

### Phi 270 Foo test 3 in pdf format

Analyze the sentences below in as much detail as possible *using connectives*; that is, you *should not* identify components that are individual terms (or 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. *If it rains, you will get wet if you're outside*

[ answer ]

2. *Al missed breakfast only if he overslept*

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

[ answer ]

4.  $A \rightarrow B \Rightarrow \neg A \wedge B$

[ answer ]

Analyze the sentence below in as much detail as possible. In this case you *should* identify components that are individual terms, predicates, or functors. Be sure that the unanalyzed components of your answer are independent (in particular, that none contains a pronoun whose antecedent is in another).

5. *Unless Al is the file's owner, the system didn't let him open it*

[ answer ]

[The following question was on a topic not covered in FO5] Expand the following sentence in all possible ways on each of the terms appearing in it (i.e., you need not use vacuous abstraction).

6. *Tabc*

[ answer ]

Use a derivation to show that the entailment below holds. You may use detachment and attachment rules.

7.  $A \rightarrow Ra(fb), Rb(fa) \rightarrow Ga \Rightarrow A \rightarrow (\neg Gb \rightarrow \neg a = b)$

[ answer ]

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### Phi 270 Foo test 3 answers

1. *it will rain*  $\rightarrow$  *you will get wet if you're outside*  
*it will rain*  $\rightarrow$  (*you will get wet*  $\leftarrow$  *you will be outside*)

$$R \rightarrow (W \leftarrow O) \text{ [or: } R \rightarrow (O \rightarrow W)\text{]}$$

if R then if O then W

[O: *you will be outside*; R: *it will rain*; W: *you will get wet*]

2.  $\neg$  Al missed breakfast  $\leftarrow$   $\neg$  Al overslept

$$\neg M \leftarrow \neg O \text{ [or: } \neg O \rightarrow \neg M\text{]}$$

if not O then not M

[M: *Al missed breakfast*; O: *Al overslept*]

3.

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

4.

A $\rightarrow$ B	3,5
A	(3)
B	A, B $\nRightarrow$ $\perp$
$\circ$	
$\perp$	2
2 RAA   $\neg$ A	1
5 MTT   $\neg$ B	(5)
$\neg$ A	$\neg$ A, $\neg$ B $\nRightarrow$ $\perp$
$\circ$	
$\perp$	4
4 IP   B	1
1 Cnj   $\neg$ A $\wedge$ B	

A	B	$A \rightarrow B$	$\neg A \wedge B$
T	T	T	F
T	F	F	F
F	T	T	F
F	F	T	F

5.  $\neg Al$  is the file's owner  $\rightarrow$  the system didn't let Al open the file  
 $\neg \underline{Al}$  is the file's owner  $\rightarrow \neg$  the system let Al open the file  
 $\neg Al = \underline{\text{the file's owner}}$   $\rightarrow \neg$   $[\lambda xyz (x \text{ let } y \text{ open } z)]$  the system Al the file  
 $\neg a = [\lambda x (x's \text{ owner})] \underline{\text{the file}} \rightarrow \neg$  Lsaf  
 $\neg a = of \rightarrow \neg$  Lsaf

[L:  $\lambda xyz (x \text{ let } y \text{ open } z)$ ; a: Al; f: the file; o:  $\lambda x (x's \text{ owner})$ ; s: the system]

6. [This question was on a topic not covered in FO5]

$[\lambda x Txbc]a$   
 $[\lambda x Taxc]b$   
 $[\lambda x Tabx]c$

