

Rockingham – Full Solution Guide

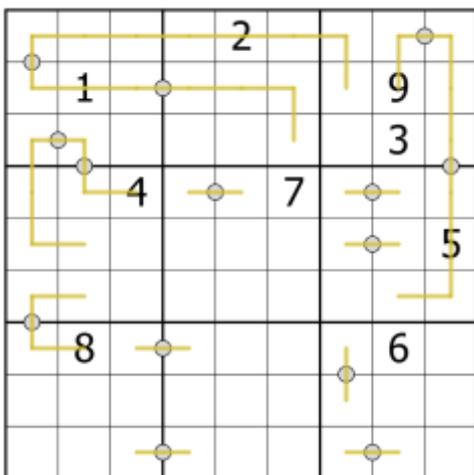
This is a full solution guide to my puzzle *Rockingham*, and so spoilers are ahead.

Rules

- Normal sudoku rules apply: Place the digits 1 to 9 once each in every row, column, and 3x3 box
- **Mid Loop:** Draw a single 1-cell-wide loop of orthogonally connected cells into the grid that does not branch or enter any cell more than once. The loop must pass through all given dots, and all given dots must be in the middle of a straight loop segment (i.e., the distance from a dot to the next turn along the loop must be identical in both directions)
- **Ambiguous Kropki:** Digits separated by a grey dot are consecutive or one is double the other. Adjacent digits on the loop not separated by a dot must NOT be consecutive or where one is double the other

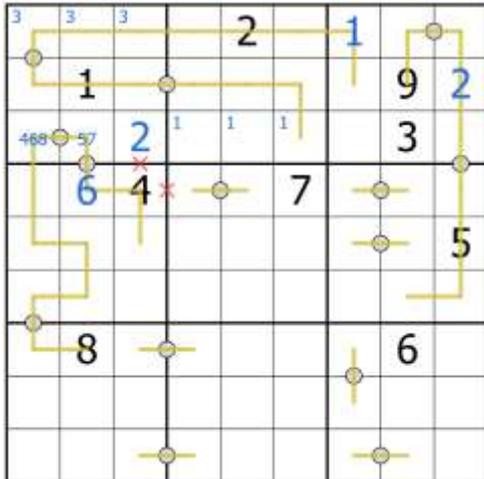
Solve Path

- NB: There are some mid-loop tricks that can drive more of the path earlier. In this solve guide I have deliberately avoided using these but will call them out when relevant
- We can draw loop lines through the centers of all the dots
- R1C1 has pushed the loop into a corner so this extends east, as does R2C1
- R2C1 now can't turn to escape so it takes the dot in R2 and extends to R2C6, forcing R1 loop to extend to R1C7
- R1C7 turns south to avoid taking R1C89 dot. R1C8 turns south, R1C9 turns south and extends to take C9 dot, and extends to R6C9 and turns west
- R3C1 turns south, can't extend to take C1 dot do extend to R5C1 and turns east
- R6C1 and R7C1 also head east
- R4C2 heads east

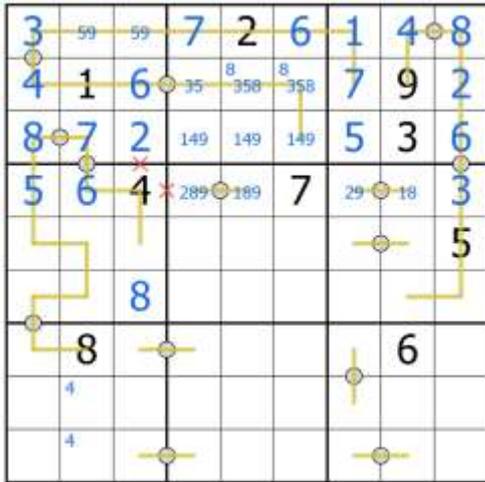


- Now we have drawn some anti-kropki lines in the grid, consider where 1 goes in R1. Not in box 1 by sudoku, not next to a 2 in box 2, not on a dot as regardless of dot type this would place another 2 in the row, so it is in R1C7

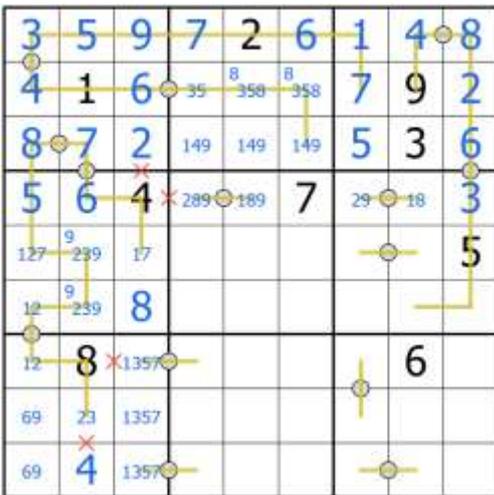
- Now consider where 2 goes in row 2, not next to a 1 in box 1, nor next to a 1 in R2C7, so must be R2C9. 2 can be marked in row 3 of box 1
- Now consider where 3 goes in row 1, not next to a 2 in box 2, so can be marked in box 1
- Now consider the options for R4C2. Next to a 4 this can't be 2, 3, 5, 8 by anti kropki, and not 1, 7, 8 by sudoku. If this were 9, it would place 8 in R3C2, so this is just a 6



- Where is 5 in row 4? On a dot it would be paired with only 4 or 6 which are taken, so it can only be R4C1
- Resolved R3C1 by anti kropki, then R3C2, placing 2 in R3C3
- R4C3 loop can't turn north by anti kropki, so goes south, forcing R5C2 south
- 4 in box 1 can't go in R1C2 by anti kropki, so it must be on the dot in C1. By available options this only pairs with a 3
- Forces 4 onto the dot in box 3 R1. Can't go next to the 2 so is in R1C8, and is paired with an 8 by available options
- Can place digits in the rest of box 3, must of box 1, and mark triples in box 2
- 8 is also placed in R6C3 by anti kropki
- Kropkis in row 4 are a 12 pair and an 89 pair
- (NB: At this point you can also prove that R4C7 can't go south as this would create a closed loop. This means R4C7 goes north, R5C7 goes south. You can prove that R6C7 does not go south as this would break the dot in box 9 C7. This means that the dot in box 9 row 9 must extend a further cell in each direction, and then R9C6 and R9C9 must turn north. You can prove that R6C8 can't go west as this would create a closed loop.)



- Can R7C2 go east? It can't, as putting 6 loop cells in row 7 would isolate the dot in R9C34, so this must turn south
- Places the 4 in C2 by anti kropki
- By considering the options for the digits in box 4 and the R67C1 dot, we get that there can't be a 23 pair in R56C2 by anti kropki, so there is a 9
- Resolves much by sudoku
- R67C1 dot is down to just 12 pair



- R67C1 dot resolves digits in box 4, making R8C2 a 2. Loop can't go south from R8C2 by anti kropki
- Marking row 6 we get a 17 pair in R6C89, resolving the kropki in row 4

3	5	9	7	2	6	1	4	8
4	1	6	35	8	358	7	9	2
8	7	2	149	49	149	5	3	6
5	6	4	2	1	7	9	8	3
7	3	1				4		5
2	9	8	3456	3456	345	4	46	17
1	8	357					6	479
69	2	357						4
69	4	357						179

- Lots of sudoku flows from here. Assuming no additional mid loop deductions have been used, we get to this series of deadly patterns

3	5	9	7	2	6	1	4	8
4	1	6	35	8	358	7	9	2
8	7	2	19	49	149	5	3	6
5	6	4	2	1	7	9	8	3
7	3	1	89	6	89	4	2	5
2	9	8	35	345	345	6	1	7
1	8	35	4	7	35	2	6	9
6	2	7	189	89	189	3	5	4
9	4	35	6	35	2	8	7	1

- R6C8 can't go north by anti kropki, so this goes south, and makes R5C8 go north
- This resolves a bunch of other loop ends, specifically R6C7 goes west, making R6C6 a 4 by anti kropki
- R9C6 goes north, removing the option for 1, resolving the 189 deadly pattern
- Should get down to unresolved 35s

3	5	9	7	2	6	1	4	8
4	1	6	35	8	35	7	9	2
8	7	2	9	4	1	5	3	6
5	6	4	2	1	7	9	8	3
7	3	1	8	6	9	4	2	5
2	9	8	35	35	4	6	1	7
1	8	35	4	7	35	2	6	9
6	2	7	1	9	8	3	5	4
9	4	35	6	35	2	8	7	1

- R8C9 can't go west by anti kropki, so goes north then west
- R8C7 has to go west to connect to something, as does R7C7
- This resolves the 35 pairs making R7C6 a 5
- Following the remaining loop ends should show only one valid path

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