

MOSTLY PERFECT



Michael Daniels

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Effect

Performer instantly creates a 4x4 Magic Square for any total freely chosen by the spectator.¹ The total can be obtained from the magic square in at least 36 different ways.

- Completely impromptu. No set-up or gimmicks.
- Very simple calculations.
- No difficult memory work.
- Suitable for stage or close-up performances.
- Produces elegant magic squares – all numbers differ and have a range (largest minus smallest) not exceeding 16.
- Each magic square is different so that the effect can be immediately repeated for different totals.
- Create magic squares for any total from 34 to 9999 (or greater).
- Includes a **browser application** that helps you to learn and practice (Internet connection not required).

Magic Squares

A magic square is a series of numbers arranged in a square so that (minimally) the values in each row, each column and both diagonals add up to the same *summation constant* or total (T). Magic squares of different sizes can be created, for example:²

8	1	6
3	5	7
4	9	2

T = 15

1	15	14	4
12	6	7	9
8	10	11	5
13	3	2	16

T = 34

17	24	1	8	15
23	5	7	14	16
4	6	13	20	22
10	12	19	21	3
11	18	25	2	9

T = 65

1	35	34	3	32	6
30	8	28	27	11	7
24	23	15	16	14	19
13	17	21	22	20	18
12	26	9	10	29	25
31	2	4	33	5	36

T = 111

The mathematics, symmetry and symbolism of magic squares have fascinated people for thousands of years. In many cultures they are believed to be imbued with 'magical' qualities, and are sometimes worn as amulets to bring fortune.

¹ Total must be at least 34.

² A 3 x 3 square is the smallest that can be created.

Some Notable Magic Squares

The Lo Shu Square

The Lo Shu square is an ancient 3x3 magic square which features in Chinese divination. Some people claim that it may date to around 2800 BCE.

4	9	2
3	5	7
8	1	6

All other normal 3x3 magic squares are rotations and/or reflections of the Lo Shu square.

The Jaina Square

This famous square is described in *Magic Squares and Cubes* by W.S. Andrews³ as dating to the 11th Century CE.

7	12	1	14
2	13	8	11
16	3	10	5
9	6	15	4

The *Jaina Square* (so named because it is also found in a 12th or 13th Century Jaina/Jain inscription at Khajuraho, Northern India) is an example of what has been termed a **'diabolic'** or **'most-perfect'** magic square because it has additional properties that enable the summation constant (T) to be produced in many different ways (more on most-perfect magic squares later).

The Dürer Square

This 4x4 magic square is featured in Albrecht Dürer's (1471-1528) famous engraving "Melancholia" (1514).

16	3	2	13
5	10	11	8
9	6	7	12
4	15	14	1

Note the date 1514 in the bottom row.

³ Andrews, W.S. (1917). *Magic Squares and Cubes*, 2nd Edition. Open Court [Republished by Dover Publications, 1960]

The Agrippa Magic Squares

Heinrich Cornelius Agrippa (1486-1535) was an occultist, astrologer and alchemist who attributed specific magic squares to the seven 'planets' known at the time.⁴

Saturn	Jupiter	Mars	Sun
4 9 2	4 14 15 1	11 24 7 20 3	6 32 3 34 35 1
3 5 7	9 7 6 12	4 12 25 8 16	7 11 27 28 8 30
8 1 6	5 11 10 8	17 5 13 21 9	19 14 16 15 23 24
T = 15	16 2 3 13	10 18 1 14 22	18 20 22 21 17 13
	T = 34	23 6 19 2 15	25 29 10 9 26 12
		T = 65	36 5 33 4 2 31
			T = 111
Venus	Mercury		
22 47 16 41 10 35 4	8 58 59 5 4 62 63 1		
5 23 48 17 42 11 29	49 15 14 52 53 11 10 56		
30 6 24 49 18 36 12	41 23 22 44 45 19 18 48		
13 31 7 25 43 19 37	32 34 35 29 28 38 39 25		
38 14 32 1 26 44 20	40 26 27 37 36 30 31 33		
21 39 8 33 2 27 45	17 47 46 20 21 43 42 24		
46 15 40 9 34 3 28	9 55 54 12 13 51 50 16		
T = 175	64 2 3 61 60 6 7 57		
	T = 260		
Moon			
37 78 29 70 21 62 13 54 5			
6 38 79 30 71 22 63 14 46			
47 7 39 80 31 72 23 55 15			
16 48 8 40 81 32 64 24 56			
57 17 49 9 41 73 33 65 25			
26 58 18 50 1 42 74 34 66			
67 27 59 10 51 2 43 75 35			
36 68 19 60 11 52 3 44 76			
77 28 69 20 61 12 53 4 45			
T = 369			

⁴ *De occulta philosophia libri tres (Three Books Concerning Occult Philosophy)*, 1531-1533.

'Most-Perfect' Magic Squares

Mostly Perfect uses a 4x4 example from the subclass of 'most-perfect' magic squares. In addition to summing to T across the rows, columns and diagonals, 'most-perfect' magic squares⁵ have the additional mathematical properties that:⁶

- The squares are **pandiagonal** (or, panmagic), meaning that the rows or columns wrap around (a row or column can be moved from one side of the square to the other).
- Every 2x2 set of numbers adds to T.
- All pairs of numbers that are separated diagonally by half the number of rows (or columns) add up to T/2.
- Because every 'most-perfect' magic square is also **pandiagonal**, these pairs of diagonally-separated numbers also wrap around from one row or column to connect with the row or column on the opposite side.

For example, consider the well-known 4x4 'most-perfect' magic square used by Harry Lorayne in his 'Instant Magic Square' presentation.⁷

8	11	14	1
13	2	7	12
3	16	9	6
10	5	4	15

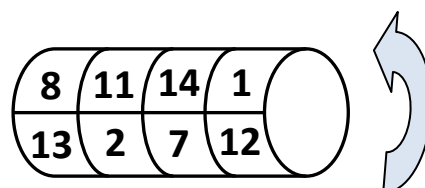
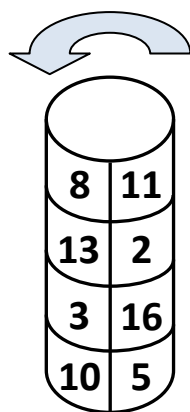
Here, not only does each row, column and diagonal sum to T=34, but also:

- Every 2x2 subset sums to 34.
- Every pair of values, TWO squares apart on ANY diagonal sums to T/2 = 17. For example, 14+3=17; 13+4=17.
- Because the square is **pandiagonal**, pairs of values diagonally separated in this way can be wrapped around from an end row or column to the row or column on the other side. These relationships are illustrated in the diagrams below

⁵ See Kathleen Ollerenshaw & David Bree (1998). *Most Perfect Pandiagonal Magic Squares: Their Construction and Enumeration*. The Institute of Mathematics and its Applications.

⁶ Most-perfect magic squares always have an EVEN number of columns and rows, and an unbroken sequence of numbers.

⁷ Harry Lorayne (1977). *The Magic Book*. London: W.H. Allen (pp. 218-222).



8	11	14	1	8	11	14	1	8	11	14	1
13	2	7	12	13	2	7	12	13	2	7	12
3	16	9	6	3	16	9	6	3	16	9	6
10	5	4	15	10	5	4	15	10	5	4	15
8	11	14	1	8	11	14	1	8	11	14	1
13	2	7	12	13	2	7	12	13	2	7	12
3	16	9	6	3	16	9	6	3	16	9	6
10	5	4	15	10	5	4	15	10	5	4	15
8	11	14	1	8	11	14	1	8	11	14	1
13	2	7	12	13	2	7	12	13	2	7	12
3	16	9	6	3	16	9	6	3	16	9	6
10	5	4	15	10	5	4	15	10	5	4	15

Note how the original 4x4 square is repeated in a tile pattern. Also note how EVERY pair of values TWO squares apart on ANY diagonal add up to $T/2 = 17$ (e.g., the pairs of values in pink).

As a consequence of these relationships, EVERY 4x4 square in the diagram above is itself a **most-perfect pandiagonal magic square** (e.g., the squares in yellow). In fact, there are 16 different most-perfect magic squares that are based on the original square. Also, because every magic square retains its properties when it is rotated through 90, 180, or 270 degrees (clockwise or anticlockwise), or when any of the four possible rotational arrangements are reflected in a mirror, there are actually $16 \times 4 \times 2 = 128$ most-perfect 4x4 magic squares that can be derived from any original 4x4 most-perfect square.

Using the Learning Tool

With your purchase of this ebook, you will have received a software application that will generate *Mostly Perfect* magic squares and will help you to learn how to create them. To start the program, simply open the application file (**perfect.html**) in your web browser (e.g., Internet Explorer, Firefox, Safari, Chrome). You do NOT need to be connected to the Internet.¹³

You will first see the screen shown below.

You can either enter a value for T in the box (34-9999), or you can generate a random value by clicking on one of the three Rand buttons. 'Rand99' will generate a value between 34 and 99, 'Rand999' between 100 and 999, and 'Rand9999' between 1000 and 9999. Once you have a value for T, you can click 'Show S, X' if you want to check your initial mental calculations. You can also generate the *Mostly Perfect* magic square by clicking 'Make Square'. This will enable you to check whether you have completed the square correctly.

When you click 'Make Square', the totals for all summation patterns are also computed and these are shown on the 52 buttons surrounding the *Mostly Perfect* square. By clicking on these buttons, you can see the four cells corresponding to each summation pattern. Green buttons indicate that the total for the pattern equals T. Pink buttons indicate that the total does NOT equal T. Pink buttons are obtained only when the value of T is ODD. When T is EVEN, all 52 buttons will be green.

¹³ The application uses JavaScript and you will need to enable this in your browser, or allow blocked content.

Further Resources for Magic Squares

Books

- Andrews, W.S. (1917). *Magic Squares and Cubes*, 2nd edition. Open Court Publishing Company. [Republished by Dover, 1960].
- Corinda, T. (1984). *13 Steps to Mentalism*. Supreme Magic Company. (pp. 65-66).
- Dalal, S. (2011). *Patterns of Perfection Revisited*. www.lybrary.com
- Dexter, W. (1974). *Feature Magic for Mentalists*. Supreme Magic Company. (pp. 95- 102).
- Dyment, D. (2008). *Stimulacra*. 2nd (revised) printing. www.deceptionary.com
- Dyment, D. (2011). *Mindsights*. 2nd (revised) printing. www.deceptionary.com
- Farrar, M.S. (2006). *Magic Squares*. <http://www.MagicSquaresBook.com/>
- Fritz, B. (2010). *Magic Squares for the Mathematically Challenged*. www.scribd.com
- Fulves, K. (1983). *Self-Working Number Magic*. Dover.
- Gardner, M. (1966) *More Mathematical Puzzles and Diversions*. Pelican Books. (Chap. 12).
- Heath, R. V. (1953) *Mathemagic*. Dover.
- Lorayne, H. (1977). *The Magic Book*. W.H. Allen. (pp. 218-222).
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- Meyer, O. (1961). *The Amazing Magic Square and Master Memory Demonstration*. www.lybrary.com
- Ollerenshaw, K. & Bree, D. (1998). *Most Perfect Pandiagonal Magic Squares: Their Construction and Enumeration*. The Institute of Mathematics and its Applications.
- Wasshuber, C. (nd). *The Ultimate Magic Square (That's Magic)*. www.lybrary.com

Websites

- Collection of Magic Squares and Figures. www.taliscope.com/Collection_en.html
- Grey Matters: Blog (Scott Cram). <http://headinside.blogspot.com/>
- Magic Square (Wikipedia). http://en.wikipedia.org/wiki/Magic_square
- Magic Squares (Mark Farrar). www.markfarrar.co.uk/msfmsq01.htm
- Perfect Magic Squares. www.perfectmagicsquares.com/

Contact

If you have any comments or questions about *Mostly Perfect*, or any of my other effects, or wish to share your ideas on any aspects of methodology or presentation, you can email me at mike@mindmagician.org

I look forward to hearing from you.



Mike Daniels

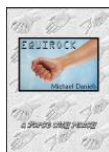
www.mindmagician.org

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"Mostly Perfect creates the most well-balanced magic square I've ever seen ... And it's not even hard to do ... Mostly Perfect is a great contribution to the world of magic squares literature, and I highly recommend it if you have any interest in magic squares whatsoever"

Magic Squares Blog (Mark Farrar)

Read Mark Farrar's full review of *Mostly Perfect* at <http://www.magicsquaresbook.com/blog/review-of-mostly-perfect-by-mike-daniels/>

Also by Michael Daniels**Equirock: A Force with Punch**

Michael Daniels

<http://www.lybrary.com/equirock-p-84246.html>**Double Scam**

Michael Daniels

<http://www.lybrary.com/double-scam-p-102771.html>**Reversal Plus**

Michael Daniels

<http://www.lybrary.com/reversal-plus-p-103958.html>**Divinorum**

Michael Daniels

<http://www.lybrary.com/divinorum-p-107076.html>**Trinities**

Michael Daniels

<http://www.lybrary.com/trinities-p-111665.html>**Speed Dating**

Michael Daniels

<http://www.lybrary.com/speed-dating-p-119767.html>**Three Easy Pieces**

Michael Daniels

<http://www.lybrary.com/three-easy-pieces-p-136615.html>**More Mind Magic**

Michael Daniels

<http://www.lybrary.com/more-mind-magic-p-187779.html>**Jiggery Pokery: A Three-Phase Texas Hold'em Routine for Mentalists**

Biagio Fasano and Michael Daniels

<http://www.lybrary.com/jiggery-pokery-p-247787.html>

Appendix

Blank Squares

(Print, cut and laminate as required)

