

Sexy Primes Conjecture

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Abstract

Sexy Primes Conjecture were proved.
Sexy Primes and Twin Primes and Cousin Primes have exactly the same dynamics.

All Primes are executed in hexagonal circulation. It does not change in a huge number (forever huge number).

In the hexagon, Sexy Primes are generated only at $(6n+1)(6n-1)$. [n is a positive integer]

When the number grows to the limit, the denominator of the expression becomes very large, and primes occur very rarely, but since Sexy Primes are $8/3$ times the square of the distribution of primes, the frequency of occurrence of Sexy Primes is very equal to 0.

However, it is not 0. Therefore, Sexy Primes continue to be generated.

If Sexy Primes is finite, the Primes is finite.
Because, Sexy Primes are $8/3$ times the square of the distribution of primes.
This is contradictory. Since there are an infinite of Primes.

and
(probability of the occurrence of the Primes)=
(probability of the occurrence of the Sexy Primes)^{1/2} × (3/8)

That is, Sexy Primes exist forever.

key words

Hexagonal circulation, Sexy primes, $8/3$ times the square of the probability of the Primes

Introduction

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First, say $6n - 1 = 6n + 5$.

And,

Calculated with Wolfram Cloud and WolframAlpha.

Also, as I say first, Sexy Primes and Twin primes appear almost twice as often as twice.

The Sexy Primes is represented as $(6n - 1)(6n - 1)$ or $(6n + 1)(6n + 1)$.

The following is a Sexy Primes.

There are no prime numbers that are not $(6n - 1)$ or $(6n + 1)$.

5 ——— $6n - 1$ (Sexy Primes)

11 ——— $6n - 1$

7 ——— $6n + 1$ (Sexy Primes)

13 ——— $6n + 1$

11 ——— $6n - 1$ (Sexy Primes)

17 ——— $6n - 1$

13 ——— $6n + 1$ (Sexy Primes)

19 ——— $6n + 1$

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(5,11), (7,13), (11,17), (13,19), (17,23), (23,29), (31,37), (37,43), (41,47), (47,53), (53,59),
 (61,67), (67,73), (73,79), (83,89), (97,103), (101,107), (103,109), (107,113), (131,137),
 (151,157), (157,163), (167,173), (173,179), (191,197), (193,199), (223,229), (227,233), (233,239),
 (251,257), (257,263), (263,269), (271,277), (277,283), (307,313), (311,317), (331,337),
 (347,353), (353,359), (367,373), (373,379), (383,389), (433,439), (443,449), (457,463), (461,467)

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From the above, the appearance frequency of Sexy Primes is almost twice than Twin Primes and Cousin Primes.

I wrote below the distribution of Sexy Primes.

(number).....	(Sexy prime).....	(Twin Prime).....	(Cousin Primes)
100000.....	2447.....	1224.....	1216
200000.....	4295.....	2160.....	2136
300000.....	6003.....	2994.....	3975
400000.....	7650.....	3804.....	3817
500000.....	9184.....	4565.....	4559
600000.....	10688.....	5331.....	5334
700000.....	12138.....	6061.....	6085
800000.....	13587.....	6766.....	6798
900000.....	15000.....	7472.....	7471
1000000.....	16386.....	8169.....	8144
2000000.....	29419.....	14871.....	14742

3000000.....	41559.....	20932.....	20826
4000000.....	53224.....	26860.....	26629
5000000.....	64481.....	32463.....	32308
6000000.....	75417.....	37915.....	37787
7000000.....	86165.....	43258.....	43125
8000000.....	96705.....	48617.....	48288
9000000.....	107042.....	53866.....	53468
10000000.....	117207.....	58980.....	58622
90000000.....	801602.....	401089.....	401025
100000000= 1×10^8	879908.....	430311.....	440258

There are 9592 Primes to $1 \times 10^5=100000$.

Probability is $\frac{9592}{100000}$.

In this, there are 2447 Sexy Primes. Probability is $\frac{2447}{100000}=0.02447$

and $[\frac{9592}{100000}]^2 \times \frac{8}{3}=0.0245350570666....$

and

There are 78498 Primes to $1 \times 10^6=1000000$.

Probability is $\frac{78498}{1000000}$.

In this, there are 16386 Cousin Primes. Probability is $\frac{16386}{1000000}=0.016386$

and $[\frac{78498}{1000000}]^2 \times \frac{8}{3}=0.016431829344$

and

There are 664579 Primes to $1 \times 10^7=10000000$.

Probability is $\frac{664579}{10000000}$.

In this, there are 117207 Cousin Primes. Probability is $\frac{117207}{10000000}=0.0117207$

and

$[\frac{664579}{10000000}]^2 \times \frac{8}{3}=0.01177773992642666...$

There are 5761455 Primes to $1 \times 10^8 = 100000000$.

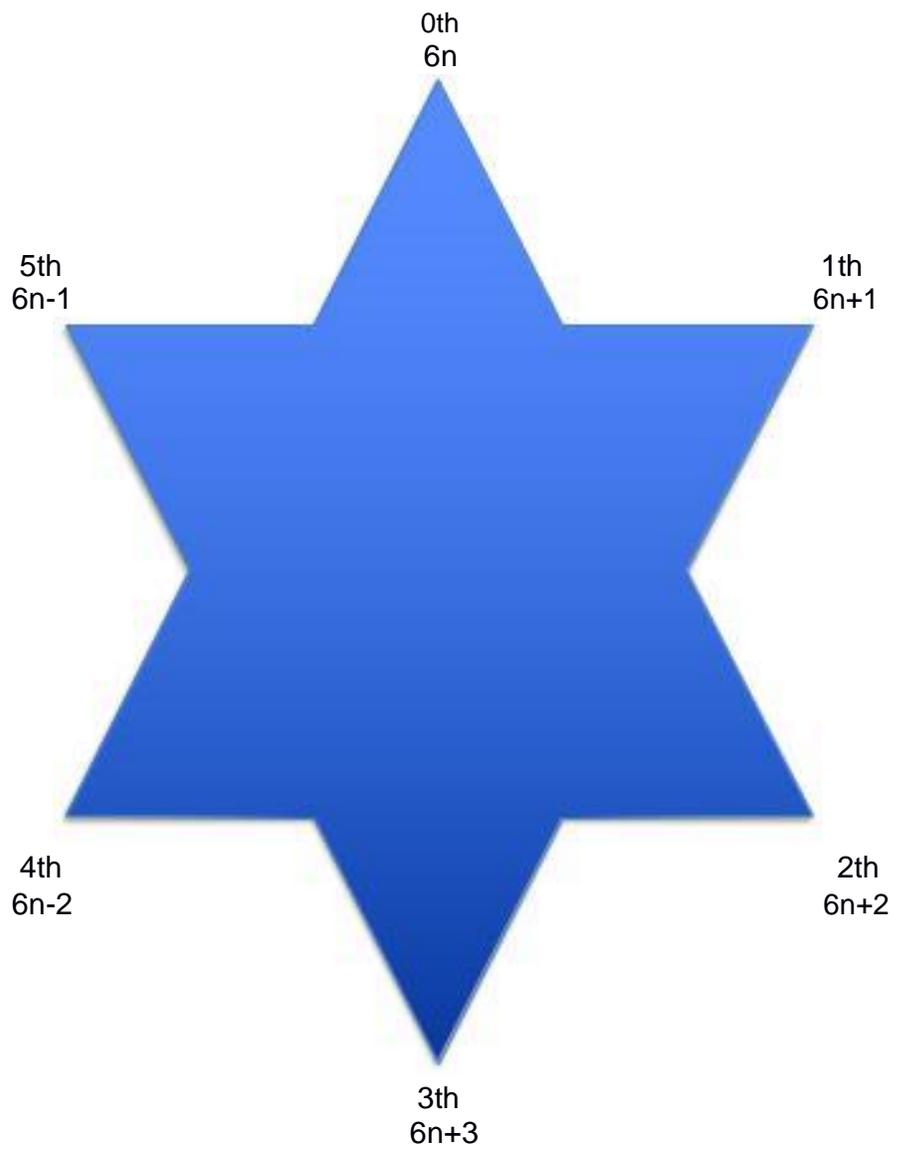
Probability is $\frac{5761455}{100000000}$.

In this, there are 879908 Cousin Primes. Probability is $\frac{879908}{100000000}=0.0879908$

and $[\frac{5761455}{100000000}]^2 \times \frac{8}{3}=0.0088518303...$

As in the case of Twin Primes, constant = $8/3$ even in Sexy Primes.

From now on, the appearance frequency of Sexy Primes is almost double, and it can be said that it is double.



Discussion

Although Sexy Primes and Twin Primes are twice as likely to appear, it can be said that the appearance mechanism is the same, and that there are infinitely Sexy Primes.

The probability that Sexy Primes will occur $8/3$ times the square of the probability that a Prime will occur in a huge number, where the probability that a prime will occur is low from the equation (1).

While a Primes is generated, Cousin Primes be generated.

And, as can be seen from the equation below, even if the number becomes large, the degree of occurrence of Primes only decreases little by little.

$$\pi(x) \sim \frac{x}{\log x} \quad (x \rightarrow \infty) \quad (1)$$

$$\begin{aligned} \log(10^{20}) &= 20 \log(10) \approx 46.0517018 \\ \log(10^{200}) &= 200 \log(10) \approx 460.517018 \\ \log(10^{2000}) &= 2000 \log(10) \approx 4605.17018 \\ \log(10^{20000}) &= 20000 \log(10) \approx 46051.7018 \end{aligned}$$

As x in $\log(x)$ grows to the limit, the denominator of the equation also grows extremely large. Even if primes are generated, the frequency of occurrence is extremely low. The generation of Sexy Primes is approximately the square of the generation frequency of primes, and the generation frequency is extremely low.

However, as long as Primes are generated, Sexy Primes are generated with a very low frequency.

When the number grows to the limit, the denominator of the expression becomes very large, and primes occur very rarely, but since Sexy Primes are $8/3$ times the square of the distribution of Primes, the frequency of occurrence of Sexy Primes is very equal to 0.

However, it is not 0. Therefore, Sexy Primes continue to be generated.

Use a contradiction method.

If Sexy Primes is finite, the Primes is finite.

This is contradictory. Because there are an infinite of Primes.

and

(probability of the occurrence of the Primes)=

(probability of the occurrence of the Sexy Primes)^{1/2} × (3/8)

That is, Sexy Primes exist forever.

Proof end.

References

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