1. Apostol §1.11 (pp. 63–64) 2, 4a, *4b, 4d, 5. (Here the greatest integer \( \lfloor x \rfloor \) is defined to be the unique integer \( n \) such that \( n \leq x < n + 1 \). You supposedly proved that this exists in an unstarred problem on Assignment #3.)

2. Apostol §1.15 (pp. 70–72) 1, 3, *5, 10, *11, *15, 16, 17. (In 5, you may assume that every nonnegative number has a unique nonnegative square root, as proved in Theorem I.35. In 11, if true, give the briefest possible sketch of the proof; if false, give a counterexample.)

*3. Prove the reflection property of integration: if \( f \) is integrable on \( [a, b] \), then

\[
\int_{-b}^{-a} f(-x) \, dx = \int_{a}^{b} f(x) \, dx.
\]

(First prove it for step functions.)

4. Apostol §1.26 (pp. 83–84) *25, 27.

*5. Prove that if \( f \) and \(|f|\) are both integrable on \( [a, b] \), then

\[
\left| \int_{a}^{b} f(x) \, dx \right| \leq \int_{a}^{b} |f(x)| \, dx.
\]

Notice the similarity to the triangle inequality!

(Hint: you may find it convenient to use 8 from Assignment #3.)

6. Is it possible for \(|f|\) to be integrable but not \( f \)? Give a proof or counterexample.