The distribution of prime numbers – Ryoji Furui on June 28, 2023 @ryoji.info

In this paper, we will attempt to discover exact solutions for prime numbers. Let us make a list of the natural numbers as six functions of n, where n is a natural number.

n	$2(3n-2)$	$3(2n-1)$	$2(3n-1)$	$6n-1$	$2*3n$	$6n+1$
1	2	3	4	5	6	7
2	8	9	10	11	12	13
3	14	15	16	17	18	19
4	20	21	22	23	24	25
5	26	27	28	29	30	31
6	32	33	34	35	36	37
7	38	39	40	41	42	43
	…					

We state the following three observations about this list.

1) The second, third, fourth, and sixth columns contain the prime factor(s) 2 and/or 3.
2) As a result of observation 1), all prime numbers except 2 and 3 are in the fifth and seventh columns. Hence, all primes except 2 and 3 can be represented as $6n-1$ or $6n+1$.
3) Because all numbers in the fifth and seventh columns never contain the prime factor 2 or 3, all composite numbers in those columns can be expressed as $(6a-1)(6b-1)$ or $(6a-1)(6b+1)$ or $(6a+1)(6b+1)$, where a and b are natural numbers.

As a result, the prime numbers can be determined as follows:

prime numbers = 2, 3, $6n-1$, $6n+1$ for n = 1, 2, …, except when $6n-1$ or $6n+1 = (6a-1)(6b-1)$ or $(6a-1)(6b+1)$ or $(6a+1)(6b+1)$ for a, b = 1, 2, ….