

## Math 322

### Project # 1

Due March 16

Your first project is to write an essay on Hölder continuous functions and their Fourier series. You should include all of the results in Exercises 15 and 16 in Chapter 3. The principal result is Bernstein's Theorem: If  $f$  satisfies a Hölder condition of order  $\alpha$  with  $\frac{1}{2} < \alpha \leq 1$ , then the Fourier Series of  $f$  converges to  $f$  uniformly and absolutely. You should provide examples of new concepts. You should also discuss how the new results relate to results proven in class and in your homeworks.

Organize your thoughts about this material and present it as you would a chapter in a book. You could follow the outline of Exercises 15 and 16, but this is probably not the best way to do it. It is certainly not the only way. Please use complete sentences, and coherent paragraphs. Number your lemmas, propositions, and theorems, as well as those formulas that you refer to later. If I find it hard to follow your reasoning you will lose points. 20% of your grade will be based on your presentation.