Math 301, Spring 2025 — Homework 7

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Due April 4 at 5:00 pm

Instructions. This problem set contains problems mostly from Week 9 of class. The problem numbers refer to our textbook, *Understanding Analysis* by Stephen Abbott.

Problem 1. Please do the following textbook problems: Exercises 3.3.1, 3.3.3, 3.3.5ab, 4.2.5, 4.2.7, 4.2.8a, 4.2.9

Remark 1. In Homework 6, Exercise 3.2.4, you showed that when A is nonempty and bounded above, $\sup A \in \overline{A}$. In Exericse 3.3.1, you may use without proof the analogous result that when A is nonempty and bounded below, $\inf A \in \overline{A}$.

Problem 2. Please fill in the following table with YES or NO in each entry. No justifications are needed but make sure you can give justification if asked.

set	closed	bounded	compact
$\mathbb{R}$			
$\emptyset$			
$\{1/n : n \in \mathbb{N}\}$			
$\{1/n : n \in \mathbb{N}\} \cup \{0\}$			
$\mathbb{N}$			
$\{1, 2, 3, 4, 5\}$			
$\mathbb{Q} \cap [0, 1]$			
$\cup_{n=1}^{\infty} [-n, n]$			