International Journal of Research In Mathematics and Computation (IJRMC)
Volume 10, Issue 1, January – June 2024, pp. 18-19, Article ID: IJRMC_10_01_004
Available online at https://iaeme.com/Home/issue/IJRMC?Volume=10&Issue=1
ISSN Print: 2348-151X and ISSN Online: 2348-1528
Impact Factor (2024): 11.98 (Based on Google Scholar Citation)

GENERALIZATAION OF BERTRAND'S CONJECTURE

Dhritiman Niyogi
India

ABSTRACT

In 1845 Joseph Bertrand conjectured that for every integer n>1 there is always atleast one prime p between n and 2n [1].

Mathematically there exists atleast one prime p such that n<p<2n.

With the help of this conjecture we are going to generalize this.

*In this article we are going to show that for any prime p, there exists atleast n primes between p and 2^n*p.*

Keywords: Bertrand, Conjecture, Prime, Generalization

Cite this Article: Dhritiman Niyogi, Generalizataion of Bertrand's Conjecture, International Journal of Research in Mathematics and Computation (IJRMC), 10(1), 2024, pp. 18-19.
https://iaeme.com/MasterAdmin/Journal_uploads/IJRMC/VOLUME_10_ISSUE_1/IJRMC_10_01_004.pdf

INTRODUCTION

Bertrand had enunciated that there exists at least one prime between n and 2*n, more specifically there exists so between p and 2*p.

We are going to be more specific and showing the generalized version of Bertrand's Conjecture.

BODY OF THE WORK

There is at least a prime between p and 2*p.

So, there is also one between 2*p and 4*p.

So between p and 4*p there are atleast two.

More over between 4*p and 8*p there is another.

So between p and 8*p there are atleast three.

Proceeding in this way we get there are atleast n so between p and 2^n*p.

We are going to prove it in a more rigorous way, by the method of induction.

It is true for n=1 , because there is atleast one between p and 2*p.

Let this be true for n=m.
So there are atleast m primes between p and 2^m*p.
But according to Bertrand there is atleast one between 2^m*p and 2^(m+1)*p .
So there are atleast m+1 primes between p and 2^(m+1)*p.
So it is true for all n.
QED.

CONCLUSION

We conclude that there are atleast n primes between p and 2^n*p.

ACKNOWLEDGEMENT

I am indebted to Dr. Kashinath Niyogi and Mousumi Niyogi for constant inspiration

APPENDIX

Generalization of Bertrand's conjecture follows from the same.

REFERENCES

[1] https://www.cantorsparadise.com/bertrand's postulate
[2] Elementary Number Theory, David M. Burton, Sixth edition, page no:-352
[3] Theory of Numbers, Pundir and Pundir, page number 5.

Citation: Dhritiman Niyogi, Generalizataion of Bertrand's Conjecture, International Journal of Research in Mathematics and Computation (IJRMC), 10(1), 2024, pp. 18-19

Abstract Link: https://iaeme.com/Home/article_id/IJRMC_10_01_004

Article Link:
https://iaeme.com/MasterAdmin/Journal_uploads/IJRMC/VOLUME_10_ISSUE_1/IJRMC_10_01_004.pdf

editor@iaeme.com