# Real Analysis

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## 1 Lecture 1 (Thu 15 Aug 2019 11:04)

See Folland's Real Analysis, definitely a recommended reference.

Possible first day question: how can we "measure" a subset of $\mathbb{R}$? We'd like bigger sets to have a higher measure, we wouldn't want removing points to increase the measure, etc. This is not quite possible, at least something that works on *all* subsets of $\mathbb{R}$. We'll come back to this in a few lectures.

**Notions of "smallness" in $\mathbb{R}$**

Definition: Let $E$ be a set, then $E$ is *countable* if it is in a one-to-one correspondence with $E' \subseteq \mathbb{N}$, which includes $\emptyset, \mathbb{N}$.

Definition: $E$ is *meager* (or of *1st category*) if it can be written as a countable union of **nowhere dense** sets.