MATH 3161 Homework Assignment 6

Instructions: Solve and turn in all of the assigned problems, showing ALL steps or reasoning used in your solutions.

Due on Tuesday, May 2nd at the BEGINNING of class.

p. 93-95: (Section 3.2) Problems 2 (do all parts for the set $A$ only!), 3(b,c), 7(a)

- If $x$ is a limit point of $A \cup B$, show that $x$ is a limit point of $A$ or $x$ is a limit point of $B$.

- In this exercise, we’ll prove that the only clopen (closed and open) sets in $\mathbb{R}$ are $\emptyset$ and $\mathbb{R}$ itself.

  (a) Prove that if $S$ is nonempty and bounded from above, then it cannot be both open and closed. (Hint: Think about whether or not $\sup S$ is in the set $S$.)
  (b) Prove that if $S$ is clopen and $x \notin S$, then $S \cap (-\infty, x]$ and $S \cap [x, \infty)$ are both clopen sets.
  (c) Prove that if $S$ is nonempty and $S \neq \mathbb{R}$, then $S$ is not clopen.