

Killer Sudoku

This puzzle is not simply an extension of sudoku because it involves some new logical procedures. The final answer is exactly like sudoku, where the nine digits can appear only once in any row or column or box, 'box' being the term used for a 3×3 region of the puzzle space. Whereas for sudoku the nine digits are simply nine labels, you have now to consider them having their numerical values. Instead of being presented with part of the answer as in sudoku, where you have enough 'givens' to be able to solve the puzzle, here you have regions marked out, which are called 'cages', and at the top left in each cage are given the sums of the numbers within the cage. These are the givens for this puzzle, but are indirect givens as they do not form part of the final solution. Your task is to supplement sudoku skills by doing some arithmetic, and you will find that there are many more new tactics needed to find the solution.

You will soon remember that the sum within a box must be 45, and this is also the case for rows and columns. If you are new to this puzzle, start with the **gentle** puzzles. You will soon find cages where the digits to fill the cells are fully determined, such as two cells which add to 3, or 4, or 16 or 17, these being respectively 1&2, 1&3, 7&9 and 8&9. Of course there are many more useful sums to be discovered, making these puzzles far more challenging than sudoku!

There is no shame in enjoying the gentle puzzles. This set of gentle puzzles follows a pattern which I call 'broken symmetry', where the 'break' is between the two cages about the centre. I haven't seen this pattern being used by others, but at this stage the symmetry is simply aesthetic. However there are some highly patterned puzzles for which the pattern engenders exceptionally worthwhile problems, for which you will be inventing new solving algorithms. This is certainly not the case with patterned sudokus, nor with any other logic puzzles that I have come across.

I have been making killers for The Observer since 2008, aiming at a level of difficulty just a tad above those in the second **intermediate** set here. The number of cages is less in these puzzles, but there are still usually a number of places where you can find a comfortable start. At this stage you will see more often the benefit in adding up cage values which over-fill (or under-fill) a box by one cell, totalling $45 + x$, so the value for the outside cell must be x . You will find other helpful procedures, but never forget that the basic sudoku rules still apply.

Let us call the third level of difficulty **advanced**. This is the level I aim for on a Sunday, and like to vary between the standard and the special, the special puzzles sometimes making new demands for their solution. A standard advanced puzzle will have a preponderance of cages with four cells, making increased demands on arithmetic. However, interest increases with the introduction of some larger cages, where you might work on what numbers are missing in them, or on how to split them up into more manageable parts.

In this last set you will find the patterned examples, where the pattern often makes the puzzle quite unique. The patterning is most often incomplete as there are not too many fully symmetric patterns that can be used. Some of these patterns I have used before, but here they will appear with a different solution, and because with a changed number pattern the complexity often changes considerably it is a worthwhile exercise.

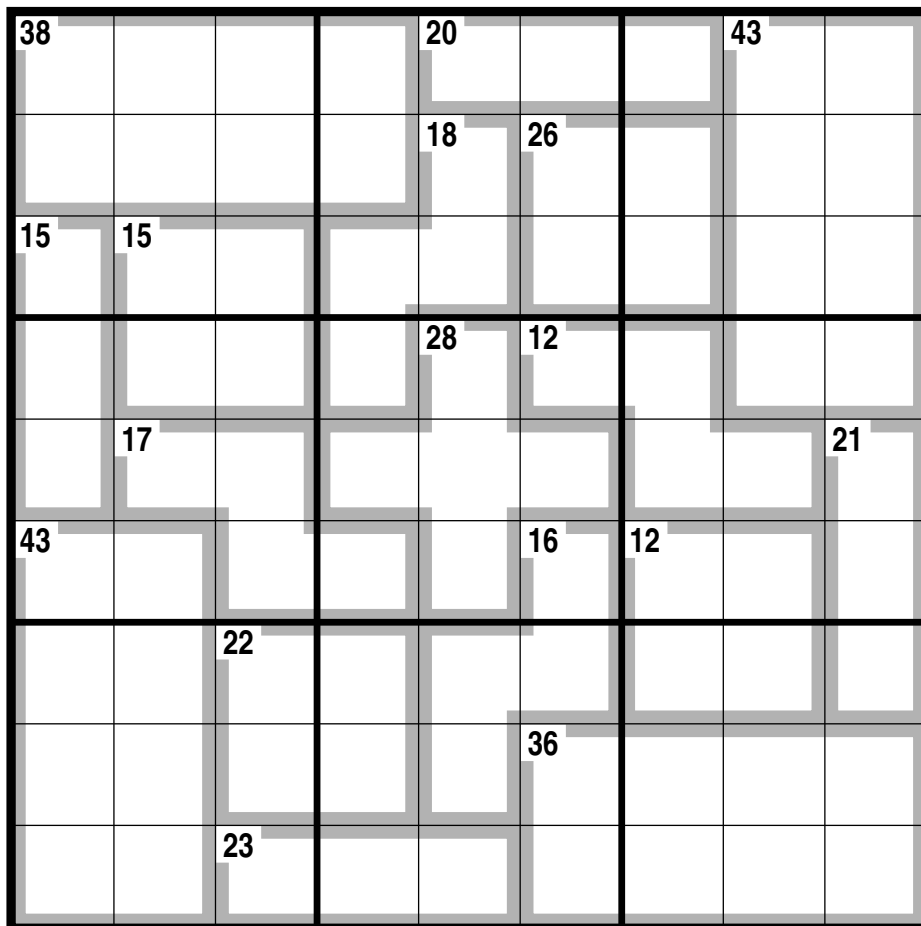
Before you rush off to do the advanced puzzles, have a go at the one on the next page!

I am told that doing puzzles on paper is a thing of the past. I would never agree with this as I am quite happy to have a snooze when the going gets hard, as the going is always easier when I resurface! A snooze in front of a screen with my head on the keyboard is rather uncomfortable! Some of these killers will require plenty of jotting space, in or around the puzzle, so I have chosen to give just two puzzles per page. If a page gives over an hour of puzzling it is surely worth the cost to the puzzler and the planet.

I wrote a book a few years ago, *Killer Sudoku & Other Puzzles* – "How do they do that?", with hints as to how puzzles are made, using a pen name, Godefridus – 'God's peace'. The idea was for profits to go to charity, but profit is a forlorn hope! The compilation here has some of the puzzle types in the book, to which are added a number of others I found in Alex Bellos' book *Puzzle Ninja*. The hope is that all the puzzles here are suitable for pencil & paper solving, with very little need for an eraser.

Killer not impossible

This puzzle follows the pattern of one presented at a Sudoku Olympiad some years ago, with cages larger than I had thought feasible. This one has a different set of numbers, and is possibly a little more difficult, but it can be done. The answer appears as the answer for one of the gentle puzzles!



Killer gentle

4	6	16	14	7	7		13	15
					8			
14		11	3		13		14	15
7	17		6					
		5		29	11		10	5
13	11					9		
		11		10			11	
13	8	9		15	7	17	9	5
		7						

1

2

10		11		10		11	9	
4		20	10	12				17
13				20		8		
8					4	13	13	3
13	6	9	14	28				
						20	7	
10	8				7		11	
	14		14				6	
13			8		6		15	

Killer gentle

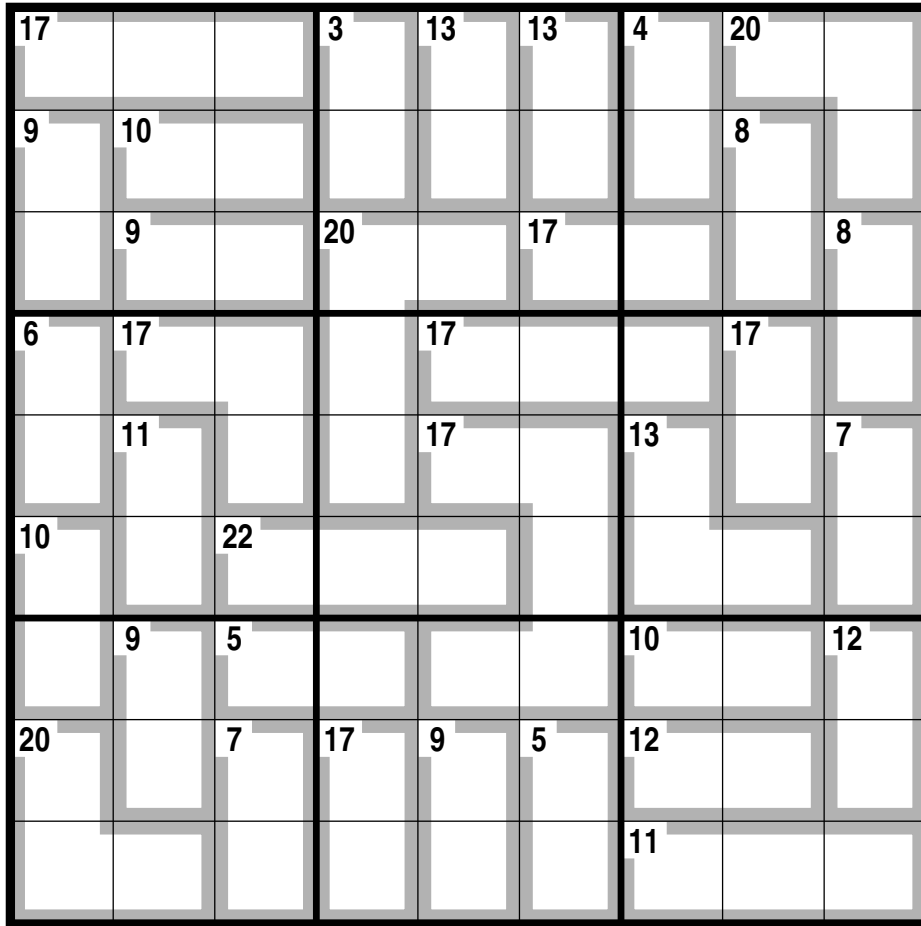
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6		14		12		14		
	14			10		10		7
10	14		14				8	
	9	5	20	8	14			12
11					12	18		
	13						5	

3

4

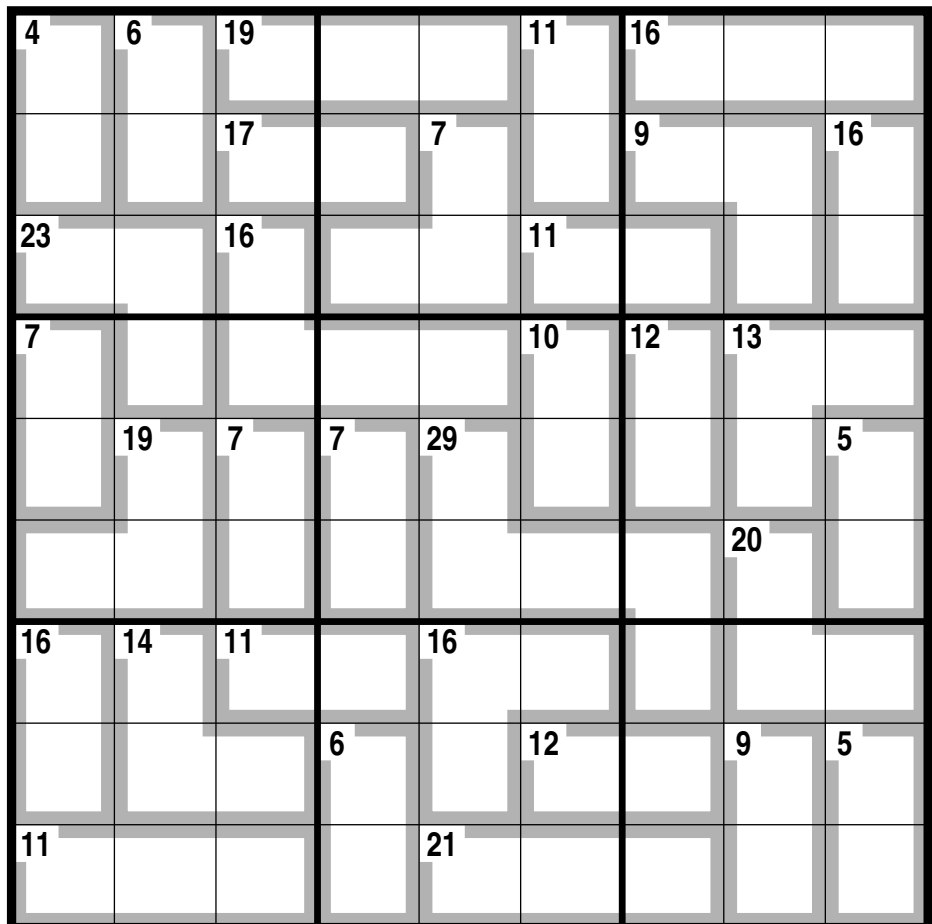
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					5			
12		8		6	8		14	
12		5	16			19		
11				24	11	16	5	
17							5	
8		12			7		9	
10	5	12		9	21		21	
		7				5		

Killer gentle

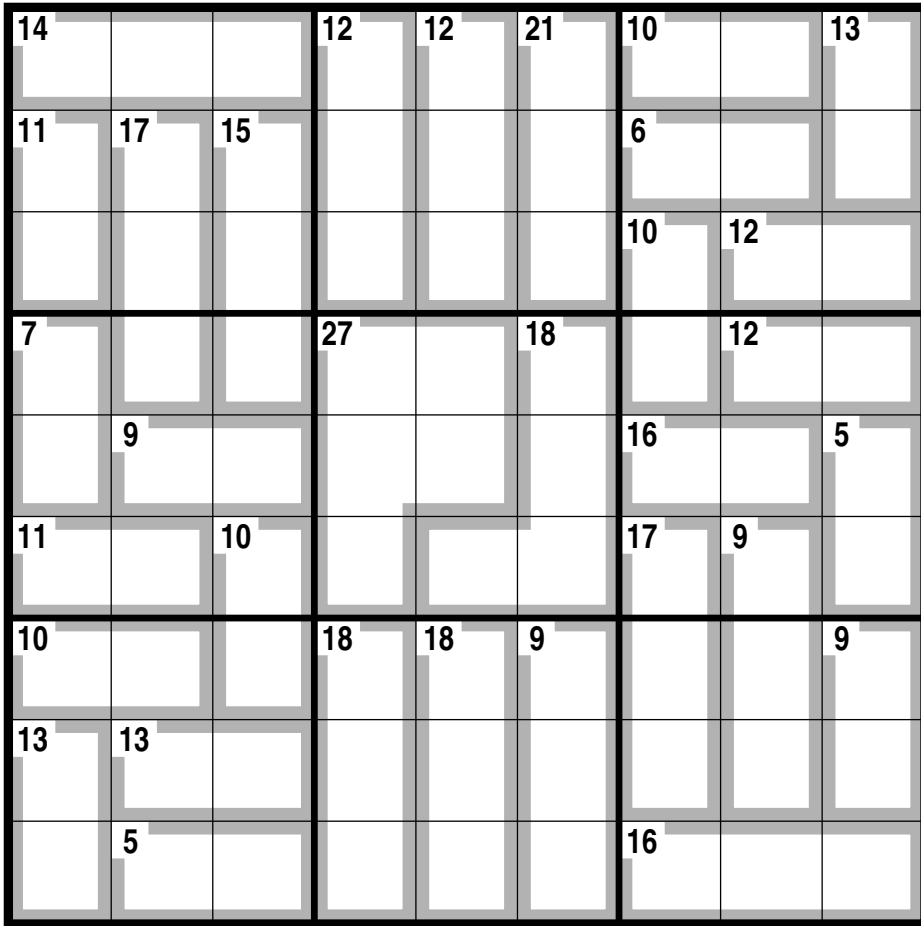


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6

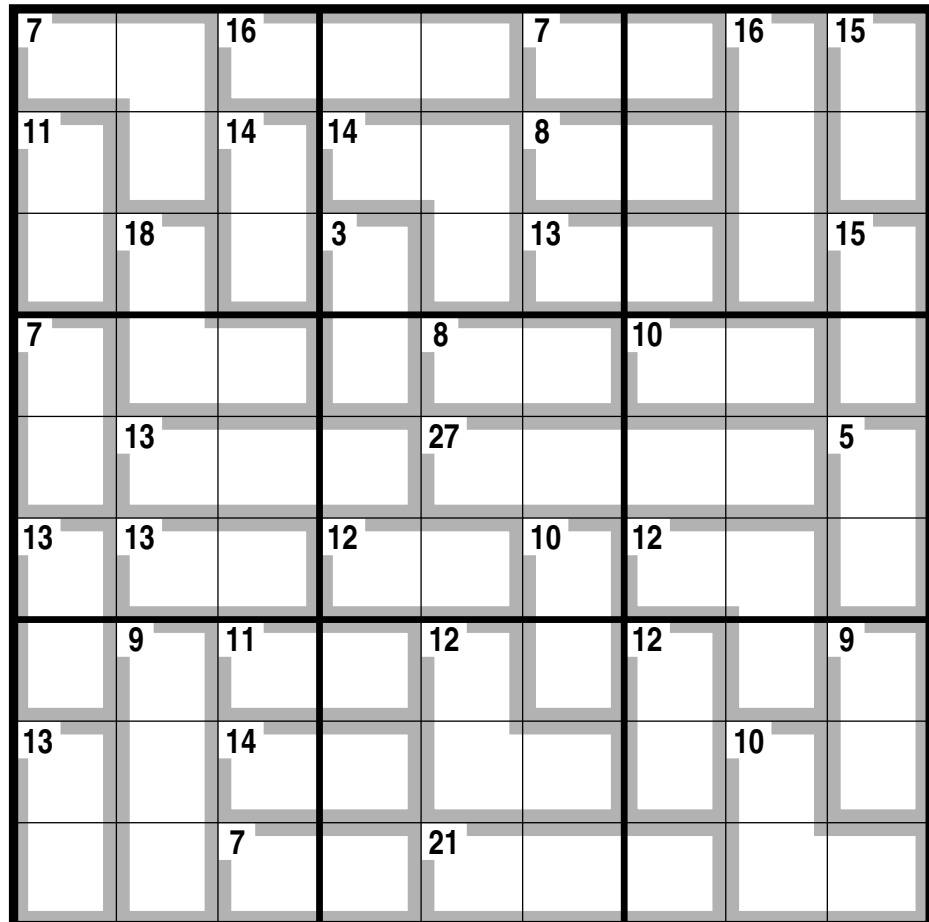


Killer gentle



9

10



Killer gentle

11		16	14			14		
	18		5		15		20	
			13	15	13	3		
12	23						11	
	10			29				14
		15		8	5			
14	11					19	16	
		11		13				10
16			11					

11

18	10		14	13		6		9
					13		14	
9	16			12	19			
	8	8					24	
16		13		22	5		3	
		10			14			10
15	8				16			
		10		14		12	16	
	16		12					

12

Killer gentle

6	11		12		7		14	22
		14	12		13			
14			6	9		11	8	
14								11
6	16	10		23	14			
		5			16		11	
22			13			12	11	
	16			4			7	
		7		13		15		

13

14

7		12		14			12	
7	11		13	19	5	9	14	
	13	10					8	5
8					18			
	9		21	23		12		10
14	12					7	7	
		11	3		13			16
12						5		
9		8			17		11	

Killer gentle

4	13		9		14	10		13
	9		9	13		6		
14		8			20			11
16			15		20	13	7	
	15	7						12
13				12		8		
	12				5		11	
13	13		11			11		5
	5			13		15		

15

16

11		13		20		8		12
8	10		6		10		16	
	8			12	6			
23	8		16			8	11	12
	9	5		18	10			
						14		
7	13	8			16	9		14
		9		16		12		
	12				7		8	

Killer gentle

10		11		10		20	8	9
12		14		10	7			
9		7					8	
5		16	10		13		13	15
11	8		18			5		
				11			10	
14		10	6	8	8		12	
6	15				13		12	
			15		13		3	

17

18

12	14			13			17	
	8	17		14	17		11	
		6				14		
14		4	6			18		
10				26	14	12	12	
17							3	
14			21		5		8	10
12					12			
9		16			19			

Killer gentle

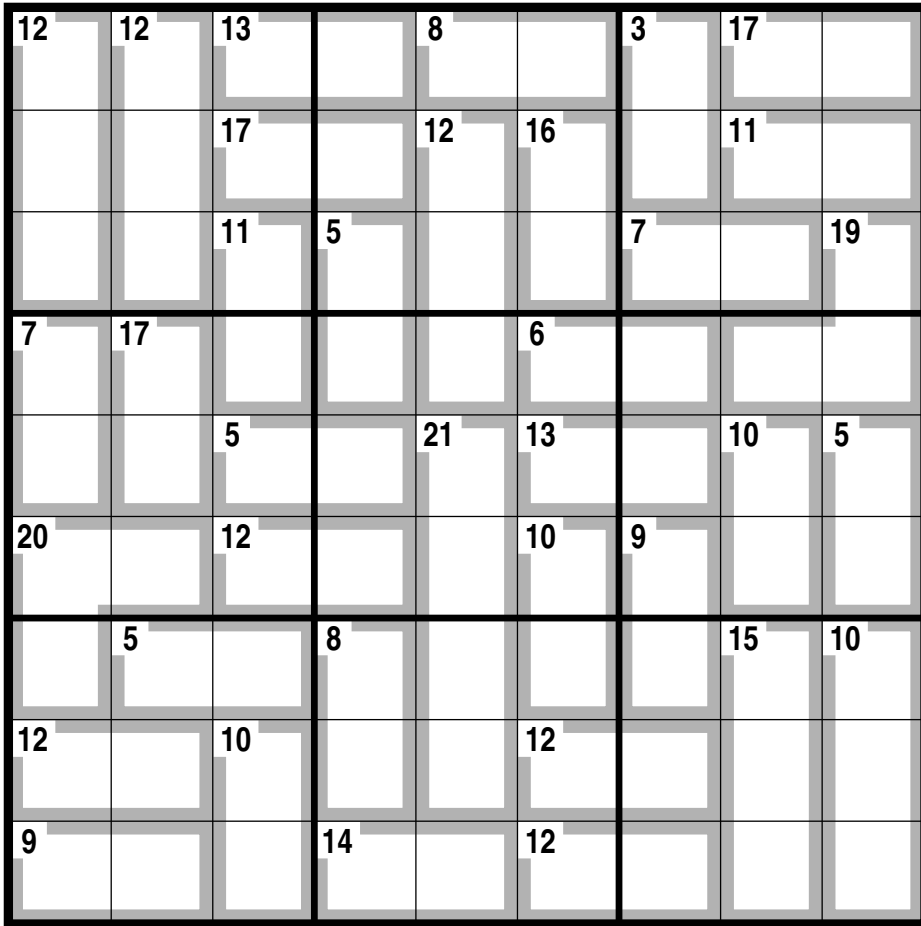
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11							11	
	15	6		11		14		15
7		8		22			13	
	15	19						5
13		8			14		7	
			15		5			9
12		19		10	7	19		
11							8	

19

20

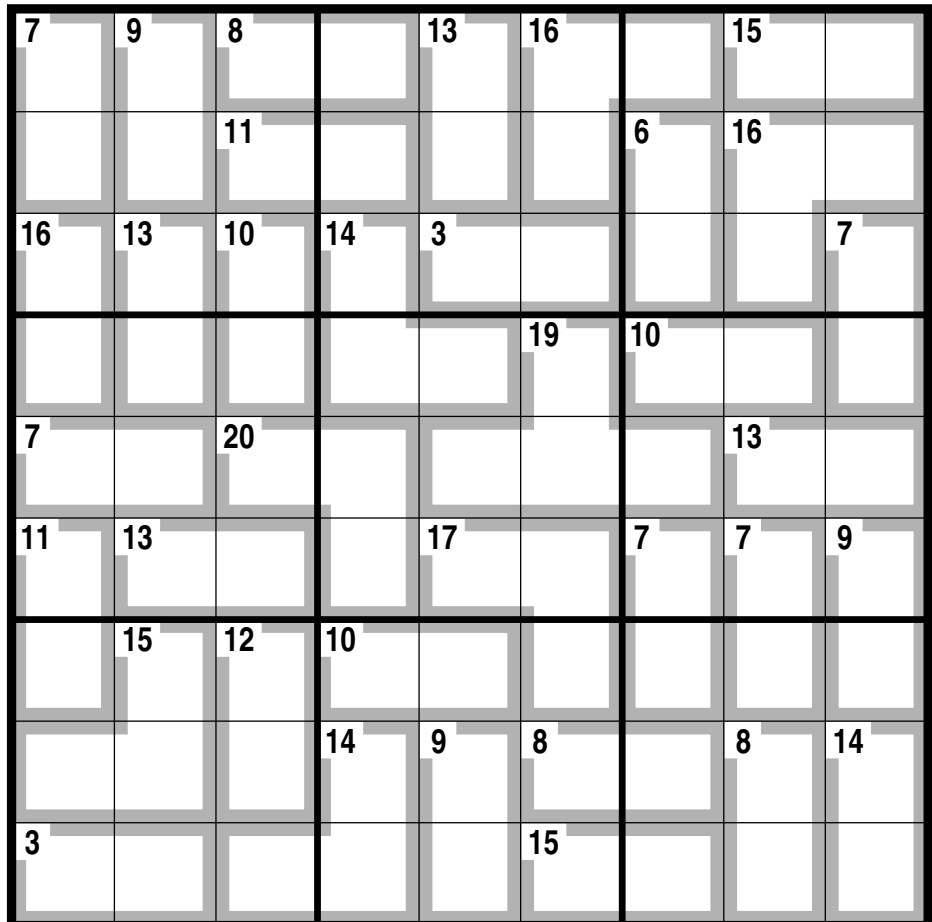
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9			12					
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		18					9	
15				16	11			9
7	20		4			17		
	18			9			6	16
			14		6			

Killer gentle



21

22



Killer gentle

7	17	9	9	14		5	11
				12	20		
13	8			14		11	
	6	12	15			9	9
13			20			17	9
	5			13			7
5		24		7	18	10	
11	8					5	8
		8					

23

24

10		7		11		19	8
14		7		11	16		12
13	5		7				14
	10			6		10	
14		14		9		7	13
12		14			14		7
	14	10				18	9
		14			15		
9		14					5

Killer (gentle) Solutions

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

1

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

2

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

3

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

4

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5

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6

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7

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8

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9

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

12

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8	6	5	1	2	7	4	3	9
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3	5	8	6	9	2	4	7	1
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15

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16

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17

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18

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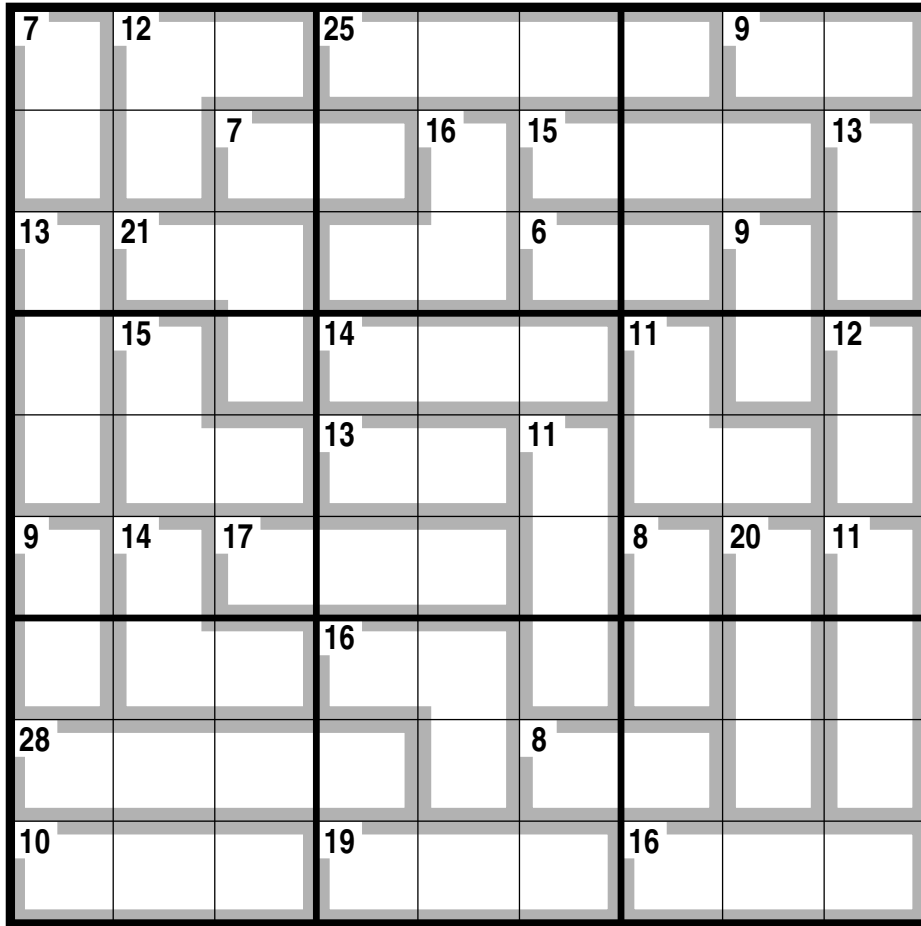
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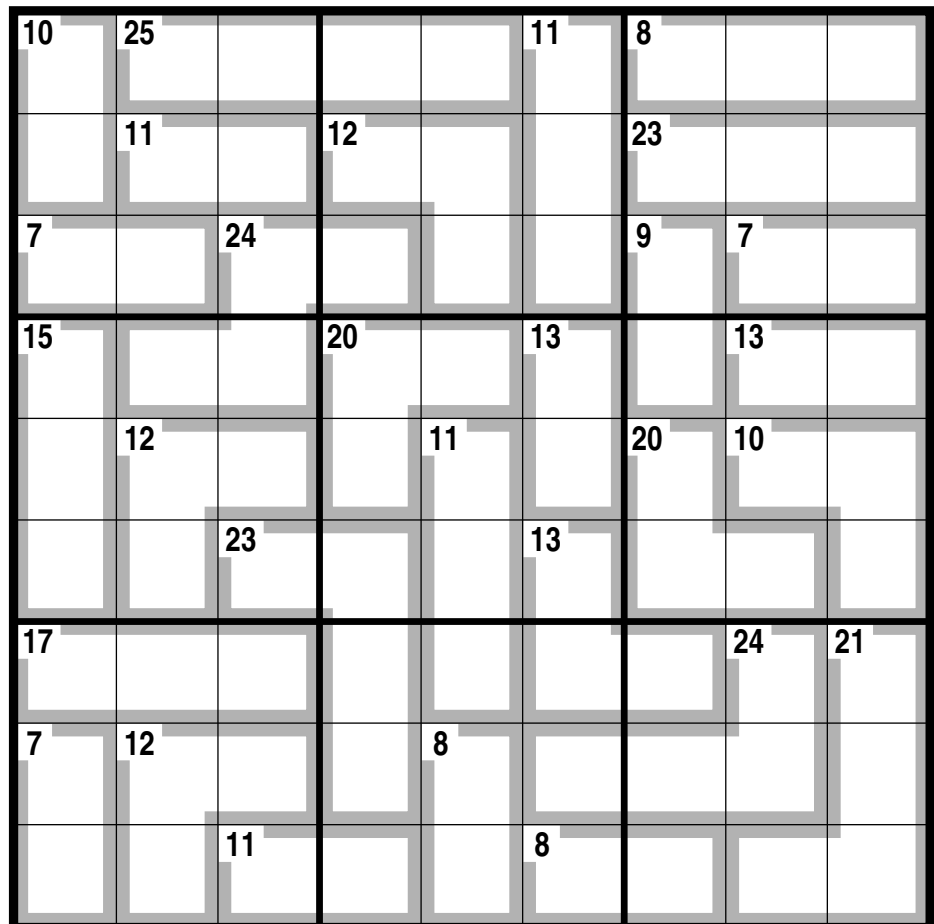
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Killer intermediate

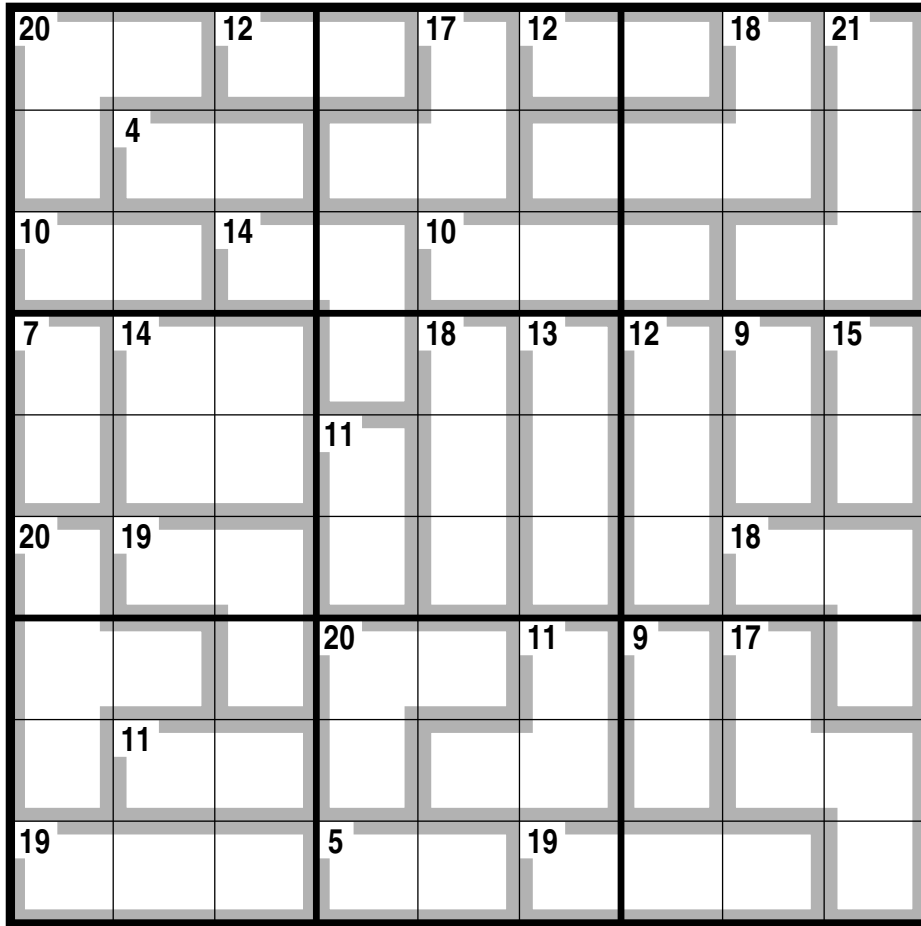


1

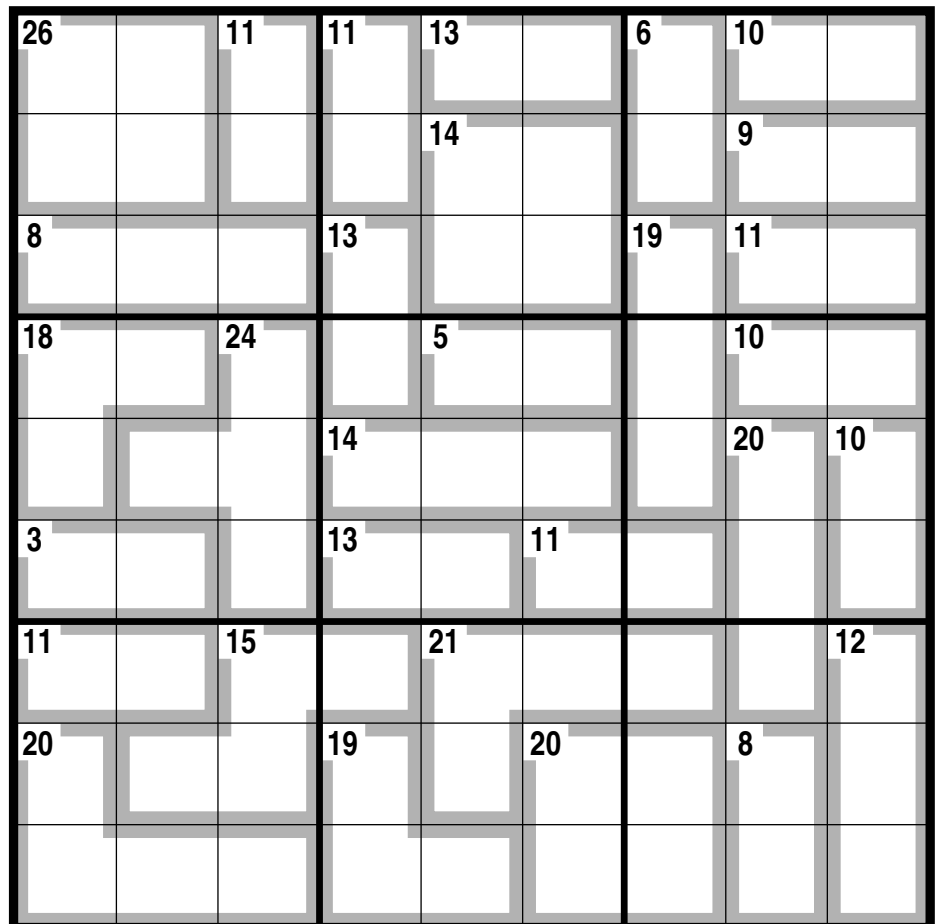


2

Killer intermediate

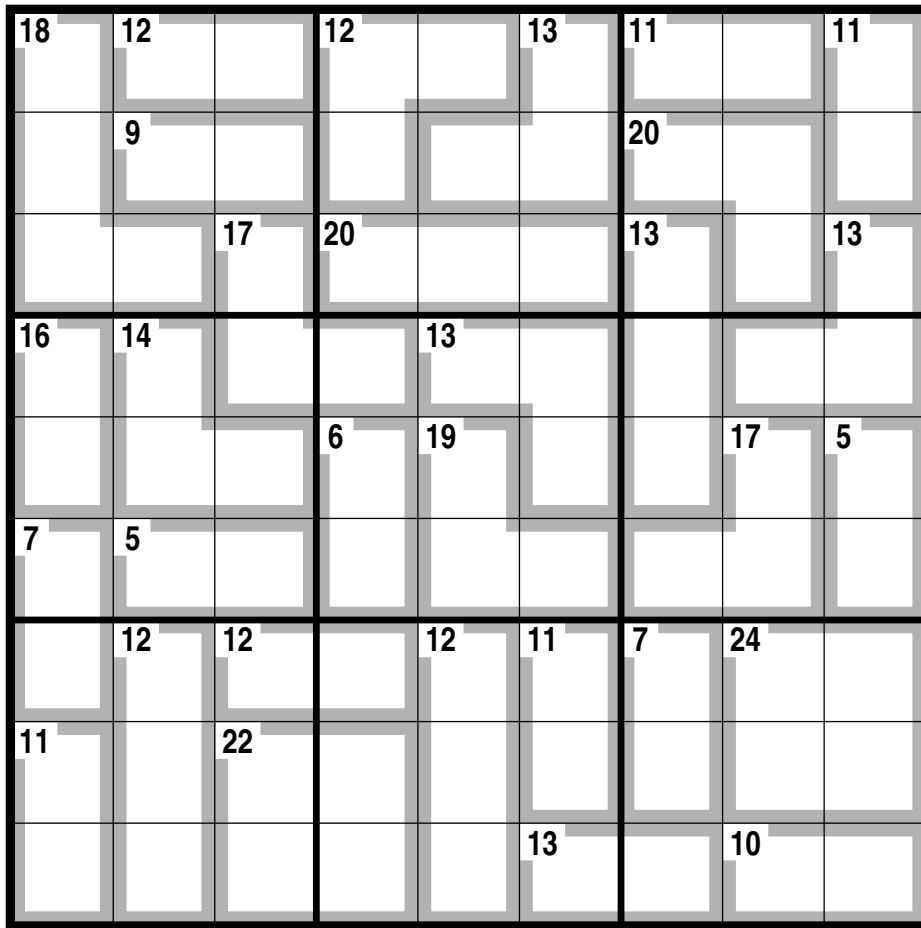


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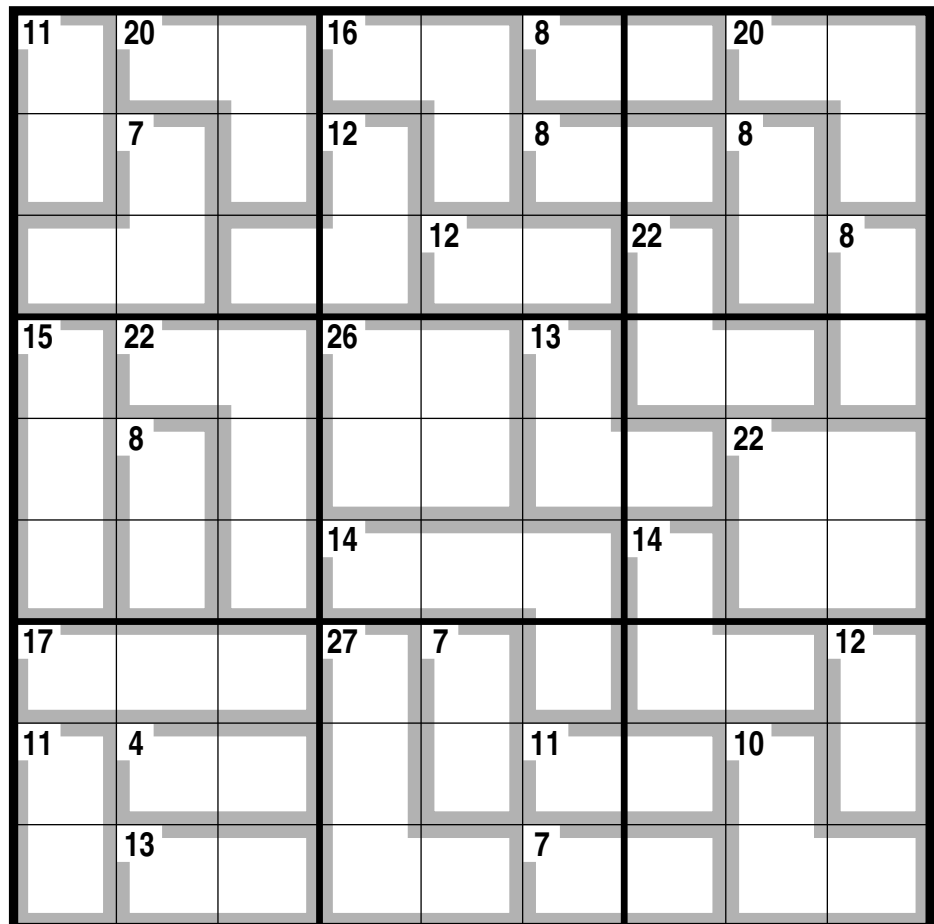
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Killer intermediate

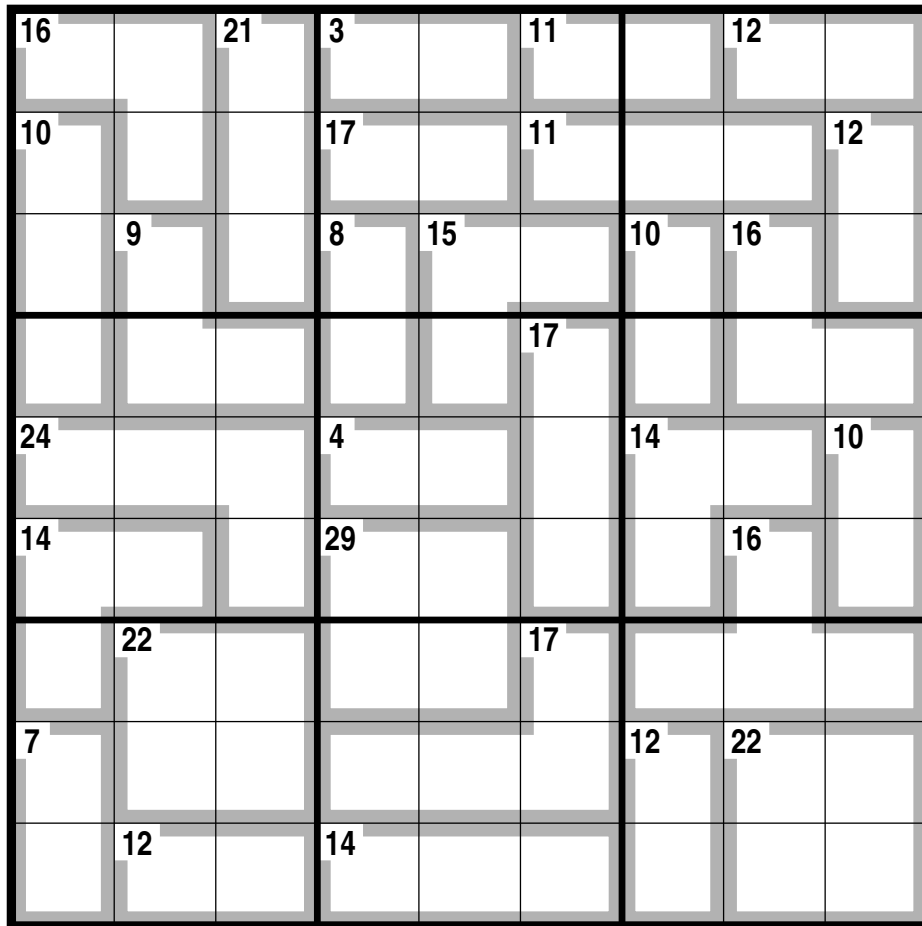


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6

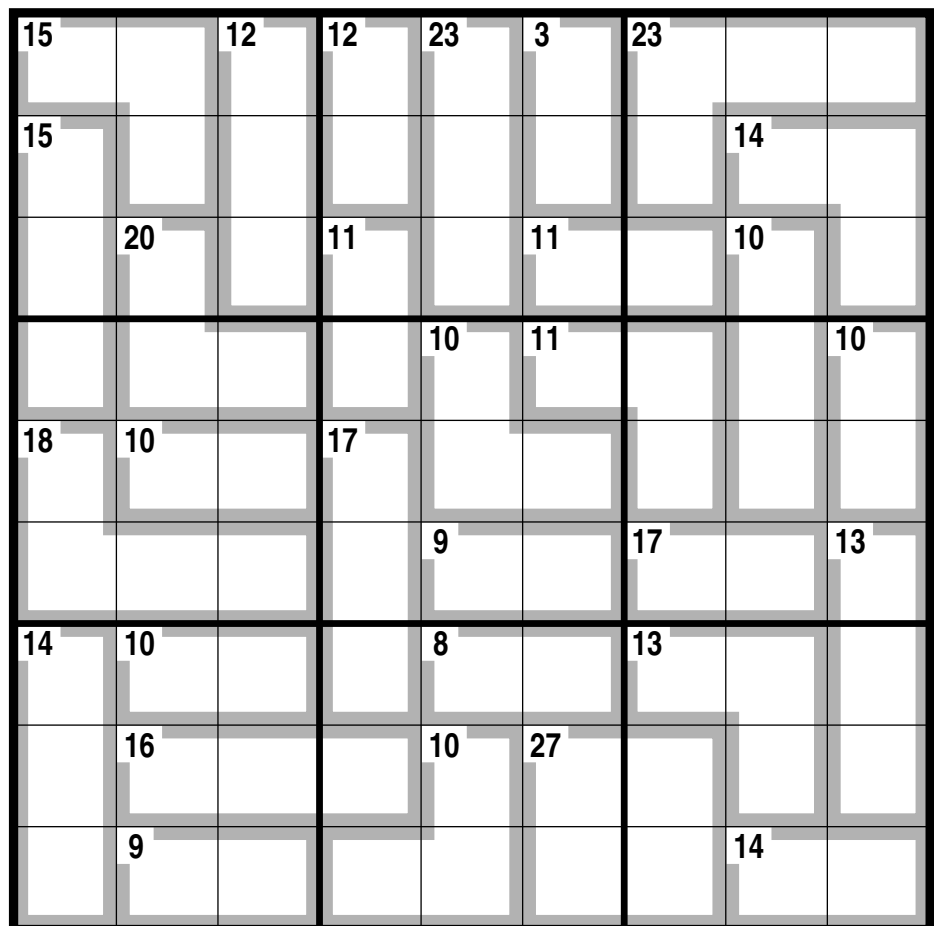


Killer intermediate



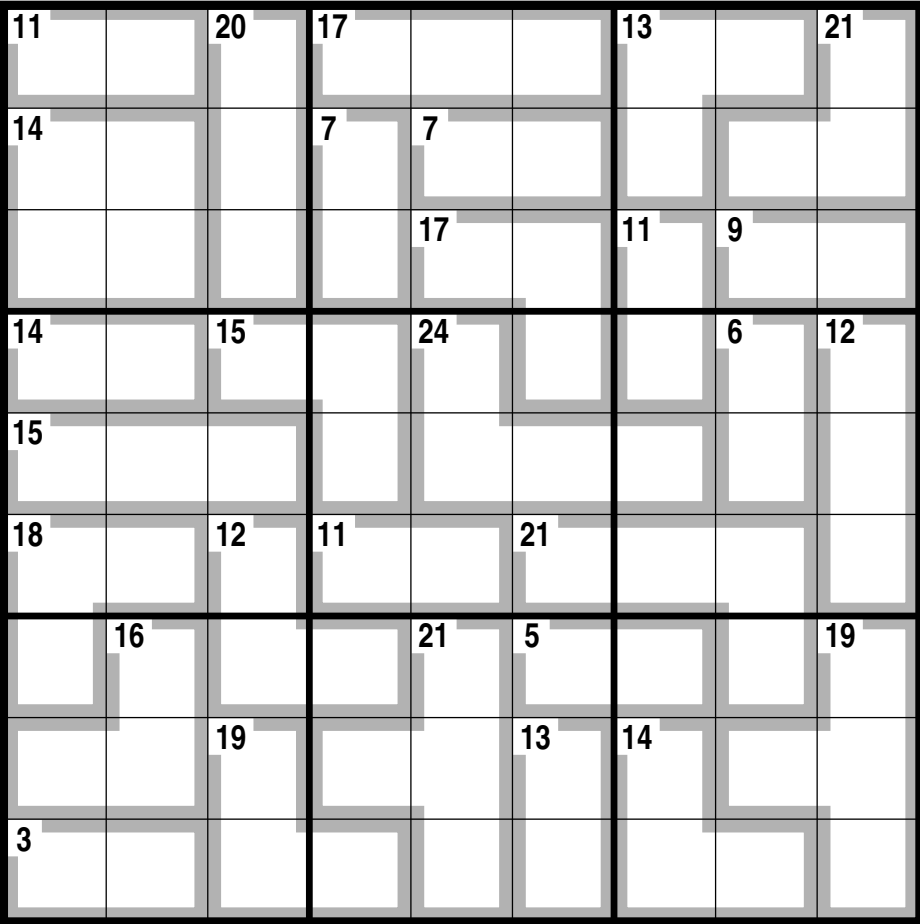
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8



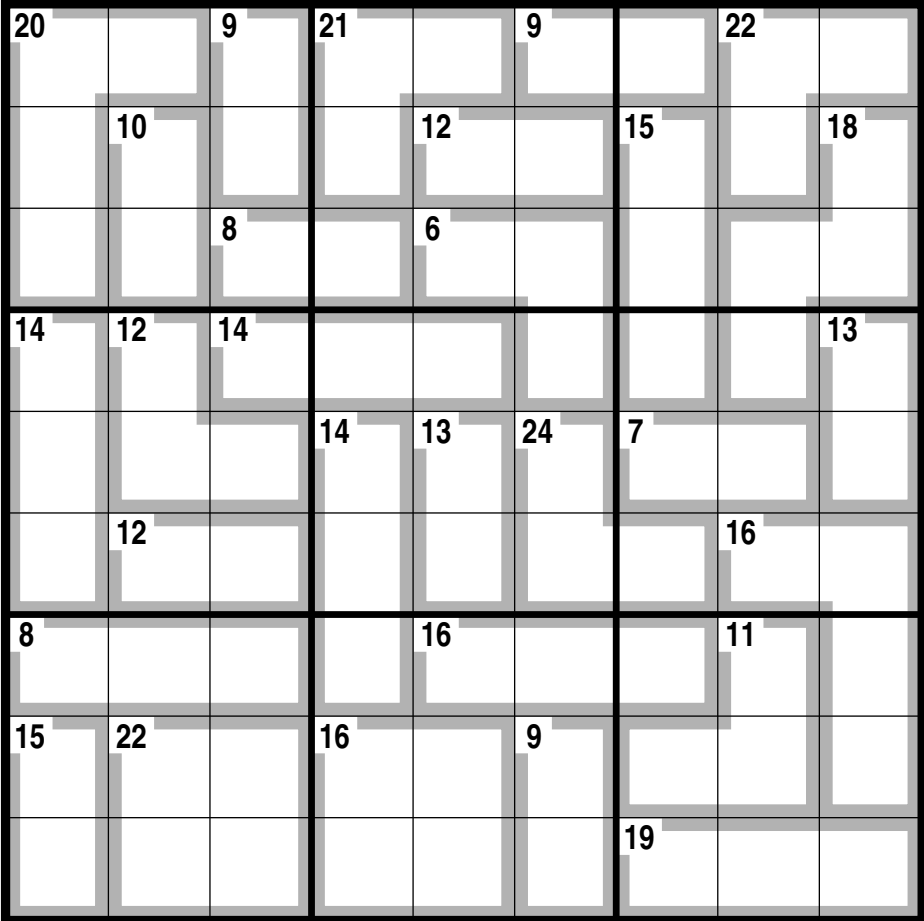
Killer

intermediate

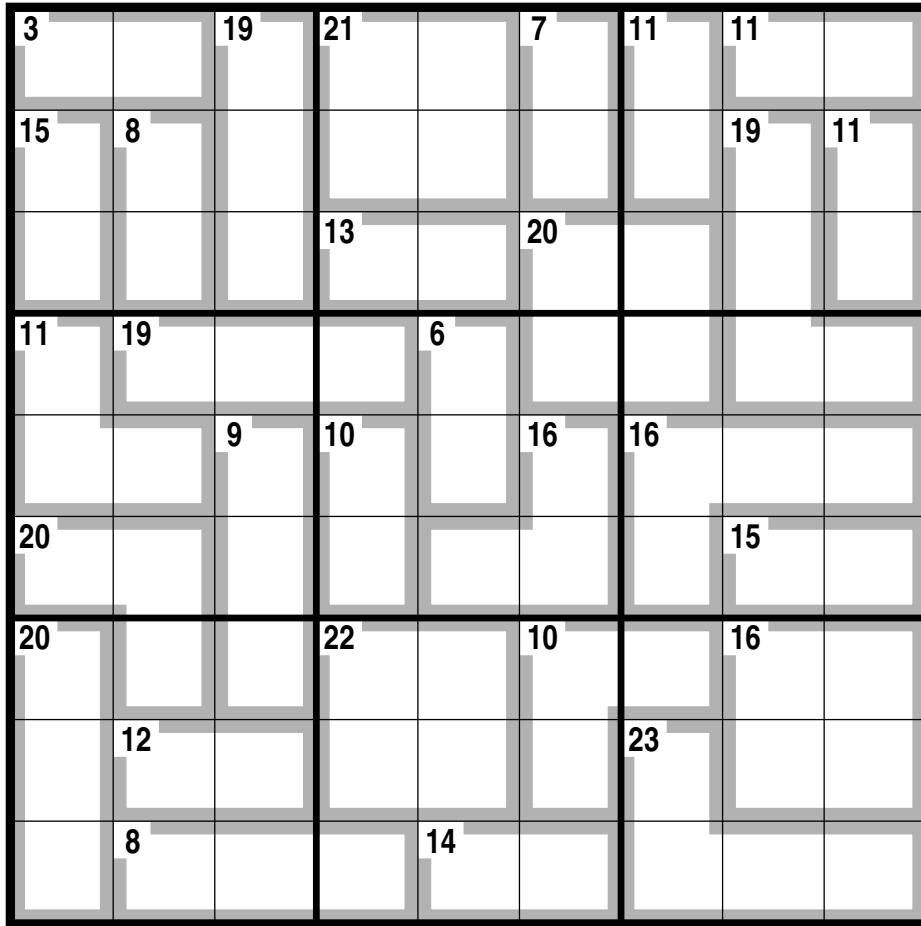


9

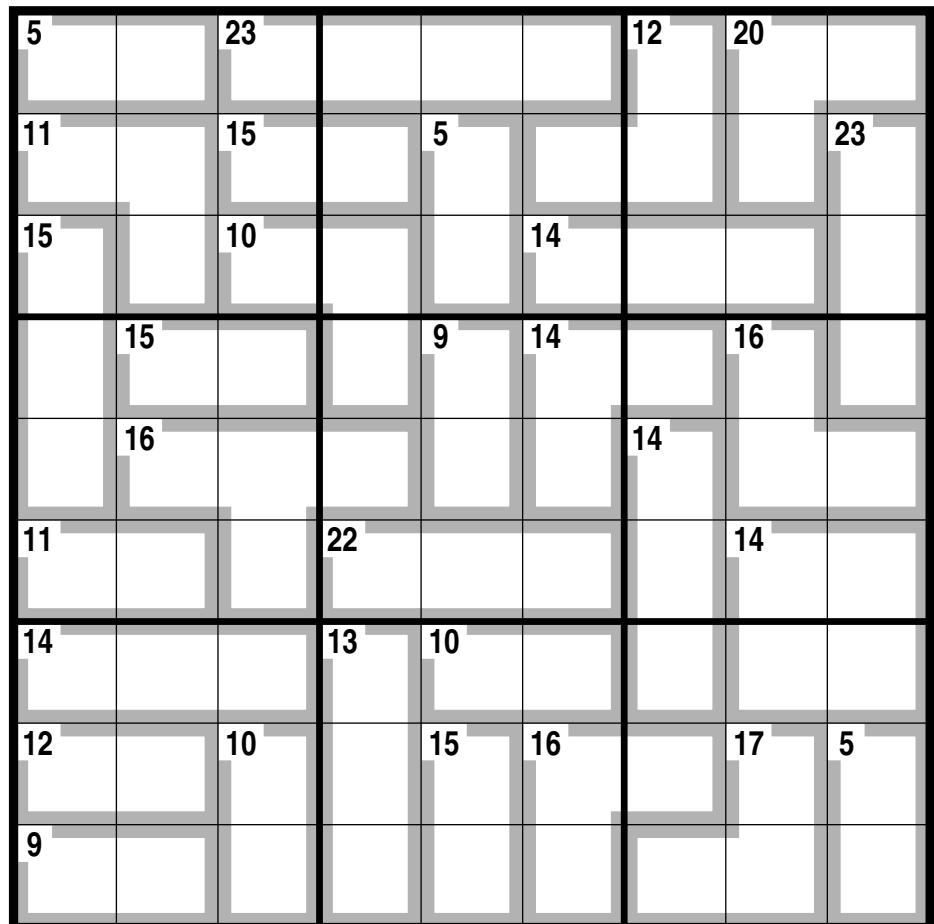
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Killer intermediate

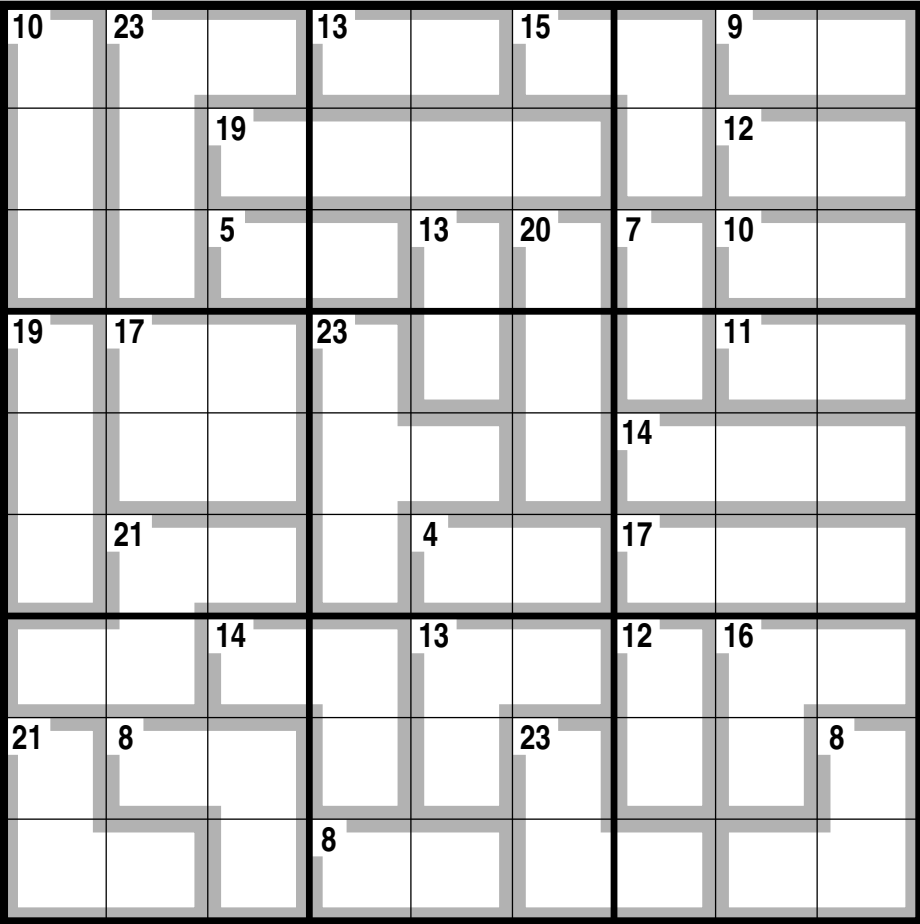


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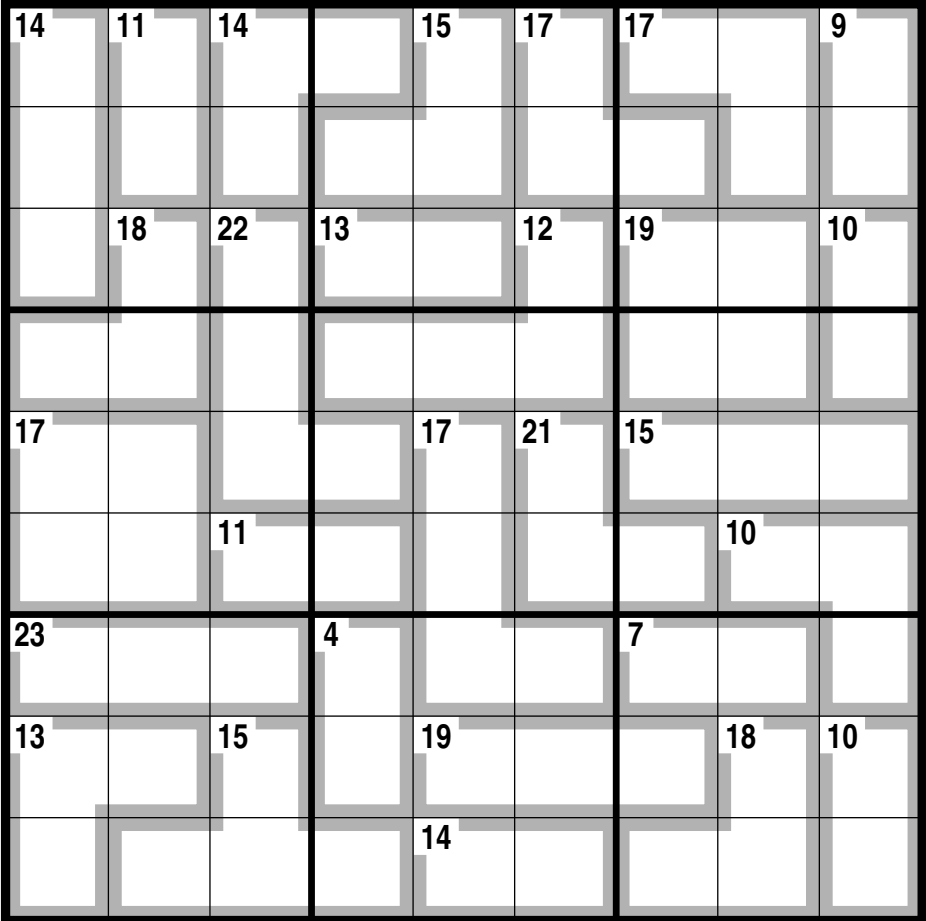


12

Killer intermediate

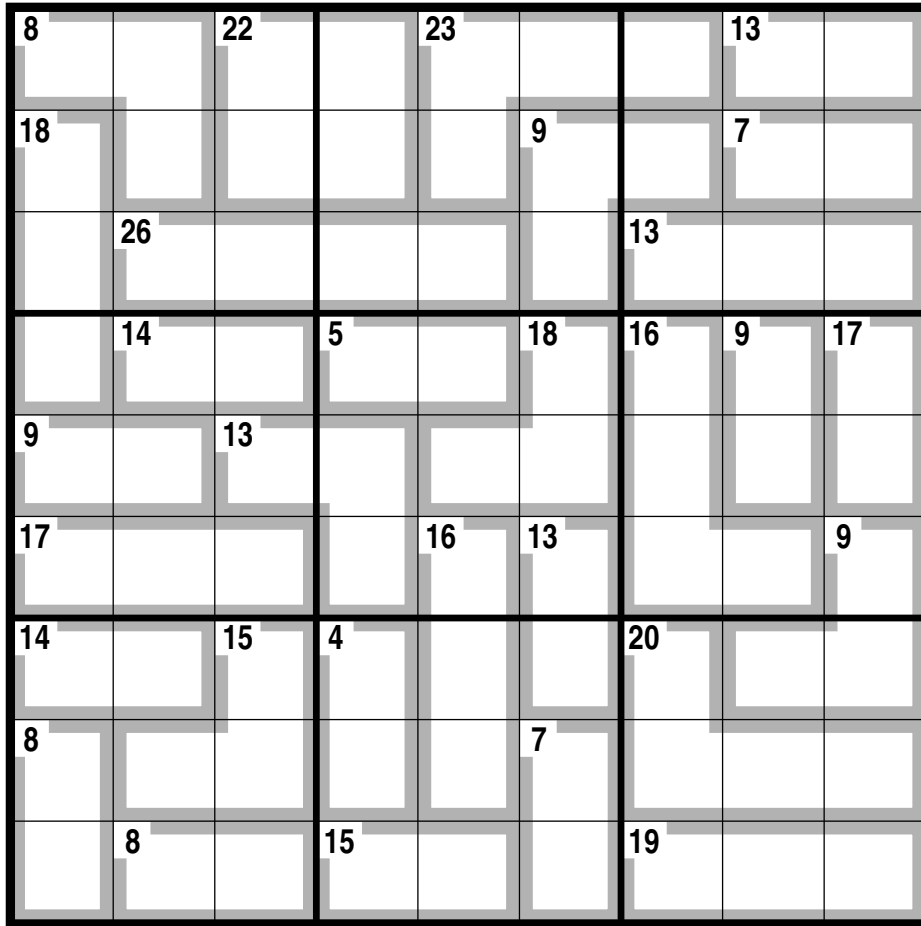


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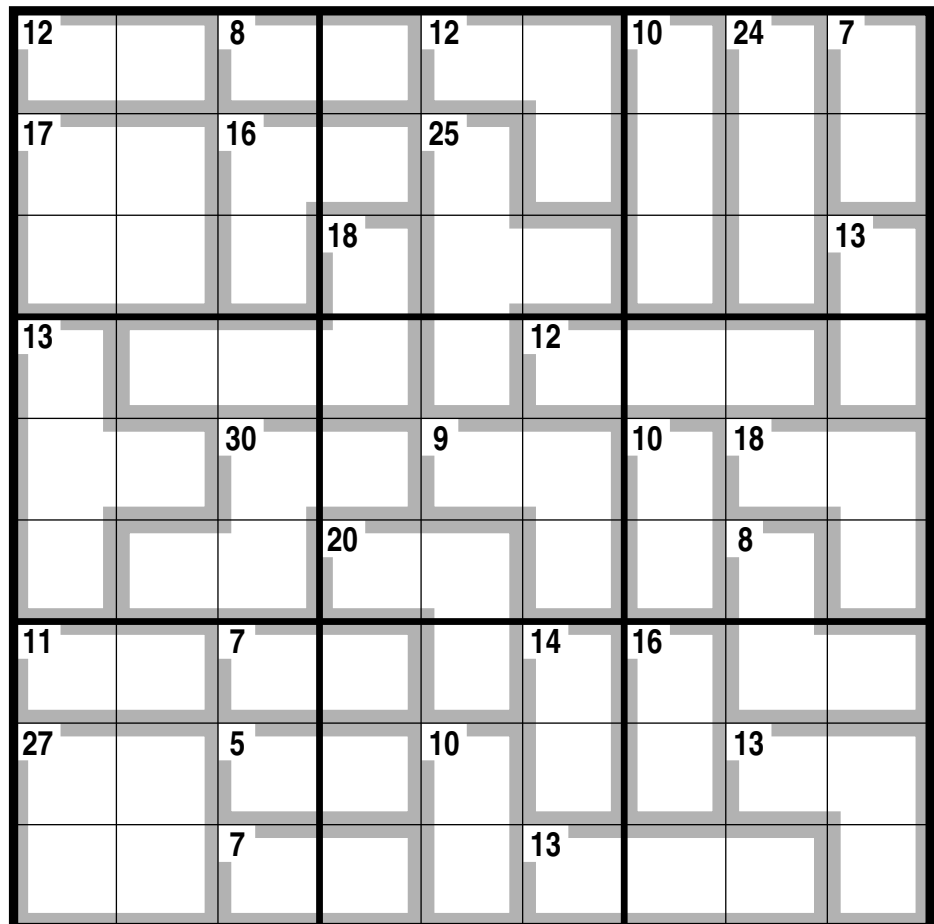


14

Killer intermediate

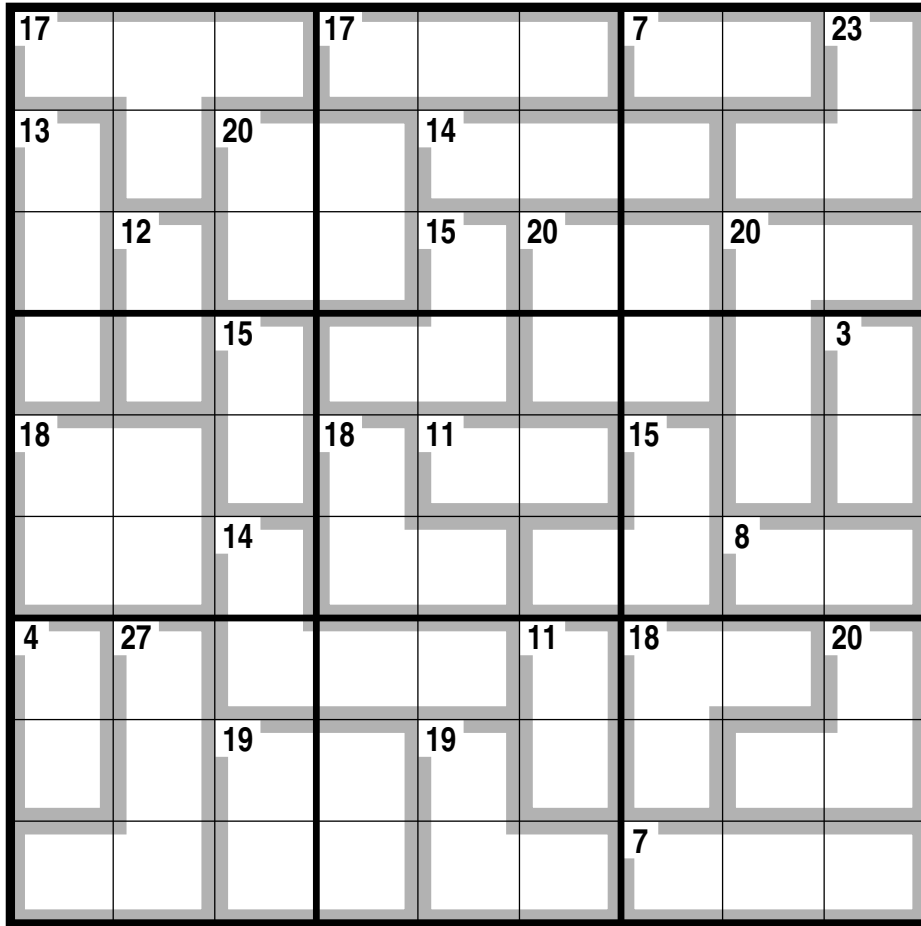


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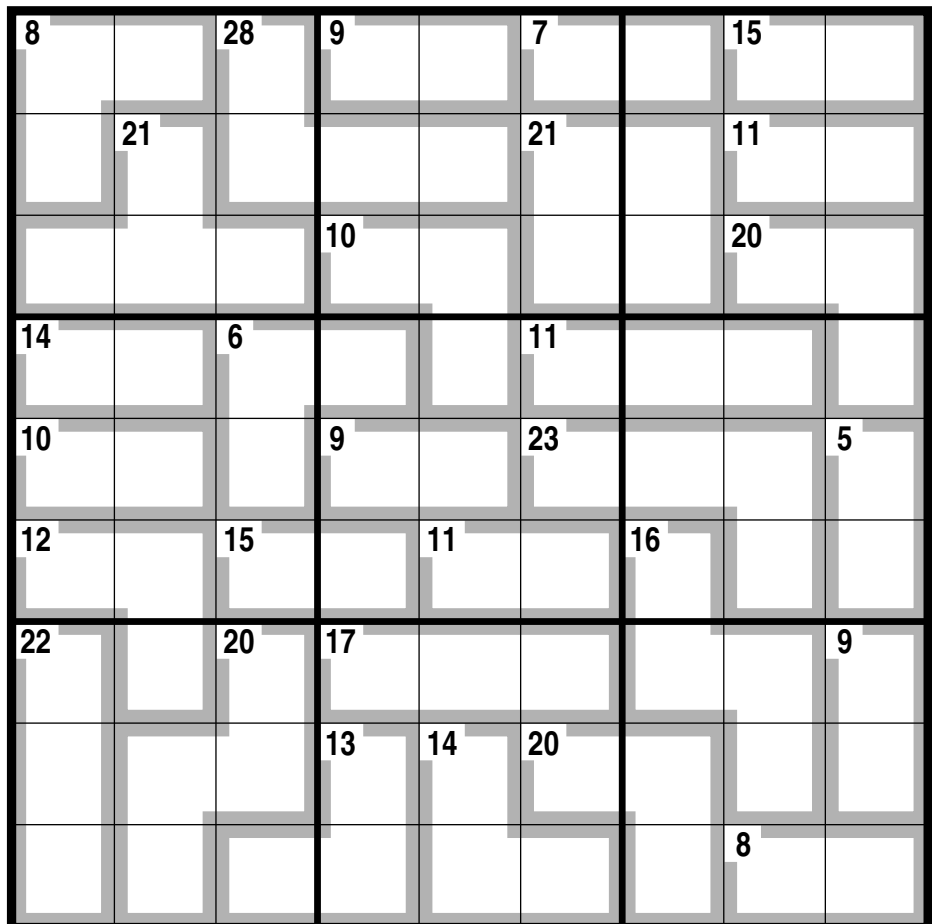


16

Killer intermediate

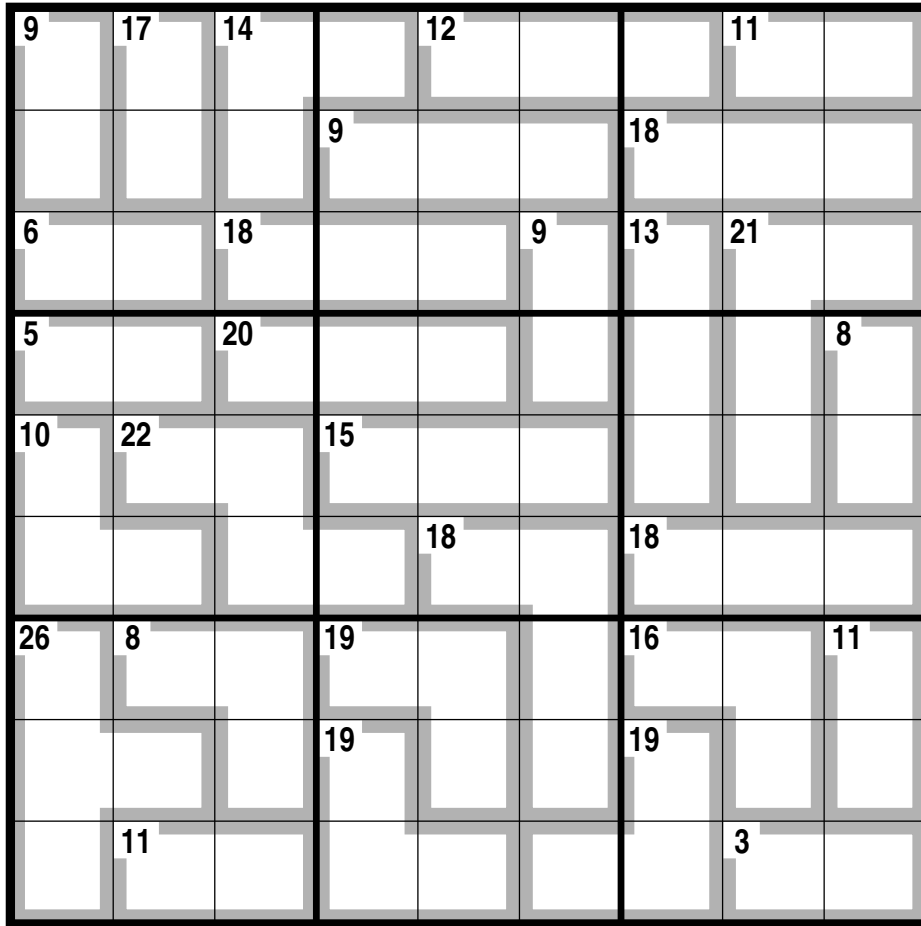


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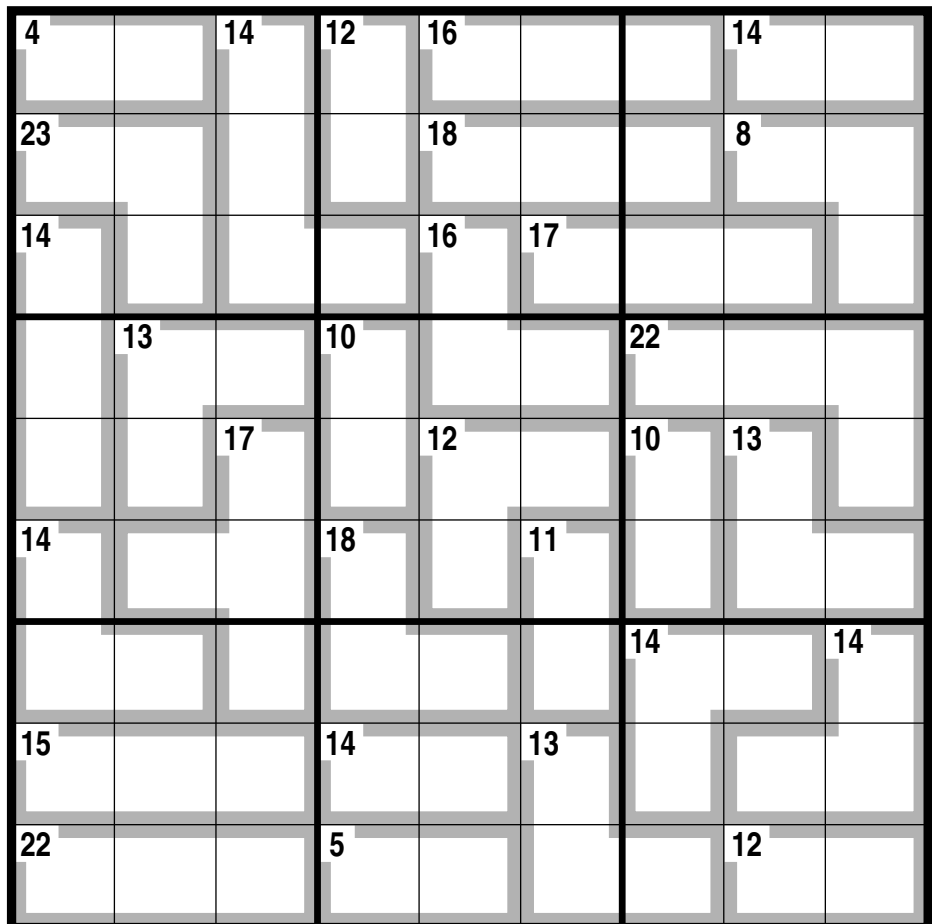
18

Killer intermediate

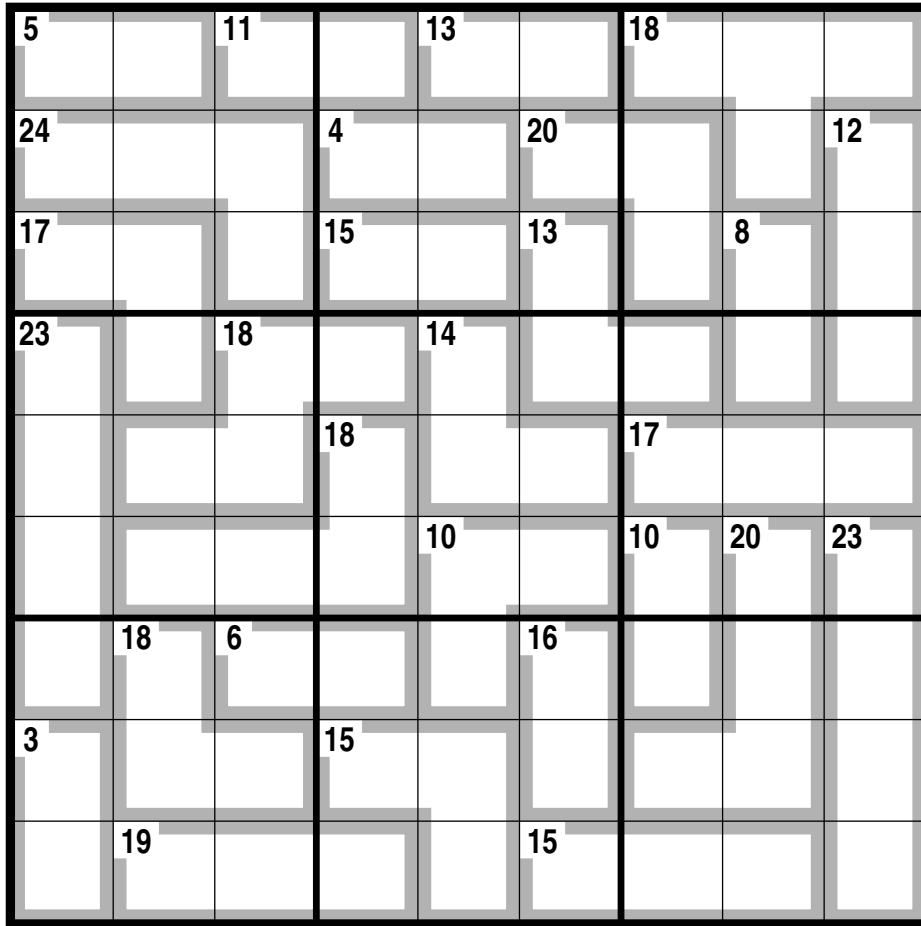


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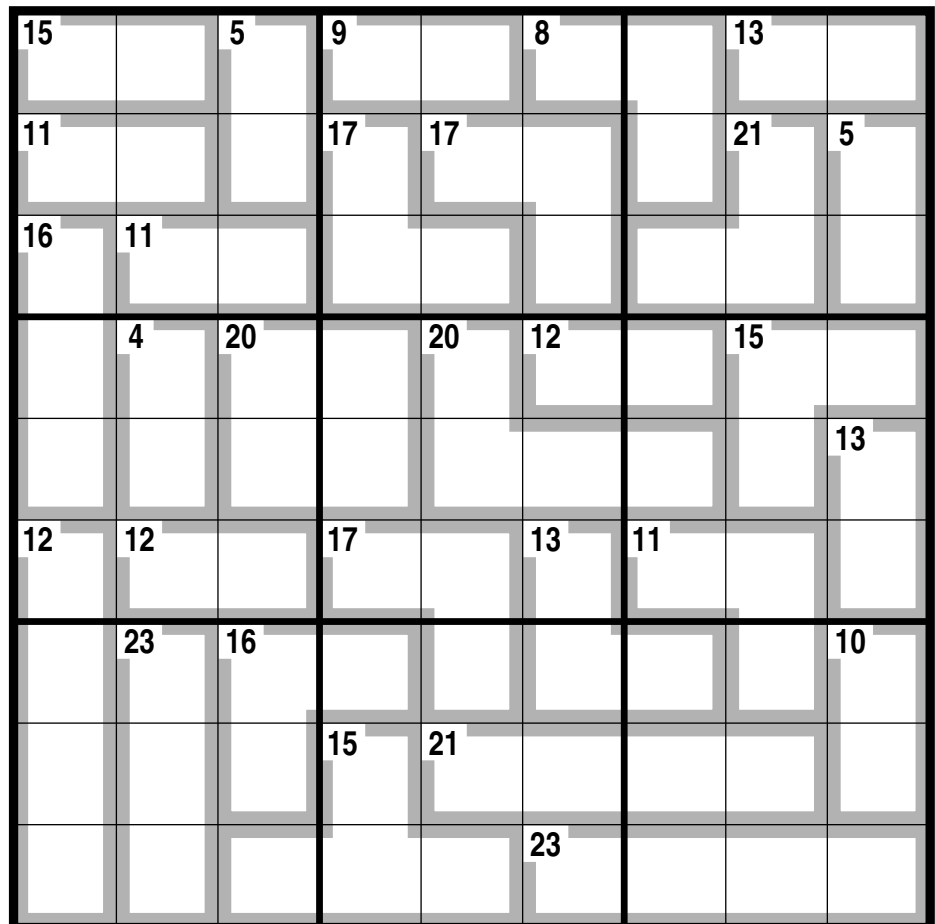
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Killer intermediate

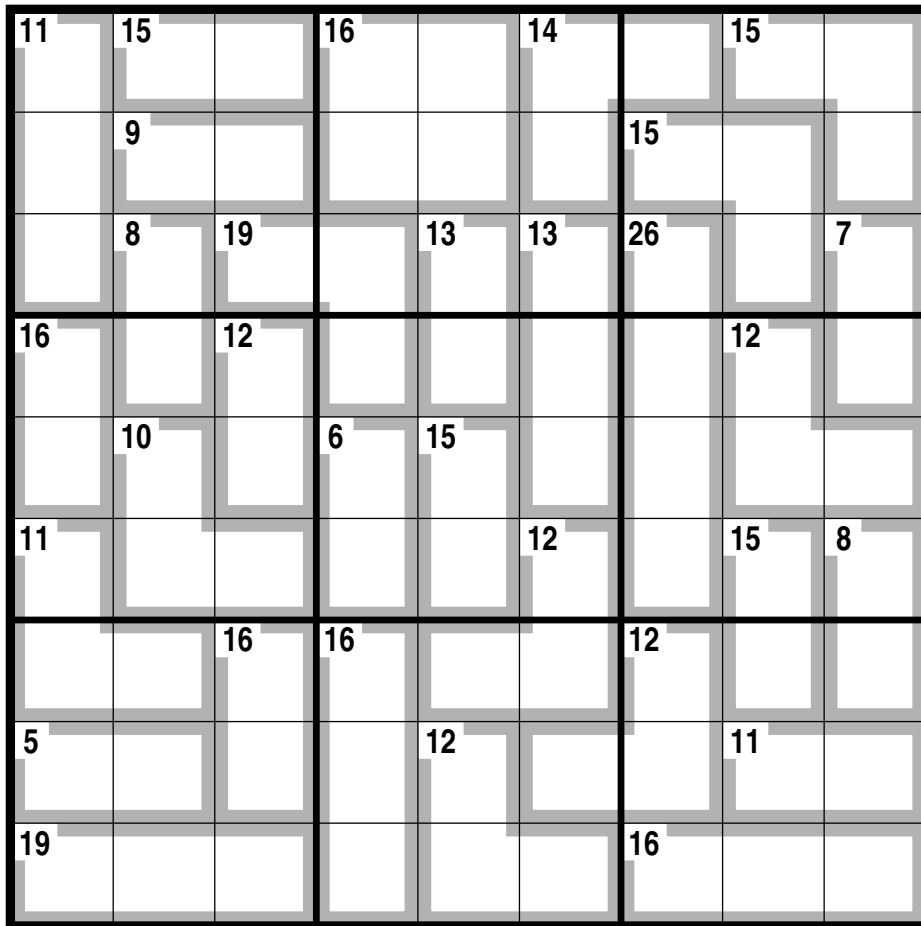


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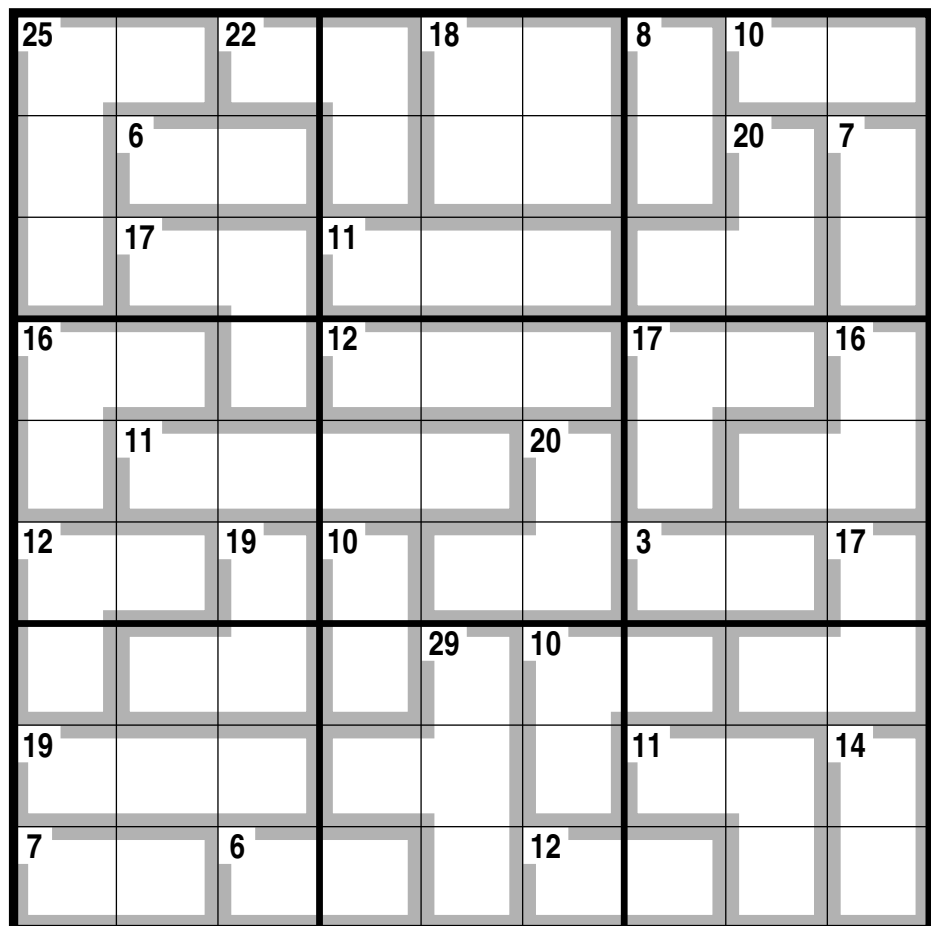


22

Killer intermediate



23



24

Killer (intermediate) Solutions

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11

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14

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16

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17

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18

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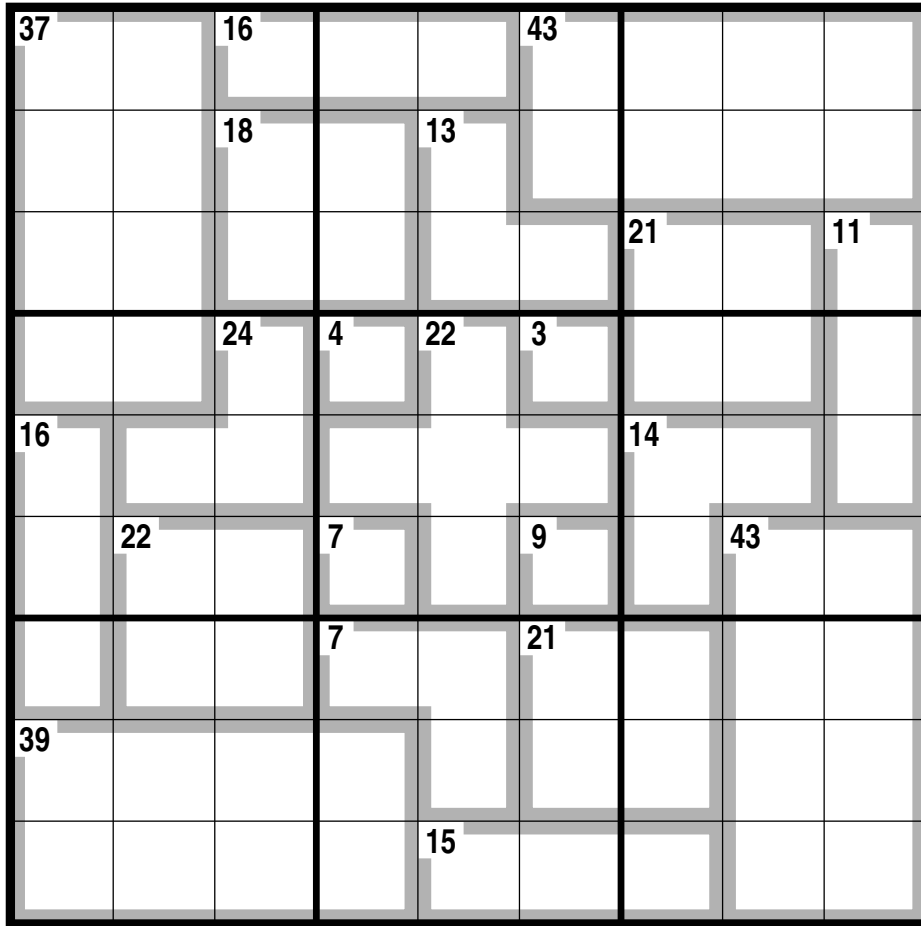
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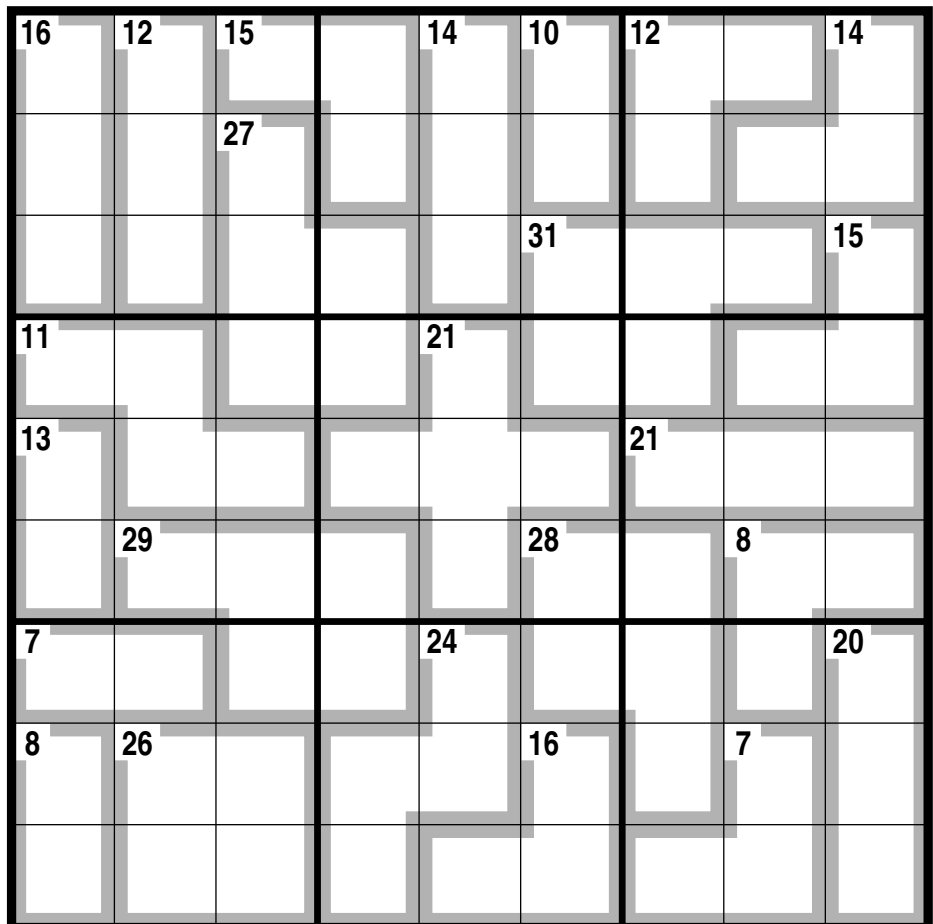
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Killer advanced

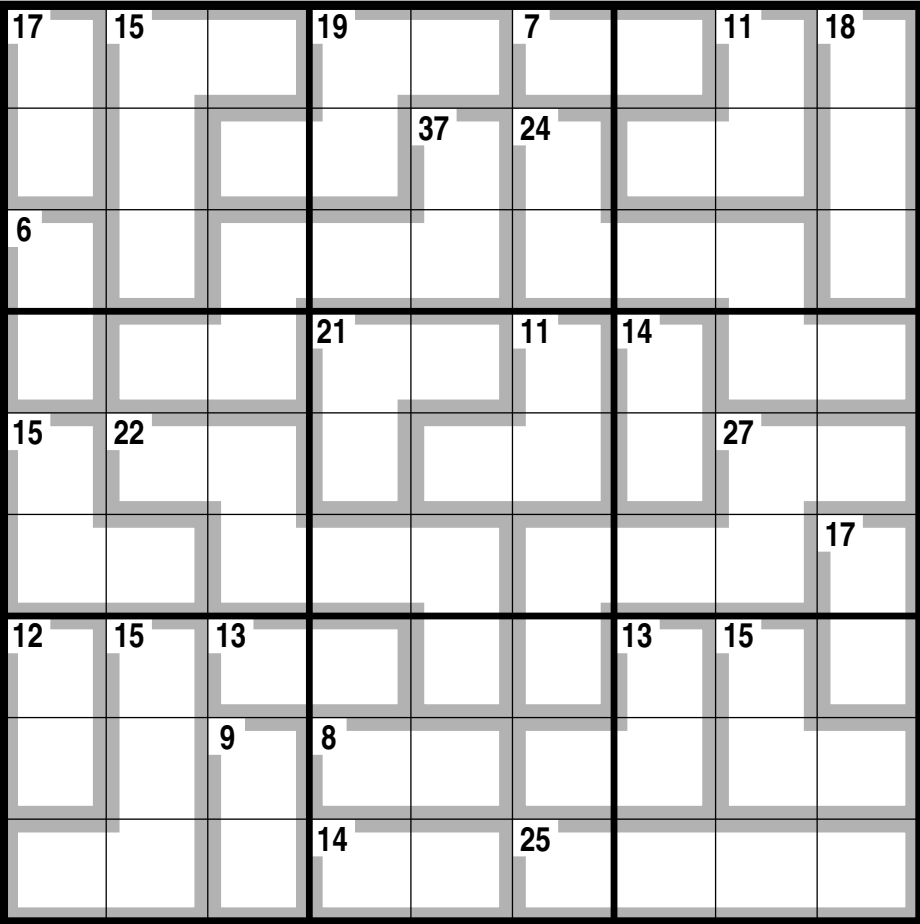


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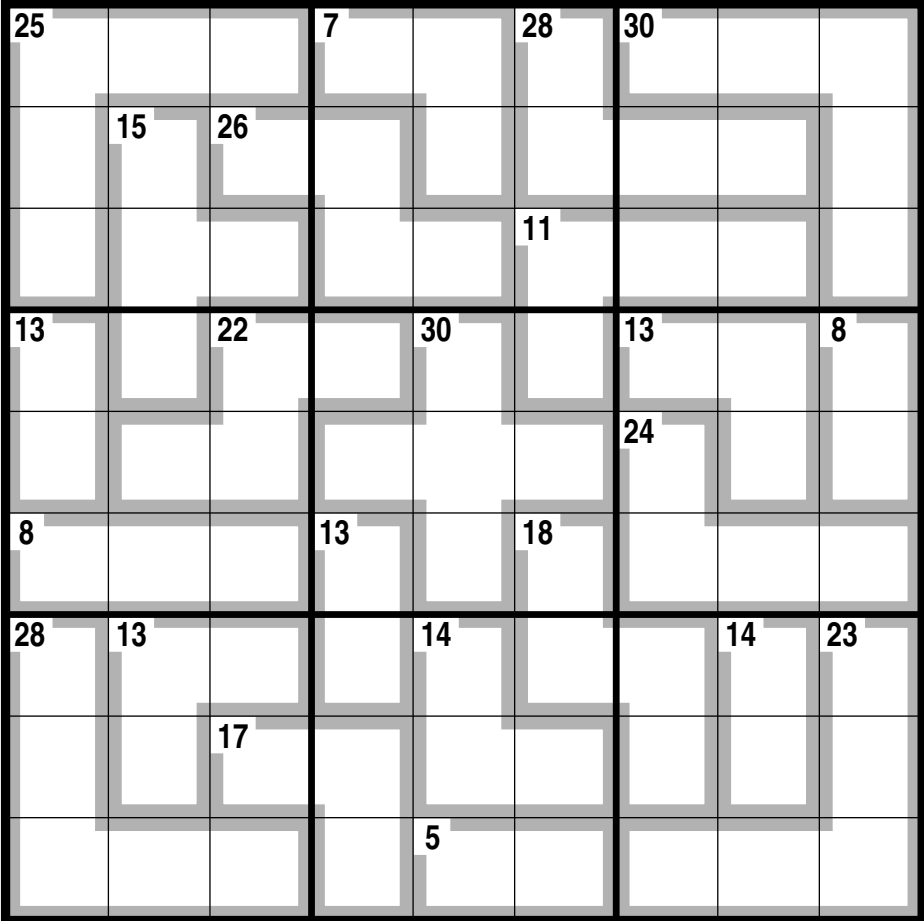


Killer advanced

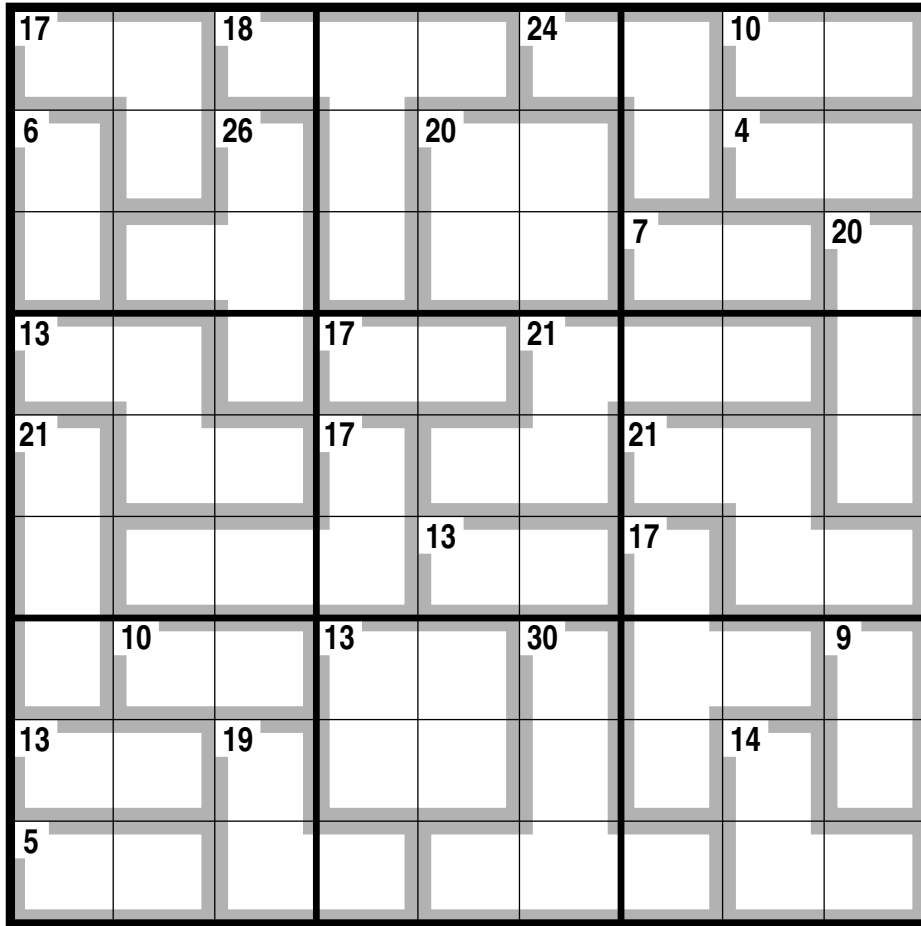


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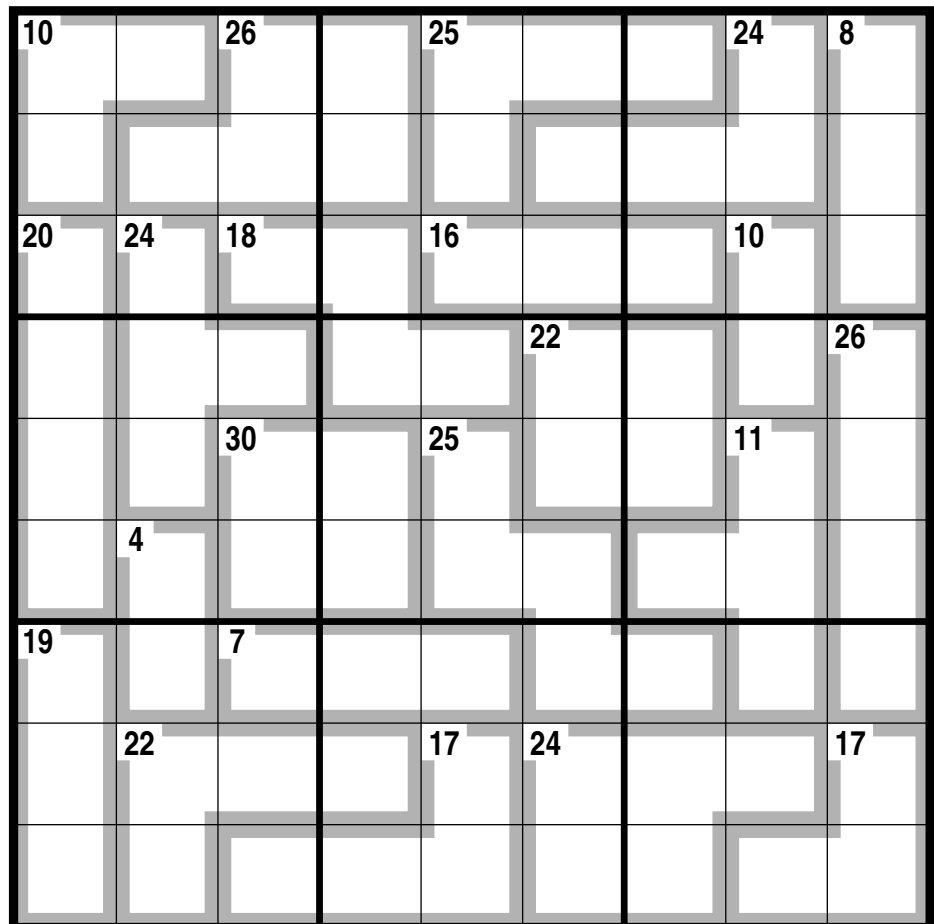


Killer advanced

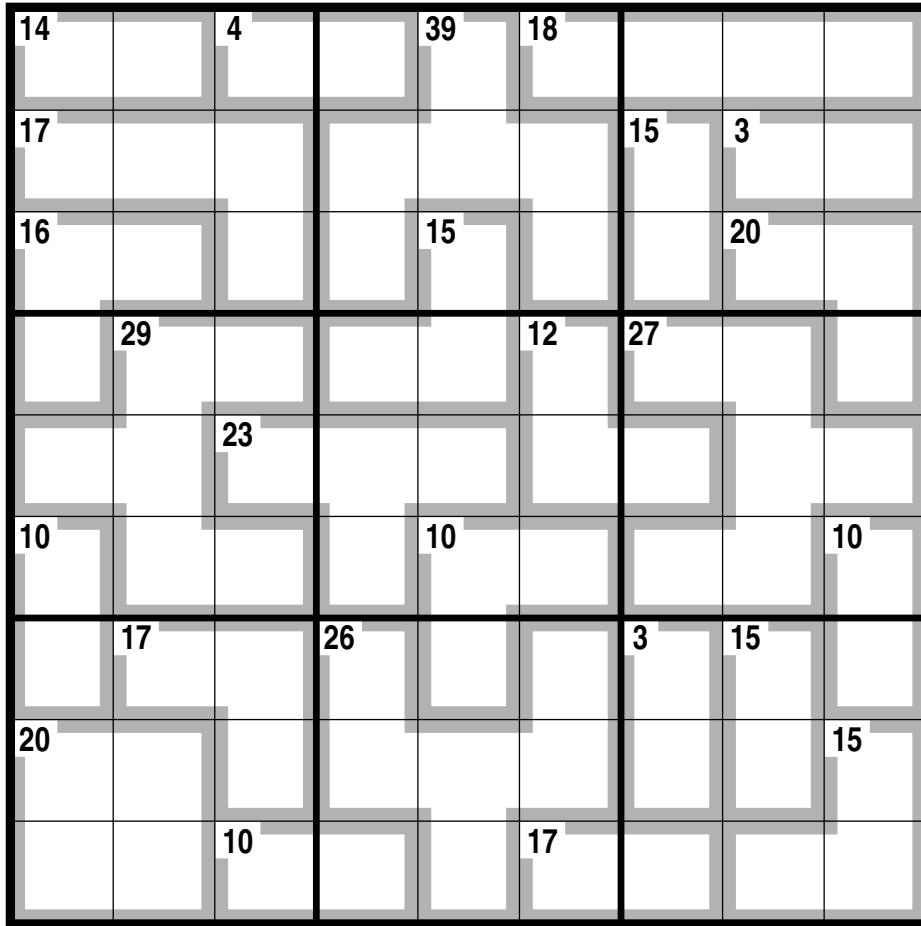


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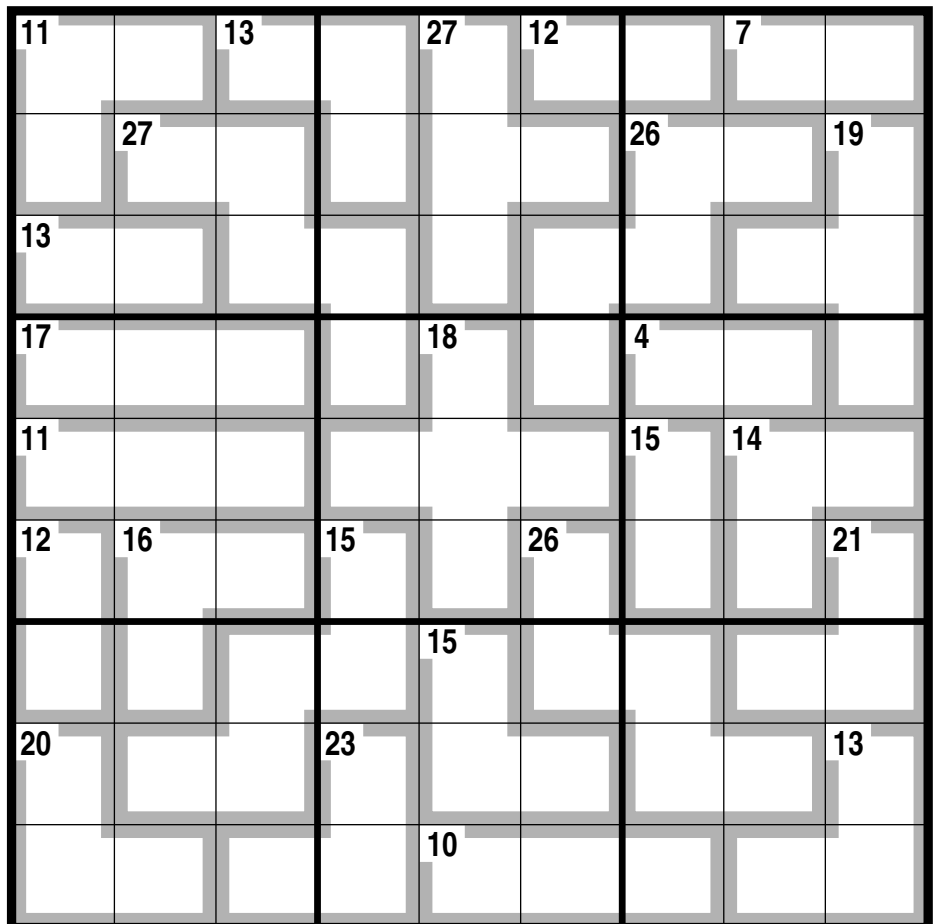
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Killer advanced

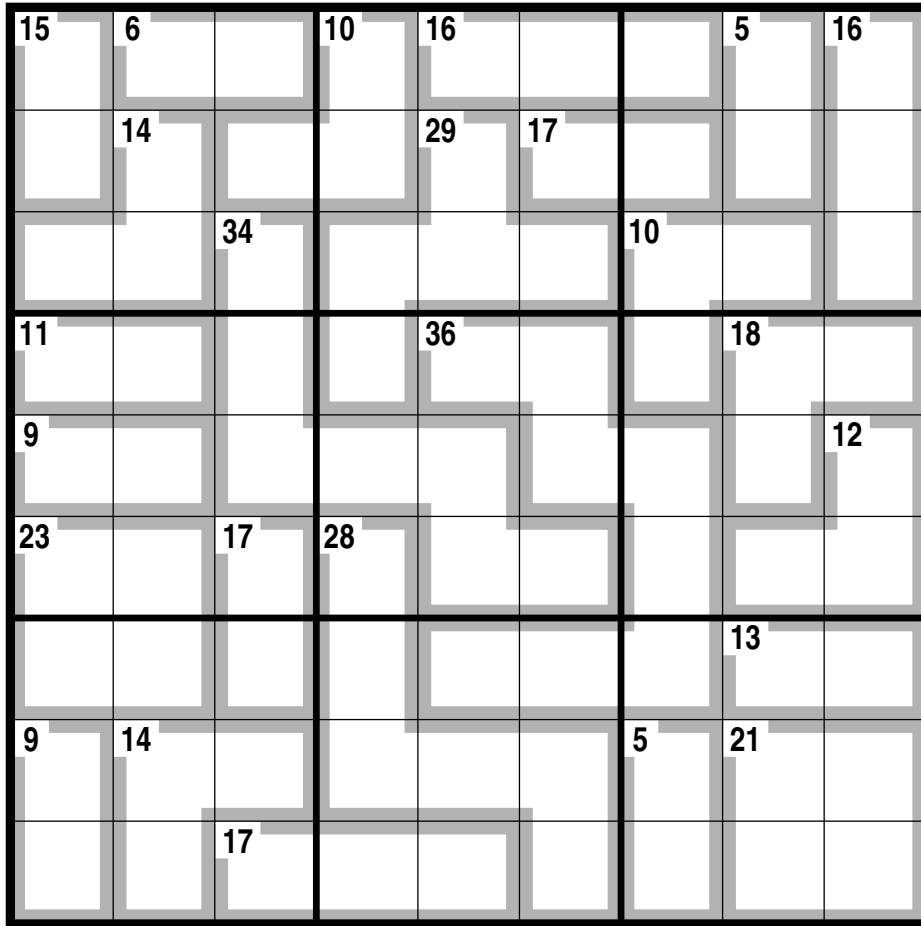


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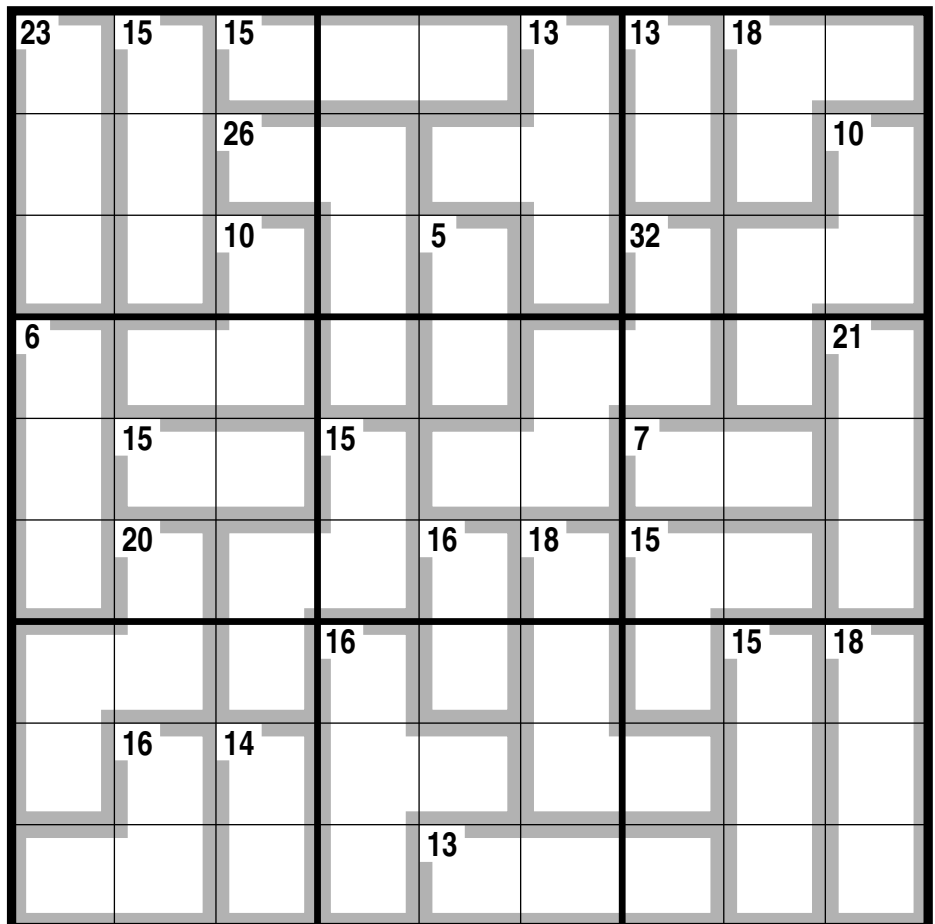


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Killer advanced

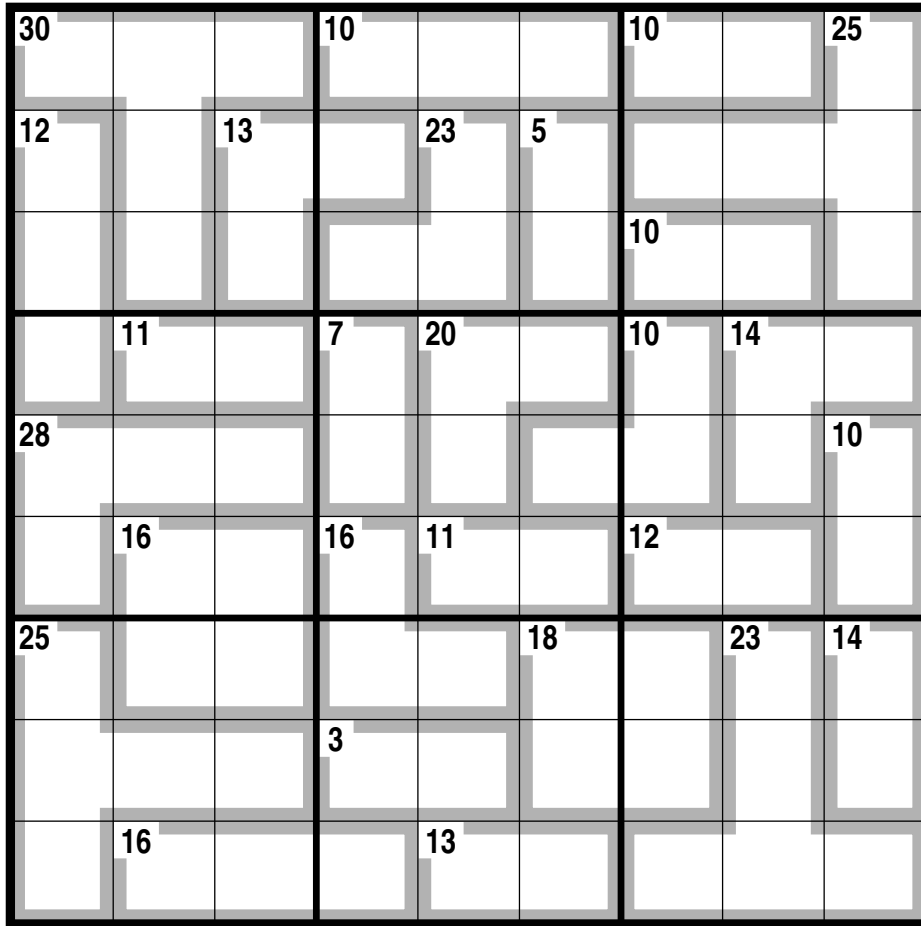


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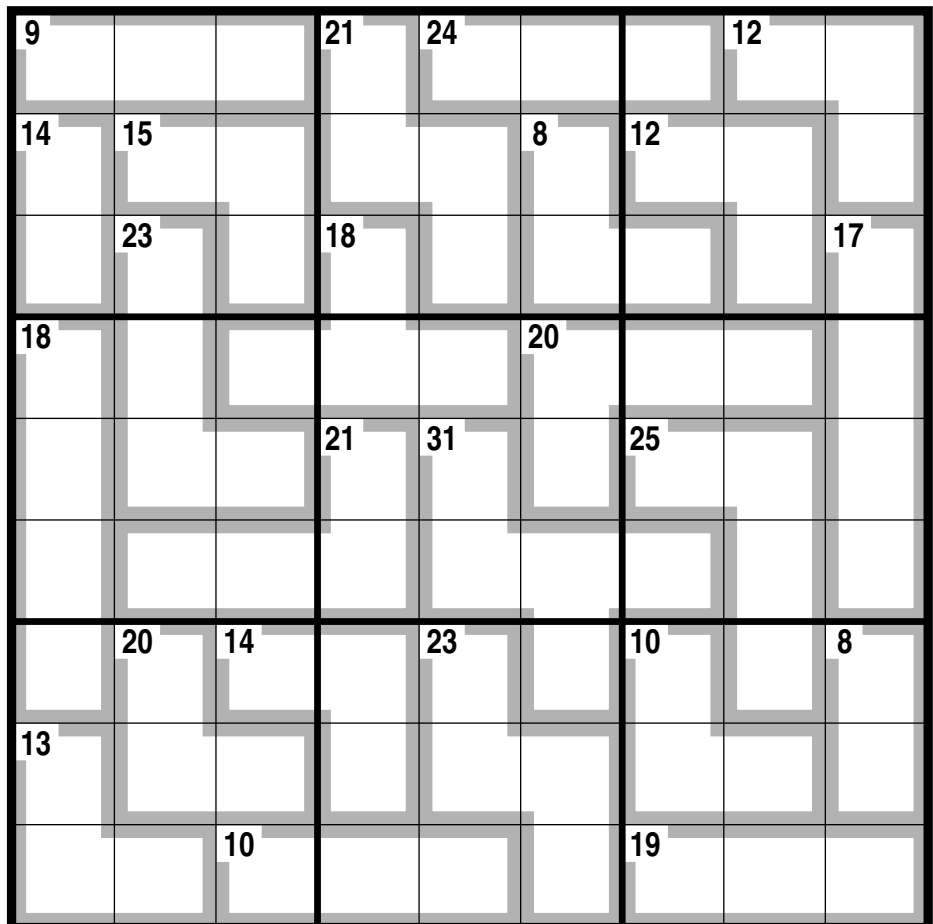


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Killer advanced

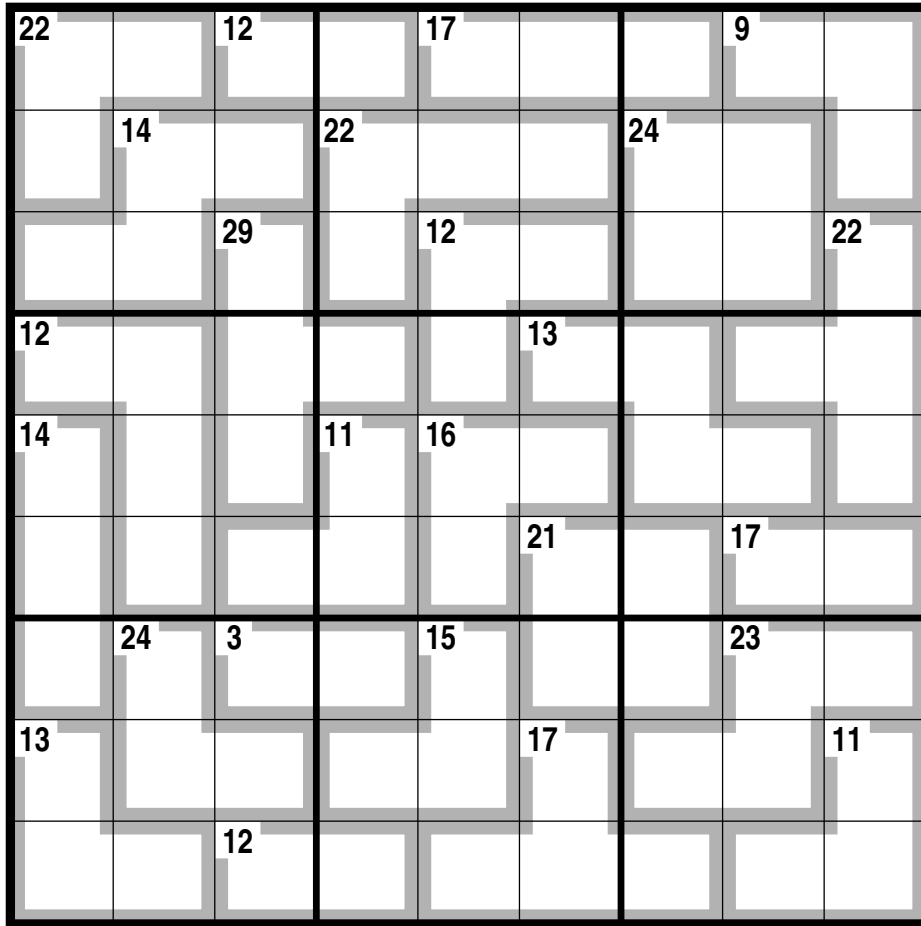


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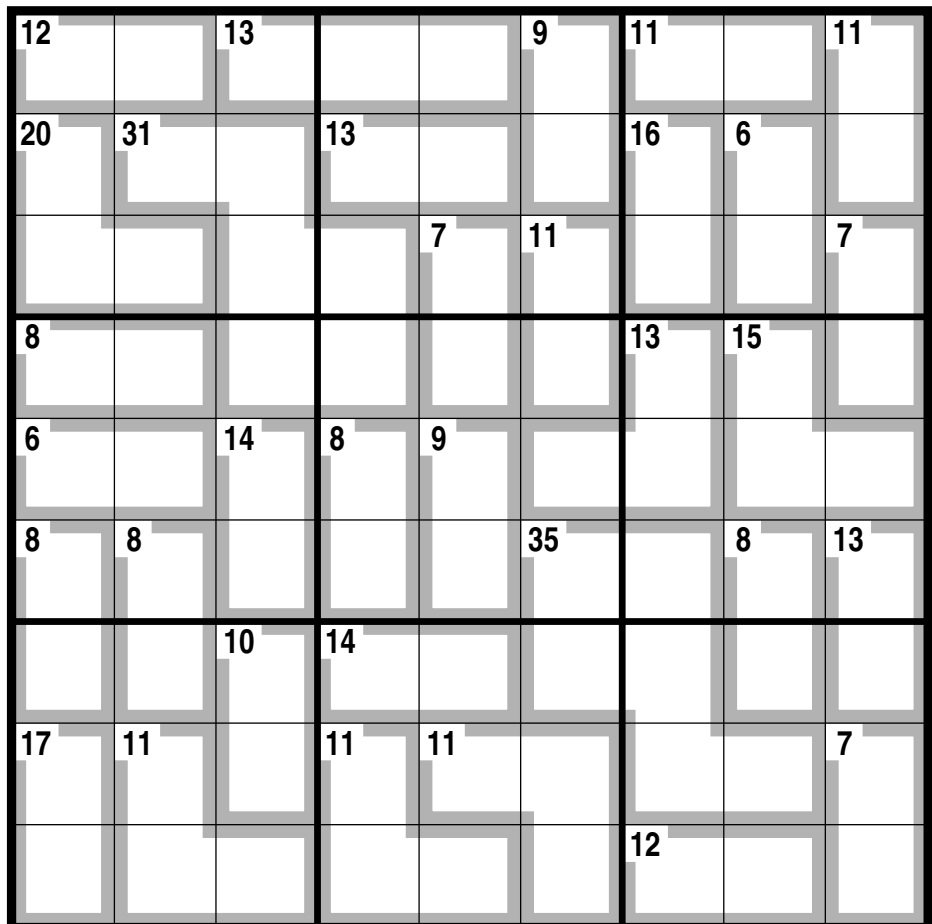


14

Killer advanced

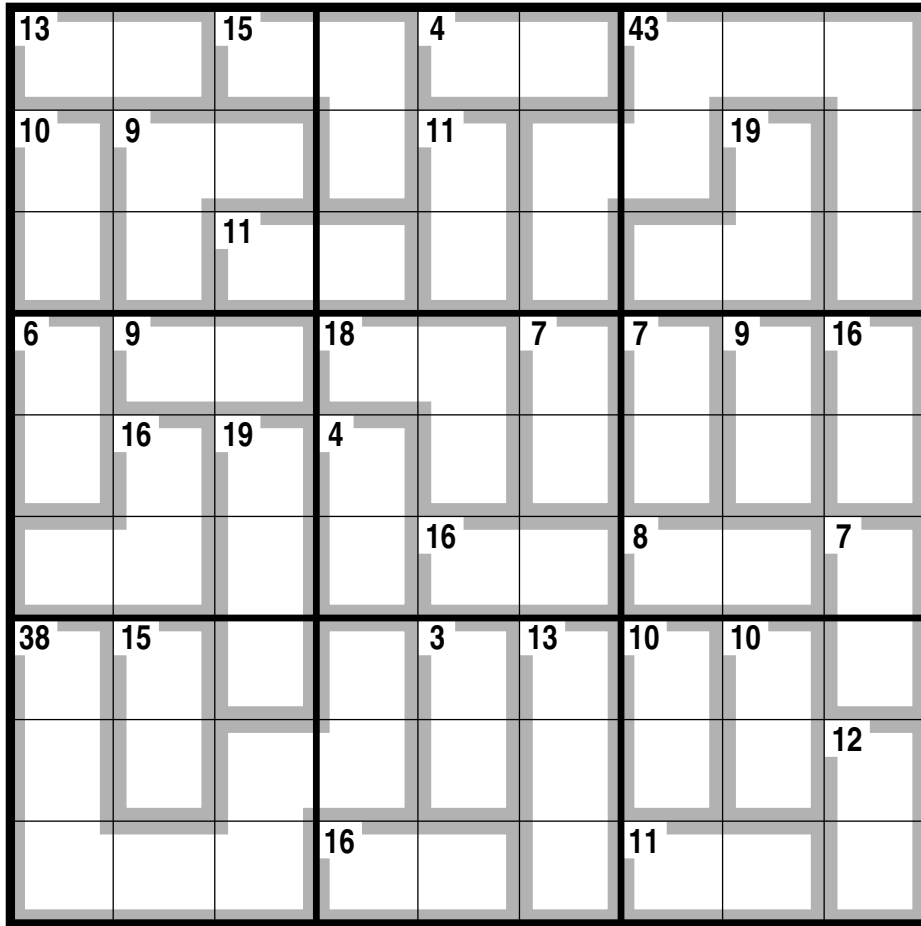


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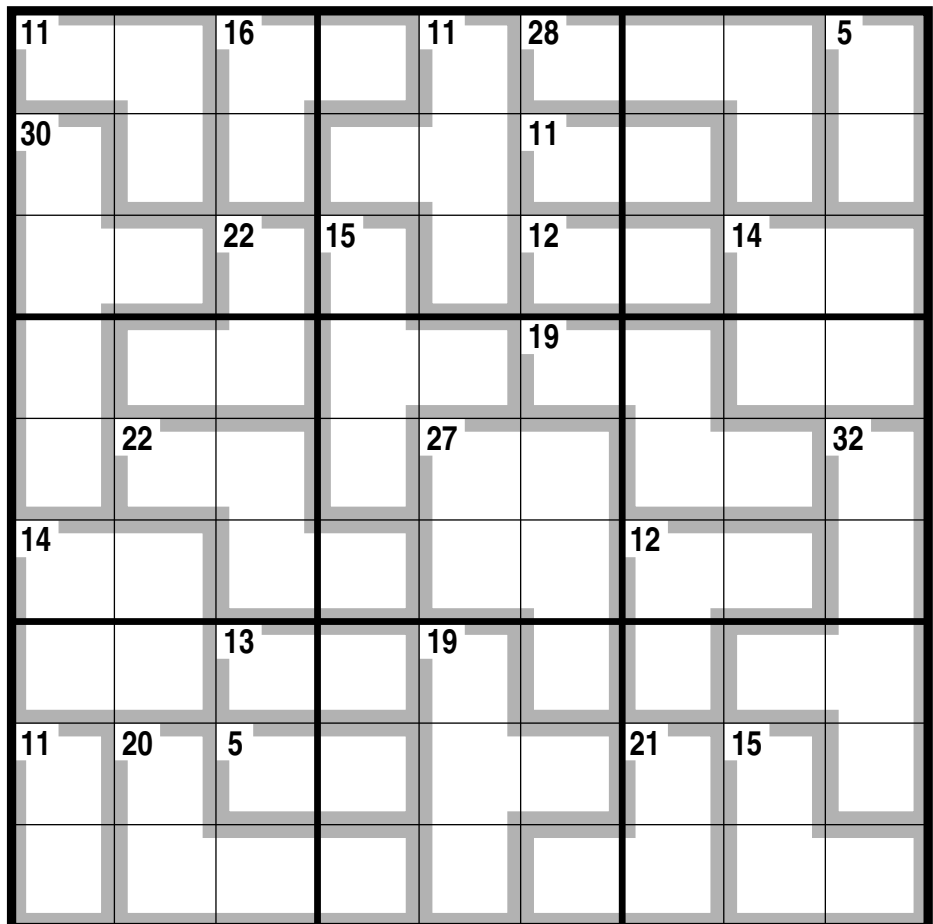


16

Killer advanced

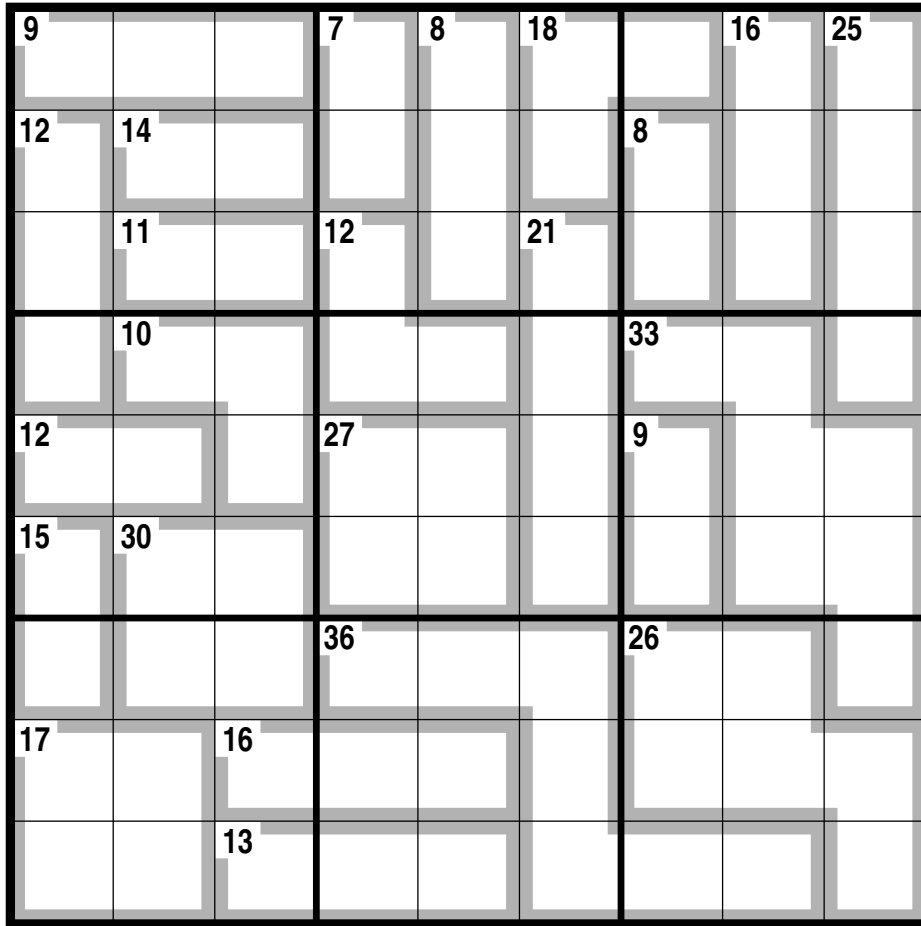


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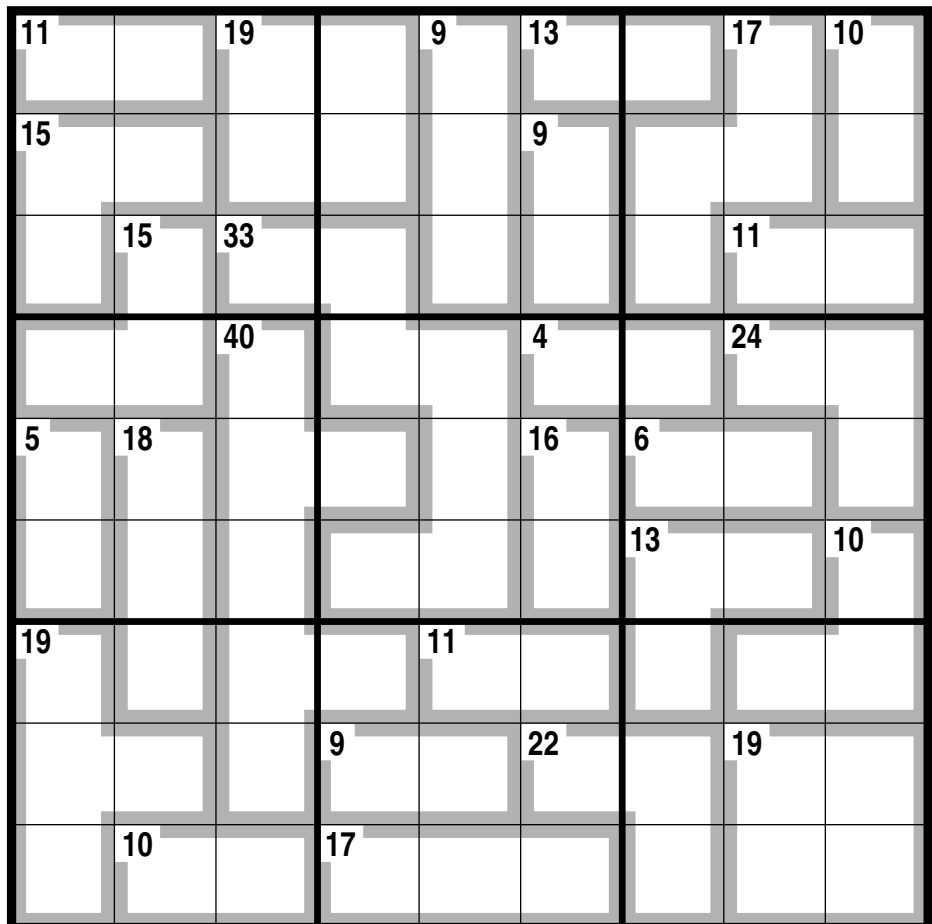


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Killer advanced

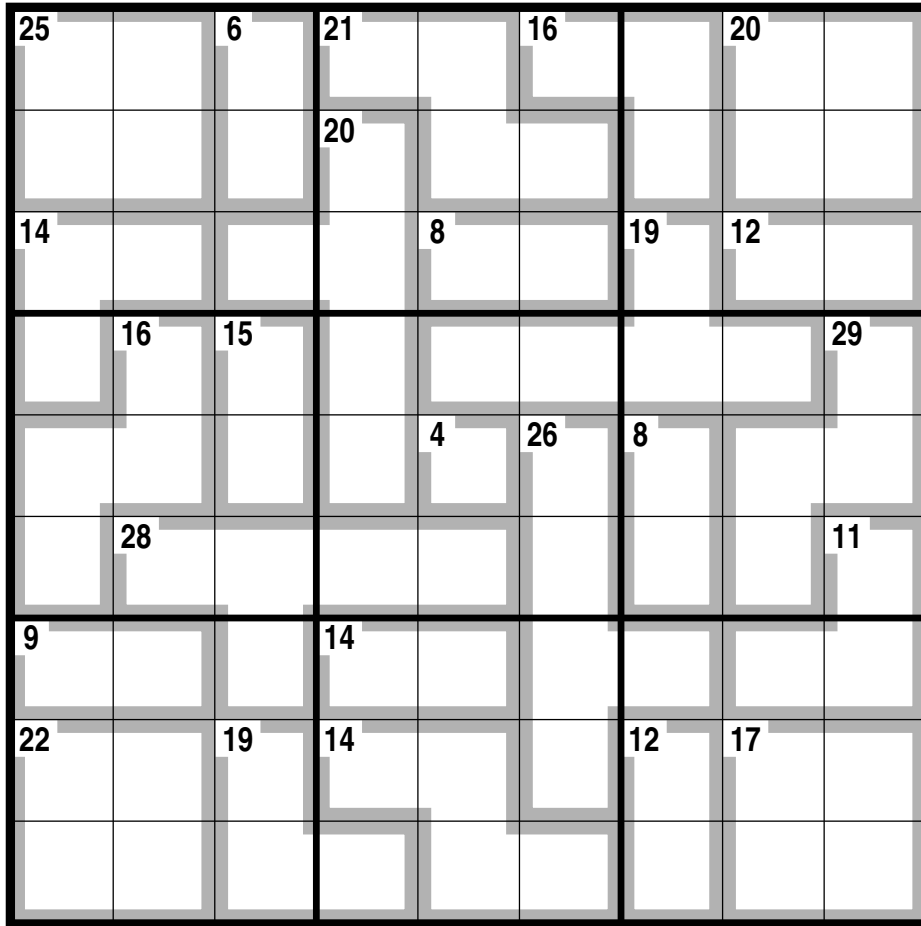


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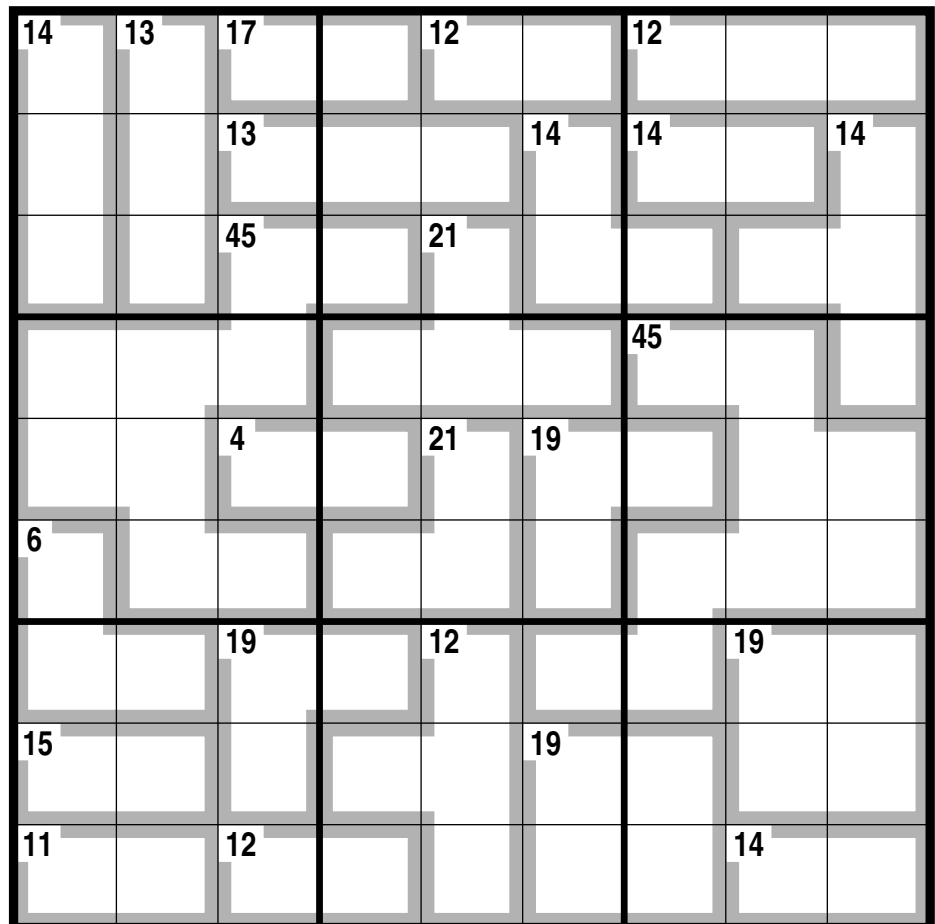


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Killer advanced

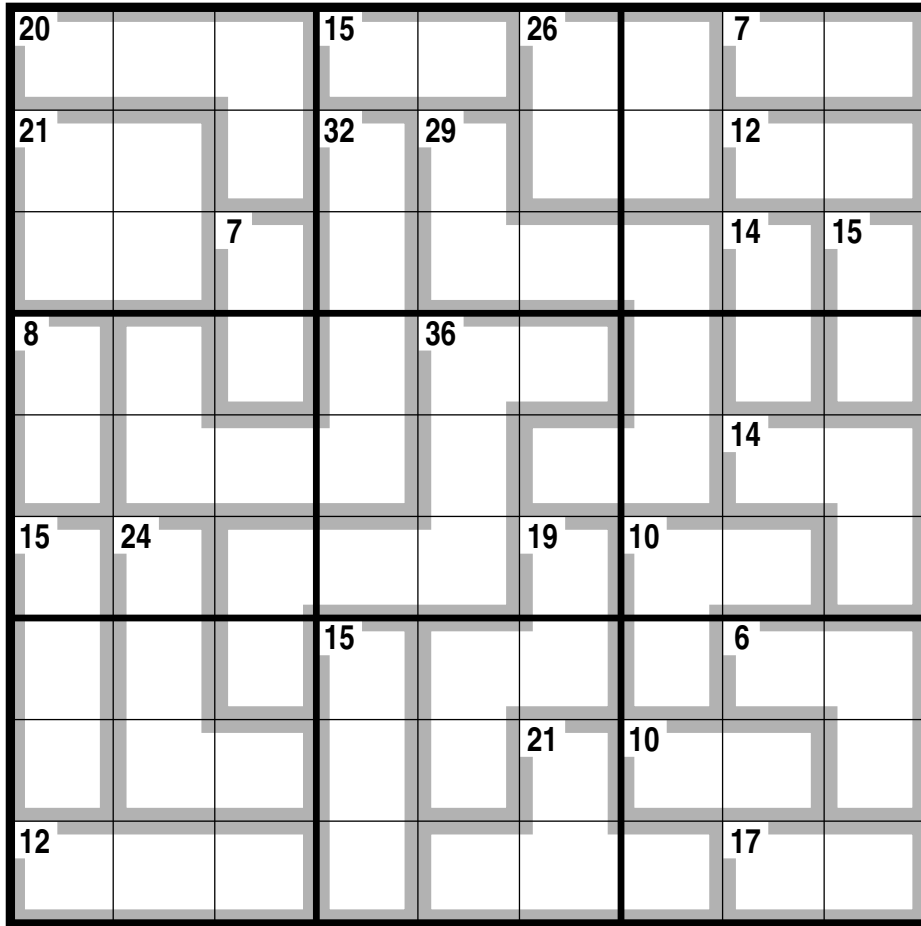


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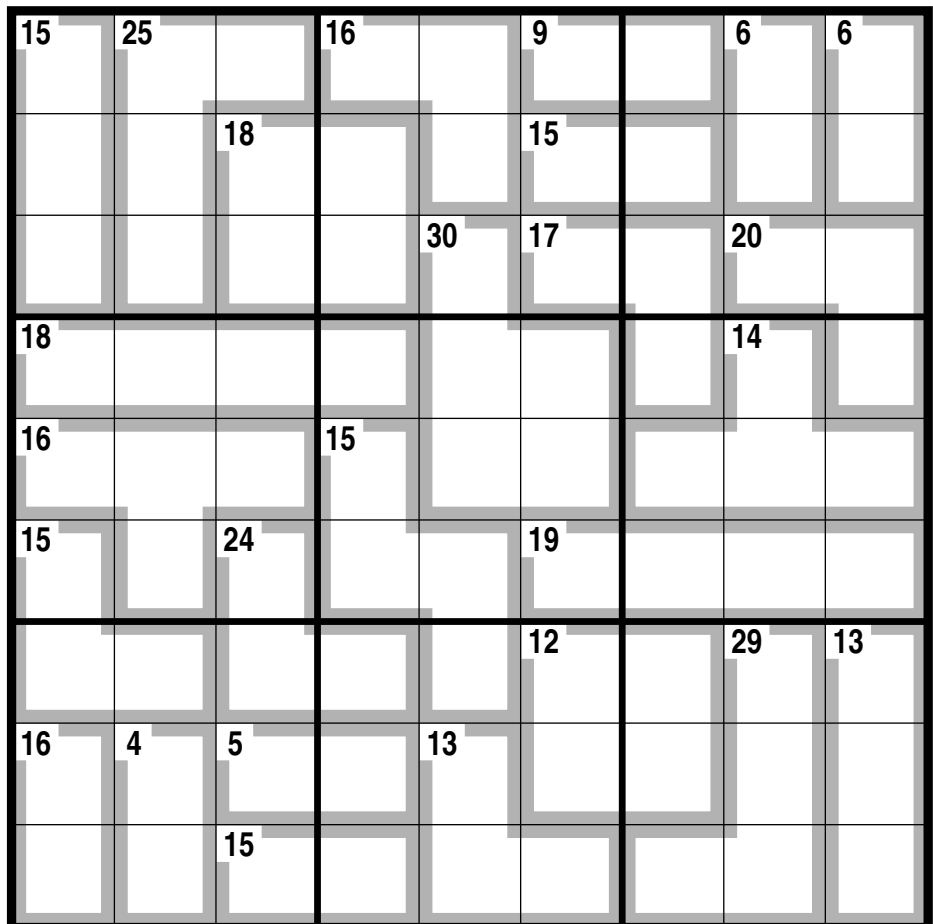
22

Killer advanced



23

24



Killer (advanced) Solutions

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9

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10

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11

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12

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13

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14

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15

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16

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17

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18

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19

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20

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