

Everyone can participate in these puzzles, compare notes, and share solutions. *Enjoy!*

Magic Squares

What makes a square magic? In math, it's the strategic arrangement of numbers in a grid. If numbers can be arranged so that the sum of each row, column, and diagonal are the same, there's magic to be explored! There are many interesting patterns and properties in magic squares, some artistic, some famous, and some yet to be discovered.

Sixteenth century artist Albrecht Dürer included a cleverly crafted magic square in one of his engravings, Melancholia. The number arrangement reveals the date of the masterpiece; the two numbers in the middle of the bottom row form the year 1514. What is the magic number (the sum of each row, column, and diagonal) for Dürer's square?

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

Benjamin Franklin created some artistic magic in an 8x8 square. When you connect the numbers in order, you reveal a wonderfully symmetric design. Franklin's square has magic rows and columns; to see the magic in the diagonals you need to find their average. Connect the numbers from 1 to 64 with straight lines to reveal Ben's magic design.

52	61	4	13	20	29	36	45
14	3	62	51	46	35	30	19
53	60	5	12	21	28	37	44
11	6	59	54	43	38	27	22
55	58	7	10	23	26	39	42
9	8	57	56	41	40	25	24
50	63	2	15	18	31	34	47
16	1	64	49	48	33	32	17

Sudoku puzzles are a variation of magic squares. The goal in solving Sudoku is to have each number appear only once in each row, column, and small square within the large square. The puzzles are a nest of magic squares; instead of finding magic in the diagonals, you find it in the nested squares.

1	2	3	4
4	3	2	1
3	4	1	2
2	1	4	3

Can you complete the magic in these Sudoku puzzles? Discuss your strategies.

3		1	
4	1	2	3
	4		2
	3		1

4	8		5	9				7
	5	6				8	4	
3		7	6	4	8			
		5	3			7		6
7	2	9		6		4		8
				7			9	2
		8					5	
2			4			9		3
		4	9	8	2	6	7	1

Sudoku puzzles don't always use numbers. You will find some puzzles with shapes or letters. You won't get a sum of course, but the letters could be used to spell a special phrase. Use the same logic you use with the numerical Sudoku to solve. Share your ideas for solving.

M	A	T	H
H			A
T			M
A	M	H	T

F	I	H						
		N	S		I	A	H	F
S		A	F		M		N	I
U	N	S	M		F		I	
		T			S	F	U	
H				N				
		M			A		F	T
		U	T			N	A	
A	T	F		M		I	S	H

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Magic Squares ANSWER KEY

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1	2	3	4
4	3	2	1
3	4	1	2
2	1	4	3

Can you complete the magic in these Sudoku puzzles? Discuss your strategies.

3	2	1	4
4	1	2	3
1	4	3	2
2	3	4	1

4	8	2	5	9	1	3	6	7
1	5	6	2	3	7	8	4	9
3	9	7	6	4	8	1	2	5
8	4	5	3	2	9	7	1	6
7	2	9	1	6	5	4	3	8
6	1	3	8	7	4	5	9	2
9	6	8	7	1	3	2	5	4
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5	3	4	9	8	2	6	7	1

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M	A	T	H
H	T	M	A
T	H	A	M
A	M	H	T

F	I	H	N	A	T	S	M	U
T	M	N	S	U	I	A	H	F
S	U	A	F	H	M	T	N	I
U	N	S	M	T	F	H	I	A
M	A	T	H	I	S	F	U	N
H	F	I	A	N	U	M	T	S
N	H	M	I	S	A	U	F	T
I	S	U	T	F	H	N	A	M
A	T	F	U	M	N	I	S	H