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EVALUATION OF NEW MATHEMATICAL CONSTANT BY APPLICATION OF TWO DEFINED NUMBERS

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ABSTRACT

Various mathematical constant have been investigated in mathematics, in this paper it is shown that if A = a + 10b +100c + 1000d +……., & B = b + 10c + 100d + ….., are two positive integer of base 10 positional numeral system then ratio of A & B in a defined manner is a Constant where a, b , c , d … are decimal digits (0 to 9).

Keywords: *Base 10 numeral system, Decimal digit, Positive integer*

1. INTRODUCTION

Between two numbers, A = a + 10b +100c + 1000d +…., and B = b + 10c + 100d + ….., B depends upon A and is less than A.

Suppose,

$$\lim_{A\to\infty}\left(1+\frac{A}{B}\right)^{B/A} \quad \text{and} \quad \lim_{A\to\infty}\left(1+\frac{B}{A}\right)^{A/B}$$

are two equations in which limit of A is infinity, as soon as the value of A taken very large, A/B reaches toward 10. Let A = 10 so B = 1 , now A/B become exactly 10. I hope A =10 & B = 1 give correct value of this Constant up to infinite decimal places.

1.1. Definition

Base 10 numeral system In math, 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9 are base ten numerals. We can only count to nine without the need for two numerals or digits. All numbers in the number system are made by combining these 10 numerals or digits

Decimal digits For writing numbers, the decimal system uses ten decimal digits, a decimal mark, and, for negative numbers, a minus sign "−". The decimal digits are 0, 1, 2, 3, 4, 5, 6, 7, 8, 9

Positive integers The positive integers are the numbers 1, 2, 3, ... (OEIS A000027), sometimes called the counting numbers or natural numbers.

2. EVALUATION OF CONSTANT

If A and B are two positive integer of base 10 positional numeral system in term of A = a+10b +100c +1000d +……., & B = b + 10c + 100d + ….., where a, b , c , d …… are decimal digits (0 to 9) then

$$\lim_{A\to\infty}\left(1+\frac{A}{B}\right)^{B/A} = \text{Constant} = 1.27098161521014063860553513752 84\ldots..$$

$$\lim_{A\to\infty}\left(1+\frac{B}{A}\right)^{A/B} = \text{Constant} = 2.5937424601$$

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Proof:

Table 'X'

a , b , c , d , e …….. Decimal digits (0 to 9)	**A = a+10b +100c +1000d +…**	**B = b + 10c + 100d +....**	$\left(1+\frac{B}{A}\right)^{B/A}$	$\left(1+\frac{A}{B}\right)^{B/A}$
a=9, b=8, c=7, d=6, e=5, f=4, g=3, h=2, i=1	123456789	12345678	1.2709816….	2.59374246…..
a=8, b=8, c=8, d=8, e=8, f=9, g=9, h=9, i=9, f=9	9999988888	999998888	1.270981615……	2.5937424601…..
a=7, b=8, c=9, d=1, e=0, f=0, g=0, h=1, i=3, j=2, k=1, l=1, m=0, n=1	10112310001987	1011231000198	1.270981615210…..	2.5937424601000 …
a=9, b=9, c=9, d=9, e=9 ,f=9, g=9, h=9, i=9, j=9, k=9, l=9, m=9, n=9, o=9,p=9, q=9, r=9, s=9,t=9	99999999999999 999999	9999999999999 999999	1.270981615210140638… …	2.59374246010000 00000…
a=9, b=9, c=9, d=9, e=9, f=9, g=9, h=9, i=9, j=9, k=9, l=9,m=9,n=9,o=9,p=9,q =9,r=9,s=9,t=9 ,u=9, v=9	99999999999999 99999999	9999999999999 99999999	1.270981615210140638605 …	2.59374246010000 0000000…
a=0,b=1	10	1	1.270981615210140638605 5351375284…..	2.5937424601

Important deduction from above observation.

For A =10 & B =1

$$\lim_{A\to\infty}\left(1+\frac{A}{B}\right)^{B/A} = C1 = 11^{(1/10)} \qquad (1)$$

and

$$\lim_{A\to\infty}\left(1+\frac{B}{A}\right)^{A/B} = C2 = 1.1^{10} \qquad (2)$$

Taking 'log' both side for equation (1) & (2)

log C1 = log 11^(1/10) = 1/10 log11
log11 = 10 log C1 (3)

logC2 = log 1.1^10 = 10[log11-log10] (4)

Put the value of 'log11' from equation (3) in equation (4)

logC2 = 10[10logC1-log10]
= 100logC1-10log10

log10^10 = 100logC1 – logC2 {as loga- logb =log(a/b)}
log10^10 = log[C1^100/ C2)

10^10 = C1^100/ C2

C1^100 = 10^10× C2

CONCLUSION

Based on above observation mentioned in table X, A = 10 give correct value of first constant up to 31 decimal places than other numbers and can be shortly written as 11^(1/10) = 1.2709816152101406386055351375284…. & constant C2 can be written shortly as 1.1^10 = 2.5937424601

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