

GPT-4: Proof of infinitely many primes

FIRST PARTY:

Thou dost not understand, my friend,
There simply is no upper end
To primes, those numbers indivisible,
No matter if it seems impossible.

SECOND PARTY:

But how dost thou so surely know?
To prove this truth, what canst thou show?

FIRST PARTY:

Consider this, my doubtful peer,
A clever proof that will make clear:
Assume that there's a final prime,
The largest one we'll see in time.
Let's call this number "P" for short,
And then, my friend, we will purport
To build a number "Q" that's new,
One larger than "P" and prime too.

SECOND PARTY:

But how, my friend, will this be done?
The proof is not yet fairly won.

FIRST PARTY:

It's simple, friend, just wait and see,
We'll multiply the primes, that's key.
All primes from two to "P" combined,
Will make this new "Q" we will find.
But one thing more we must include,
To make the proof more watertight,
We'll add a one onto the end,
And now the proof is in our sight.

SECOND PARTY:

I see it now, it's crystal clear,
For "Q" must be a prime, my dear.
It can't divide by any prime,
All smaller than itself in time.
And since we chose "P" as the last,
This proves that our assumption's past.
There is no final prime, we see,
The numbers go on endlessly.