Directions: Please try to do 5 problems. You can select any of the problems below or look in other texts for problems relating to convergence/divergence of series of functions and power series. (Note: If you do a problem from another text, make a note of the title, author, and problem number.)

1. One more problem on rearrangements: Suppose \( \sum_{k=1}^{\infty} a_k \) converges conditionally but not absolutely. Prove that there is some rearrangement that diverges.

2. Section 9.3: To make sure you understand the definition of uniform convergence, try one of #1, 2, 3, 4, or 5.

3. Section 9.3: Problem 9.3.7 offers another quantity, namely boundedness, that is preserved when a sequence of bounded functions converges uniformly.

4. Section 9.4: #3, 4, and 5 are all interesting.

5. Section 9.5: Please read through this section. A few computational problems you might try are #6, 8, and 10. (I'll put the more theoretical problems from this section on the next homework.)

6. Another interesting question that came up in class: Let \( D \) be the set of all \( x \) such that some power series, \( \sum_{k=0}^{\infty} c_k x^k \), converges. Show that \( D \) is an interval. (What can be said about the set \( D \) for an arbitrary series of convergent functions, \( \sum_{k=1}^{\infty} f_k(x) \)?)