MATH 135 HOMEWORK 1

A. HENING

Do problems 1, 2, 3, 4, 5, 6 from Rudin Chapter 1 and the following problem. Problems 6d) is a BONUS problem (you dont have to do it but if you do, you get extra credit).

1. Prove or disprove the following of the supremum:
   a) for a nonempty subset of $A \subset \mathbb{R}$ which is bounded below the following holds
   $$\inf A = -\sup\{-A\} \text{ where } -A := \{-x \mid x \in A\}$$
   b) for two nonempty subsets of $\mathbb{R}$, call them A and B:
   $$\sup(A \cdot B) = \sup(A) \cdot \sup(B) \text{ where } A \cdot B = \{x \cdot y \mid x \in A \text{ and } y \in B\}$$
   c) for two sets like in part b)
   $$\sup(A + B) = \sup(A) + \sup(B) \text{ where } A + B := \{x + y \mid x \in A \text{ and } y \in B\}$$