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# Generalizataion of Bertrand's conjecture

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## 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: 1.** 1.Bertrand, 2.Conjecture, 3. Prime, 4. Generalization

## 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.

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

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