

## Physics 303 Fourier Analysis Project

The purpose of this project is to become acquainted with the methods of Fourier Analysis by determining the proper Fourier expansion of the function  $F(x) = x^3$  over the domain  $x = [-\pi, \pi]$ . The project will be comprised of a 4-5 page document containing the mathematical steps to the solution, a number of graphs (see below), and about 1-2 pages worth of text describing the steps and commenting on the results. *This project will count as the final test grade for the semester.*

### What to include:

- Mathematical details of the solution for the Fourier expansion of  $x^3$ . These can either be hand written or typed using equation editor.
- Short introductory paragraph describing what a Fourier series is as well as text describing the steps toward the solution.
- A Mathematica (or other) script which evaluates a certain number of terms in your expansion and plots the function along with the expansion. Do this for 5 or 6 values of N (the number of terms in the expansion).
- Some concluding comments about the results.

**Due date:** Friday (12/10) by 10:00 AM in my box in Lewis Hall (or secretary in main office). Feel free to see me if you have questions or get stuck.