Phi 270 Foo 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. *Notice the special instructions for 2*.

1. *Only necessary projects were funded*. [Different interpretations of the scope of *only* are possible here; any of them will do.]
[answer]

2. *Tom can solve the puzzle if anyone can*. [In this case, restate your answer using an unrestricted quantifier.]
[answer]

3. *No one received every vote*
[answer]

Use derivations to establish the validity of the following arguments. You may use attachment rules. English interpretations are suggested but remember that they play no role in derivations, and don't hesitate to ignore them if they don't help you think about the derivations.

4.
$$\frac{(\forall x\text{: } Dx)\ Mx \qquad (\forall x\text{: } \neg\, Ax)\ \neg\, Mx}{\forall x\ (Dx \rightarrow Ax)}$$
[answer]
[A: λx (x *is an animal*); D: λx (x *is dog*); M: λx (x *is a mammal*)]

5.
$$\frac{\forall x\ (\forall y\text{: } Py \wedge Byx)\ Dyx}{(\forall x\text{: } Px)\ (\forall y\text{: } Bxy)\ Dxy}$$
[answer]
Everyone who has built anything is proud of it / *Everyone is proud of everything he or she has built*

6. Use a derivation to show that the following argument is not valid and describe a structure (by using either a diagram or tables) that divides one of the derivation's open gaps.
$$\frac{(\forall x\text{: } Rxx)\ \neg\, Fx \qquad \forall x\ Rxc}{\forall x\ (\forall y\text{: } Fy)\ \neg\, Rxy}$$
[answer]

Phi 270 Foo test 4 answers

1. *Only necessary projects were funded*
(∀x: ¬ x *was a necessary project*) ¬ x *was funded*
(∀x: ¬ (x *was a project* ∧ x *was necessary*)) ¬ x *was funded*
(∀x: ¬ (Px ∧ Nx)) ¬ Fx
or: (∀x: Px ∧ ¬ Nx) ¬ Fx—i.e., *No unnecessary projects were funded*;
or: (∀x: Nx ∧ ¬ Px) ¬ Fx—i.e., *Among the necessities only projects were funded*
[F: λx (x *was funded*); N: λx (x *was necessary*); P: λx (x *was a project*)]

2. *Tom can solve the puzzle if anyone can*
(∀x: x *is a person*) *Tom can solve the puzzle if* x *can*
(∀x: Px) (*Tom can solve the puzzle* ← x *can solve the puzzle*)
(∀x: Px) (S *Tom the puzzle* ← S x *the puzzle*)
(∀x: Px) (Stp ← Sxp) [*or:* (∀x: Px) (Sxp → Stp)]
∀x (Px → (Stp ← Sxp)) [*or:* ∀x (Px → (Sxp → Stp))]
[P: λx (x *is a person*); S: λxy (x *can solve* y); p: *the puzzle*; t: *Tom*]

3. *No one received every vote*
(∀x: x *is a person*) ¬ x *received every vote*
(∀x: Px) ¬ x *received every vote*
(∀x: Px) ¬ (∀y: y *is a vote*) x *received* y
(∀x: Px) ¬ (∀y: Vy) Rxy
[P: λx (x *is a person*); R: λxy (x *received* y); V: λx (x *is a vote*)]
Incorrect answers:
(∀x: Px) (∀y: Vy) ¬ Rxy *says No one received any vote*
¬ (∀x: Px) (∀y: Vy) Rxy *says Not everyone received every vote*
(∀y: Vy) ¬ (∀x: Px) Rxy *says No vote is such that everyone received it*

4.

	(∀x: Dx) Mx	a:3
	(∀x: ¬ Ax) ¬ Mx	a:4
	ⓐ	
	Da	(3)
3 SB	Ma	(4)
4 SC	Aa	(5)
	•	
5 QED	Aa	2
2 CP	Da → Aa	1
1 UG	∀x (Dx → Ax)	

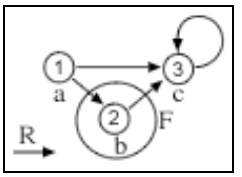
5.

	∀x (∀y: Py ∧ Byx) Dyx	b:3
	ⓐ	
	Pa	(6)
	ⓑ	
	Bab	(3),(7)
3 UI	(∀y: Py ∧ Byb) Dyb	a:5
	¬ Dab	(5)
5 SC	¬ (Pa ∧ Bab)	6
6 MPT	¬ Bab	(7)
7 Nc	⊥	4
4 IP	Dab	2
2 RUG	(∀y: Bay) Day	1
1 RUG	(∀x: Px) (∀y: Bxy) Dxy	

[This can be done without the *reductio* argument begun at stage 4 by using an attachment rule to derive Pa ∧ Bab in order to exploit (∀y: Py ∧ Byb) Dyb for a]

6.

	(∀x: Rxx) ¬ Fx	b:3,c:7,a:9
	∀x Rxc	a:4,b:5,c:6
	ⓐ	
	ⓑ	
	Fb	(3)
3 SC	¬ Rbb	
4 UI	Rac	
5 UI	Rbc	
6 UI	Rcc	(7)
7 SB	¬ Fc	
	Rab	
	¬ Raa	
	○	Fb,¬Rbb,Rac,Rbc,Rcc,¬Fc,Rab,¬Raa ⇏ ⊥
	⊥	10
10 IP	Raa	9
	¬ Fa	
	○	Fb,¬Rbb,Rac,Rbc,Rcc,¬Fc,Rab,¬Fa ⇏ ⊥
	⊥	9
9 MCR	⊥	8
8 RAA	¬ Rab	2
2 RUG	(∀y: Fy) ¬ Ray	1
1 UG	∀x (∀y: Fy) ¬ Rxy	



divides both open gaps