Review for Exam I

1. Chapter 6
   A. Properties of Sets
      i. Open, Closed, Relatively Open
      ii. Connected, Diameter, Bounded, Totally Bounded
   B. Examples of Sets with Properties in A.
      i. $\mathbf{R}^1$ ii. $\mathbf{R}^2$
      iii. $\mathbf{R}_d$ iv. l^2
   C. Metric Spaces
      i. Complete
      ii. Compact
   D. Examples of Metric Spaces with Properties in C.
   E. Continuous Functions on Compact, Connected Metric Spaces
      i. Real-valued continuous functions on closed bounded intervals [a,b]
   F. Uniform Continuity
      i. Continuous functions on compact metric spaces.
   G. Theorems whose proofs you should know
      i. Theorem 6.2D (Image of connected set under continuous function is again connected.)
      ii. Theorem 6.6A (Image of a compact metric space under continuous function is again compact.)
   H. Representative Problems
      i. Given a set S, identify which of the properties in 1.A the set S possesses.
      ii. Identify a set S which has a specified list of properties (from 1.A).
      iii. Given a metric space M, identify which of the properties in 1.A and 1.C the space M possesses.
      iv. Identify a metric space M which has a specified list of properties (from 1.A and 1.C).
      v. Page 149, #2   vi. Page 153, #2, 4
      vii. Page 156, #2   viii. Page 163, #4-8, 10
      ix. Page 166, #2-4   x. Page 167, #4
      xi. Page 171, #3, 7   xii. Page 177, #10-11
2. Chapter 7
   A. Sets of Measure Zero
   B. Definition of "holds almost everywhere"
   C. Definition of Upper and Lower Sums for a Bounded Function on a Bounded Interval
   D. Definition of Riemann Integral for a Bounded Function on a Bounded Interval
   E. Theorem 7.3A (Statement)
   F. Representative Problems
      i. Given a set S, identify whether the set is of measure zero
      ii. Given a function f, identify whether it is continuous a.e.
      iii. Page 180, #1, 3-5
      iv. Page 184, #1-2, 4, 9
      v. Page 187, #1-5