1. a) *Solution.* See Definition 10.2 in the lecture notes. □

   b) *Solution.* See the proof of Lemma 10.7 in the lecture notes. □

2. *Solution.* Then the following derivation is admissible, which proves the lemma.

$$\dfrac{\dfrac{C \lor s = t \quad f(x) = f(x)}{C \lor f(s) = f(t)} \qquad D \lor L[x]}{C \lor D \lor L[f(t)]} .$$

□

3. *Solution.*

Statement	**yes**	**no**
Let $\mathcal{G}$ be a set of universal sentences (of $\mathcal{L}$) without $=$. Then $\mathcal{G}$ is satisfiable iff $\mathcal{G}$ has a Herbrand model (over $\mathcal{L}$).	✓	
There exists exactly one path in a semantic tree that gives rise to a (partial) Herbrand interpretations.		✓
A tableau proof for F is a closed tableau for $\{F\}$.		✓
A strategy S is fair if for any sequence of tableaux $T_1, T_2, \ldots$ following S we have for each $i \in \mathbb{N}$: (i) Every non-literal formula in T_i is eventually expanded on each branch it occurs, and (ii) every δ-formula occurrence in T_i has the δ-rule applied to it arbitrarily often on each branch it occurs.		✓
The Herbrand complexity of an unsatisfiable clause set $\mathcal{C}$ is the cardinality of the smallest subset of ground instances of $\mathcal{C}$ which is unsatisfiable.	✓	
For an inner Skolemisation step the arguments of the introduced Skolem function are a subset of the free variables in the scope of the existentially quantified variable replaced.	✓	
The antiprenex form of an NNF A is obtained my maximising the quantifier range by quantifier shifting rules.		✓
Suppose literal L is strictly larger than any other literal in a clause C wrt. some proper literal order $\succ_{\mathsf{L}}$. Then L is also strictly maximal wrt. C.	✓	
Superposition with equations is sound, but not (refutationally) complete.		✓
We say a ground clause set is saturated upto redundancy if all inferences from non-redundant premises are redundant.	✓	

□