

21-131 Assignment 1: due Tuesday September 2

From Apostol, write solutions to the following problems:

- 1.1. page 8, # 2, parts (a) and (b)
- 1.2. page 16, # 15
- 1.3. page 16, # 20
- 1.4. page 19, # 5
- 1.5. page 19, # 9

- 1.6. Let P and Q be statements that are either true or false, and consider the implication $P \rightarrow Q$.
 - (a) Construct truth tables for the *converse* $Q \rightarrow P$ and the *contrapositive* $\neg Q \rightarrow \neg P$.
 - (b) Devise statements $P(x)$ and $Q(x)$ concerning positive integers x such that $\forall x(P(x) \rightarrow Q(x))$ is true but $\forall x(Q(x) \rightarrow P(x))$ is false.

- 1.7. Prove Theorem I.7 in Apostol, page 18, using Axioms 1 through 6 and Theorems I.1 through I.6. (It is a good idea to work out the proofs of all of Theorems I.5 through I.15 on page 18, but you are not required to turn them in.)

Remark. Homework solutions should be written in complete sentences. Mathematical writing should respect all the rules of grammatical English. As with riding a bicycle, ballroom dancing, or any sport, say, your skill in communicating your ideas improves only with practice and discipline.