

Logic—Sample Test C2 with Answers

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.

$Lx = x$ lounges.

$Px = x$ is a person.

$Tx = x$ is thirsty.

$e =$ Emelda

$k =$ Kelly

$d =$ Dave

1. “Kelly is not thirsty.”

$\sim Tk$

2. “If Emelda isn’t thirsty, no one is.”

$\sim Te \supset \sim \exists x(Px \ \& \ Tx)$

3. “No one is thirsty.”

$\sim \exists x(Px \ \& \ Tx)$

4. “Someone who isn’t thirsty is lounging.”

$\exists x((Px \ \& \ \sim Tx) \ \& \ Lx)$

5. “Kelly and Emelda are not both thirsty.”

$\sim(Td \ \& \ Tq)$

6. “Dave will only lounge if he’s not thirsty.”

$Ld \supset \sim Td$

7. “Everyone who isn’t thirsty is lounging.”

$\forall x((Px \ \& \ \sim Tx) \supset Lx)$

8. “No one who is thirsty will lounge.”

$\exists x((Px \ \& \ Tx) \ \& \ Lx)$

9. “Everybody racing is thirsty.”

$\forall x((Px \ \& \ Rx) \supset Tx)$

10. “If Dave is thirsty, no one will be racing.”

$Td \supset \sim \exists y(Py \ \& \ Ry)$

11. “If someone thirsty is racing, he or she will not be lounging.”

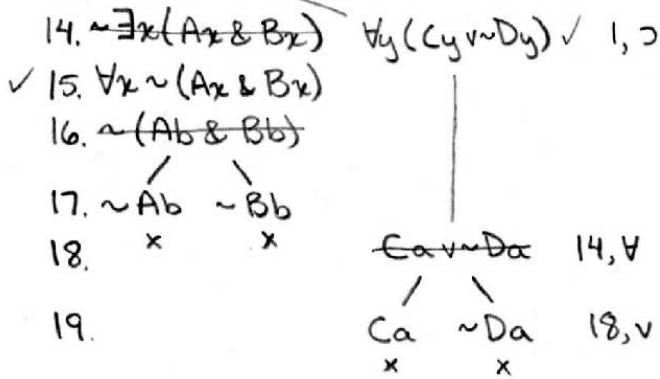
$\forall y((Py \ \& \ (Tx \ \& \ Rx)) \supset \sim Lx)$

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

16. $\{ \exists x(Ax \& Bx) \supset \forall y(Cy \vee \sim Dy), \sim \forall x(\sim Ax \vee \sim Bx), \sim \exists x Cx, \exists x Dx \}$

1. ~~$\exists x(Ax \& Bx) \supset \forall y(Cy \vee \sim Dy)$~~
2. ~~$\sim \forall x(\sim Ax \vee \sim Bx)$~~
3. ~~$\sim \exists x Cx$~~
4. $\exists x Dx$
5. Da 4, \exists
- ✓ 6. $\forall x \sim Cx$ 3, $\sim \exists$
7. $\sim Ca$ 6, \forall
8. ~~$\exists x \sim(\sim Ax \vee \sim Bx)$~~ 2, $\sim \forall$
9. ~~$\sim(\sim Ab \vee \sim Bb)$~~ 8, \exists
10. ~~$\sim \sim Ab$~~ 9, $\sim \vee$
11. ~~$\sim \sim Bb$~~ 9, $\sim \vee$
12. Ab 10, $\sim \sim$
13. Bb 11, $\sim \sim$



Inconsistent