

Mathematics 5318

Name (please print) \_\_\_\_\_

Take-home Final Exam

Due on Friday, May 9, 2003 at 1:00 p. m.

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Please, kindly staple the pages together before you turn it in.

**I.** State and prove Theorem 4.3E.

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- II.** Provide an example of a metric space and a Cauchy sequence in it which is not convergent. The  
(10) metric space must be different from any subspace of  $R^1$ , where  $R^1$  stands for the real line with the absolute value metric. The example following Theorem 4.3E can be used but every detail must be proved including the fact that the sequence is Cauchy.

**III.** Problem 5.3 #6.  
(10)

- IV.** Prove that if the sequence of real numbers  $\{S_n\}_{n=1}^{\infty}$  is convergent to  $L$ , then any subsequence of  
(10)  $\{S_n\}_{n=1}^{\infty}$  is also convergent to  $L$ .

**V.** Exercise 4.2 # 3.  
(10)