Feedback — Problem Set 3

You submitted this homework on **Fri 17 Oct 2014 12:21 PM PDT**. You got a score of **24.00** out of **31.00**.

This problem set focuses on material covered in Week 3 (Lecture 5), so you should watch the lecture and attempt Assignment 5 before submitting your answers. The deadline for completing (and submitting) the problem set is Monday October 20 at 9:00 AM US-PST. Note that you can save your entries as you work through the problems, and can change them at any time prior to submission, but once you submit your answers no further changes are possible. Note: A downloadable PDF file of this problem set is supplied as an asset to Lecture 5.

Question 1

Let x be a variable ranging over doubles tennis matches, and t be a variable ranging over doubles tennis matches when Rosario partners with Antonio. Let $W(x)$ mean that Rosario and her partner (whoever it is) win the doubles match x. Select the following English sentences that mean the same as the symbolic formula $\exists t W(t)$. [6 points]

Your Answer		Score	Explanation
☐ Rosario and Antonio win every match where they are partners.	✔	1.00	
☑ Rosario and her partner sometimes win the match when she partners with Antonio.	✔	1.00	
☐ Whenever Rosario partners with Antonio, they win the match.	✔	1.00	
☐ Rosario and Antonio win exactly one match when they are partners.	✔	1.00	
☑ Rosario and Antonio win at least one match when they are partners.	✔	1.00	
☐ If Rosario and her partner win the match, she must be partnering with Antonio.	✔	1.00	
Total		6.00 / 6.00	

Question 2

Let x be a variable ranging over doubles tennis matches, and t be a variable ranging over doubles tennis matches when Rosario partners with Antonio. Let $W(x)$ mean that Rosario and her partner (whoever it is) win the doubles match x. Select the following English sentences that mean the same as the symbolic formula $\forall t W(t)$. [6 points]

Your Answer		Score	Explanation
☑ Rosario and Antonio win every match where they are partners	✔	1.00	
☐ Rosario always partners with Antonio.	✔	1.00	
☑ Whenever Rosario partners with Antonio, they win the match.	✔	1.00	
☐ Sometimes, Rosario and her partner win the match.	✔	1.00	
☑ Rosario and her partner win the match whenever she partners with Antonio.	✔	1.00	
☐ If Rosario and her partner win the match, she must be partnering with Antonio.	✔	1.00	
Total		6.00 / 6.00	

Question 3

Which of the following formal propositions says that there is no largest prime. (There may be more than one. You have to select all correct propositions.) The variables denote natural numbers. [6 points]

Your Answer		Score	Explanation
☐ $\neg\exists x \exists y[\text{Prime}(x) \wedge \neg\text{Prime}(y) \wedge (x < y)]$	✔	1.00	
☑ $\forall x \exists y[\text{Prime}(x) \wedge \text{Prime}(y) \wedge (x < y)]$	✘	0.00	
☐ $\forall x \forall y[\text{Prime}(x) \wedge \text{Prime}(y) \wedge (x < y)]$	✔	1.00	
☐ $\forall x \exists y[\text{Prime}(y) \wedge (x < y)]$	✘	0.00	

☐ $\exists x \forall y [\mathrm{Prime}(y) \wedge (x < y)]$ ✔   1.00

☐ $\forall x \exists y [\mathrm{Prime}(x) \wedge (x < y)]$ ✔   1.00

Total   4.00 / 6.00

Question 4

The symbol $\exists! x$ means ``There exists a unique x such that ...'' Which of the following accurately defines the expression $\exists! x \phi(x)$? [5 points]

Your Answer	Score	Explanation
○ $\exists x \forall y [\phi(x) \wedge [\phi(y) \Rightarrow (x \neq y)]]$		
○ $\exists x [\phi(x) \wedge (\exists y)[\phi(y) \Rightarrow (x \neq y)]]$		
○ $\exists x \exists y [(\phi(x) \wedge \phi(y)) \Rightarrow (x = y)]$		
○ $[\exists x \phi(x)] \wedge (\forall y)[\phi(y) \Rightarrow (x = y)]$		
⦿ $\exists x [\phi(x) \wedge (\forall y)[\phi(y) \Rightarrow (x = y)]]$	✔ 5.00	
Total	5.00 / 5.00	

Question 5

Which of the following means "The arithmetic operation $x \uparrow y$ is not commutative." ($\uparrow$ is just some arbitrary binary operation.) [3 points]

Your Answer	Score	Explanation
○ $\forall x \forall y [x \uparrow y \neq y \uparrow x]$		
○ $\forall x \exists y [x \uparrow y \neq y \uparrow x]$		
⦿ $\exists x \exists y [x \uparrow y \neq y \uparrow x]$	✔ 3.00	
○ $\exists x \forall y [x \uparrow y \neq y \uparrow x]$		
Total	3.00 / 3.00	

Question 6

Evaluate this purported proof, and grade it according to the course rubric. Enter your grade (which should be a whole number between 0 and 24, inclusive) in the box. You should come within 4 points of the instructor's grade for full marks [5 points], within 6 points for partial marks [3 points].

You should read the website section "Using the rubric" (it includes a short explanatory video) before attempting this question. There will be many more proof evaluation questions as the course progresses.

You entered:

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Your Answer		Score	Explanation
20	✖	0.00	Too high. The key algebraic idea is there, but there is no argument! I think it deserves about 10 marks according to the rubric. SEE THE TUTORIAL VIDEO.
Total		0.00 / 5.00	