SMARANDACHE CONCATENATE TYPE SEQUENCES*

Helen Marimutha
Northland Pioneer College (USA)

ABSTRACT

Professor Anthony Begay of Navajo Community College influenced me in writing this paper. I enjoyed the Smarandache concatenation. The sequences shown here have been extracted from the Arizona State University(Tempe) Archives. They are defined as follows:

(1) Smarandache Concatenated natural sequence:

1, 22, 333, 4444, 55555, 666666, 7777777, 88888888, 999999999, 10101010101010101010, 11111111111111111111, 12121212121212121212121212, 13131313131313131313131313, 14141414141414141414141414, 15151515151515151515151515, . . .

(2) Smarandache Concatenated prime sequence:

2, 23, 235, 2357, 235711, 23571113, 2357111317, 235711131719, 23571113171923, ...

Conjecture: there are infinitely many primes among these numbers!

(3) Smarandache Concatenated odd sequence:

1, 13, 135, 1357, 13579, 1357911, 135791113, 13579111315, 1357911131517, ...

Conjecture: there are infinitely many primes among these numbers!

(4) Smarandache Concatenated even sequence:

2, 24, 246, 2468, 246810, 24681012, 2468101214, 246810121416, ...

Conjecture: none of them is a perfect power!

(5) Smarandache Concatenated S-sequence { generalization}:

Let $s_1, s_2, s_3, s_4, \ldots, s_n, \ldots$ be an infinite integer sequence (noted by S). Then:

$$s_1,\ \overline{s_1 s_2},\ \overline{s_1 s_2 s_3},\ \overline{s_1 s_2 s_3 s_4},\ \ldots,\ \overline{s_1 s_2 s_3 \ldots s_n},\ \ldots$$

is called the Concatenated S-sequence.

Questions: (a) How many terms of the Concatenated S-sequence belong to the initial S-sequence?

(b) Or, how many terms of the Concatenated S-sequence verify the relation of other given sequences?

The first three cases are particular.

Look now at some other examples, when S is a sequence of squares, cubes, Fibonacci respectively (and one can go so on).

(6) Smarandache Concatenated Square sequence:

1, 14, 149, 14916, 1491625, 149162536, 14916253649, 1491625364964, ...

How many of them are perfect squares?

(7) Smarandache Concatenated Cubic sequence:

1, 18, 1827, 182764, 182764125, 182764125216, 182764125216343, ...

How many of them are perfect cubes?

(8) Smarandache Concatenated Fibonacci sequence:

1, 11, 112, 1123, 11235, 112358, 11235813, 1123581321, 112358132134, ...

Does any of these numbers is a Fibonacci number?

REFERENCES

1. Smarandache, F. (1997). **Collected Papers Vol. II**, University of Kishinev.
2. Smarandache, F. (1975). "Properties of the Numbers", University of Craiova Archives. [See also Arizona State University Special Collections, Tempe, Arizona, USA].

* This paper originally appeared in **Bulletin of Pure and Applied Sciences**, Vol. 16 E(No. 2) 1997; p. 225-226