MAT 370 — HOMEWORK — SPRING 2000

Homework 10, due Monday, 5/1
Read sections 7.1 – 7.3.
Problems:

1. Prove or disprove: if $\sum_{n=1}^{\infty} a_n$ converges, then $\sum_{n=1}^{\infty} a_n^2$ converges.
2. p. 209, # 33.
3. p. 210, # 44.
4. Consider the sequence of functions $\{f_n\}_{n=1}^{\infty}$ given by:

$$f_n(x) = \frac{x^n}{n + x^n}.$$

   (i) Prove that $\{f_n\}_{n=1}^{\infty}$ converges uniformly on $[0, 1]$.
   (ii) Prove that $\{f_n\}_{n=1}^{\infty}$ converges uniformly on $[c, \infty)$ for any $c > 1$.
   (iii) Prove that $\{f_n\}_{n=1}^{\infty}$ does not converge uniformly on $(1, \infty)$.

5. Consider the infinite series $\displaystyle\sum_{n=0}^{\infty} e^{-nx}$.

   (i) Prove that the series converges uniformly on $[c, \infty)$ for any $c > 0$.
   (ii) Prove that the series converges pointwise, but not uniformly, on $(0, \infty)$.

6. p. 233, # 15.

Extra Credit Problem

7. p. 210, # 41e.

The final exam will be held in the usual classroom, LSE-204, on Monday, May 8, 7:40 - 9:30 AM. It will cover the entire course.

I will be in my office to answer questions Tuesday through Friday, May 2-5, for several hours each day. I will post a schedule later. You may call to see if I am in (965-3286). I am also happy to answer questions by e-mail: *jss@math.la.asu.edu*