

MATH 2060B - HW 4
Due Date: 17 Feb 2021, 23:59

Problems: Ex7.2 P.215: 2, 8, 12

(2 Questions in total)

Textbook: Bartle RG, Sherbert DR(2011). Introduction to Real Analysis, fourth edition, John Wiley Sons,Inc.

Instruction:

1. Please submit your solution in one pdf file to Blackboard.
2. Rename your file in the form "HW1_ChanTaiMan_1155151031".
3. You are reminded that your HW is graded based on **both** your idea and your presentation

Questions:

- 1** (P.215 Q2). Let $h : [0, 1] \rightarrow \mathbb{R}$ be defined by $h(x) := \begin{cases} x + 1 & x \in \mathbb{Q} \cap [0, 1] \\ 0 & x \notin \mathbb{Q} \cap [0, 1] \end{cases}$. Show that h is not Riemann integrable.
- 2** (P.215 Q8). Let f be continuous on $[a, b]$ ($a, b \in \mathbb{R}$) such that $f(x) \geq 0$ for all $x \in [a, b]$ and $\int_a^b f = 0$. Prove that $f(x) = 0$ for all $x \in [a, b]$.
- 3** (P.215 Q12). Define $g : [0, 1] \rightarrow \mathbb{R}$ by $g(x) := \begin{cases} \sin(1/x) & x \in (0, 1] \\ 0 & x = 0 \end{cases}$ Show that $g \in \mathcal{R}[0, 1]$