

MATH 2050A - HW 4

Due Date: 27 Oct 2020, 23:59

*You are reminded that your HW is graded
based on **both** your idea and your presentation*

Problems: P.91 Q3b, 5, 9

(3 Questions in total)

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

We type here all the required problems *for your convenience only*. The presentation of the problems here may be different from the original one but the respective solution should be unaffected.

1 (P.91 Q3b). Show directly from the definition that the following is not a Cauchy sequence:

$$\left(n + \frac{(-1)^n}{n} \right)$$

2 (P.91 Q5). Let $x_n := \sqrt{n}$ for all $n \in \mathbb{N}$. Show that

(i). $\lim_n |x_{n+1} - x_n| = 0$

(ii). (x_n) is *not* a Cauchy sequence.

3 (P.91 Q9). Let $0 < r < 1$ and (x_n) be a sequence such that $|x_{n+1} - x_n| < r^n$ for all $n \in \mathbb{N}$. Show that (x_n) is a Cauchy sequence.