

# Sieve distinction, prime counting

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A key point that needs to be understood to get at why my prime counting discovery is important is how it's a big deal that it is fully recursive without needing to be given primes.

Basically what I have is

$$p(x,y) = \text{floor}(x) - S(x,y) - 1$$

where  $S(x,y)$  is the sum of the  $dS(x,k)$  function where

$$dS(x,k) = (p(x/k, k-1) - p(k-1, \text{sqrt}(k-1)))(p(k, \text{sqrt}(k)) - p(k-1, \text{sqrt}(k-1)))$$

and you can just pick some natural number  $x$ , like 100, and follow that formula and out will come the answer 25.

So the complete math form doesn't require you do much of anything but follow the mathematical formula which directs you.

However, for sieves, you can't just follow a formula but you also have to give it more information, like for Legendre's Formula, you need to have the list of primes up to the square root of 100, or it won't work.

So you have to tell the sieve function that 2, 3, 5 and 7 are primes, and then it can count out for you that there are 25 primes up to 100.

The "intelligence" you might say of my discovery that allows it to figure out that those numbers are prime without you telling it is in

$$(p(k, \text{sqrt}(k)) - p(k-1, \text{sqrt}(k-1)))$$

which equals 0 if  $k$  is composite and 1 if  $k$  is prime, so it's a logic circuit.

It gives 1, which is true, if  $k$  is prime, and 0, as in false, if  $k$  is composite.

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So built into my prime counting function is a logical switch that flips on or off automatically based on whether or not  $k$  is prime, which is not seen in anything else in mathematical history.

It's just extraordinary, and no one can point to anything even like it in this area.

Now that logical switch does slow it down, so if you want to count fast, you can speed it up by yourself telling it whether or not  $k$  is prime versus letting the mathematical function find out by recursion.

Then it becomes a sieve as you're giving it more information.

Now in any other method that you will see mathematicians talking about for counting primes you'll see a tell-tale list of primes being needed, and it's not because it's a luxury, but because it must be so, or their formulas won't work.

James Harris