

Phi 270 Fo4 test 4 in pdf format

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. $\forall x Fx$

$\forall x \neg Gx$

$\forall x (Fx \wedge \neg Gx)$

[answer]

6. $(\forall x: Rxa) \forall y Txy$

$\forall x (\forall y: Rya) Tyx$

[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. $\forall x Rax$

$(\forall x: Rxa) Rxx$

[answer]

Phi 270 Fo4 test 4 answers

1. *Sam checked every lock*

Every lock is such that (Sam checked it)

$(\forall x: \underline{x} \text{ is a lock}) \underline{\text{Sam}} \text{ checked } \underline{x}$

$(\forall x: Lx) Csx$

[C: $\lambda xy (x \text{ checked } y)$; L: $\lambda x (x \text{ is a lock})$; 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)

$(\forall x: x \text{ is a person who was in the office}) \rightarrow \underline{x} \text{ answered } \underline{\text{the call}}$

$(\forall x: \underline{x} \text{ is a person} \wedge \underline{x} \text{ was in } \underline{\text{the office}}) \rightarrow Axc$

$(\forall x: Px \wedge Nxo) \rightarrow Axc$

$\forall x ((Px \wedge Nxo) \rightarrow \neg Axc)$

[A: $\lambda xy (x \text{ answered } y)$; P: $\lambda x (x \text{ is a person})$; N: $\lambda xy (x \text{ was in } y)$; 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)

$(\forall x: x \text{ is a person}) \text{ Ralph got the joke if } x \text{ did}$

$(\forall x: Px) (\underline{\text{Ralph got the joke}} \leftarrow \underline{x} \text{ got the joke})$

$(\forall x: Px) (Grj \leftarrow Gxj)$

$(\forall x: Px) (Gxj \rightarrow Grj)$

[P: $\lambda x (x \text{ is a person})$; G: $\lambda xy (x \text{ got } y)$; j: *the joke*]

4. *Only bestsellers were on every list*

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

$(\forall x: \neg x \text{ is a bestseller}) \rightarrow x \text{ was on every list}$

$(\forall x: \neg Bx) \rightarrow \text{every list is such that } (x \text{ was on it})$

$(\forall x: \neg Bx) \rightarrow (\forall y: y \text{ is a list}) x \text{ was on } y$

$(\forall x: \neg Bx) \rightarrow (\forall y: Ly) Nxy$

[B: $\lambda x (x \text{ is a bestseller})$; L: $\lambda x (x \text{ is a list})$; N: $\lambda xy (x \text{ was on } y)$]

5.

$\forall x Fx$	$\forall x Fx$	a: 3
$\forall x \neg Gx$	$\forall x \neg Gx$	a: 5
	<div style="border-bottom: 1px solid black; padding-bottom: 5px; margin-bottom: 5px;"> a </div>	
3 UI	<div style="border-left: 1px solid black; padding-left: 5px; margin-left: 5px;"> Fa </div>	(4)
	<div style="border-left: 1px solid black; padding-left: 5px; margin-left: 5px;"> <div style="text-align: center; margin-bottom: 5px;">•</div> </div>	
	<div style="border-left: 1px solid black; padding-left: 5px; margin-left: 5px;"> <div style="border-bottom: 1px solid black; padding-bottom: 5px; margin-bottom: 5px;"> Fa </div> </div>	2
4 QED	<div style="border-left: 1px solid black; padding-left: 5px; margin-left: 5px;"> Fa </div>	
	<div style="border-left: 1px solid black; padding-left: 5px; margin-left: 5px;"> <div style="text-align: center; margin-bottom: 5px;">•</div> </div>	
5 UI	<div style="border-left: 1px solid black; padding-left: 5px; margin-left: 5px;"> $\neg Ga$ </div>	(6)
	<div style="border-left: 1px solid black; padding-left: 5px; margin-left: 5px;"> <div style="text-align: center; margin-bottom: 5px;">•</div> </div>	
	<div style="border-left: 1px solid black; padding-left: 5px; margin-left: 5px;"> <div style="border-bottom: 1px solid black; padding-bottom: 5px; margin-bottom: 5px;"> $\neg Ga$ </div> </div>	2
6 QED	<div style="border-left: 1px solid black; padding-left: 5px; margin-left: 5px;"> $\neg Ga$ </div>	
2 Cnj	<div style="border-left: 1px solid black; padding-left: 5px; margin-left: 5px;"> $Fa \wedge \neg Ga$ </div>	1
	<div style="border-left: 1px solid black; padding-left: 5px; margin-left: 5px;"> <div style="border-bottom: 1px solid black; padding-bottom: 5px; margin-bottom: 5px;"> $Fa \wedge \neg Ga$ </div> </div>	
1 UG	<div style="border-left: 1px solid black; padding-left: 5px; margin-left: 5px;"> $\forall x (Fx \wedge \neg Gx)$ </div>	

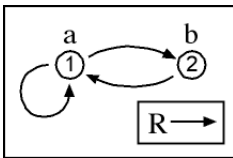
6. $(\forall x: Rxa) \forall y Txy \quad c:3$

	(b)		
	(c)	Rca	(3)
3 SB		$\forall y Tcy$	b: 4
4 UI		Tcb	(5)
		•	
5 QED		Tcb	2
2 RUG		$(\forall y: Rya) Tyb$	1
1 UG		$\forall x (\forall y: Rya) Tyx$	

7. $\forall x Rax \quad a:3, b:4$

	(b)	Rba	
		$\neg Rbb$	
3 UI		Raa	
4 UI		Rab	
		○	$Rba, \neg Rbb, Raa, Rab \Rightarrow \perp$
		\perp	2
2 IP		Rbb	1
1 RUG		$(\forall x: Rxa) Rxx$	

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