The first 10^{th} Smarandache Symmetric Numbers

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Abstract: In this article , we present some important observations of the first 10^{th} Smarandache Symmetric Numbers
(exclude the second number i.e. 11) , and the relationship of squaring .

In [1] ,the first 10^{th} Smarandache Symmetric Numbers
(excluding number 11) , namely ;

1 , 121, 12321, 1234321, 123454321, 12345654321 ,

1234567654321 , 123456787654321 , 12345678987654321 . (1)

Consider (1) , then convert this numbers to the following triangle:

1
121
12321
1234321
123454321
12345654321
1234567654321
123456787654321
12345678987654321

The following observation may interest readers of Smarandache

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1) The area (in the number of all digits in the above triangle) of this triangle equal 9^2 , which is a square .

2) The terminal digits follow the pattern 1,1,1 , ... , 1, which is a square .
3)
4) The initial digits follow the pattern 1,1,1 , ... , 1 , which is a square .

5) The sum of the digits of any number equal perfect square ,

Example ; 121 $\quad 1+2+1=4$

12345678987654321 $\quad 81$

Hence , the sum of digits follow the pattern $1^2, 2^2, 3^2, \ldots, 9^2$.

6) The number of digits follow the pattern 1,3,5,7,...,17 ,and the sum is , which is a square , namely 81.

7) If we take any column in the triangle then cubing the digits then sum them , we get square for example , take column 5 , then we have 12345 , cubing this digits and sum ; $1^3+2^3+3^3+4^3+5^3=15^2$
So, cubing the digits in columns and sum them, follow the pattern $1^2, 3^2, 6^2, 10^2, 15^2, 21^2, 28^2, 36^2, 45^2$.

8) Any number in the triangle is a perfect square and there is no prime , hence the number follow the pattern :
$1^2, 11^2, 111^2, 1111^2, 11111^2, 111111^2, 1111111^2, 11111111^2, 111111111^2$.

9) The bias of triangle looks like 9! , and 8! So if we multiply the bias by its component we get square(9!X8! = square) .

Know convert the triangle to the following matrix , namely :

$$\begin{pmatrix} 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ 1 & 2 & 2 & 2 & 2 & 2 & 2 & 2 & 2 \\ 1 & 2 & 3 & 3 & 3 & 3 & 3 & 3 & 3 \\ 1 & 2 & 3 & 4 & 4 & 4 & 4 & 4 & 4 \\ 1 & 2 & 3 & 4 & 5 & 5 & 5 & 5 & 5 \\ 1 & 2 & 3 & 4 & 5 & 6 & 6 & 6 & 6 \\ 1 & 2 & 3 & 4 & 5 & 6 & 7 & 7 & 7 \\ 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 8 \\ 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 \end{pmatrix}$$

Notes :

1) The matrix is a square one (9x9).
2) The matrix is symmetric a round the diagonal.
3) The detriment equal 1 , which is a square .

4) We can get this matrix by the following two matrices ;

where the rows or column represent the pattern 1,11,111,1111,...,11111111

$$\begin{pmatrix} 1&0&0&0&0&0&0&0&0 \\ 1&1&0&0&0&0&0&0&0 \\ 1&1&1&0&0&0&0&0&0 \\ 1&1&1&1&0&0&0&0&0 \\ 1&1&1&1&1&0&0&0&0 \\ 1&1&1&1&1&1&0&0&0 \\ 1&1&1&1&1&1&1&0&0 \\ 1&1&1&1&1&1&1&1&0 \\ 1&1&1&1&1&1&1&1&1 \end{pmatrix} \quad \begin{pmatrix} 1&1&1&1&1&1&1&1&1 \\ 0&1&1&1&1&1&1&1&1 \\ 0&0&1&1&1&1&1&1&1 \\ 0&0&0&1&1&1&1&1&1 \\ 0&0&0&0&1&1&1&1&1 \\ 0&0&0&0&0&1&1&1&1 \\ 0&0&0&0&0&0&1&1&1 \\ 0&0&0&0&0&0&0&1&1 \\ 0&0&0&0&0&0&0&0&1 \end{pmatrix}$$

Reference:

[1] Ashbacher. Charles . Pluckings Form the Tree of Smarandache Sequences and Functions- chapter 1: http://www. Ashbacher.com/