# A PROPERTY OF TRICHOTOMY OF NUMBER 3

## INTRODUCTION

This investigation deals mostly with the unveiling of the structure of the prime numbers as well as distribution. Is this a cognoscible mathematical structure, which responds to a certain law of internal is the challenge. The notion of a deductive logic about an authentic general structure of the set of highly abstract and yet open to the study of this elements.

## BACKGROUND

It is known that a positive integer is said to be an absolute prime if it is divisible by 1 and itself mathematical objects to define; and, with whom "it is possible to form or generate any integer or multiplication in a unique way", as the Fundamental Theorem of Arithmetic, states.

In classical mathematics, by convention the number 1 is not considered a prime; number 2 is the f prime; 3 is the second prime number. An ontologically understandable theory of number 3 has a serie which interest the set of transformations or equivalences of which emerges the rules of numerical and and, if possible, the rules of prediction about the hard and elusive to order absolute or ordinary primes.

A first approximation to the unveiling of the mathematical structure of the prime numbers, eve "embryonic structure" was given by us in the previous article under the title of "A property of dicl prime 2". Then, here, we start with a brief and uncomplete, but basic summary for the time being, of of number 3 and its property of trichotomy. This property emerges from the mathematical logic itsel deductive logic and divides or partition the set of natural integers N in three subsets which exhaust th of the naturals up to the infinite. Then it can be visualized the statement and discovery of one or mor Lets see one:

## THEOREM

**"The product of three consecutive numbers is always a multiple of 3"**

Let, by the property of trichotomy, be the natural integers n, n+1, n+2 and P their product, then

$$n(n+1)(n+2) = P$$

Of three consecutive natural integers, at least two are odd numbers and one is necessary even, or vice

## DISCUSSION

The proof we present of the theorem allow us see differently the prime numbers and their special r principle of the deductive mathematical logic. On the other hand, the development of this potent n study of the density, structure and distribution of the primes, departing from a hypothesis of construc succession of nine digits exhaustive up to the infinite, applying a congruence module 9, let us visu principles of general validity about the ordering which is a verifiable and precise principle, to disco other properties in secuential and parallel senses, concerning the systematic study we pursue.

## CONCLUSION

Applying our particular methodology we notice that the rules of formal algebraic and arithmetic o respected concerning the addition, multiplication, substraction and division in a rigurous manne conclusion under the trichotomy property of the prime number 3. The important part is that in the pro our theory we advance from the simple to the complex parts.

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## ANNEX

**Proof 2** (for more experts)

Let $3 \mid n(n+1)(n+2)$

and $n(n+1)(n+2) = 3K$ where $K \in N$

by mathematical induction

numbers and one is necessary even):

| | | |
|---|---|---|
| 1 | 2 | 3 |
| 4 | 5 | 6 |
| 7 | 8 | 9 |
| 10 | 11 | 12 |
| 13 | 14 | 15 |
| 16 | 17 | 18 |
| . | . | . |
| . | . | . |
| . | . | . |

**Proof 1** (for less experts)

There are two factors which are odd numbers 1 and 3, at least one is a multiple of 3 and so divisibl multiple of 3 and divisible by that number, and if at least one of these factors is multiple of 3 and s number. Been P multiple of 3 and always divisible by 3, which is a prime, P will be divisible by 3 a sufícient condition in the structure thus created. Then the product P is divisible (multiple) by 3, and proved. Q.E.D.

Note: Furthermore, applying to the three subsets, congruence module 9, we observe that it is genera succession in the form of an elementary square matrix with the 9 decimal digits (except 0) in whicl appear the succession of the natural integers, although we do not yet notice any order of the primes.

| | | |
|---|---|---|
| **1** | **2** | **3** |
| **4** | **5** | **6** |
| **7** | **8** | **9** |
| 1 | 2 | 3 |
| 4 | 5 | 6 |
| 7 | 8 | 9 |
| . | . | . |
| . | . | . |
| . | . | . |

This is quite interesting, although it apparently contradicts the statement of the russian mathematician . when he concludes in his study of the Recurrent Successions, that the most important prime numbe non recurrent succession. Later we will show a new theorem we have discovered concerning this matte

$n = 1 \qquad 1 \times 2 \times 3 = 6 = 3 \times 2$

furthermore if $n = k$

we state the hypothesis

$$k(k+1)(k+2) = 3K$$

where

$$n = k+1$$

then

$$(k+1)(k+2)(k+3) = 3K'$$

follows

$$(k+1)(k+2)(k+3) = (k+1)(k+2)k + 3(k+1)(k+2)$$

it implies

$$3K + 3(k+1)(k+2)$$

taking the common factor

$$= 3[K + (k+1)(k+2)]$$

which gives

$$= 3K'$$

**Q.E.D.**