

### Phi 270 Fo4 test 3 in pdf format

Analyze the sentences below in as much detail as possible *using only connectives*; that is, the unanalyzed components should all be sentences (rather than individual terms, predicates, or functors). Present the result in *both symbolic and English notation*. Be sure that the unanalyzed components of your answer are complete and independent sentences; also try to respect any grouping in the English.

1. *Dan wasn't home unless it was a holiday.*

[ answer ]

2. *If ten days had passed, then the return was accepted only if the item was damaged.*

[ answer ]

Use derivations to check whether each of the entailments below holds. You may use detachment and attachment rules. If an entailment fails, present a counterexample that divides an open gap.

3.  $A \rightarrow (B \rightarrow \neg C) \Rightarrow C \rightarrow (B \rightarrow \neg A)$

[ answer ]

4.  $A \rightarrow B \Rightarrow B \rightarrow C$

[ answer ]

Analyze the sentence below in as much detail as possible, giving a key to your abbreviations of unanalyzed expressions. In this case you *should* identify components that are individual terms, predicates, or functors; however, you do not need to present the result in English notation (i.e., symbolic notation is enough). (Be sure that the unanalyzed components of your answer are independent—in particular, that none contains a pronoun whose antecedent is in another—and be sure also that the individual terms you identify really are individual terms rather than general terms or quantifier phrases.)

5. *Ann called Bill and he picked her up at the garage.*

[ answer ]

6. *If Carol's father is Dave's boss, then she has either met Dave or heard her father speak of him.*

[ answer ]

Use a derivation to show that the entailment below holds. You may use detachment and attachment rules. (Be sure to indicate the alias sets at each stage when they change.)

7.  $a = fc, b = fd, Rac \Rightarrow c = d \rightarrow Rbd$

[ answer ]

**Phi 270 Fo4 test 3 answers**

1. *Dan wasn't home unless it was a holiday*

*Dan wasn't home*  $\leftarrow \neg$  *it was a holiday*

$\neg$  *Dan was home*  $\leftarrow \neg$  *it was a holiday*

$\neg H \leftarrow \neg D$

$\neg D \rightarrow \neg H$

if not D then not H

[H: *Dan was home*; D: *it was a holiday*]

2. *If ten days had passed, then the return was accepted only if the item was damaged*

*ten days had passed*  $\rightarrow$  *the return was accepted only if the item was damaged*

*ten days had passed*  $\rightarrow (\neg$  *the return was accepted*  $\leftarrow \neg$  *the item was damaged*)

$T \rightarrow (\neg A \leftarrow \neg D)$

$T \rightarrow (\neg D \rightarrow \neg A)$

if T then if not D then not A

[T: *ten days had passed*; D: *the item was damaged*; A: *the return was accepted*]

3.

A $\rightarrow$ (B $\rightarrow$ $\neg$ C)	4
C	(6)
B	(5)
A	(4)
B $\rightarrow$ $\neg$ C	5
$\neg$ C	(6)
•	
$\perp$	3
$\neg$ A	2
B $\rightarrow$ $\neg$ A	1
C $\rightarrow$ (B $\rightarrow$ $\neg$ A)	

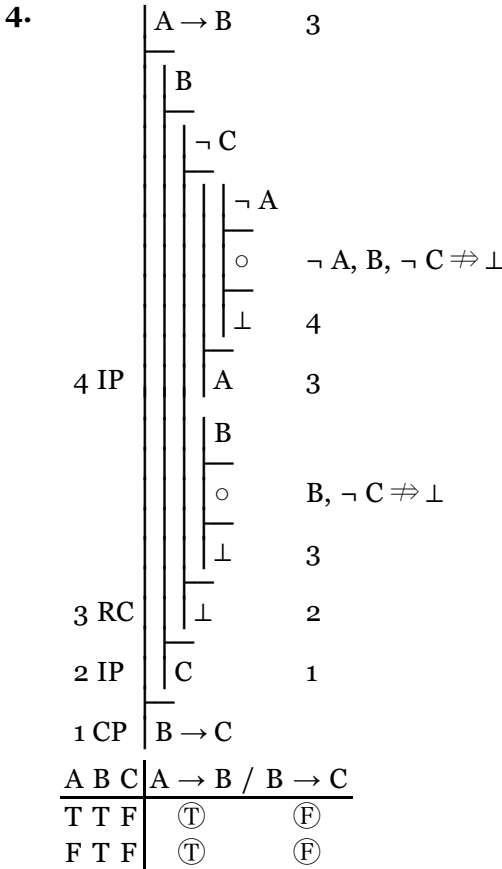
4 MPP  
5 MPP

6 Nc

3 RAA

2 CP

1 CP



The first row divides the second gap and the second row divides both

5. *Ann called Bill and he picked her up at the garage*  
*Ann called Bill*  $\wedge$  *Bill picked Ann up at the garage*  
 $[\lambda xy (x \text{ called } y)]$  *Ann Bill*  $\wedge$   $[\lambda xyz (x \text{ picked } y \text{ up at } z)]$  *Bill Ann*  
*the garage*

$Cab \wedge Pbag$

[C:  $\lambda xy (x \text{ called } y)$ ; P:  $\lambda xyz (x \text{ picked } y \text{ up at } z)$ ; a: *Ann*; b: *Bill*; g: *the garage*]

6. *If Carol's father is Dave's boss, then she has either met Dave or heard her father speak of him*

Carol's father is Dave's boss

→ *Carol has either met Dave or heard her father speak of him*

Carol's father = Dave's boss

→ (*Carol has met Dave* ∨ *Carol has heard her father speak of Dave*)

$[\lambda x (x's\ father)]\ \underline{Carol} = [\lambda x (x's\ boss)]\ \underline{Dave}$

→ (*Carol has met Dave* ∨ *Carol has heard Carol's father speak of Dave*)

$fc = bd \rightarrow ([\lambda xy (x\ has\ met\ y)]\ \underline{Carol}\ \underline{Dave}$

∨  $[\lambda xyz (x\ has\ heard\ y\ speak\ of\ z)]\ \underline{Carol}\ \underline{Carol's\ father}\ \underline{Dave})$

$fc = bd \rightarrow (Mc d \vee Hc(fc)d)$

[M:  $\lambda xy (x\ has\ met\ y)$ ; H:  $\lambda xyz (x\ has\ heard\ y\ speak\ of\ z)$ ; f:  $\lambda x (x's\ father)$ ; b:  $\lambda x (x's\ boss)$ ; c: *Carol*; d: *Dave*]

7.

a = fc	
b = fd	a-fc, b-fd, c, d
Rac	(2)
c = d	a-fc-b-fd, c-d
•	
2 QED=   Rbd	1
1 CP	
c = d → Rbd	