

Logic and Computation I, Autumn 2022

Homework No.8

Due Date: December 19, 11:59 pm (Beijing)

Name:

Problem 1

- (1) For any formula $\varphi(x_1, \dots, x_n)$, prove that the truth value must be preserved with equality $((x_1 = y_1 \wedge \dots \wedge x_n = y_n) \rightarrow \varphi(x_1, \dots, x_n) \leftrightarrow \varphi(y_1, \dots, y_n))$.
- (2) Let $\psi(\varphi)$ be the formula obtained by replacing the relation symbol $R(\vec{x})$ in formula ψ with formula $\varphi(\vec{x})$. Show $\forall \vec{x}(\varphi_1(\vec{x}) \leftrightarrow \varphi_2(\vec{x})) \rightarrow (\psi(\varphi_1) \leftrightarrow \psi(\varphi_2))$.

Solution: