

Homework 2 for Math 131AH Honors Analysis

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Due on Tuesday, October 4.

Rudin, p. 22 (ch. 1): 3, 4, 5, 6, 9. Optional: 20.

(1) Let A and B be nonempty subsets of $\mathbf{R}^{>0} = \{x \in \mathbf{R} : x > 0\}$ which are bounded above. Define

$$C = \{xy : x \in A \text{ and } y \in B\}.$$

Show that $\sup C = (\sup A)(\sup B)$.

(2) Show that the irrationals are dense in \mathbf{R} . That is, show that for any real numbers x, y with $x < y$, there is an irrational number α such that

$$x < \alpha < y.$$