

Start Time:

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Time limit 15 minutes, not counting download and upload. Please add explanation if over 17 minutes.

1. Let Γ be the set of formulas $\{x_1 \neq x_2, P(x_1) \rightarrow \forall x_3(P(x_3))\}$. Then,

$$\Gamma \not\models \neg P(x_1).$$

Give an example of a structure \mathfrak{A} and an object assignment σ that illustrates that $\Gamma \not\models \neg P(x_1)$. Specify the universe $|\mathfrak{A}|$ as a set, specify the interpretations of nonlogical(s) as sets of tuples, and describe the object assignment.

ANSWER: There are many possible answers. One of the easiest ones is:

$$\begin{aligned} |\mathfrak{A}| &= \{0, 1\} \\ P^{\mathfrak{A}} &= \{\langle 0 \rangle, \langle 1 \rangle\} \\ \sigma(x_1) &= 0 \\ \sigma(x_2) &= 1 \end{aligned}$$

The other values of σ are irrelevant.