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A NOVEL METHOD TO FIND OUT THE Nth ROUTE OF A GIVEN NUMBER

[1] **V. Annantha Padmanabhan**
[1]Retired Government servant
9 N.G.O Colony, Pollachi-6, Coimbatore, Tamilnadu.
anant.primes2015@gmail.com

Abstract : The Problem of arriving the square or Cubic... root value of a given number is attracting many mathematicians age long. In this paper I suggest some novel methods to solve the problem.

IndexTerms - ***Arriving the root values of a given number.***

There are many fundamental problems in this study of mathematics, in various areas of it. At elementary level of mathematics I considered that there are two main problems exists. And they are very very important.

1) Finding Total number of primes less than or equal to a given number is the first problem

2) Arriving the Nth Root of a given number is the second problem

The first problem was firstly noticed by Pythagoras. Many attended to solve it. The problem has been solved by Anantha Padmanaban's in his paper Number IJNRD2310217 – Published in the international journal of novel research and development (IJNRD) IJNRD.ORG in the issue of IJNRD l Volume 8, Issue 10 October 2023 l ISSN : 2456-4184 l IJNRD.ORG

Prime numbers are considered as building blocks of the number system. The numbers other than the primes are called as composites which terminology is well known to all.

Now the second question receives two important. Let it be primes are composites, how the numbers originated gets originated is a fundamental question primes are whole numbers or integers. Where as the roots of a number may or may not be an integer the strange case is the root of Number 1. Is square, Cubic... are all number 1.

There are some other types o number whose roots are also integers, but different from the given number. For Example: The square root of the Number 4 is 2. Some of the other square root or cubic roots... Nth Root of certain other numbers or fractions, Usually expressed as Decimal fraction, not as common fraction. For Example: The Square root of Number 3 is 1.73205080756.

Since from the time of inception or invention of the number system, for the thousands and thousands of years for many mathematicians finding out the square root or cubic root... or Nth root of a given number was a big problem because it is impossible till date to arrive the exact number of which the roots or being searched of. So the real problem exists in arriving the exact value of the roots it is a common experience that the square root of number 2 multiplied by the same number is not yielding the number 2.

1.41421356237 * 1.41421356237 = 1.9999999999 (The decimals are limited to 11 digits)

Usually it is said by many mathematicians that the root of 2 is exiting somewhere else in between the number 1 and 2.

Nobody knows where it exists!

In the book of elementary mathematics authored by V.V. Zaitsev, V.V. Ryzkov and M.I. Skenavi published by Mir Publishres Moscow @ Page number 39 it is stated that... What this means is that in the domain of rational numbers **it is impossible** to take this square root of 2 the symbol root 2 is meaningless in the domain of rational numbers. Yet the problem which consist in finding the side of a square whose area is equal to S is just as natural for S=2, as for S=4. The way out of this and similar difficulties consist in further extending the number concept – It consists in introducing a new type of numbers called irrational numbers in other words since it is not possible to overcome to arrive the exact root value of given N where the root values is not an integer and the decimals digits cannot be fix in a certain limits. So a new type of number called irrational number is introduced by learned mathematicians.

We write

$1 < \sqrt{2} < 2$

$1.4 < \sqrt{2} < 1.5$

$1.41 < \sqrt{2} < 1.42$... and so on

Here For Example: 1.41 is the Decimal minor approximation of $\sqrt{2}$ with in 0.01 and 1.42 is the major approximation (In the above system we used, The algebraic method and in equalities)

The other celebrated system of mathematics is known as Vedic mathematics, which introduces a lot of short cut methods to arrive solutions in arithmetic, and elementary and higher mathematical problem For Example: In his book Vedic Mathematics Sri. Jagad Guru Tirthaji Maharaja – The Sankarachariya of Govathanamath, Puri @ page number XIVII-In the introduction of his book the square root of 738915489 is arrived at in the following way

7398915489 (27183
4
47)338
329
541)991
541
5428)45054
43424
163089
163089
0

The Square Root is 27183

2) The Complex Numbers

It is impossible to extract the Square root of a negative numbers. And it is well known that Root of -1= i. Where 'i' is an imaginary number.

$1^2 + 1 = 0$

Or

$1^2 = -1$ Hence $\sqrt{-1} = i$

It is a generally used phenomena in all higher mathematical studies.

3) In this Paper we are considering positive integers firstly whose Nth Root is attain in a novel method. Secondly we are considering the negative numbers too.

4) The novel methodology to find out the square root of given positive number

Let us considered all the number whose square root are integers in a sequence they are

4 9 16 25 36 49 64...

Δ 5 7 9 11 13 15
Δ_2 2 2 2 2 2

This sequence is name as Ananth's Sequance. The difference between first two numbers is 5 that means that there exist 3 parts in between 4 and 9. If we exclude the first and last number in this segment. That we take for consideration

1/5 = .2
2/5 = .4
3/5 = .6
4/5 = .8
5/5 = 1

Again the square root of 4 is 2
So 2.2 *2.2 = 4.84
If we increase the decimal value by stage by stage, we get

2.21*2.21=4.884
2.22*2.22=4.9284
2.23*2.23=4.9729
2.24*2.24=5.0176

So we can considered that a square root of number 5 is 2.24

If we want more 0 digits for some practical purpose we may adopt the following system

2.24*2.24=5.0176
Add .9 to the previous value That is 2.23
2.239*2.239 = 5.013121

This value is also having only one zero digit value. So less .1 to the new value that is 2.239 we get 2.238 * 2.238 = 5.008644

Thus by adding .9 the previously obtained value which do not give the integer portion of the square root equal to the given number. So by altering the decimal value suitably we can get the exact integer value by multiplying two square root values of the given number to get more zero decimal places the above mentioned system may be followed.

Thus we can arrive the following square root values of 6,7,8 as

$\sqrt{6}$=2.45
$\sqrt{7}$=2.09
$\sqrt{8}$=2.84
And $\sqrt{9}$=3

Again if we considered the next segment that is 9-16 In the mentioned sequence we get 7 parts for this segment

1/7 = 0.14285714285
2/7 = 0.2857142571
3/7 = 0.42857142857
4/7 = 0.57142857142
5/7 = 0.7142857148
6/7 = 0.8571428571
7/7 = 1

And $\sqrt{9}$=3

So 3.14*3.14=9.8595
3.15*3.15=9.9225
3.16*3.16=9.9856
3.17*3.17=10.0489

So the square root of number 10 maybe considered as 3.17 Similarly the square root values of all numbers may be obtained. It should be noted importantly that segment value and number of divisions (Parts) should be considered with out file.

This methodology of obtaining this square root value is noted as linear method of arriving square root values.

2nd Method

The Circular Method

1) Firstly considered two alpha series. The methodology of the generating of two alpha series is explained in the paper of V. Anantha Padmanabhan's Paper Number IJNRD 231006, published by INRD.ORG Valume 8 Issue 10 October 2023.

They are

1) 5 11 17 23 29 35

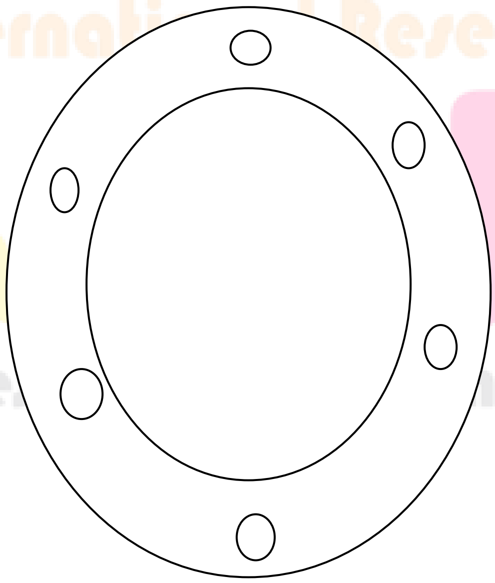
Δ 6

2) 7 13 19 25 31 37

Δ6

Both are A.P s

Considered a ring which (Geometrical Form) has seven points demarked



There are seven small rings inside

Now considered the Anandh's Sequence which has already being explained That is

	4	9	16	25	36	49	64
Δ1	5	7	9	11	13	15	
Δ2	2	2	2	2	2		

These 3 series and the given Demarked Ring which 7 points inside is capable of producing a lot of real positive numbers

1) α1 * A1 = 5*4 = 20

2) α1 * A2 = 5*9 = 45

3) α1 * A3 = 5*16 = 80

4) α1 * A4 = 5*25 = 125

5) α1 * A5 = 5*36 = 180

6) α1 * A6 = 5*49 = 245

7) α1 * A7 = 5*64 = 320

Considered the above numbers as 1 Sequence

	20	45	80	125	180	245	320
Δ1	25	35	45	155	65	75	
Δ2	10	10	10	10	10		

As explained in previous pages the segment 1 consist of two boundary number 20-45

1) 1/25 = 0.04

2) 2/25 = 0.08

3) 3/25 = 0.12

4) 4/25 = 0.16

5) 5/25 = 0.2

6) 6/25 = 0.24

7)7/25 = 0.28

8) 8/25 = 0.32

9) 9/25 = 0.36

10)10/25 = 0.4

11)11 /25 = 0.44

12)12/25 = 0.48

13)13/25 = 0.52

14)14/25 = 0.56

15)15/25 = 0.60

16)16/25 = 0.64

17)17/25 = 0.68

18)18/25 = 0.72

19)19/25 = 0.76

20)20/25 = 0.80

This square root of number 20 do not fall in the Anandh's Series and lies in between 16/25 in the above series .

This segment as 9 parts so5/9 = 0.55

Again √16=4

So 4.55*4.55 = 20.7025

If we want more zero digits we may adopt the methodology already explained.
Another Example: Let us consider the Number 30 at random. Which is 20+10.
It is also not false in Anandha's Series and it felts in the segment 25-36 which has 11 parts

so 5/11=0.45

5.45*5.45=29.70

5.5*5.5=30.25

If we want more zero digits as decimals we may follow the methodology already explained in this way we may obtained the square root of all the numbers that exists from 20 to 320.

The boundary numbers in the cycle are
20,45,80,125,180.245,320.

If we considered the square root value of the above number alone, we found that the follow a defendant order

The Segment	The Previous A series Number	√ of Previous Term in A Series
1) 20-45	1)16	1)4
2)45-80	2)36	2)6
3)80-125	3)64	3)8
4)125-180	4)121	4)11
5)180-245	5)169	5)13
6)245-320	6)225	6)15
7)320-405	7)289	7)17

D	D-=D/δ in A Series	
1) 20-16 = 4	1)4/9	1)4/9 = 0.44
2)36-45 = 9	2)9/13	2)9/13 = 0.69
3)64-80 = 16	3)16/17	3)16/17 = 0.94
4)121-125 = 4	4)4/23	4)4/23 = 0.17
5)169-180 = 11	5)11/27	5)11/27 = 0.40
6)225-245 = 20	6)20/31	6)20/31 = 0.64
7)320-324 = 4	7)4/35	7)4/35 = 0.11

Now

√20 = 4.44*4.44 = 19.71

4.48*4.48 = 20.7

Similarly

√45 -> 6.71*6.71 = 45.02

√80-> 8.95*8.95 = 80.10

√125->11.181*11.181 = 125.01

√180->13.43*13.43 = 180.36

√245->15.65*15.65 = 245.01

√320->17.9*17.9 = 320.41

Now the square root are

4.48, 6.71, 8.95. 11.181, 13.43, 15.653, 17.9

This may be written as	Actual Value
1)) 4.48+0 = 4.48	4.48
2) 4.48+2.23 = 6.71	6.71
3) 4.48+2*2.23 = 8.94	8.95
4) 4.48+3*2.3 = 11.17	11.181
5) 4.48+4*2.3 = 13.4	13.43
6)4.48+5*2.3 = 15.653	15.653
7) 4.48+6*2.3 = 17.86	17.9

Similarly we can considered next seven numbers * $\alpha 1_2$, The Third seven numbers into $\alpha 1_3$ and so on and we can find similar order for every cyclic seven numbers thus the α1 numbers may be replaced by $\alpha 1_1$, $\alpha 1_2$, $\alpha 1_{3,}$ $\alpha 1_{4,}$ ...ect $\alpha 1_n$ likewise the α_2 Numbers may also be considered.

Considering the Negative numbers

The negative numbers will have either of the two multiple parts of the square root as negative. Thus we can find all the numbers with one square root is as a negative number.

The Cubic roots - Sequence

8 27 64 125 216 343 512

Δ1 19 37 61 91 127 169

Δ2	18	24	30	36	42	
Δ3		6	6	6	6	

Considered 3√10

2.009 * 2.009 * 2.009 = 8.12

Similarly we can generate the 4th root sequence, 5th root sequence... Nth root sequence etc.

4th Root Sequence

	16	81	256	625	1296	2401
Δ1	65	175	369	671	1105	
Δ2	110	194	302	434		
Δ3	84	108	132			
Δ4	24	24				

Nth Ananths Sequence

$2^n, 3^n, 4^n, 5^n, 6^n, 7^n$ ...

CONCLUSION:

Thus we can find out the Nth root of any Number by using the novel methodology.

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