

MAT324: Real Analysis – Fall 2016
ASSIGNMENT 1

Due Thursday, **September 8**, in class.

Problem 1: Let \mathcal{C} be the Cantor middle-thirds set constructed in the textbook. Show that \mathcal{C} is compact, uncountable, and a null set.

Problem 2: Let A be the subset of $[0, 1]$ which consists of all numbers which do not have the digit 4 appearing in their decimal expansion. Find $m(A)$.

Problem 3: Let A be a null set. Show that $m^*(A \cup B) = m^*(B)$ for any set B .

Problem 4: Let E_1, E_2, \dots, E_n be disjoint measurable sets. Show that for all $A \subseteq \mathbb{R}$, we have

$$m^* \left(A \cap \left(\bigcup_{j=1}^n E_j \right) \right) = \sum_{j=1}^n m^*(A \cap E_j).$$