

An Alternative Method On Sieve Of Eratosthenes To Find Prime Numbers.

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Abstract -

We introduce $\text{ALPHA Prime Theory}$ and $\text{ALPHA Prime Series}$, a new method to find prime numbers and their prime factors. We also highlighted the key property that is the additive property of natural numbers which is direct responsible for behavior of prime and composite numbers in natural number line and how it can help us to find prime and composite numbers and its prime factors.

$\text{ALPHA Prime Number Theory}$ –

We introduce a new theory – $\text{ALPHA Prime Theory}$.

Theory states that,

Composite numbers (multiple of two prime numbers) are the sum of one specific even number and one specific prime number.

Composite numbers (multiple of two prime numbers.) are also the sum of one specific even number and one specific composite number.

We know that there are multiplicative property of composites numbers

$(5 * 5 = 25)$ $(5 * 7 = 35)$ $(5 * 11 = 55)$ $(5 * 13 = 65)$ Multiple of 5.

$(7 * 7 = 49)$ $(7 * 11 = 77)$ Multiple of 7 etc.

But this theory also states that there are additive property for all composite numbers (multiple of two prime numbers.)

Where p is prime number, n is even number c is composite number (multiple of two prime numbers.)

Where $p > 3$,

$$p + n = c$$

$$c + n = c$$

(Note- that to generate this series specific even and prime numbers are required. Therefore, one should know what are those specific number's).

In this case of series, number 7 & 16 is used that gives 100% result.

We named this series as ALPHA **Prime Series**.

Inputting specific prime number 7 and specific even number 16 we get

$7 + 16 = 23$ with this simple equation and continue adding constant number 16 to each sum in sequence we generate below series.

Explained below is the series which shows clearly how adding one specific natural number 16 and prime number 7 creates a series and using this series one can find composite numbers and prime numbers.

Using this series one can,

- 1) Know what prime number, the divisible factor is for given composite numbers.
- 2) What composite numbers would come next in the line etc.
- 3) Unlike Mersenne prime number finding method, one can use this method to find composite numbers along with their two or more prime factors.

ALPHA **Prime Series** -

Follow below instructions-

Generating series.

$$7 + 16 = 23$$

$$23 + 16 = 39$$

$$39 + 16 = 55$$

$$55 + 16 = 71$$

$$71 + 16 = 87$$

$$87 + 16 = 103$$

$$103 + 16 = 119$$

Go on adding number 16 to each sum in sequence to generate ALPHAseries.

Consider the left hand side vertical columns of above series.

7, 23, 39, 55, 71, 87.....

7	439	871 (13*67)
23	455 (13*35)(5*91)(7*65)	887
39 (3*13)	471	903 (7*129)(3*301)
55 (5 * 11)	487	919
71	503	935 (11*85)(5*17=85)
87 (3*29)	519 (3*173)	951 (3*317)
103	535 (5*107)	
119 (7*17)	551	

135 (5*27)(3*45)	567 (7* 81) (3*189)
151	583 (11*53)
167	599
183 (3*61)	615 (5* 123)(3*205)(5*41=205)
199	631
215 (5 * 43)	647
231 (7 *33)(11 * 21)	663 (13*51)(17*39) (3*21)
247 (13*19)	679 (7*97)
263	695 (5*139)
279 (3*93)	711 (3*237)(3*79=237)
295 (5* 59)	727
311	743
327 (3*109)	759 (11*69)(3*253)
343 (7*49)(7*7=49)	775 (5*155)(5*31 = 155)
359	791 (7*113)
375 (5*75)(3*125)	807 (3*269)
391 (17* 23)	823
407 (11*37)	839
423 (3*141)(3 *47=141)	855 (5*171)(3*285)(3*95=285)

This series goes towards infinity. After series numbers 951 one can continue the

series by adding 16 to each sum in sequence and find more results.

Notice the pattern –

39 is divisible by 3	55 is divisible by 5	119 is divisible by 7
87 is divisible by 3	135 is divisible by 5	231 is divisible by 7
135 is divisible by 3	215 is divisible by 5	343 is divisible by 7

This pattern makes sure that every third numbers in this series are divisible by number 3, that every 5th numbers in this series are divisible by number 5, that every 7th numbers in this series are divisible by number 7 and so on...

This patters for each and all numbers follows all the way towards infinity. This shows that, before only we would know which composite is divisible by what numbers and thereby, we can easily find prime factors and know which is prime numbers.

Follow the instruction and find prime numbers -

Steps -

As we know 7, 2, 3 is prime so start checking from number 39.

Check number 39 by Dividing it by 3, 5 , 7

39 is divisible by 3. We get prime factor 13. Remember that starting from number 39, every 3rd number is a composite number in a series and must be divisible by 3.

Check number 55 by Dividing it by 3, 5 , 7

55 is divisible by 5. We get prime factor 11. Remember that starting from number 55, every 5th number in a column must be divisible by 5 and starting from number 55, every 11th number in a column must be divisible by 11.

Check number 71

Check number 71 by Dividing it by 3, 5, 7

It is not divisible by any of this number therefore it is prime.

Check number 87

After number 39, number 87 is third number in the column.

Therefore 87 is divisible by 3. Dividing 87 by 3 we get a prime factor 29. Now remember that starting from number 87, every 29th number is a composite number in a column and must be divisible by 29.

Check number 103 dividing it by 3, 5, 7

It is not divisible by any of this number therefore it is prime.

Check number 119 by Dividing it by 3, 5, 7

119 is divisible by 7. Dividing 119 by 7 we get prime factor 17. Remember that starting from number 119, every 7th number is a composite number in a column and must be divisible by 7. Remember that starting from number 119, every 17th number is a composite number in a column and must be divisible by 17.

Check number 135

After number 55, number 135 is 5th number in the column and after number 87, number 135 is 3rd number in the column. Therefore 135 is divisible by both by 5 and 3. Dividing 135 by 5 & 3 we get composite 45 and composite 27 which is also divisible by 5 & 3. Also Remember that starting from number 135, every 45th number is a composite number in a column and must also be divisible by

composite number 45 & 27.

Check number 151, 167 by Dividing it by 3, 5, 7

None of the number is divisible by 3, 5, 7 therefore it is prime.

Check number 183.

After number 135, number 183 is third number in the column.

Therefore 183 is divisible by 3. Dividing 183 by 3 we get prime factor 61. Now remember that starting from number 183, every 61th number is a composite number in a column must be divisible by prime number 61.

Check number 231.

After number 55, number 231 is 11th number in the column. After number 119, number 231 is 7th number in the column.

Therefore 231 dividing 231 by 11 we get composite number 21. Dividing 231 by 7 we get composite number 33. Both composite numbers are further divisible by prime number 3. Remember that starting from number 231, every 21th number is a composite number in a column must be divisible by 21. Also, remember that starting from number 231, every 33th number is also a composite number in a column must be divisible by 33.

One can continue go on generating series and follow the above explained process to find more results. Any doubt? contact us.

Infinitely Many Specific Even & Prime Numbers-

There are infinitely many specific even and prime numbers when added, gives infinite series of finding prime numbers and composite numbers. We know all those specific numbers.

Below is an e.g. of another series –

ALPHA **& Omega Series.**

$$20 + 5 = 25$$

$$28 + 7 = 35$$

$$44 + 11 = 55$$

$$52 + 13 = 65$$

$$68 + 17 = 85$$

$$76 + 19 = 95$$

$$92 + 23 = 115$$

$$100 + 25 = 125$$

Series is generated using (20, 8, 16) (5, 2, 4) as specific natural numbers. This series gives composite numbers divisible only by prime number 5.

Prime numbers are not randomly distributed -

Notice how the whole series follows pattern each after the other. This pattern is the real proof that prime and composite numbers are not randomly distributed in natural number line. Series also exclude all even numbers and produce only prime numbers, composite numbers. It is not a coincident, that's all because of pattern following system by series.

Mersenne Prime Number –

Mersenne prime number $M_n = 2^n - 1$ is good to find any largest prime numbers but Alfa Omega prime numbers is best to find largest prime numbers along with their prime factors. There is no other method or way to find prime numbers and prime factors in such an easy way that this new ALPHA **Series** provides.

Conclusion –

This is how one can further count the ALPHA **Series**, follow the process and find as many prime and composite numbers with 100 % guarantee. Notice how the whole series follows pattern each after the other. This pattern is the real proof that prime numbers are not randomly distributed in natural number line. Therefore, we conclude that prime and composite numbers distribution is the result of additive property along with multiplicative property.

Reference –

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