

# Sixy SUDOKU



Dear puzzler,

Puzzles are a good way to take your mind off the outside world. And each puzzle solved, no matter how hard or easy, is a small source of satisfaction in these hard times.

So here is my small contribution. I hope these free puzzles will make a pleasant diversion to pass the time through the day.

Sixy Sudoku is a variation I developed last year, and it was first published in *The New York Times* on July 21, 2019. The rules: Insert the digits 1-6 just once in each a) row b) column c) bold outlined area AND d) white and gray areas.

Have fun and take care,

~Peter

# PUZZLE-SOLVING FIRST AID

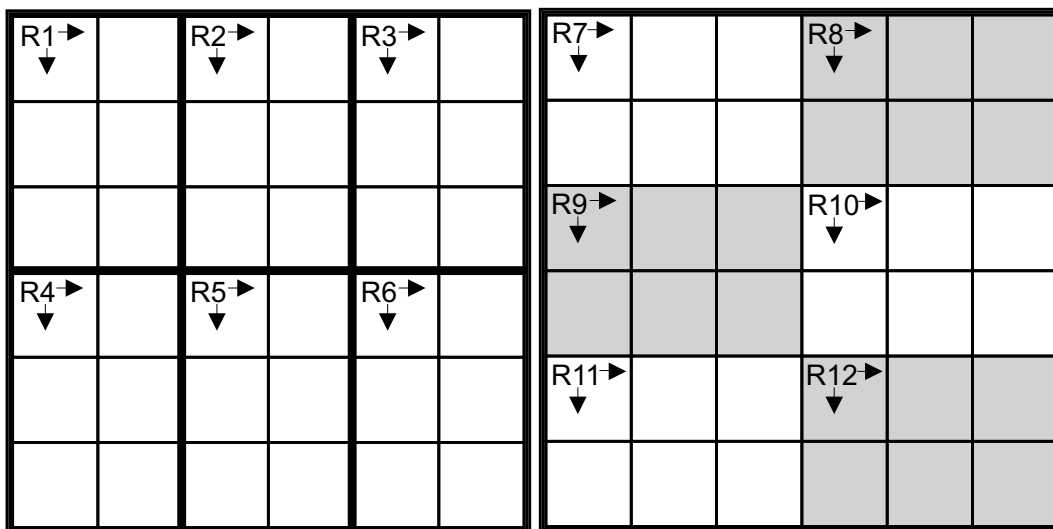
*The rules: insert the digits 1 to 6 in the grid in such a way that each digit occurs just once in each row, column or region.*

There are twelve regions: R1 to R6 are the regions enclosed by a boldface border, regions R7 to R12 are the horizontal white and gray rectangles.

A number of puzzle-solving techniques are reviewed below. Some are simple and can be applied to any puzzle, but others are highly advanced and will only be needed for the most difficult 5 dot puzzles.

1 or 2 dot puzzles can be solved using methods A and B only. In principle the same applies to 3 dot puzzles, but as everyone occasionally misses a trick method C can be very handy. All 4 dot puzzles need trick C several times.

Most important of all: only insert a digit if you are 100% certain that no other digit is possible!



## METHOD A

### *The only possibility in a space*

If there is only one remaining possibility for a space, that digit can be inserted immediately. In that case all the other digits must already have been inserted in the row, column or region, or already been eliminated using another technique.

In the puzzle below for example, this applies to the d1 space. In row d there is already a 1, and boldfaced region R5 (bottom left) already contains a 2. In the gray region in which d1 is located there is already a 3 and a 6, and a 5 in column 1. The only remaining possibility is a 4. How about spaces b3 and d3?

In spite of the simplicity of this method it is easily missed. This particular puzzle can in fact be solved using method A only. Try it for yourself, without using Methods B to E!

	1	2	3	4	5	6
A						
B	5			4		3
C		3	6			
D				1		
E						
F			2			

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## METHOD B

*No other place for the digit*

One method which can often be applied is to check whether there is perhaps only one space left in a particular row, column or region in which a particular digit can be inserted. This method works in column 3 for example, where the only space left for a 4 is f3.

In the middle-left region R3 the only space in which a 5 can still be inserted is c2, after which a 5 should be inserted in space f1 in column 1, and in the top-right region R2 in b6.

This puzzle can be solved using methods A and B only, even though only five digits were given.

	1	2	3	4	5	6
A			5			
B					1	
C				2		
D		4				
E	6					
F						

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# METHOD C

## *Certain uncertainties*

Sometimes it helps if you know approximately where a number should be inserted. In this puzzle methods A and B are of no use to us. But in row f the 4 has to be inserted in f5 or f6. Since both spaces are in boldfaced region R6 at the bottom-right, the 4 can no longer be inserted in the other spaces of that region. It follows from this that the only space in which a 4 can be inserted in column 6 is f6.

Another example: in column 2 a 3 has to be inserted in e2 or f2. Since both spaces are located in boldfaced region R5 at the bottom-left, it is no longer possible to insert a 3 in d1. After which the only space in which a 3 can be inserted in gray region R9 is d3.

Method C can often be used to solve Sixys.

	1	2	3	4	5	6
A	2	1		4		6
B		4				
C				3		
D		2				
E	4					
F			2			

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## METHOD D

### *Digit groups*

In the puzzle below, only the 3 and the 5 can still be inserted in c4 and c5 using method A. They cannot therefore be inserted in the remaining spaces of that row. Which means that a 4 has to be inserted in c2.

Here it was a matter of two digits in two spaces, but the same reasoning applies to three digits and three spaces.

Suppose in another puzzle that it is only possible to insert a 2 or a 3 in a1, a 1 or a 3 in a2, and a 1, 2 or 3 in a3. This means that for those three spaces (a1, a2, a3) there are only three possible digits available (1, 2, 3). Which means it is no longer possible to insert a 1, 2 or 3 in a4, a5 or a6!

	1	2	3	4	5	6
A			5			1
B				2		
C	6			35	35	2
D			3	1		
E				4		
F		1				

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## METHOD E

### *X-wing*

One advanced method is referred to as the 'X-wing'. In the following puzzle the 6 can only be inserted in column 1 in a1 or f1. In column 6 the 6 can only be inserted in a6 or f6. If a 6 is inserted in a1, it follows that a 6 also has to be inserted in f6. And if it is inserted in f1, the 6 in column 6 is inserted in a6. Connecting the combinations by a line produces an X, hence the name X-wing.

Now that a 6 has been inserted in either f1 or f6, it is no longer possible to insert a 6 in any of the remaining spaces of row f (or row a). So the only possibility left for f4 is a 4!

Here the four possibilities are located precisely at the four corners, but this is not strictly necessary. They could also be at b2, b6, d2 and d6 for example.

X-wings occur far more frequently in Sixys than in standard 9x9 sudokus.

	1	2	3	4	5	6
A	○			■	■	○
B		○	4	■	○	■
C	■	6	■	3		
D	■	■	■	○	6	
E				2	■	1
F	○	5		■	■	○

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## IN CONCLUSION

The methods described here are sufficient to solve all the puzzles in these free booklets. Most puzzles can be solved with less. Having said that however, discovering an X-wing in a simple puzzle is a lot of fun, even if you do not need it.

There are other methods out there. Most are variations on the ones described above. But we prefer to let you discover them for yourself!

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