Least greatest proofs
For a set of numbers $X$ , how do you formalize "there is a greatest $X$ " or "there is a least $X$ "?
Prove or disprove: There is a least prime number.
Prove or disprove: There is a greatest integer.
Approach 1, De Morgan's and universal generalization:
Approach 2, proof by contradiction:
Extra examples: Prove or disprove that $\mathbb{N}$ , $\mathbb{Q}$ each have a least and a greatest element.