

There Is No Largest Prime Number

The proof uses *reductio ad absurdum*.

Theorem

There is no largest prime number.

Proof.

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



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Proof.

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



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2. Let q be the product of the first p numbers.
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