MATH 265 Homework 4

Due Sep 26

Instructions:

- Please scan your work and upload it to Gradescope by **the end of Sep 26**.

1 Non-Graded Questions

Textbook Section 2.3: Questions 4, 7, 9, 11, 14

2 Graded Questions

1. (3 points) Let S be a nonempty subset of $\mathbb{R}$, and $w \in W$. Suppose that w is a lower bound of S. Show that $w = \inf S$.

2. (3 points) Let A be a nonempty subset of $\mathbb{R}$ that is bounded below. Let $-A := \{-a : a \in A\}$. Show that $\sup(-A) = -\inf A$.

3. Let A, B be a nonempty subset of $\mathbb{R}$ that are bounded above with $A \cap B \neq \emptyset$.

   (a) (2 points) Show that
   $$\sup A, \sup B \geq \sup(A \cap B).$$

   (b) (2 points) Construct an example of A, B such that

   $$\sup A = \sup B \neq \sup(A \cap B).$$

   (*You do not need to prove it.*)