



## Explanation Magic Sudoku.

This variant is a traditional Sudoku combined with a Magic Square (five by five positions). A number can appear only once in every row, column and block.

### Solution of the Sudoku:

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

### Explanation:

In the Block in the middle (five by five positions) the sum of the numbers (horizontal and vertical) is always 25.

Horizontal, third row:  $5+6+9+1+4 = 25$

Horizontal, fourth row:  $1+9+2+8+5 = 25$

Etc.

Vertical third column  $5+1+7+8+4 = 25$

Vertical, fourth column row:  $6+9+1+4+5 = 25$

Etc.



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

Because the sum of each full row and column (nine positions) is 45, the sum of the remaining four positions in a row and column is: 20.

Horizontal third line:  $2 + 7 + 3 + 8 = 20$

Vertical third column:  $3 + 9 + 2 + 6 = 20$

### Sudoku

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



**Solution examples:**

	6	3				2		
				4			7	
			6	9	1			
3						5		7

In the top line of the magic square the 6, 9 and 1 are filled in; the sum = 16.

Remains for the other two positions:  $25 - 16 = 9$ , possible is: 1 and 8 or 2 and 7 or 6 and 3 or 4 and 5, the 1 is already present so 1 and 8 is not possible.

The 6 and 3 cannot be completed on the first position in the top row of the magic square, are already present in the left upper block, so 3 and 6 is not possible.

2 and 7 are already filled in the right block so the combination 2 and 7 is also not possible.

Therefore remains 4 and 5. 5 cannot be filled in at the most right position because that number is already filled in the 7th column.

The solution is therefore:

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



**Continuation:**

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

In the fifth row in the columns 8 and 9, the 2 and 4 filled.

In this row the sum of the digits in positions 1, 2, 8 and 9 is: 20.

So, the sum of the digits in the first and second column is:  $20 - 6 = 14$ .

Possible is: 9 and 5 or 8 and 6.

8 and 6 is impossible because these numbers are both already found in the left block.

Remains the combination: 9 and 5,

Because the 5 already present in the second column, the solution is:

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

In addition to the solution based on the properties of the magic square all the solution methods of a traditional methods are needed to solve the puzzle.

Good luck !