

Logic—Sample Test C1

NAME _____

1. Define 'counterexample'. (10 points)
2. Define 'valid'. (20 points)

Translate the following sentences into the language of sentential logic using the abbreviations given to you. (These problems are worth 2 points each.)

Px = x is a person.
 Fx = x flees.
 Ty = y is threatened.
 Sx = x is a serpent.
 Dx = x is a demon.
 Ax = x is an angel.
 a = Angela
 j = Juan
 m = Melissa

3. "Angela isn't being threatened."
4. "Melissa, the angel, is fleeing."
5. "Juan, Melissa and Angela are not all demons."
6. "Someone is being threatened."
7. Not everyone who is threatened, flees."
8. "All serpents are demons."
9. "Demons never flee when threatened."
10. "If Juan flees, there is a serpent demon in existence."

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$Fj \supset \exists x(Sx \ \& \ Dx)$

$Px = x$ is a person.

$Fx = x$ flees.

$Ty = y$ is threatened.

$Sx = x$ is a serpent.

$Dx = x$ is a demon.

$Ax = x$ is an angel.

$a =$ Angela

$j =$ Juan

$m =$ Melissa

11. “No fleeing demons are serpents.”

12. “Unless threatened, angels never flee.”

13. “The serpent demon Juan is threatened.”

14. “An angel flees only if it is threatened.”

15. “Not everybody is an angel or demon.”

16. “Angels flee if threatened, unlike demons, who never do so.”

17. “Both angels and demons flee when threatened.”

18. “Unless an angel is threatened, Juan the serpent flees.”

19. “Neither Juan nor Angela are demons, but someone is.”

20. “Unless no angels are serpents, there will be serpents that are demons as well.”

21. “Juan is not a demon, nor is Angela; they are angels instead.”

22. “All angels are threatened if there is some demon that is not a serpent.”

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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). Complete the truth tree. (8 points each)

23. Every woman has a right to fair treatment.
Thus, women exist.

$Wx = x$ is a woman

$Rx = x$ has a right to fair treatment

24. All elephants are mammals.
No elephants can fly.

Thus, no mammals can fly.

$Ex = x$ is an elephant

$Mx = x$ is a mammal

$Fx = x$ can fly

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25.
$$\frac{\forall y(My \supset Fy) \supset \exists z(Pz \ \& \ Qz)}{\sim \exists x(Px \ \& \ Qx)}$$

$$\exists x(Mx \ \& \ \sim Fx)$$