

Go Fish – Full Solution Guide

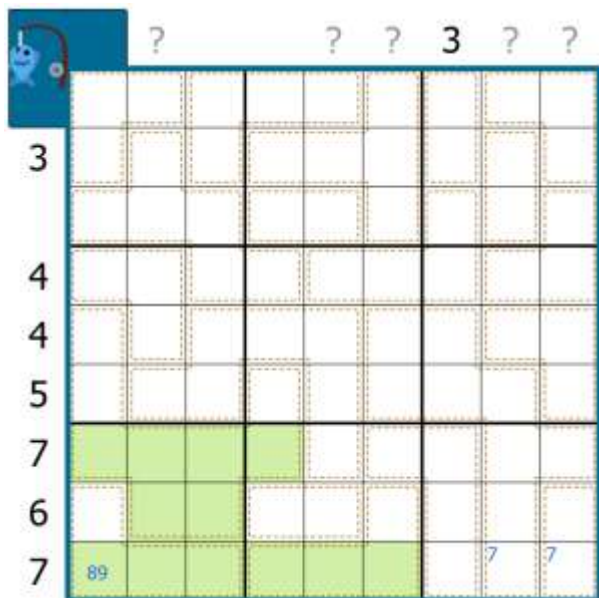
This is a full solution guide to my puzzle *Go Fish*, and so spoilers are ahead.

Rules

- Normal sudoku rules apply: Place the digits 1 to 9 once each in every row, column, and 3x3 box
- Cages: Each cage represents an aquarium for aquarium rules. In addition, digits may not repeat in a cage
- Aquarium: Shade some cells as water. If a cell is water then all cells in the same cage at the same or lower row must also be water. Clues outside the grid indicate the number of water cells in that row or column
- Numbered Air Pockets: Clues outside the grid give the digit to be placed in the Nth position in that row or column, where N is the digit in the first position (standard numbered rooms). In addition, the digit indicated by a numbered room clue can only appear in a non-water cell
 - ? means that the clue must be valid for both numbered room and aquarium rules. (Different ? clues can represent different numbers)

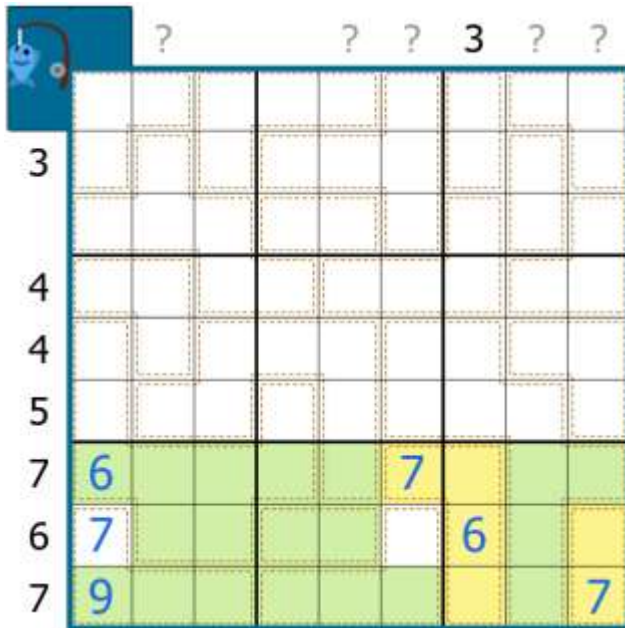
Solve Path

- Aquarium has some counting tricks. For example, look at row 9. 7 cells need to be water, so the cages with 3 cells in the row must be water or our count doesn't get high enough. Similarly the 4 cell cage in row 7, with water flowing down to row 8
- R9 numbered room of 7 can't go in position 7 as that would put two 7s in the row, so it's in R9C89

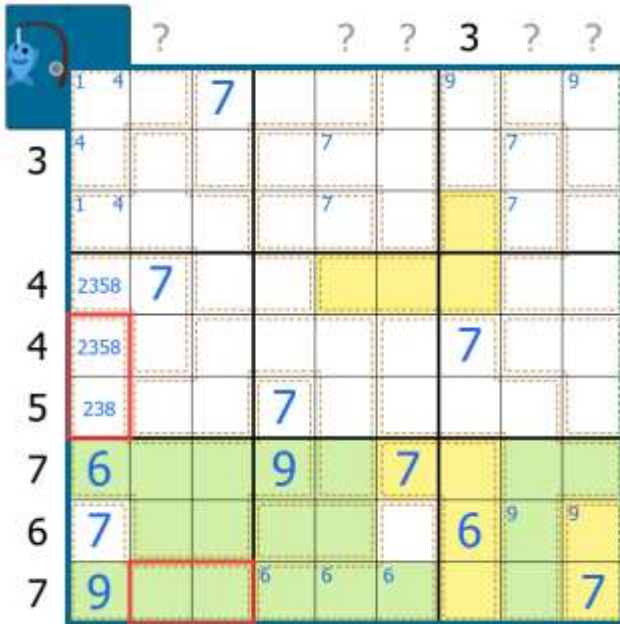


- R7 numbered room clue needs to be placed, and it can't go in box 9. By available spots it can only be R7C56
- Placing in R7C5 would make this an air cell, but then the count of water cells in the row would be wrong, so it is in R7C6
- Makes R7C89 water which flows down to R9C8, and resolves the R9 numbered room clue

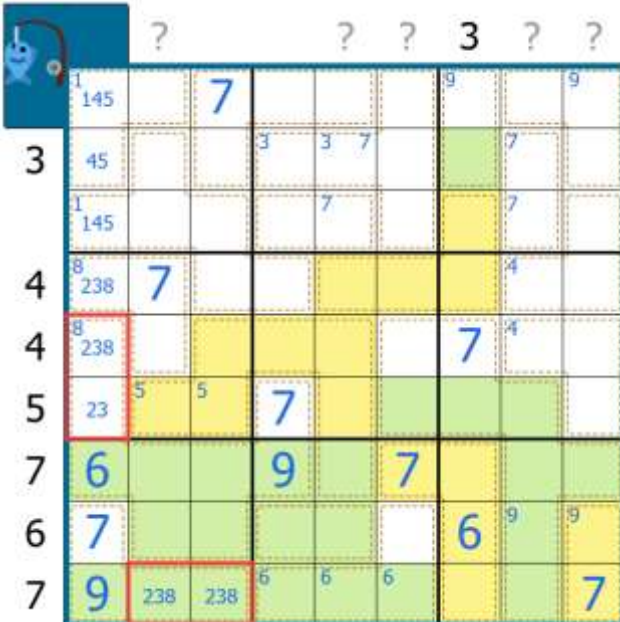
- Makes R9C7 air, which flows up to R7
- R8 now has 2 air cells, so R8C45 must be water or we have too many air cells
- By numbered room 6 can only go in R8C7



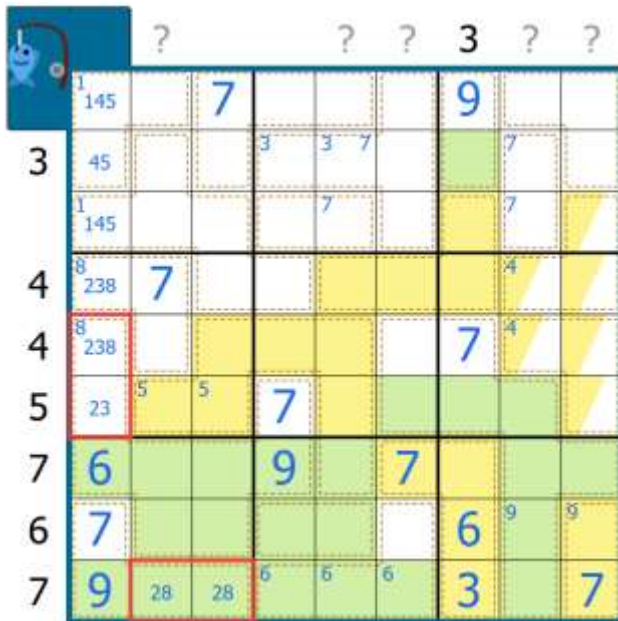
- 9 cell cage containing R7C1 must contain a 7, can only go in R6C4
- Must contain a 9, can only go in R7C4
- 9 cell cage containing R6C6 must contain a 7, can only go in R5C7
- 7 in row 1 is placed. It can't go on any of the numbered room clues as row 7 is water in all of these places
- 9 in row 1 must be box 3 for similar reasons. It could be R1C7 placing a 3. It could be R1C9, and then there would be 7 water cells in column 9, so all of the remaining cells in C9 would be water
- Considering the options for R456 numbered room clues we can restrict down to four options
- By killer geometry R56C1 are the same digits as R9C23
- Consider aquarium in row 4. A 4 clue can only be fulfilled by having two pairs of domino cages as water. Makes R4C567 air, which flows up to R3C7



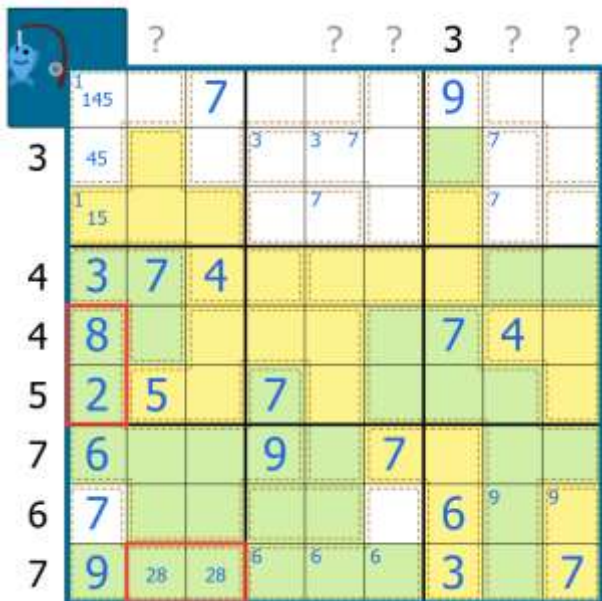
- Now consider aquarium in column 7. We need three water cells. If R6C7 or R2C7 were air this would flow up to the cell above and the count would be wrong
- Makes R6C678 water
- Interacts with the R6 numbered room to roughly place 5 in row 6
- Leaves triples in C1 box 1 and 4
- R2 numbered room pencilmarks 3 into box 2



- By numbered room, 4 in row 4 or 5 is in box 6. In either case, an extra air cell is placed in R4C9. Hence it is not possible for R1C9 to be a 9 any more as there are insufficient water cells to fulfil this
- Makes R1C7 a 9, placing a 3



- By our earlier killer geometry, R9C23 are from 28, R5C6 are from 28 which is resolved
- Places a 4 in R4C3, making the whole cage air



- Pencilmarking box 4 gives a 169 triple, all of which see R5C45 along with the 5 in the cage, leaving R5C45 to be a naked 23 pair
- 3 pencilmarks in boxes 2 and 5 align, placing 3 in column 6

	?		?	?	3	?	?
1	145		7			2	9
3	45			3	3	7	2
	15				7	2	
4	3	7	4				6
4	8	169	169	23	23	6	7
5	2	5	169	7	1489	4	6
7	6	3	3	9	148	7	
6	7			2	2	3	6
7	9	28	28	6	6	6	3

- R1C8 is very limited. Available air slots are only positions 1, 2, 3 and 5. 1 impossible by numbered room as the column has more than 1 water cell. 5 impossible as there are more than 4 water cells in the column. 3 ruled out by sudoku, so just a 2
- Makes R2C8 air
- Where is 2 in the R6C6 cage? Placed
- Places 4 and 6 in that same cage
- Places 4 in boxes 9 and 7 by killer geometry

	?		?	?	3	?	?
1	145		7				9
3	45			3	3	7	2
	15				7	2	
4	3	7	4				2
4	8	19	19	23	23	6	7
5	2	5	6	7	189	4	18
7	6	3	13	3	135	9	18
6	7	4	15	2	2	3	6
7	9	28	28	6	46	6	46

- Places 9 in R6C6 cage

	?		?	?	3	?	?	
1	145		7				9	2
3	45			3	3	7	2	158
	15				7	2	158	7
4	3	7	4				2	6
4	8	19	19	23	23	6	7	4
5	2	5	6	7	189	4	18	3
7	6	13	135	9	18	7	4	158
6	7	4	15	1258	1258	3	6	9
7	9	28	28	46	46	15	3	15

- We can pencilmark all the possibilities for R1 on the clues. R1C6 is left as just an 8 as all other options fail either by indexing a water cell, or because the indexed cell can't contain the number of water cells in that column
- Means there are 3 water cells in that column, so the rest are air

	?		?	?	3	?	?	
1	145	36	7	1456	45	8	9	2
3	45			3	3	7	2	158
	15	6			7	2	158	7
4	3	7	4				2	6
4	8	19	19	23	23	6	7	4
5	2	5	6	7	189	4	18	3
7	6	13	135	9	18	7	4	158
6	7	4	15	1258	125	3	6	9
7	9	28	28	46	46	15	3	15

- R5 is complete, placing a 5
- Resolves the R1C9 clue. Not 5 by sudoku, not 6 as column 9 does not contain 1, 8 or 9 water cells, so just a 3

	?			?	3	?	?						
1	145	6	36	7	1456	45	8	9	2	3			
3	45				3	3	7	2	5	158	7	67	168
	1	15	6			7	2		5	158	7	1678	4
4	3	7	4						2	6	168	6	1689
4	8	19	19	23	23	6	7	4	5				
5	2	5	6	7	8	189	4	18	3	189			
7	6	3	13	3	135	9	8	18	7	4	5	158	2
6	7	4	15	2	1258	2	125	3	6	9	18		
7	9	28	28	6	46	6	46	15	3	5	15	7	

- Resolves R1C2 clue, just a 6, and this column has 5 water cells which are already fulfilled
- Rest of the grid is becoming constrained and can be pencilmarked

	5	?				?	3	?	4	?					
1	145	6	7	145	45	8	9	2	3						
3	45	289	289		3	3	7	2	5	158	7	67	168		
	1	15	3	2389	3	2389		7	2	1259	5	158	7	1678	4
4	3	7	4	158	159	159	2	6	168	6	1689				
4	8	19	19	23	23	6	7	4	5						
5	2	5	6	7	8	189	4	18	3	189					
7	6	3	13	3	135	9	8	18	7	4	5	158	2		
6	7	4	15	2	1258	2	125	3	6	9	18				
7	9	28	28	6	46	6	46	15	3	5	15	7			

- By killer geometry, R8C9 = R6C7 and has to be placed in C8, and can only go in R3C8
- Resolved the 7 in box 3, and column 8 has 7 water cells which can be completed despite doing nothing
- By sudoku, R2C1 and R1C5 are the same digit. If this digit were a 5, this would place 3 in R2C5 in numbered room, and 3 in R5C5 by aquarium. Hence R2C1 is a 4
- Alternatively, if R6C5 were 8, it would make R7C5 and R8C9 1s, and you could not place 1 in row 9. Hence, there is a 19 pair in the cage

	⁵ ?				³ ?	3		⁴ ?
	1 145	6	7	15	45	8	9	2 3
3	45	289	289	³ 135	³ 13459	² 1259	⁵ 158	7 6
	¹ 15	³ 239	³ 239	6	7	² 29	⁵ 158	18 4
4	3	7	4	158	159	159	2	6 189
4	8	19	19	23	23	6	7	4 5
5	2	5	6	7	⁸ 189	4	18	3 189
7	6	³ 13	³ 135	9	⁸ 18	7	4	⁵ 158 2
6	7	4	15	² 1258	² 125	3	6	9 18
7	9	28	28	4	6	15	3	⁵ 15 7

- Sudoku, along with some unorthodox killer geometry, to finish

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