Real Analysis 1, MATH 5210, Spring 2017 Homework 2, Littlewood's Three Principals, Egoroff's Theorem, and Lusin's Theorem. (3.3) Due Friday, January 27, at 1:30

Write in complete sentences!!! *Explain* what you are doing and convince me that you understand what you are doing and why. Justify all steps by quoting relevant results from the textbook, class notes, or hypotheses. Do not copy the work of others; **do your own work!!!**

- **3.25.** Suppose f is a function that is continuous on a closed set F of real numbers. Prove that f has a continuous extension to all of \mathbb{R} . There is, there is continuous g defined on all of \mathbb{R} such that g = f on F. HINT: Notice that $\mathbb{R} \setminus F$ is open and you know what an open set of real numbers looks like.
- **3.27.** Show that the conclusion of Egoroff's Theorem can fail if we drop the assumption that the domain has finite measure.
- **3.30.** Prove the extension of Lusin's Theorem to the case that f is not necessarily real-valued, but instead is finite a.e. HINT: Use Exercise 3.14.