

MATH 2050C Mathematical Analysis I

2022-23 Term 2

Problem Set 11

due on Apr 14, 2023 (Friday) at 11:59PM

Instructions: You are allowed to discuss with your classmates or seek help from the TAs but you are required to write/type up your own solutions. You can either type up your assignment or scan a copy of your written assignment into ONE PDF file and submit through Gradescope on/before the due date. Please remember to write down your name and student ID. **No late homework will be accepted.** All the exercises below are taken from the textbook.

Required Readings: Chapter 5.3

Optional Readings: none

Problems to hand in

Section 5.3: Exercise # 2, 3, 6, 17

Suggested Exercises

Section 5.3: Exercise # 1, 4, 11, 12, 15, 16

Challenging Exercises (optional)

1. Section 5.3: Exercise # 13
2. Suppose $f : \mathbb{R} \rightarrow \mathbb{R}$ is a function such that

$$\lim_{h \rightarrow 0} (f(x+h) - f(x-h)) = 0$$

for every $x \in \mathbb{R}$. Is f necessarily a continuous function on \mathbb{R} ?

3. Let $f : [0, 1] \rightarrow \mathbb{R}$ be a continuous function such that $f([0, 1]) = [0, 1]$. Prove that there exists some $x_0 \in [0, 1]$ such that $f(x_0) = x_0$.