

Talk title

June 21, 2021

## There Is No Largest Prime Number

The proof uses *reductio ad absurdum*.

### Theorem

*There is no largest prime number.*

- ① Suppose  $p$  were the largest prime number.
- ② Consider the number  $q = p + 1$ .
- ③  $q$  is not prime, because it is greater than 1 and divisible by  $p$ .
- ④ But  $q + 1$  is greater than 1, thus divisible by some prime number not in the first  $p$  numbers.

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The proof uses *reductio ad absurdum*.

### Theorem

*There is no largest prime number.*

- ① Suppose  $p$  were the largest prime number.
- ② Let  $q$  be the product of the first  $p$  numbers.
- ③
- ④ But  $q + 1$  is greater than 1, thus divisible by some prime number not in the first  $p$  numbers.

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### Theorem

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- ① Suppose  $p$  were the largest prime number.
- ② Let  $q$  be the product of the first  $p$  numbers.
- ③ Then  $q + 1$  is not divisible by any of them.
- ④ But  $q + 1$  is greater than 1, thus divisible by some prime number not in the first  $p$  numbers.

## A longer title

- one
- two