

## MATH 204: Homework 6

Due Wed Mar 1

Problems are from Rudin 3rd edition.

**Problem 1.** Chapter 6 (p. 138): 18, 19

**Problem 2.** Chapter 7 (p. 165): 1, 2, 3, 4, 12, 13 (do not just take the statements in the hint for granted, you need to prove them or justify them by citing the correct theorems)

**Problem 3.** Use the Baire Category Theorem to show that there exists a real continuous function on  $\mathbb{R}$  which is nowhere differentiable. See Chapter 3 Problem 22 for a statement of the Baire Category Theorem.

*Hint:* Try using Baire Category Theorem in the metric space

$$C(\mathbb{R}) = \{f : \mathbb{R} \rightarrow \mathbb{R} : f \text{ bounded and continuous}\}.$$