

Logic—Sample Test D3

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.

$Ax = x$  is alabaster.

$Sx = x$  is smooth.

$Mx = x$  is malachite.

$Tx = x$  is a temple.

$Dx = x$  is damaged.

$Cx = x$  is cared for.

$s$  = the statue

$f$  = the floor

1. “The alabaster floor will be damaged if it is not cared for.”
2. “No temples are made of malachite.”
3. “The only temple that is damaged is the alabaster one.”
4. “Unless the statue is a malachite statue, it isn’t cared for.”
5. “The floor is undamaged, but everything else is damaged.”
6. “The statue is made of neither alabaster nor malachite.”
7. “Every alabaster thing is cared for, except possibly the statue, which is damaged.”

Logic—Sample Test D3

$Px = x$  is a person.

$Cx = x$  is a coat.

$Bxy = x$  belongs to  $y$ . ( $y$  owns  $x$ ,  $y$  possesses  $x$ ,  $y$  has  $x$ , etc.)

$Wxy = x$  is wearing  $y$ .

$Sxyz = x$  sold  $y$  to  $z$ .

$Fx = x$  is made of fur.

$s =$  Shawn

$l =$  Laurie

8. "Shawn sold his only coat to Laurie."
9. "No one sold anything to Shawn."
10. "All Shawn's coats are fur coats."
11. "Laurie has a fur coat."
12. "Someone is wearing one of Laurie's coats."
13. "Anyone wearing fur possesses a coat."
14. "Any coat that is fur belongs to either Shawn or Laurie."
15. "Laurie only wears non-fur coats."
16. "No one besides Laurie is wearing a fur coat."
17. "Everyone is wearing what he or she owns."

Logic—Sample Test D3

18. The relation  $L$ , where  $Lxy$  means “ $x$  is at least as large as  $y$ .”

Reflexive? ( Reflexive / Irreflexive / Neither )

Symmetric? ( Symmetric / Anti-symmetric / Neither )

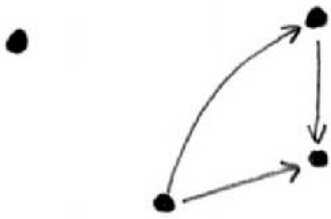
Transitive? ( Transitive / Not-transitive )

19. The relation  $R$ , where  $R$  is defined over the universe pictured below.

Reflexive? ( Reflexive / Irreflexive / Neither )

Symmetric? ( Symmetric / Anti-symmetric / Neither )

Transitive? ( Transitive / Not-transitive )

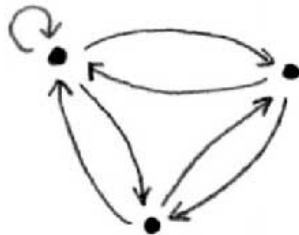


20. The relation  $Q$ , where  $Q$  is defined over the universe pictured below.

Reflexive? ( Reflexive / Irreflexive / Neither )

Symmetric? ( Symmetric / Anti-symmetric / Neither )

Transitive? ( Transitive / Not-transitive )



Logic—Sample Test D3

Use the truth tree method to determine whether the following two statements are equivalent to each other. Number all lines. Label all derived lines with the rule and the line from which they were derived. Cross out discharged sentences.

{  $\forall x \forall y ((Bx \ \& \ By) \supset x=y)$ ,  $\sim \exists x \exists y (Bx \ \& \ By \ \& \ x \neq y)$  }

Logic—Sample Test D3

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.

21.  $\{ \exists x(Px \ \& \ a=x), \ \forall xy((Py \ \& \ x=a) \supset Qxy), \ \forall x\sim Qxx \}$

22.  $\{ \forall x(f(x)\neq x), \ \forall xG_{f(x)x}, \ \exists y\sim Gyy \}$