Review Sheet for 50780 midterm

Standard disclaimer: The following represents a sincere effort to help you prepare for our exam. It is not guaranteed to be perfect. There might well be minor errors or (especially) omissions. These will not, however, absolve you of the responsibility to be fully prepared for the exam. If you suspect a problem with this review sheet, please bring it to my attention.

Format: The exam will consist of a take home portion, posted online Friday February 28 with solutions due by Friday March 7; and an in-class portion on Monday March 16. The in class portion will consist exclusively of two kinds of problems: short answer questions where you are asked to state a definition or theorem, and true/false questions in which you are required to give specific counterexamples to false statements.

Some terms and theorems that might come up: Outer measure of a set; measurable set; null set; Cantor set; countable additivity, continuity, and approximation properties of Lebesgue measure; measurable function, integral simple function, Lebesgue integral of an ISF, of a non-negative function, and of a measurable function; integrable function; egorov's theorem; dominated and monotone convergence theorems; Fatou's lemma; relationship between Riemann and Lebesgue integrals; $L^1(A)$, $L^2(A)$ and the associated norms; Cauchy-Schwarz inequality for $L^2(\mathbf{R})$; approximation and completeness theorems for L^1 and L^2.

You will not have to: state Banach-Tarski; give an example of a non-measurable set (if you need such a thing for some other example, you maybe simply assert its existence); prove any theorems from class or the text; reproduce the two functions defined in section 11B;