

# There Is No Largest Prime Number

With an introduction to a new proof technique

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# Outline

## 1 Results

- Proof of the Main Theorem

# Proof That There Is No Largest Prime Number

A proof using *reductio ad absurdum*.

## Theorem

*There is no largest prime number.*

## Proof.

- 1 Suppose  $p$  were the largest prime number.
- 2 Let  $q := 1 + \prod_{i=1}^p i = 1 + p!$ .
- 3 Then  $q$  is not divisible by any  $p' \in \{1, \dots, p\}$ .
- 4 Thus  $q > p$  is also prime. □