

Logic—Sample Test D1

NAME _____

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

$Dx = x$ is a dog

$Px = x$ is a person

$Cx = x$ is a cat.

$Bxy = x$ belongs to y

$Lxy = x$ likes y

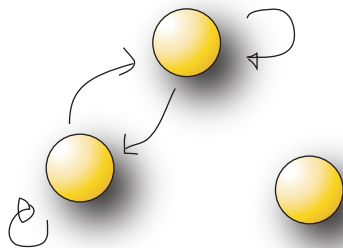
$s =$ Stephanie

$t =$ Penelope

1. “Stephanie has a dog named Penelope.”
2. “Everyone has a cat.”
3. “Stephanie has a dog and a cat.”
4. “No one likes all cats.”
5. “There isn’t a single dog that likes a cat.”
6. “Penelope likes Stephanie if Stephanie has a dog.”
7. “No cat belongs to everyone.”
8. “Any cat Stephanie likes, likes Penelope in return.”
9. “One of Penelope’s dogs doesn’t like itself.”
10. “Everyone has a dog except maybe Stephanie.”
11. “If Stephanie doesn’t like Penelope, she won’t like any of Penelope’s dogs.”

Logic—Sample Test D1

12. “Anyone who has a dog, likes it.”
13. “One of Stephanie’s dogs likes everyone except possibly Penelope.”
14. “Penelope’s cats only like her, not anyone else.”
15. “None of Stephanie’s dogs like her.”
16. “Stephanie likes all cats except any she owns, which she doesn’t like.”
17. “At least two people like Penelope.”
18. “Penelope has exactly one cat.”
19. “Stephanie has no more than one dog.”
20. “Stephanie doesn’t like herself and the same goes for Penelope.”
21. The relation M , where Mxy means x is a mother to y .
Reflexive? (Reflexive / Irreflexive / Neither)
Symmetric? (Symmetric / Anti-symmetric / Neither)
Transitive? (Transitive / Intransitive / Neither)
22. The relation R , where R is defined over the universe pictured below.
Reflexive? (Reflexive / Irreflexive / Neither)
Symmetric? (Symmetric / Anti-symmetric / Neither)
Transitive? (Transitive / Intransitive / Neither)



Logic—Sample Test D1

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. Answers should look just as in the book (except that you should cross out each complex sentence after you use it.)

23. { Rfg, Rgf, $\forall x \forall y (x \neq y \supset \sim(Rxy \ \& \ Ryx))$ }

Logic—Sample Test D1

Use the truth tree method to determine whether the argument is valid. Number all lines. Label all derived lines with the rule and the line from which they were derived. Answers should look just as in the book (except that you should cross out each complex sentence after you use it.)

24. $\forall x(Hx \supset \exists y((Fxy \ \& \ x \neq y) \ \& \ \sim Fyx))$
 $\forall x \forall y \forall z((Fyx \ \& \ Fyz) \supset Fxz)$
 Hs

 $\sim \exists x Kx$

Logic—Sample Test D1

25. $\forall x(Px \supset \forall y((Py \ \& \ y = b) \supset Lxy))$

Pa & Pb

Lab

Logic—Sample Test D1

26. $Pb \ \& \ \forall y(\sim Py \supset y = b)$

$\sim \exists x(Bx \supset (Px \ \& \ a = x))$

Pa