

The Magic Properties of Holy Turtle Magic Squares

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Abstract

Holy Turtle Magic Square is defined according to the first known Magic Square. Holy Turtle Magic Squares contain an additional magic property: “any two numbers with center symmetry are complimentary to each other; their sum is equal to two times the center digit.”

History of the first Magic Square

Legends that came before a written language was developed usually are questionably true, but they do reflect some historical events that pass from generation to generation by spoken language.

He Tu and Luo Shu were mentioned in many ancient Chinese literatures. For example, in The Book of Yi it was written: “The heavenly messages from the Holy Picture that came from He and from the Holy Book that came from Luo are being followed by our bright leaders”. Around 120 BC in West Han Dynasty, Kong An-Guo, a descendant of Confucius, wrote his interpretation of the words that were in The Book of Shang Shu as: “Holy Picture of He was found when King Fu Xi (the first of Three Ancient Kings in China, around 30th century BC or earlier) saw a dragon horse rise from Huang He (Yellow River) with a pictured message. He drew the message and made Bagua. King Da Yu (the founder of Xia Dynasty, Xia is the first Dynasty in China from 21st to 16th century BC) was given the Holy Book of Luo. It was carried on the back of a holy turtle when he was working to prevent the Yellow River from flooding. It had nine numbers. He followed this heavenly message and divided everything into nine categories”. The earliest Chinese books named He Tu and Luo Shu were actually drawings with no written language. They have been known as “The Books from Heaven with no words”. These drawings are numbers in orderly patterns. The message from the turtle was carved on its shell. It was arranged in a 3X3 square matrix. The sum of the numbers in any direction equals 15. It is known to be the first and the smallest Magic Square.

From He Tu and Luo Shu, Yi Jing (also known as “The Book of Changes”) was later developed. Based on this knowledge, Astronomy, Geography, Mathematics, Feng Shui, governing, and much more knowledge were eventually derived in China.

Definition of Magic Squares and Holy Turtle Magic Squares

In general a Magic Square matrix is defined as a square matrix that fulfills the following conditions:

1. The sum of each row is the same.
2. The sum of each column is the same.
3. The sum of each diagonal is the same.
4. The sums listed above are all equal to each other.

There are many kinds of Magic Squares, but the one that came from the holy turtle is very unique. First, it is an odd numbered Magic Square. Second, it is sequential numbered starting with “1”. Third, one of the diagonals is sequential numbered. Fourth, the first number “1” is started right next to the center grid. Fifth, the center digit is also the central number among all the digits. We may classify this type of Magic Square as the “Holy Turtle Magic Square”.

Anatomy of a 9X9 Holy Turtle Magic Square

Since Guo successfully constructed a super constrained Fu Xi Sudoku^{1,2} by modifying a 9X9 Holy Turtle Magic Square using only nine digits repeatedly, it was found that a Holy Turtle Magic Square contained more numbering magic than we previously thought.

In a 9X9 Holy Turtle Magic Square filled with digits from 1 to 81 (Figure 1), the sums of every row, every column, and the two diagonals all obey the Magic Square definition with their nine digit sums all equal to 369. However, we found this matrix also possesses nine San sets¹ and nine Chuan sets¹. The sums of all these sets are also equal to 369. Moreover, the centered 3X3 box and the radiated Plum set^{1,3,4} that includes the center digit also have sums equal to 369.

In addition, the centered Plum set forms a true 3X3 Magic Square. If all three numbers either in row, column, or diagonal in this Plum set are added up, they all equal to 123, one third of 369.

After a detailed analysis of this 9X9 Holy Turtle Magic Square, we found there is another stunning magic property that is absent in many Magic Squares. This unique property is: “any two numbers that form a center of symmetry are complimentary to each other, their sum is equal to two times the center digit.” This property is also present in any 3X3 Magic Square.

With this property in Holy Turtle Magic Square matrix, we found that all lines/shapes/etc., with the same number of digits and a pattern of center symmetry, would have sums that equal to a constant. For example, if we choose eleven digits as our

choice, then we can think of any pattern that includes eleven digits and also possesses a center of symmetry in this matrix such as:

A1, B1, C2, D3, E4, E5, E6, F7, G8, H9, I9
 or C1, C2, C3, D4, D5, E5, F5, F6, G7, G8, G9
 or A2, A3, B1, C1, D4, E5, F6, G9, H9, I7, I8
 or A8, A9, B8, C7, D6, E5, F4, G3, H2, I1, I2

where each symbol represents a unique grid on the Holy Turtle Magic Square chart shown in Figure 1. The above four sets of grids are just a few examples of all the possible combinations of eleven digits that have sums equal to 451. The choice of numbers and patterns are unlimited. It may not be a coincidence that the famous Yin Yang Fish or Tai Ji Fish diagram in a Bagua also has this kind of symmetrical pattern.

	A	B	C	D	E	F	G	H	I
1	37	78	29	70	21	62	13	54	5
2	6	38	79	30	71	22	63	14	46
3	47	7	39	80	31	72	23	55	15
4	16	48	8	40	81	32	64	24	56
5	57	17	49	9	41	73	33	65	25
6	26	58	18	50	1	42	74	34	66
7	67	27	59	10	51	2	43	75	35
8	36	68	19	60	11	52	3	44	76
9	77	28	69	20	61	12	53	4	45

Figure 1, a 9X9 Holy Turtle Magic Square chart presented in a spread sheet arrangement.

Reference

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4. Jau-Min S. Guo, "Dieluohan, a New Frontier for Multiple Sudoku Overlaps",
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