Calculate Square Root of Any Two Natural Numbers at a Same Time Using a Single Binomial Expansion

Biki Tikader*

Srikrishna College, University of Kalyani, Bagula - 741502, India

Abstract: This short mathematical note describe an appropriate mathematical process for finding square root of any positive natural number using binomial expansion. This paper will be meaningful to those with a background in binomial theorem.

Keywords: Negative Numbers, Euler's Equation, Binomial Expansion, Natural Numbers

1. Introduction

In this note I do not refer to any article over on the calculation and laws of binomial theorem. A polynomial with two terms is called a binomial. Binomial theorem tells us that the expanded expression of the form

\[(a-b)^n = \binom{n}{0}a^n - \binom{n}{1}a^{n-1}b + \binom{n}{2}a^{n-2}b^2 - \ldots + \binom{n}{k}a^{n-k}b^k - \ldots + \binom{n}{n}b^n\]

So we can say the formula is

\[(a+b)^n = \sum_{k=0}^{n} \binom{n}{k}a^{n-k}b^k\]

2. Mathematical Note

Considering \(n=0.5\) and \(a=0, 0.1, 0.2, 0.3, 0.4, 0.5\) we can calculate \((1-2)^{0.5}\) in this way -

\[(1-2)^{0.5} = (0.5x10.5^2x2^0) - (0.5x2x10.5^2x2^0) + (0.5x3x10.5^2x2^0) - (0.5x4x10.5^2x2^0) + (0.5x5x10.5^2x2^0)\]

and adding the last five terms, we get

\[(-5x20.1+10x0.2-10x20.3+5x20.4-20.5)=(-1) \ldots (4)\]

From (3) we can say

\[b^{1/2} = \text{expansion till fifth term of (a-b)/2 where a and b are any natural numbers.}\]

From (4) we can say

\[a^{1/2} = \text{mod of expansion from second to last term of (a-b)/2 where a and b are any natural numbers.}\]

3. Conclusion

Without using non terminating binomial series we can also calculate root of any natural number in this way. Even we can find root of two different natural numbers with a single binomial expansion.

4. Acknowledgments

I gratefully acknowledge Debashis Bala, Chayan Roy and Sudipto Roy for their significant contribution. Also thanks them for their comment on this math.

Reference


Volume 10 Issue 1, January 2021
www.ijsr.net
Licensed Under Creative Commons Attribution CC BY

Paper ID: SR21108102827
DOI: 10.21275/SR21108102827
1495