

## 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.

## 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.