

Closed book. Closed Notes. Only the Definitions-Theorems handout allowed. 25 points per problem. Please write very legibly.

1. Prove the Compactness Theorem for propositional logic (Version II) from the Adequacy Theorem for P (“general version”) and the Soundness Theorem for P (“general version”).
2. Let Γ be a set of formulas. Show that if Γ is satisfiable, then it is consistent.
3. Use a Cantor diagonal argument to show that the set of all truth assignments is uncountable.
4. (a) Write in L_{NN} : An odd number is not divisible by an even number.
(b) Write in L_{ST} : If a set equals its own powerset, then it is empty.

(In this problem, if you have time, you may write brief explanations for parts of your formulas. This is *optional*; it may or may not help with partial credit.)
