AN IMPORTANT FORMULA TO CALCULATE THE NUMBER OF PRIMES LESS THAN X
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If x >= 4, then:

$$\prod(x) = \sum_{k=2}^{x} \left| \frac{S(k)}{k} \right| - 1$$

where S(k) is the Smarandache Function: the smallest integer such that S(k)!
is divisible by k, and $\left| a \right|$

means the integer part of a.

Proof:
  Knowing the Smarandache Function has the property that if p > 4 then
S(p) = p if only if p is prime,
and S(k) <= k for any k,
and S(4) = 4 (the only exception from the first rule),
we easily find an exact formula for the number of primes
less or equal than x.