Sports: What are sports and how to sports

Ryan Smith

Prime Numbers Colon

Why 6 was Actually Afraid of 7

by Ryan Smith


Me ranting about the number 5 for an hour
Dumb CS people thinking they're going to learn about sports

Ryan

Isn’t

This

What

You

Study

Isn’t

That

Illegal

By

UDLS

Standards?

So back to prime numbers

Who here knows what a prime number is?

What are prime numbers?

- Numbers that are only divisible by themselves and 1
- Greeks had postulated that all non-primes could be made up of multiplying primes

Non-Prime numbers

Prime numbers

Why are primes so cool?

- Prime numbers are the only REAL numbers
  - “exist independently of the human mind, a raw and immutable mathematical reality”
  - We are essentially trying to figure out a formula for all universal numbers

- Prime numbers in nature
  - Cicada have life cycles of 17 and 13 years

Let’s talk history

Most of the information will be coming from this book

begin?

Dear Doron,

There are fantastic developments to Alain Connes's lecture at IAS last Wednesday. Connes gave an account of how to obtain a trace formula involving zeroes of L-functions only on the critical line, and the hope was that one could obtain also Weil's explicit formula in the same context; this would solve the Riemann hypothesis for all L-functions at one stroke. Thus there cannot be even a single zero (1) off the critical line!

$$\zeta(s) = \sum_{n=1}^{\infty} \frac{1}{n^s}$$

Well, a young physicist at the lecture saw in a flash that one could set the whole thing in a combinatorial setting using supersymmetric fermionic-bosonic systems (the physics corresponds to a near absolute zero ensemble of a mixture of anyons and morons with opposite spins) and, using the C-based meta-language MISPAR, after six days of uninterrupted work, computed the logdet of the resolvent Laplacian, removed the infinities using renormalization, and, lo and behold, he got the required positivity of Weil's explicit formula! Wow!

XOXO
Gossip Girl

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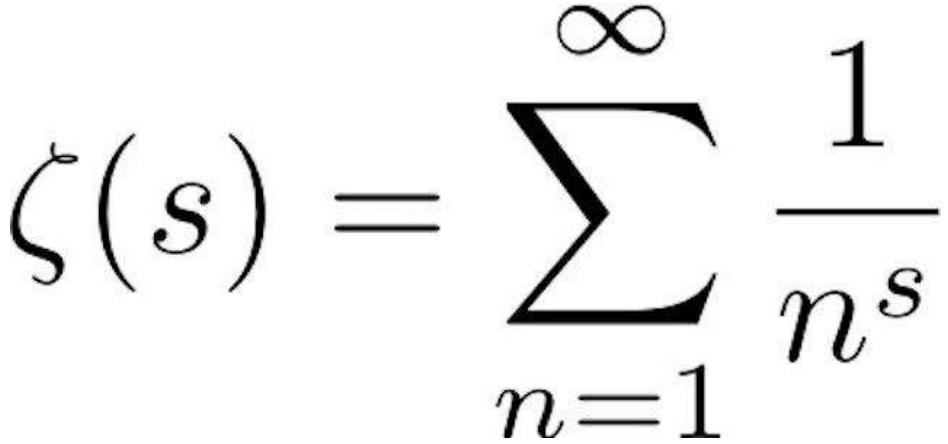

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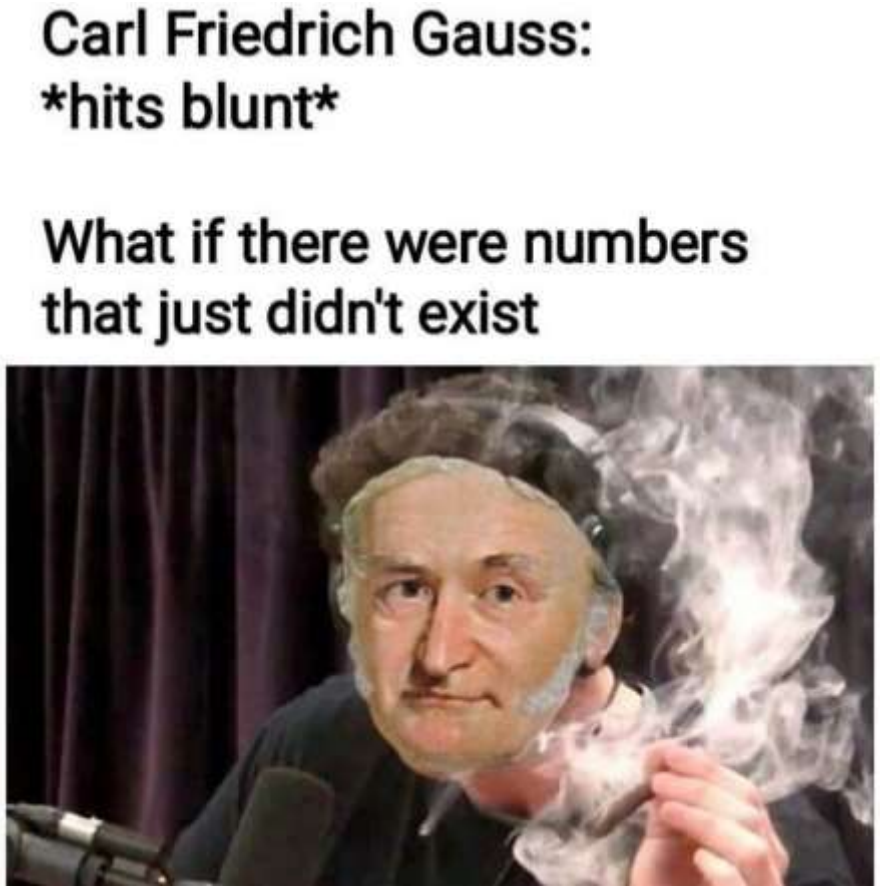
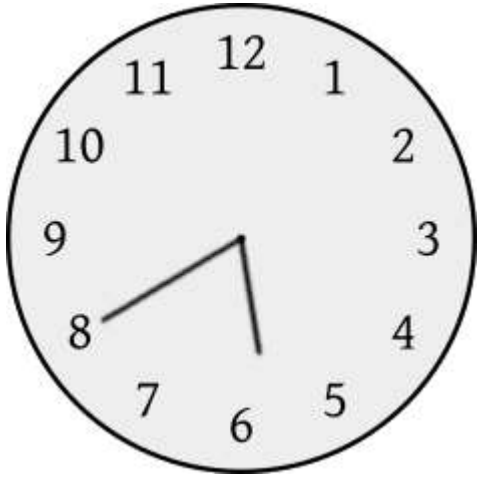
Carl Friedrich Gauss



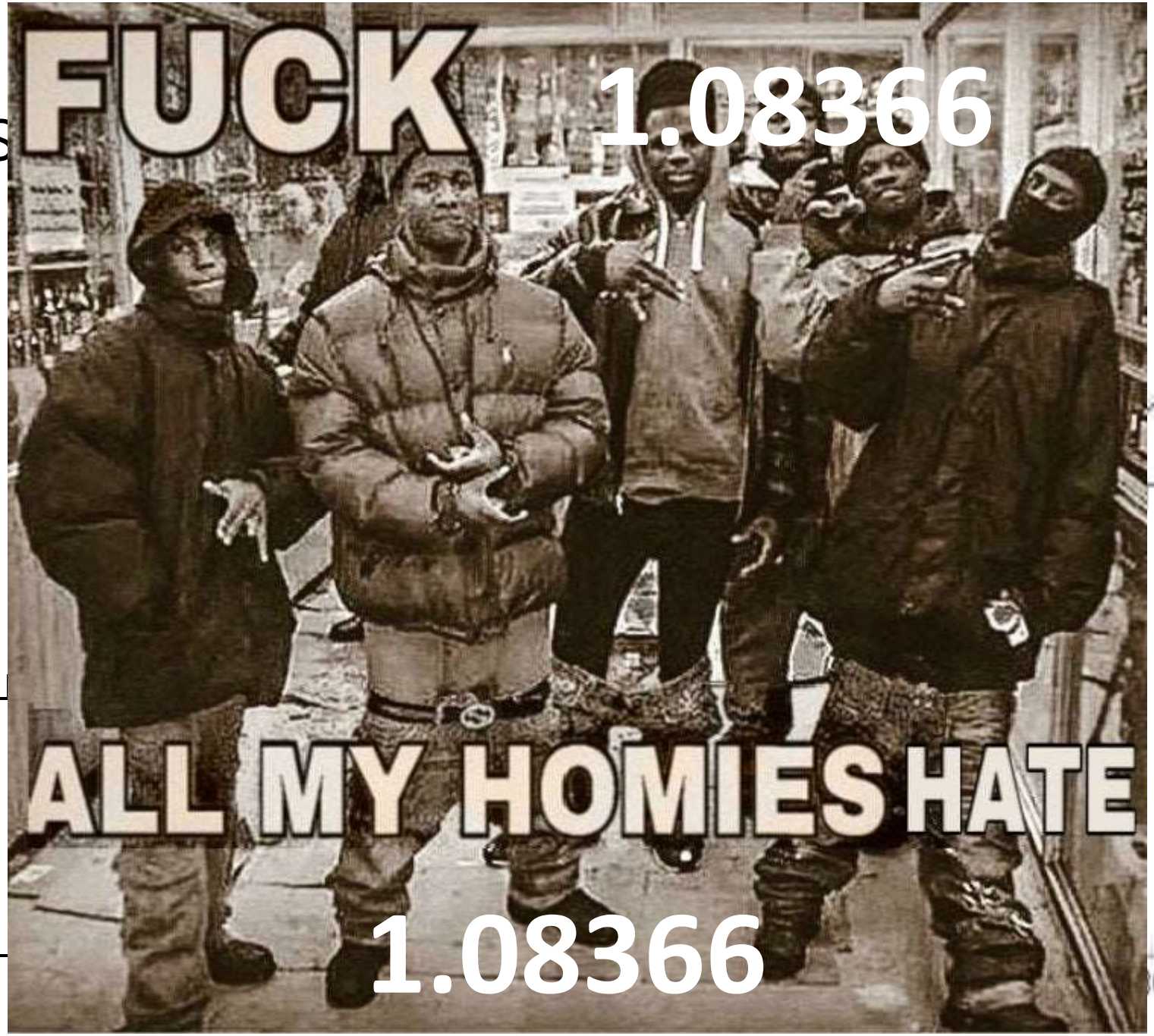
- Also, he created the “clock calculator”
  - If you took a clock calculator with N hours on it and you fed in the primes, the clock would always have a remained of one.

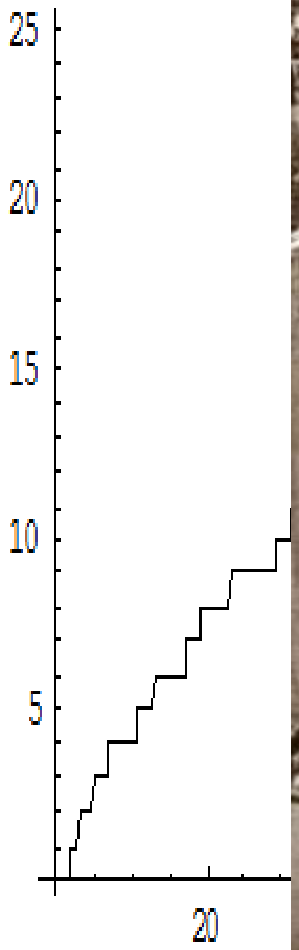


Gauss's pattern

x	Number of primes from 1 to x	On average, how many numbers must you count before you reach a prime number	Difference in consecutive numbers in the previous column
10	4	2.5	
100	25	4	1.50
1,000	168	5.952380952	1.95
10,000	1229	8.136696501	2.18
100,000	9592	10.42535446	2.29
1,000,000	74498	13.42317915	3.00
10,000,000	684579	14.60751791	1.18
100,000,000	5761455	17.35672673	2.75
1,000,000,000	50847534	19.66663713	2.31
10,000,000,000	455052511	21.97548581	2.31

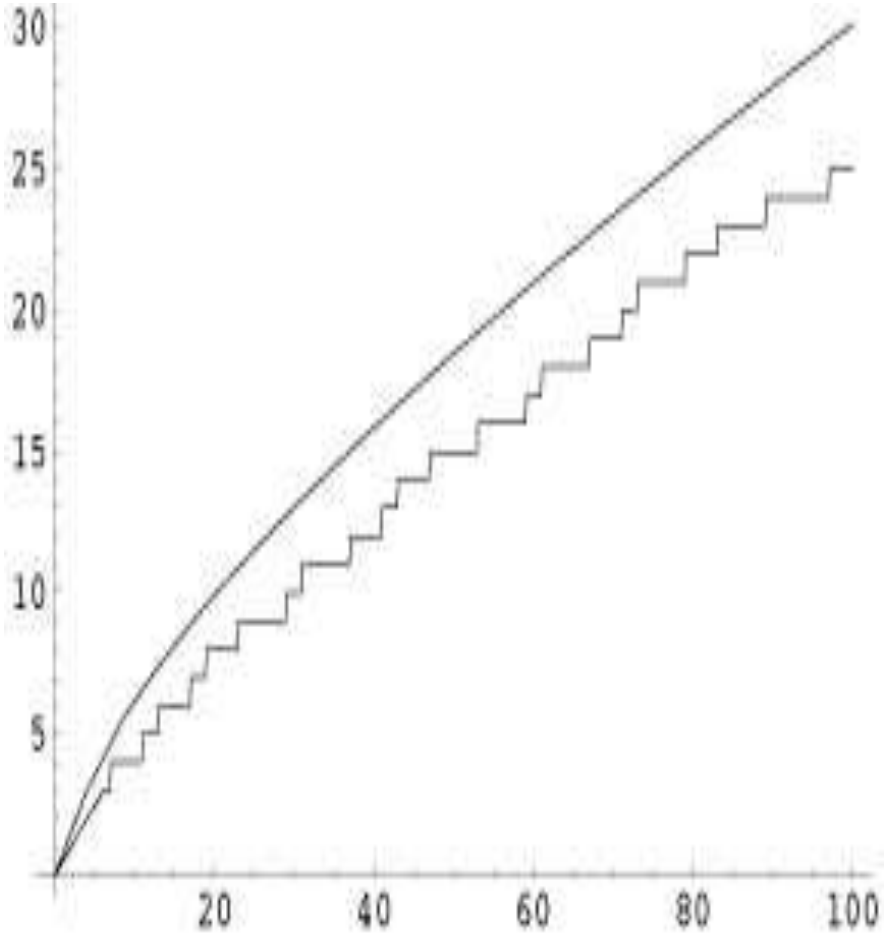
Gauss’s





Back to Gauss

- Prime numbers are just nature “tossing a random coin”
- Now the odds of the coin were n/log(n)
  - The probability of 1,000,000 being a prime number is 1,000,00/log(1,000,000)
  - Which is roughly 1/15
- Prime Number conjecture
  - Prove that the percentage error of Gauss’s log integral and the real number of primes gets smaller and smaller the further you count.



Bernhard Riemann

$$\zeta(2) = 1 + \frac{1}{2^2} + \frac{1}{3^2} + \cdots = \frac{\pi^2}{6}$$

$$\zeta(4) = 1 + \frac{1}{2^4} + \frac{1}{3^4} + \cdots = \frac{\pi^4}{90}$$

$$\zeta(6) = 1 + \frac{1}{2^6} + \frac{1}{3^6} + \cdots = \frac{\pi^6}{945}$$

$$\zeta(8) = 1 + \frac{1}{2^8} + \frac{1}{3^8} + \cdots = \frac{\pi^8}{9450}$$

$$\zeta(10) = 1 + \frac{1}{2^{10}} + \frac{1}{3^{10}} + \cdots = \frac{\pi^{10}}{93555}$$

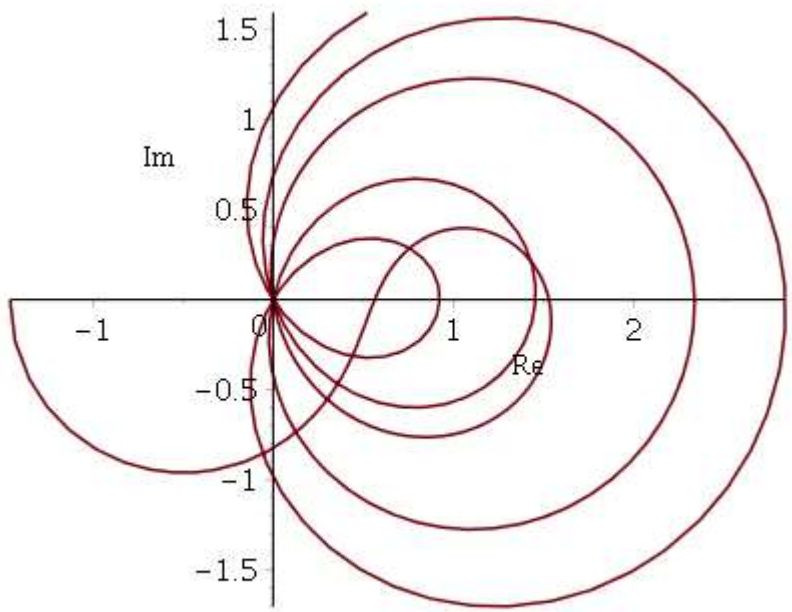
$$\zeta(12) = 1 + \frac{1}{2^{12}} + \frac{1}{3^{12}} + \cdots = \frac{691\pi^{12}}{638512875}$$

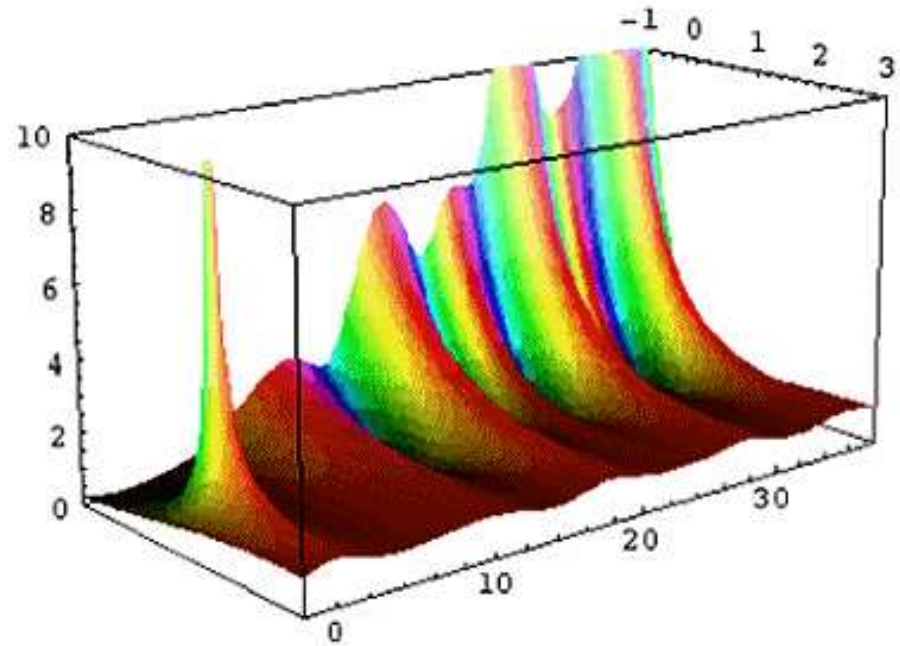
$$\zeta(14) = 1 + \frac{1}{2^{14}} + \frac{1}{3^{14}} + \cdots = \frac{2\pi^{14}}{18243225}$$

$$\zeta(16) = 1 + \frac{1}{2^{16}} + \frac{1}{3^{16}} + \cdots = \frac{3617\pi^{16}}{325641566250}.$$

Zeta Landscape

- Based on normal and imaginary numbers

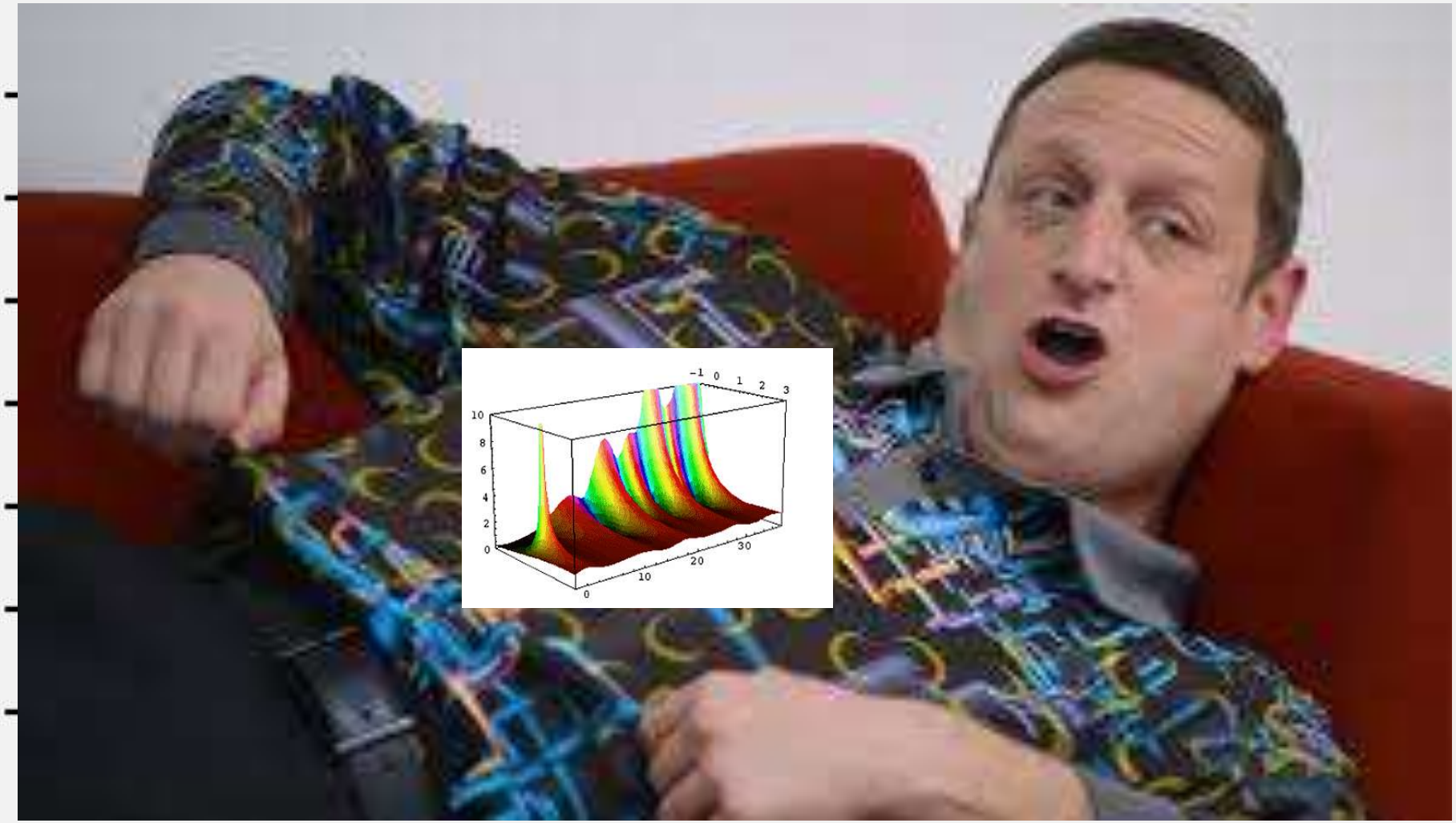




People who have contributed to solving this problem

David Hilbert

List of Unsolved Millennium Prize Problems



Landau

Not Absolute Fucker

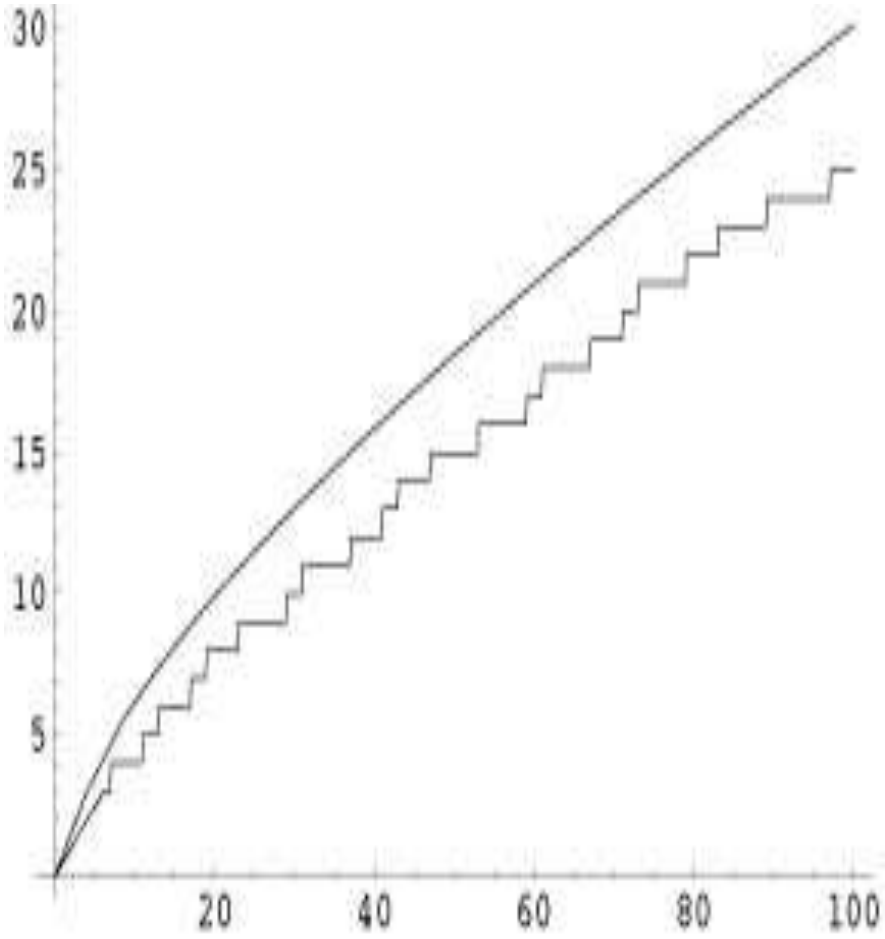
- Tracked his newly wed student down at the train station and gave him a manuscript to be proofread by the end of the honeymoon
- Made a student listen to him lecture about some math shit (snoresville), at a dinner, and then made him walk home after the bus was gone.
- There are a finite number of equations in the universe

lol

This is John Littlewood

Proved that Gauss's guess starts to underestimate the number of primes only in regions of numbers that we will never probable be able to calculate.

This number is thought to be 10^10^34.



Srinivasa Ramanujan

- Born in India (1887) and worked as a clerk.
- Recreated the Reimann hypothesis on his own
- Sent a post-card to Littlewood

lol

- Joined Cambridge and helped create “the Partitions”
- Unfortunately committed suicide
- His contributions were later used to create a formula to test if a number was prime

Marin Marsenne

- 2^n -1
- 2 ^67 -1 was not a prime

The future of primes

The Daily W

Sunday, August 30, 2006

FINDS LARGEST NUMBE

Dr. Samuel I Krieger wore out six pencils, used 72 sheets of legal size note paper and frazzled nerves quite badly but he was able to announce today that 231,584,178,474,632,390,84 259,279,281 is the largest known prime number. He was unable to say offhand who cared.

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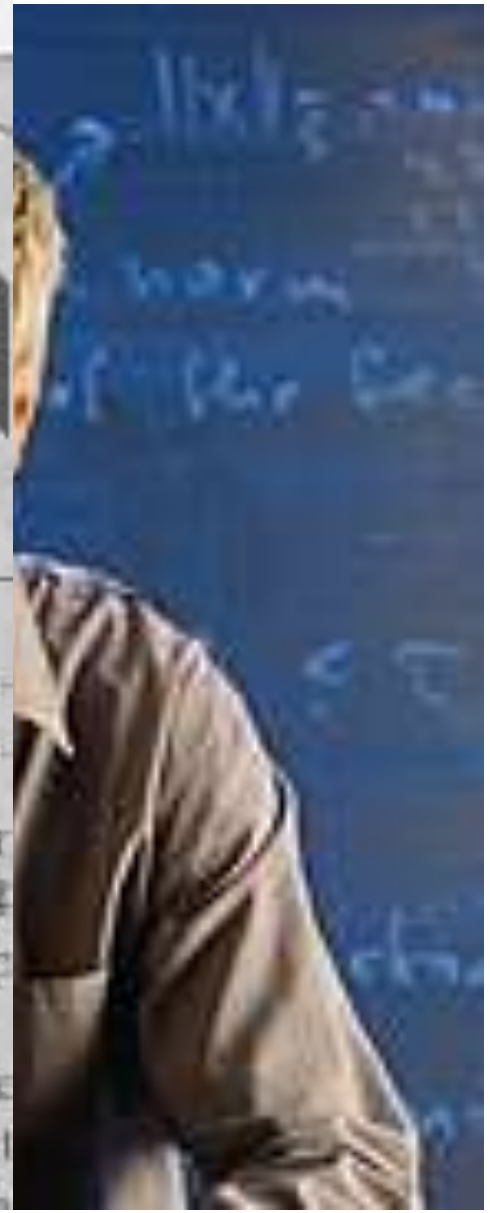
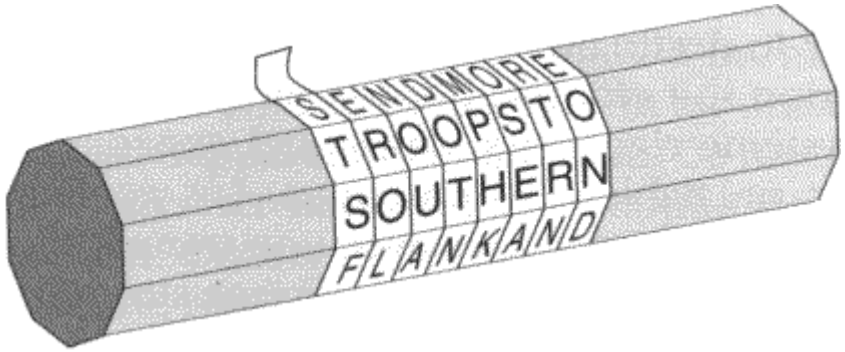
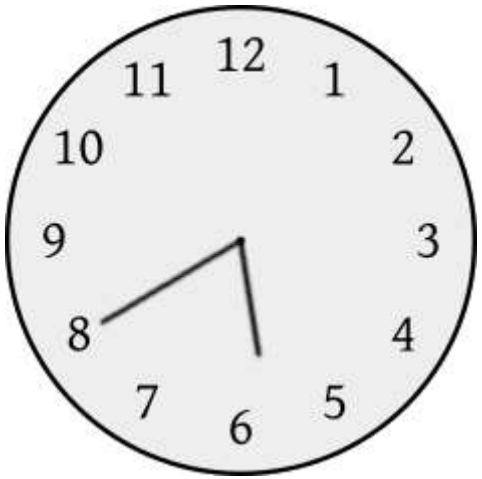


Internet Security

- 193,707,721 X 761,838,257,287
- Prime number P and Q
- P X Q = 120 Digit Prime Number






Carry-Me

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Thank you for watching!

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