

Logic 1, WS 2006. Homework 1, given Oct 12, due Oct 19

1. Compute the truth value of the formula $(A \wedge (A \Rightarrow B)) \Rightarrow B$ under the interpretation $A \rightarrow \mathbb{F}, B \rightarrow \mathbb{T}$.
2. Prove by definition that for any two propositional formulae ϕ, ψ : if the formula $\phi \Leftrightarrow \psi$ is a tautology, then $\phi \equiv \psi$.
3. Prove by definition that for any two propositional formulae ϕ, ψ : $\phi \equiv \psi$ if and only if $\phi \models \psi$ and $\psi \models \phi$.
4. Prove by definition that for any propositional formulae $\phi_1, \dots, \phi_n, \psi$: $\phi_1, \dots, \phi_n \models \psi$ if and only if the formula $\phi_1 \wedge \dots \wedge \phi_n \wedge \neg\psi$ is unsatisfiable.
5. Give 5 truth reduction equivalences between propositional formulae. (For instance, such an equivalence is $A \vee \mathbb{F} \equiv A$).