Review article

Prime number determination method Vol.1

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Abstract

As a prime number determination method, if the number is divided by 12 or 18 or 24 or 30 and the remainder is a prime number including 1, it is a prime number.
If the remainder is 2, it is an even number.
If the remainder is 3, it is a multiple of 3.
In particular, the remainder of the prime divided by 12 is limited to 1, 5,7 and 11.
Therefore, the method of dividing by 12 seems to be the most efficient.

There is also a method of using the fact that the remainder becomes a prime number of 30 or less by dividing by 30, which is better or more subtle.

When prime is divided by 30, the remainder always becomes prime.

Thus the prime number circulates in 12 or 30 and more for example, 18, 24, etc..

But, In the case of multiplication of prime number and prime number, the remainder may be 35 or 25 and prime number when dividing by 48.

And this is not only when dividing by 48, the same can be said when dividing by 30, 24, 18.

It can not be determined whether it is a prime or not, it is just a sieve.

Discussion

All of the following, the one which prime was divided.

13/12=1 × 12 + 1
17/12=1 × 12 + 5
19/12=1 × 12 + 7 twin prime
23/12=1 × 12 + 11
29/12=2 × 12 + 5
31/12=2 × 12 + 7
37/12=3 × 12 + 1
41/12=3 × 12 + 5
43/12=3 × 12 + 7 twin prime
47/12=3 × 12 + 11
53/12=4 × 12 + 5
59/12=4 × 12 + 11
61/12=5 × 12 + 1 twin prime
71/12=5 × 12 + 11
73/12=6 × 12 + 1 twin prime
79/12=6 × 12 + 7
83/12=6 × 12 + 11
89/12=7 × 12 + 5
97/12=8 × 12 + 1
101/12=8 × 12 + 5
103/12=8 × 12 + 7 twin prime
107/12=8 × 12 + 11
109/12=9 × 12 + 1 twin prime
113/12=9 × 12 + 5
127/12=10 × 12 + 7
131/12=10 × 12 + 11
137/12=11 × 12 + 5
139/12=11 × 12 + 7 twin prime
149/12=12 × 12 + 5

151/12=12 × 12 + 7 twin prime
157/12=13 × 12 + 1
163/12=13 × 12 + 7
167/12=13 × 12 + 11
173/12=14 × 12 + 5
179/12=14 × 12 + 11
181/12=15 × 12 + 1 twin prime
191/12=15 × 12 + 11
193/12=16 × 12 + 1 twin prime
197/12=16 × 12 + 5
199/12=16 × 12 + 7 twin prime
211/12=17 × 12 + 7
223/12=18 × 12 + 7
227/12=18 × 12 + 11
229/12=19 × 12 + 1 twin prime
233/12=19 × 12 + 5
239/12=19 × 12 + 11
241/12=20 × 12 + 1 twin prime
251/12=20 × 12 + 11
257/12=21 × 12 + 5
263/12=21 × 12 + 11
269/12=22 × 12 + 5
271/12=22 × 12 + 7 twin prime
277/12=23 × 12 + 1
281/12=23 × 12 + 5
283/12=23 × 12 + 7 twin prime
293/12=24 × 12 + 5
307/12=25 × 12 + 7
311/12=25 × 12 + 11
313/12=26 × 12 + 1 twin prime
317/12=26 × 12 + 5
331/12=27 × 12 + 7
337/12=28 × 12 + 1
347/12=28 × 12 + 11
349/12=29 × 12 + 1 twin prime
353/12=29 × 12 + 5
359/12=29 × 12 + 11
367/12=30 × 12 + 7

373/12=31 × 12 + 1
379/12=31 × 12 + 7
383/12=31 × 12 + 11
389/12=32 × 12 + 5
397/12=33 × 12 + 1
401/12=33 × 12 + 5
409/12=34 × 12 + 1
419/12=34 × 12 + 11
421/12=35 × 12 + 1 twin prime
431/12=35 × 12 + 11
433/12=36 × 12 + 1 twin prime
439/12=36 × 12 + 7
443/12=36 × 12 + 11
449/12=37 × 12 + 5
457/12=38 × 12 + 1
461/12=38 × 12 + 5
463/12=38 × 12 + 7 twin prime
……
739/12=61 × 12 + 7
743/12=61 × 12 + 11
953/12=79 × 12 + 5
997/12=83 × 12 + 1
1021/12=85 × 12 + 1
1361/12=113 × 12 + 5
1381/12=115 × 12 + 1
1511/12=125 × 12 + 11
1579/12=131 × 12 + 7
1621/12=135 × 12 + 1
1693/12=141 × 12 + 1
1783/12=148 × 12 + 7
1877/12=156 × 12 + 5
1901/12=158 × 12 + 5
1907/12=158 × 12 + 11
1913/12=159 × 12 + 5
1931/12=160 × 12 + 11
1987/12=165 × 12 + 7
1999/12=166 × 12 + 7
2063/12=171 × 12 + 11

2161/12=180 × 12 + 1
2293/12=191 × 12 + 1
2477/12=206 × 12 + 5
3001/12=250 × 12 + 1
3191/12=265 × 12 + 11
3331/12=277 × 12 + 7
4073/12=339 × 12 + 5
4691/12=390 × 12 + 11
9883/12=823 × 12 + 7
…….
…….
…….
…….
…….
67/30=2 × 30 + 7
71/30=2 × 30 + 11
73/30=2 × 30 + 13 twin prime
79/30=2 × 30 + 19
83/30=2 × 30 + 23
89/30=2 × 30 + 29
97/30=3 × 30 + 7
101/30=3 × 30 + 11
103/30=3 × 30 + 13 twin prime
107/30=3 × 30 + 17
109/30=3 × 30 + 19 twin prime
113/30=3 × 30 + 23
127/30=4 × 30 + 7
131/30=4 × 30 + 11
137/30=4 × 30 + 17
139/30=4 × 30 + 19 twin prime
149/30=4 × 30 + 29
151/30=5 × 30 + 1 twin prime
157/30=5 × 30 + 7
163/30=5 × 30 + 13
167/30=5 × 30 + 17
173/30=5 × 30 + 23
179/30=5 × 30 + 29
181/30=6 × 30 + 1 twin prime

191/30=6 × 30 + 11
193/30=6 × 30 + 13 twin prime
197/30=6 × 30 + 17
199/30=6 × 30 + 19 twin prime
211/30=7 × 30 + 1
213/30=7 × 30 + 13
227/30=7 × 30 + 17
229/30=7 × 30 + 19 twin prime
233/30=7 × 30 + 23
239/30=7 × 30 + 29
241/30=8 × 30 + 1 twin prime
251/30=8 × 30 + 11
257/30=8 × 30 + 17
263/30=8 × 30 + 23
269/30=8 × 30 + 29
271/30=9 × 30 + 1 twin prime
277/30=9 × 30 + 7
281/30=9 × 30 + 11
283/30=9 × 30 + 13 twin prime
293/30=9 × 30 + 23
307/30=10 × 30 + 7
311/30=10 × 30 + 11
313/30=10 × 30 + 13 twin prime
317/30=10 × 30 + 17
331/30=11 × 30 + 1
337/30=11 × 30 + 7
347/30=11 × 30 + 17
349/30=11 × 30 + 19
…….
…….
1901/30=63 × 30 + 11
1913/30=63 × 30 + 23
1933/30=64 × 30 + 13
1949/30=64 × 30 + 29
1951/30=65 × 30 + 1
1973/30=65 × 30 + 23
2003/30=66 × 30 + 23
2011/30=67 × 30 + 1

2017/30=67×30 + 7

……..

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Just to be sure, I write it again, but the numbers divided are all prime numbers.

Prime number is representable either as 6n+1 or as 6n-1.
When 6n+1
If n=2k, 6*2k+1=12k+1
If n=2k+1, 6*(2k+1)+1=12k+7
And
When 6n-1
If n=2k, 6*2k-1=12k-1=12(k-1)+11
If n=2k+1, 6*(2k+1)-1=12k+5

In this way, the remainder of the prime divided by 12 is limited to 1, 5, 7 and 11.

Re-discussion

(The following shows the multiplication of prime numbers.)

when
51521*51853=2671518413=148417689×18 + 11=222626534×12 + 5=111313267×24 + 5
=89050613×30 + 23(51521=8586×6 + 5 , 51853=8642×6 + 1)= 55656633×48 + ***29***

when
27067*25367=686608589=38144921×18 + 11=57217382×12 + 5=
28608691×24 + 5=22886952×30 + 29=14304345×48 + ***29***

when
28099*29137=818720563=45484475×18 + 13=68226713×12 + 7=34113356×24 + 19
=27290685×30 + 13(28099=4683×6 + 1, 29137=4856×6 + 1)= 17056678×48 + ***19***

when
30271*25261=764675731=42481985×18 + 1=63722977×12 + 7=31861488×24 + 19

=25489191 × 30 + 1(30271=5045 × 6 + 1, 25261=4210 × 6 + 1 =2105 × 12 + 1)= 15930744 × 48 + ***19***

when
44071*41281=1819294951=101071941 × 18 + 13=151607912 × 12 + 7=75803956 × 24 + 7 =60643165 × 30 + 1=37901978 × 48 + *7*

when
33581*35671=1197867851=66548213 × 18 + 17=99822320 × 12 + 11=49911160 × 24 + 11=39928928 × 30 + 11=24955580 × 48 + ***11***

when
7*151=1057=58 × 18 + 13=88 × 12 + 1=44 × 24 + 1=35 × 30 + 7

when
41077*44279=1818848483=101047137 × 18 + 17=151570706 × 12 + 11=75785353 × 24 + 11=60628282 × 30 + 23=37892676 × 48 + ***3ββββ5***=30314141 × 60 + 23
when
41*43=1763=97 × 18 + 17=146 × 12 + 11=73 × 24 + 11=73 × 24 + 11=58 × 30 + 23=36 × 48 + ***35***
when
46591*49037=2284682867=126926825 × 18 + 17=190390238 × 12 + 11=95195119 × 24 + 11=76156095 × 30 + 17=47597559 × 48 + ***35***
when
191=955=53 × 18 + 1=79 × 12 + 7=39 × 24 + 19=31 × 30 + ***25***

when
(48*2+5)*(48*1+5)= 101 × 53 =5353=111 × 48 + ***25***

re-conclusion

prime number can expess 48n+5 or 48n+7, Therefore, The multiplication's remainder divided by 48 may be 25 or 35.

Reference

1) https://en.wikipedia.org/wiki/Prime_number

2) https://en.m.wikipedia.org/wiki/Formula_for_primes

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I am a psychiatrist now and also a doctor of brain surgery before.

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I would like to receive an email. I will not answer the phone.
I am very poor of english.　　Document are all google-translation.

When it is translated into English, Japanese becomes cryptographically.

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

$$\zeta(s) = \frac{2^s}{2^s - 1} \frac{3^s}{3^s - 1} \frac{5^s}{5^s - 1} \frac{7^s}{7^s - 1} \cdots\cdots \tag{2}$$

【*References*】

1) https://en.wikipedia.org/wiki/Riemann_hypothesis

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