

## Real Analysis Qualifying Exam Topics

1. Sub-ring, ring, the additive measure, and sigma-additive measure.
2. Outer measure, and Lebesgue-measurable sets.
3. Continuity of the measure.
4. Egorov's and Luzin's Theorems.
5. Measurable functions.
6. Simple, elementary functions, and the definition of the Lebesgue Integral
7. Properties of the Lebesgue integral.
8. Chebyshev's inequality.
9. Lebesgue (Dominated Convergence), Levy, and Fatou Theorems.
10. Sign-changing, absolutely continuous, and singular measures.
11. The Hahn Decomposition and Radon-Nikodim Theorems.
12. Monotonic functions, their differentiability almost everywhere.
13. Functions of bounded variations, absolutely continuous functions.
14. The Main Theorem of Calculus for the Lebesgue integral.

I could have forgotten something, I am writing these things "by heart", you should follow the notes you have taken in class. The main point-please solve all problems I gave through the semester course. If you solved all of them and know ALL Definitions-you are prepared.