Pattern Mathematics

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2 June 2004

History

In the year 1966, I was about to graduate from W.T. White High School in Dallas, Texas. It was during the summer of that year that I developed a new form of mathematics, which I labeled Pattern Mathematics. This is not a revolutionary branch of mathematics that will open new windows into the world but rather an obscure branch that will sit in the corner collecting dust. For the life of me, I could not figure out anything useful to do with the theory. This is the story of how this mathematical theory came to be. At the time, I was 18 years old. Almost as an afterthought, I decided to go to college. No one up to that time in my family had ever gone to college before. So with only 4 months till graduation, I chose a road to travel down. In short order, I was accepted into the University of Texas at Arlington as a Physic major. I obtained a scholarship from Sears, for $400. That doesn’t seem like a lot of money today but that scholarship covered my first year’s tuition and books. I also competed and won a summer scholarship to the Dallas Tabulation Institute. The Institute’s course material covered operation and programming of tabulating machines and also provided an introduction into computers. The world was about to be transformed by computers and it was a time of wonder. Before computers, there were tabulating machines. These were complex electronic and mechanical units that emulated many of the same functions as the modern computer. These tabulation machines were programmed using wires. The information to be processed was punched on IBM cards. These cards were feed into tabulating machine to perform functions. As the coursework progressed, I was given the opportunity to work with a computational machine. This was a monster of a machine, larger than a small freezer. It had thousands of relays. The patch panel contained hundreds of plug in slots. I decided to program the machine to square any number. When I was done, every slot in the patch panel contained a wire. I almost felt like a mad scientist. The teachers had never seen anyone do this operation before. I took an IBM card and punched the largest number available, all 9’s and feed it into the machine. The card went in but nothing came out. Relays began to click. The machine shook. There was some smoke. I thought I destroyed the machine. After a full 60 seconds the card spit out of the machine with an unusual answer. Pattern mathematics was born.

Notation

First, I must explain the notation used in pattern mathematics. The symbols **[** and **]** shall denote digit notation. The following rules apply in digit notations.

Digits can be joined.
[5] [6] [2] [1] is the same as 5,621

Repeating pattern of single digits is denoted as $[^{n}X]$ where X is the single integer and **n** is the number of digits.
$[^{3}9]$ is the same as the number 999
$[^{8}3]$ is the same as the number 33,333,333
$[^{3}9]\ [^{8}3]$ is the same as 99,933,333,333

Standard mathematical notation also applies
x = multiply, / = divide
$(X)^2$ or $[X]^2$ is the square of the number X

Rules

There are only a few simple rules.

n must always be a positive integer.

$[^{0}X]$ is a non-digit and disappears.
For example $[^{0}1]\ [0]\ [^{0}8]\ [9]$ = 09 (because $[^{0}1]$ & $[^{0}8]$ are non digits and disappear from the equation)

First Set of Formulas

The first set of formulas deals with squaring integers.

$$[{}^{n}3]^2 = [{}^{n-1}1]\ [0]\ [{}^{n-1}8]\ [9]$$

For example

when n = 1	3^2 = 09
when n = 2	33^2 = 1,089
when n = 15	$333{,}333{,}333{,}333{,}333^2$ = 111,111,111,111,110,888,888,888,888,889

$$[{}^{n}6]^2 = (2)^2 \text{ x } [{}^{n}3]^2 = [{}^{n-1}4]\ [3]\ [{}^{n-1}5]\ [6]$$

For example

when n = 1	6^2 = 36
when n = 2	66^2 = 4,356
when n = 15	$666{,}666{,}666{,}666{,}666^2$ = 444,444,444,444,443,555,555,555,555,556

$$[{}^{n}9]^2 = (3)^2 \text{ x } [{}^{n}3]^2 = [{}^{n-1}9]\ [8]\ [{}^{n-1}0]\ [1]$$

For example

when n = 1	9^2 = 81
when n = 2	99^2 = 9,801
when n = 15	$999{,}999{,}999{,}999{,}999^2$ = 999,999,999,999,998,000,000,000,000,001

$$[{}^{n}1]^2 = (1)^2/(3)^2 \text{ x } [{}^{n}3]^2$$

For example

when n = 1	1^2 = 1/9 x 9	or 1
when n = 2	11^2 = 1/9 x 1,089	or 121
when n = 3	111^2 = 1/9 x 110,889	or 12,321

$$[{}^{n}2]^2 = (2)^2/(3)^2 \text{ x } [{}^{n}3]^2 \quad \text{or} \quad 4/9 \text{ x } [{}^{n}3]^2$$

For example

when n = 1	2^2 = 4/9 x 9	or 4
when n = 2	22^2 = 4/9 x 1,089	or 484
when n = 3	222^2 = 4/9 x 110,889	or 49,284

$$[{}^{n}4]^2 = (4)^2/(3)^2 \text{ x } [{}^{n}3]^2 \quad \text{or} \quad (2)^2 \text{ x } [{}^{n}2]^2$$

For example

when n = 1	4^2 =16/9 x 9	= 4 x 4	or 16
when n = 2	44^2 = 16/9 x 1,089	= 4 x 484	or 1,936
when n = 3	444^2 = 16/9 x 110,889	= 4 x 49,284	or 197,136

$$[{}^{n}5]^2 = (5)^2/(3)^2 \text{ x } [{}^{n}3]^2$$

For example

when n = 1	5^2 = 25/9 x 9	or 25
when n = 2	55^2 = 25/9 x 1,089	or 3,025
when n = 3	555^2 = 25/9 x 110,889	or 308,025

$[^n 7]^2 = (7)^2/(3)^2 \times [^n 3]^2$

For example

when n = 1	$7^2 = 49/9 \times 9$	or 49
when n = 2	$77^2 = 49/9 \times 1{,}089$	or 5,929
when n = 3	$777^2 = 49/9 \times 110{,}889$	or 603,729

$[^n 8]^2 = (8)^2/(3)^2 \times [^n 3]^2$ or $(4)^2 \times [^n 2]^2$

For example

when n = 1	$8^2 = 64/9 \times 9$	= 16 x 4	or 64
when n = 2	$88^2 = 64/9 \times 1{,}089$	= 16 x 484	or 7,744
when n = 3	$888^2 = 64/9 \times 110{,}889$	= 16 x 49,284	or 788,544

$[^n 0]^2 = [^{2n} 0]$

For example when n = 2 $00^2 = 0{,}000$

Well this portion of the theory looks fairly useless but from it springs:

$([X]\ [^n 0])^2 = [X]^2\ [^{2n} 0]$

For example

when X = 1 and n = 1	$10^2 = 100$
when X = 1 and n = 2	$100^2 = 10{,}000$
when X = 1 and n = 15	$1{,}000{,}000{,}000{,}000{,}000^2 = 1{,}000{,}000{,}000{,}000{,}000{,}000{,}000{,}000{,}000{,}000$
when X = 8 and n = 15	64,000,000,000,000,000,000,000,000,000,000

$([X]\ [^n 0])^m = [X]^m\ [^{mn} 0]$

For example when X = 6, n = 3, m = 5

$6{,}000^5 = 7{,}776{,}000{,}000{,}000{,}000{,}000$

I do not claim the invention of pattern mathematics for 0's. That precedes me. I have included this formula for the sake of completeness.

Second Set of Formulas

The second set of equations is power formulas for the digit 9.

$[^n 9]^2 = [^{n-1} 9]\ [8]\ [^{n-1} 0]\ [1]$

$[^n 9]^3 = [^{n-1} 9]\ [7]\ [^{n-1} 0]\ [2]\ [^n 9]$

$[^n 9]^4 = [^{n-1} 9]\ [6]\ [^{n-1} 0]\ [5]\ [^{n-1} 9]\ [6]\ [^{n-1} 0]\ [1]$

$[^n 9]^5 = [^{n-1} 9]\ [5]\ [^{n-1} 0]\ [^n 9]\ [^n 0]\ [4]\ [^n 9]$

$[^n 9]^6 = [^{n-1} 9]\ [4]\ [^{n-2} 0]\ [1]\ [4]\ [^{n-2} 9]\ [8]\ [^{n-1} 0]\ [1]\ [4]\ [^{n-1} 9]\ [4]\ [^{n-1} 0]\ [1]$

for n equal to or greater than 2

$[^n 9]^7 = [^{n-1} 9]\ [3]\ [^{n-2} 0]\ [2]\ [0]\ [^{n-2} 9]\ [6]\ [5]\ [^{n-2} 0]\ [3]\ [4]\ [^{n-2} 9]\ [7]\ [9]\ [^{n-1} 0]\ [6]\ [^n 9]$

for n equal to or greater than 2

One interesting aspect for the power formulas for digit 9 is their ability to support a flip side. The decimal location can be shifted from the right side to the left side and the equations will still hold true.

$$([0]\,.\,[^{n}9])^2 = [0]\,.\,[^{n-1}9]\,[8]\,[^{n-1}0]\,[1]$$

For example if $n = 15$ then $(0.999999999999999)^2 = 0.999999999999998000000000000001$

$$([0]\,.\,[^{n}9])^3 = [0]\,.\,[^{n-1}9]\,[7]\,[^{n-1}0]\,[2]\,[^{n}9]$$

$$([0]\,.\,[^{n}9])^4 = [0]\,.\,[^{n-1}9]\,[6]\,[^{n-1}0]\,[5]\,[^{n-1}9]\,[6]\,[^{n-1}0]\,[1]$$

$$([0]\,.\,[^{n}9])^5 = [0]\,.\,[^{n-1}9]\,[5]\,[^{n-1}0]\,[^{n}9]\,[^{n}0]\,[4]\,[^{n}9]$$

$$([0]\,.\,[^{n}9])^6 = [0]\,.\,[^{n-1}9]\,[4]\,[^{n-2}0]\,[1]\,[4]\,[^{n-2}9]\,[8]\,[^{n-1}0]\,[1]\,[4]\,[^{n-1}9]\,[4]\,[^{n-1}0]\,[1]$$

for n equal to or greater than 2

$$([0]\,.\,[^{n}9])^7 = [0]\,.\,[^{n-1}9]\,[3]\,[^{n-2}0]\,[2]\,[0]\,[^{n-2}9]\,[6]\,[5]\,[^{n-2}0]\,[3]\,[4]\,[^{n-2}9]\,[7]\,[9]\,[^{n-1}0]\,[6]\,[^{n}9]$$

for n equal to or greater than 2

Prologue

My old notebook contains a few other formulas from almost 40 years ago. They are significantly more complex. I no longer have the sharp focus I had when I was young. When I stare at them today, my brain fogs over and if I stare too intently I get headaches. Besides it would take a supercomputer to prove or disprove them. So I have left these others off the list.