P: [_ is a person]; G: [_ got _]; j: the joke

4. Only bestsellers were on every list

Only bestsellers are such that (they were on every list)

(∀x: ¬ x is a bestseller) ¬ x was on every list

(∀x: ¬ Bx) ¬ every list is such that (x was on it)

(∀x: ¬ Bx) ¬ (∀y: y is a list) x was on y

(∀x: ¬ Bx) ¬ (∀y: Ly) Nxy

B: [_ is a bestseller]; L: [_ is a list]; N: [_ was on _]

5.

	∀x Fx	a: 3	
	∀x ¬ Gx	a: 5	
	ⓐ		
3 UI	Fa	(4)	
	•		
4 QED	Fa	2	
5 UI	¬ Ga	(6)	
	•		
6 QED	¬ Ga	2	
2 Cnj	Fa ∧ ¬ Ga	1	
1 UG	∀x (Fx ∧ ¬ Gx)		

6.

$\forall x\,(Rxa \rightarrow \forall y\,Txy)$ c:4

ⓑ
ⓒ

		Rca	(5)
4 UI		Rca → ∀y Tcy	5
5 MPP		∀y Tcy	b: 6
6 UI		Tcb	(7)
		●	
7 QED		Tcb	3
3 CP		Rca → Tcb	2
2 UG		∀y (Rya → Tyb)	1
1 UG		∀x ∀y (Rya → Tyx)	

7.

$\forall x\,Rax$ a:4, b:5

ⓑ

	Rba	
	¬ Rbb	
4 UI	Raa	
5 UI	Rab	
	○	Rba, ¬Rbb, Raa, Rab $\not\Rightarrow$ ⊥
	⊥	3
3 IP	Rbb	2
2 CP	Rba → Rbb	1
1 UG	∀x (Rxa → Rxx)	

Counterexample presented by a diagram
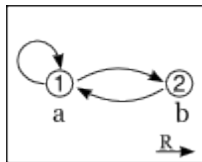
Counterexample presented by tables

range: 1, 2

a b	R	1	2
1 2	1	T	T
	2	T	F