

Logic—Sample Test C4

NAME \_\_\_\_\_

1. Define 'counterexample'. (10 points)

2. Define 'valid'. (10 points)

Translate the following sentences into the language of quantifier logic using the given abbreviations. Remember that you do not need to worry about tense. (2 points each.)

$Yx = x$  is yellow.

$Gx = x$  is green.

$Rx = x$  is red.

$Dx = x$  is a dress.

$Bx = x$  is a blouse.

$Cx = x$  is in the closet.

$Sx = x$  is made of silk.

$Lx = x$  is made of leather.

$Jx = x$  is Julie's, (belongs to Julie, is owned by Julie, is possessed by Julie, etc.)

$s =$  Katy's scarf

3. "Katy's scarf is green and yellow."

4. "Julie has a yellow blouse."

5. "If Katy's scarf is green, it's in the closet."

6. "All of Julie's dresses are in the closet."

7. "At least some of Julie's red blouses are not in the closet."

8. "Julie has a silk dress, not a leather one."

9. "Either there is a dress or a blouse in the closet."

10. "Any dress in the closet that is red is made of silk."

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11. "Katy's scarf isn't made of silk, but of leather."

12. "None of Julie's blouses are made of leather."

13. "Not every blouse in the closet is silk."

14. "Only dresses are in the closet."

15. "Some of Julie's things are yellow, while others are red."

16. "A yellow blouse is in the closet."

17. "Everything not in the closet doesn't belong to Julie."

18. "If there is a yellow or green dress, it is in the closet."

19. "Nothing in the closet is made of silk and leather."

20. "All of Julie's blouses and dresses are green."

21. "If any of Julie's dresses are red, she also has a yellow blouse."

22. "All of Julie's dresses are yellow, except possibly those made of leather."

Logic—Sample Test C4

Use the truth tree method to determine whether the arguments are valid. Number all lines. Label all derived lines with the rule and the line from which they were derived. Cross out discharged sentences. (7 points each.)

23.  $\forall x(Px \supset Qx)$   
 $\forall x(\sim Px \supset \sim Qx)$   
Ph & Qt  

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 $Pt \ \& \ Qh$

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24.  $\forall x((Hx \ \& \ Bxf) \supset I)$   
 $\forall x(Yx \supset Bxf)$   
 $\exists x(Hx \ \& \ Yx)$ 

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 $I$

25. Is the following a contradiction? Prove your answer. (9 points.)  
“All tigers have stripes, but some tigers don’t have stripes.”

Logic—Sample Test C4

Use the truth tree method to determine whether the set of sentences is consistent. Number all lines. Label all derived lines with the rule and the line from which they were derived.

26. {  $\exists x(Ax \ \& \ Bx)$ ,  $\forall x(Bx \supset Cjx)$ ,  $\forall x(Ax \supset Cxj)$ ,  $\forall y \sim \exists x(Cyx \ \& \ Cxy)$  } (7 points.)

Logic—Sample Test C4

27. { “Every rock is marked.”, “Anything that isn’t marked is indecipherable.”, “Some rocks are decipherable.” } (3 points for translation, 7 for proof)

$Rx = x$  is a rock.

$Mx = x$  is marked.

$Dx = x$  is decipherable.