Phi 270 F02 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. *They'll be here soon unless they had car trouble*
[answer]

2. *If it snowed, then the schools were open only if the plows got out early.*
[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. $A \rightarrow (\neg B \rightarrow C) \Rightarrow \neg C \rightarrow (A \rightarrow B)$
[answer]

4. $A \rightarrow (\neg B \rightarrow C) \Rightarrow C \rightarrow (A \rightarrow B)$
[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. *Al is Bob's father and Bob works for him*
[answer]

Synthesize an English sentence with the following logical form:

6. $Sa(mb) \rightarrow \neg S(ma)b$
[S: λxy (x *went to school with* y); a: *Al*; b: *Bob*; m: λx (x*'s mother*)]
[answer]

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

7. $Fa \rightarrow C, Fb \Rightarrow a = b \rightarrow C$
[answer]

Phi 270 F02 test 3 answers

1. *They'll be here soon unless they had car trouble*

They'll be here soon ← ¬ *they had car trouble*

S ← ¬ T [*or:* ¬ T → S]

`if not` T `then` S

[S: *they'll be here soon*; T: *they had car trouble*]

2. *If it snowed, then the schools were open only if the plows got out early*

it snowed → *the schools were open only if the plows got out early*

it snowed → (¬ *the schools were open* ← ¬ *the plows got out early*)

S → (¬ O ← ¬ E) [*or:* S → (¬ E → ¬ O)]

`if` S `then if not` E `then not` O

[E: *the plows got out early*; O: *the schools were open*; S: *it snowed*]

3.

	A → (¬ B → C)	3
	¬ C	(4)
	A	(3)
3 MPP	¬ B → C	4
4 MTT	B	(5)
	•	
5 QED	B	2
2 CP	A → B	1
1 CP	¬ C → (A → B)	

4.

	A → (¬ B → C)	3
	C	
	A	(3)
3 MPP	¬ B → C	5
	¬ B	(5)
5 MPP	C	
	○	A, ¬ B, C ⇏ ⊥
	⊥	4
4 IP	B	2
2 CP	A → B	1
1 CP	C → (A → B)	

A	B	C	A → (¬ B → C) / C → (A → B)					
T	F	T	Ⓣ	T	T	Ⓕ	F	

5. *Al is Bob's father and Bob works for him*

Al is *Bob's father* ∧ *Bob works for Al*

Al = *Bob's father* ∧ [λx (x *works for* y)] *Bob Al*

a = [λx (x*'s father*)] *Bob* ∧ Wba

a = fb ∧ Wba

[W: λx (x *works for* y); a: *Al*; b: *Bob*; f:λx (x*'s father*)]

6. S *Al* ([λx (x*'s mother*)] *Bob*) → ¬ S ([λx (x*'s mother*)] *Al*) *Bob*

[λxy (x *went to school with* y)] *Al Bob's mother* → ¬ [λxy (x *went to school with* y)] *Al's mother Bob*

Al went to school with Bob's mother → ¬ Al's mother went to school with Bob

Al went to school with Bob's mother → Al's mother didn't go to school with Bob

If Al went to school with Bob's mother, then Al's mother didn't go to school with Bob

7.

	$Fa \rightarrow C$	3
	Fb	(4)
	|	
	| $a = b$	a-b
	| |	
	| | $\neg C$	(3)
	| |	
3 MTT	| | $\neg Fa$	(4)
	| | $\bullet$	
	| |	
4 Nc=	| | $\perp$	2
	| |	
2 IP	| C	1
	|	
1 CP	$a = b \rightarrow C$	