MYSTERIES

OF THE

PRIME NUMBERS

OR RULES EXISTING IN THE CHAOS OF PRIME NUMBERS

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23-04-2020

Prime number – natural number which has only two divisors: 1 and itself.

Theorem 1:

*Prime numbers shall be divided into “**proper prime numbers**” and “**forced prime numbers**”.*

Definition 1:

***Proper prime numbers** are greater than the first composite number (number 4).*

So these are prime numbers >=5.

Definition 2:

***Forced prime numbers** are smaller than the first composite number.*

So these are prime numbers 2 and 3.

Searching for the proper prime numbers

To find proper prime numbers we need to use a spiral.

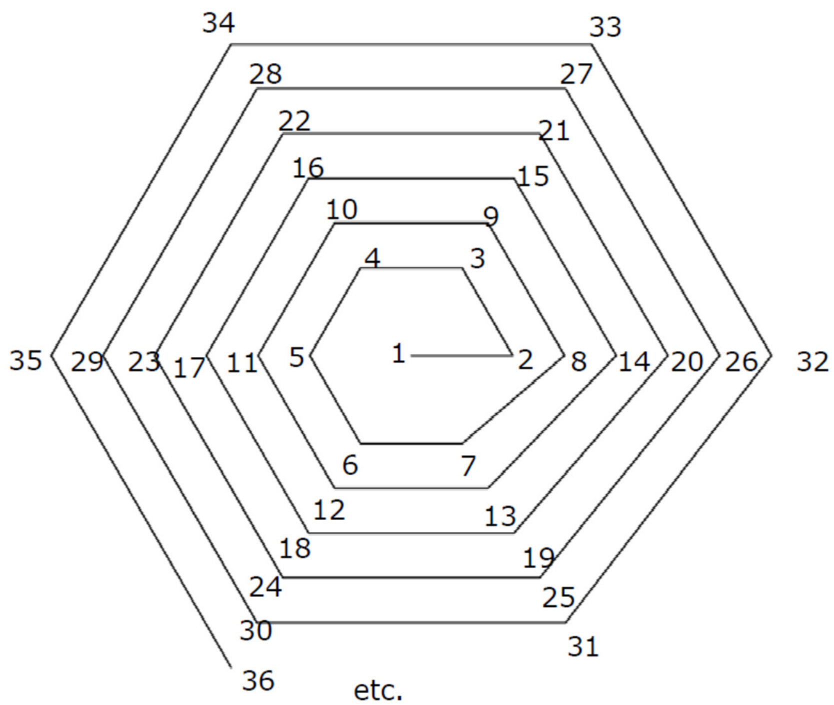

Figure 1. The spiral

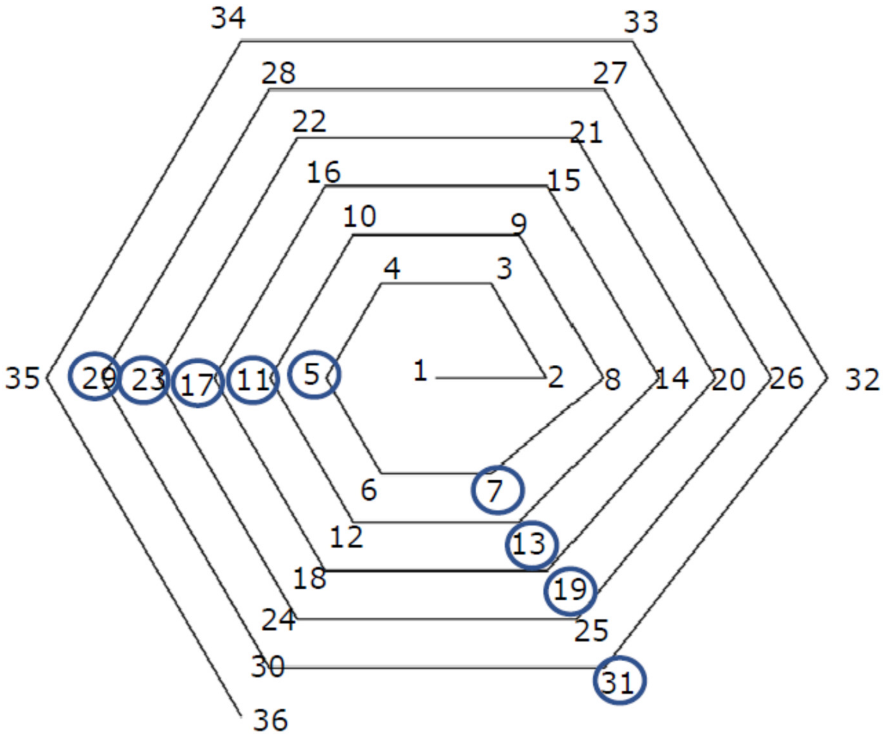

Figure 2. Proper prime numbers on the spiral.

Theorem 2

All proper prime numbers are located at the same two corners of the spiral.

To check if all proper prime numbers are in the same corners of the spiral we create a table in which the next numbers from the rows below are increased by the value of 6.

1	**2**	**3**	**4**	**5**	**6**
7	**8**	**9**	**10**	**11**	**12**
13	**14**	**15**	**16**	**17**	**18**
19	**20**	**21**	**22**	**23**	**24**
25	**26**	**27**	**28**	**29**	**30**
31	**32**	**33**	**34**	**35**	**36**
37	**38**	**39**	**40**	**41**	**42**
43	**44**	**45**	**46**	**47**	**48**
49	**50**	**51**	**52**	**53**	**54**
55	**56**	**57**	**58**	**59**	**60**
61	**62**	**63**	**64**	**65**	**66**
67	**68**	**69**	**70**	**71**	**72**
73	**74**	**75**	**76**	**77**	**78**
79	**80**	**81**	**82**	**83**	**84**

etc.

Table 1

We remove even numbers from the table, and 2 as the forced prime number.

1	2	3	4	5	6
7	8	9	10	11	12
13	14	15	16	17	18
19	20	21	22	23	24
25	26	27	28	29	30
31	32	33	34	35	36
37	38	39	40	41	42
43	44	45	46	47	48
49	50	51	52	53	54
55	56	57	58	59	60
61	62	63	64	65	66
67	68	69	70	71	72
73	74	75	76	77	78
79	80	81	82	83	84

Table 2

We also remove numbers divisible by 3

1		3		5	
7		9		11	
13		15		17	
19		21		23	
25		27		29	
31		33		35	
37		39		41	
43		45		47	
49		51		53	
55		57		59	
61		63		65	
67		69		71	
73		75		77	
79		81		83	

Table 3

And 1 – it is not a prime number

1				**5**	
7				**11**	
13				**17**	
19				**23**	
25				**29**	
31				**35**	
37				**41**	
43				**47**	
49				**53**	
55				**59**	
61				**65**	
67				**71**	
73				**77**	
79				**83**	

Table 4

As we can see, all the proper prime numbers are located at two vertices of the spiral.

		5	
7		**11**	
13		**17**	
19		**23**	
25		**29**	
31		**35**	
37		**41**	
43		**47**	
49		**53**	
55		**59**	
61		**65**	
67		**71**	
73		**77**	
79		**83**	

etc.

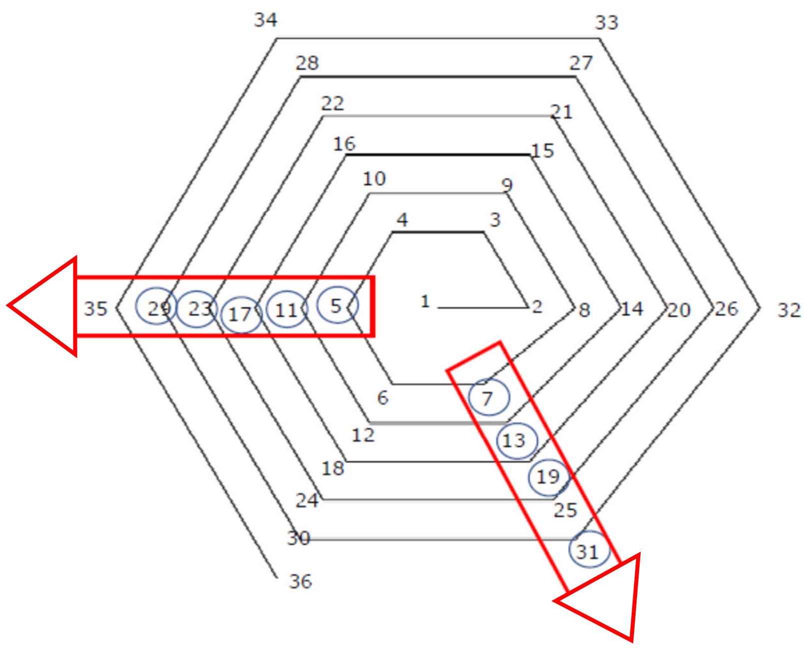

Figure. 3

Theorem 3:

All proper prime numbers lie on parallel straight lines satisfy the equations:

$$f(n) = 5 + 6 * n \qquad n = 0 \ldots i$$

$$f(m) = 7 + 6 * m \qquad m = 0 \ldots k$$

***Definition 3*:**

*Lines with all proper prime numbers we call: **Axis 5** and **Axis 7**.*

Axis 5	5	11	17	23	29	35	41	47	53	59	65	71	77	83	89	95	101	107	113	119	125	131	137	143
Axis 7	7	13	19	25	31	37	43	49	55	61	67	73	79	85	91	97	103	109	115	121	127	133	139	145

proper prime numbers

compound numbers

Figure 4. Following numbers on Axes 5 and 7

An interesting thing is that for ***m and n <= -2***

- we get negative values from Axis 7 on Axis 5
- we get negative values from Axis 5 on Axis 7

The shadow of the prime number

Definition 4

The shadow of the prime number is a set of complex numbers "pretending" prime numbers on Axis 5 and Axis 7.

These numbers are located at a distance from the value of the given proper prime number from it and they are:

For Axis 5 and Axis 7:

$$CL_{p(i)} = Lp_{(i)} + Lp_{(i)} * 6 * j$$

$CL_{p(i)}$ – shadow of the (i) prime number

$Lp_{(i)}$ – (i) proper prime number

$j = 1 \ldots n$

5	11	17	23	29	35	41	47	53	59	65	71	77	83	89	95	101	107	113	119	125	131	137	143	149	155	161	167	173	179	185
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
		1	2	3	4	5	6	7	8	9	10	11	1	2	3	4	5	6	7	8	9	10	11	1	2	3	4	5	6	7
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	1	2	3	4	5	6	7	8	9	10	11
				1	2	3	4	5	6	7	8	9	10	11	10	13	14	15	16	17	18	19	20	21	22	23	1	2	3	4

Figure 5. Shadow of prime numbers on Axis 5

		1	2	3	4	5	6	7	8	9	10	11	12	13	1	2	3	4	5	6	7	8	9	10	11	12	13	1	2	3	4	5
	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4
7	13	19	25	31	37	43	49	55	61	67	73	79	85	91	97	103	109	115	121	127	133	139	145	151	157	163	169	175	181	187	193	199

Figure 6. Shadow of prime numbers on Axis 7

As we can see, there are numbers that are not prime numbers on Axis 7.

We calculate the shadow of prime numbers cast from Axis 5 to Axis 7 to find them.

$CL_{p5\text{-}7(i)} = Lp_{(i)(05)}{}^2 + Lp_{(i)(05)} * 6 * k$

$CL_{p5\text{-}7(i)}$ – **the shadow of the (i) prime number cast from Axis 5 to Axis 7**

$Lp_{(i)(05)}$ – **(i) proper prime number from Axis 5**

$k = 0 \ldots n$

5	11	17	23	etc.																												
																			0	1	2	3	4	5	6	7	8	9	10	11		
			0	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4
7	13	19	25	31	37	43	49	55	61	67	73	79	85	91	97	103	109	115	121	127	133	139	145	151	157	163	169	175	181	187	193	199

Figure 7. Shadow of prime numbers cast from Axis 5 to Axis 7

After removing the shadows of consecutive prime numbers, only proper prime numbers remain on Axis 5 and Axis 7.

If we add the numbers 2 and 3 (forced prime numbers) we get:

ALL THE FOLLOWING PRIME NUMBERS

which we will determine using the general compound function.

$$f(n,m) = \begin{cases} 2 \\ 3 \\ \\ 5 + 6 * n & n = 0 \ldots i \\ 7 + 6 * m & m = 0 \ldots k \end{cases}$$

<u>Since prime numbers are calculated using a linear function and lying on straights, all non-trivial derivatives of functions (ʒ) according to the Riemann hypothesis will always be on a critical line.</u>