Definitions:

- LUB(SUP) AND GLB(INF)
- DENSE
- A SET IS COUNTABLE (UNCOUNTABLE)
- SEQUENCE / SUBSEQUENCE
- A FUNCTION IS BOUNDED on DOMAIN, X
- L IS THE LIMIT OF A SEQUENCE
- L is NOT THE LIMIT OF A SEQUENCE
- MONOTONE SEQUENCE
- A SET IS BOUNDED
- CAUCHY SEQUENCE (NOT CAUCHY)

Infinite limit def: \( \lim_{n \to \infty} x_n = \infty \)

Other Basic Results/Problems:

\[
\forall \epsilon > 0, \exists a \in A \text{ s.t. } a > (\sup A) - \epsilon \quad |a \pm b| \leq |a| + |b|, \quad |a \pm b| \geq |a - b| \\
\left\{ x : |x - a| < \frac{|a - b|}{2} = \epsilon \right\} \cap \left\{ y : |y - b| < \frac{|a - b|}{2} = \epsilon \right\} = \emptyset \\
\text{Rationals are dense, countable:} \\
\text{If } A \subseteq B \text{ then } \sup A \leq \sup B \\
\sup(f(x) + g(x)) \leq \sup f(x) + \sup g(x) \quad (x \in X) \\
\text{limits are unique} \\
\text{if } (x_n)_{n \in \mathbb{N}} \text{ converges, then it is bounded} \\
\text{simple proofs: } \text{prove: } \frac{2n^2 + 1}{5n^2 + 2} \to \frac{2}{5} \\
\text{basic limit theorems: if } x_n \to x \text{ and } y_n \to y \text{ then } x_n \pm y_n \to ____ \quad x_n \cdot y_n \to ____ \text{ AND} \\
\frac{x_n}{y_n} \to \text{ PROVIDED } (y_n)_{n=1}^{\infty} \text{ satisfies: } ____