Homework 2: due 10:30 am, 12-April-2018

Question 1. Prove the “easy” direction of the completeness theorem in propositional calculus. That is, prove that if $X \vdash \alpha$, then $X \models \alpha$.

Question 2. Prove that if a set $X$ is satisfiable, then it is consistent.

Question 3. Prove that if a set $X$ is consistent, then it is satisfiable.

Question 4. Do you think the completeness theorem for propositional calculus, i.e., the equivalence between $\vdash$ and $\models$, still holds when we allow $PV$, the set of atomic formulas, to be uncountable? If it does, which part of the proof has to be modified? Please explain.

Question 5. Use the completeness theorem to prove the compactness theorem.