The Palpot Line – Full Solution Guide
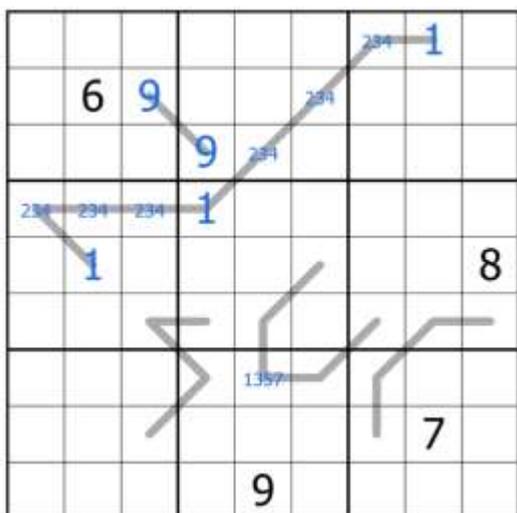
This is a full solution guide to my puzzle *The Palpot Line*, and so spoilers are ahead.

Rules

- Normal sudoku rules apply: Place the digits 1 to 9 once each in every row, column, and 3x3 box
- **Palindromes**: Digits along a grey line read the same in both directions
- **Meta Renban**: The digits along each line must sum to a unique number, and the sums of these lines must form a set of consecutive numbers. (For example, the lines could sum to 27, 28, 29, 30 and 31)

Solve Path

- Meta: An even length palindrome can only sum to an even total. An odd length palindrome can sum to an odd total if the central digit is odd
- Meta: The highest the two cell line can sum to is 18, if it is double 9. The lowest the nine cell line can sum to is 21, if it has 1234 on both wings and a 1 in the middle, so the meta renban spans 17 to 21 or 18 to 22
- Meta: There are only two odd length palindromes, so the meta renban spans 18 to 22
- Hence R4C4 is a 1 and the rest of the digits on the nine-cell line are minimised
- Hence R7C5 is odd

- 9 is placed in row 1
- 1 is placed in row 6 and column 7
- Hence the R6C9 line sums to 20, and 9 is placed in R6C8 and R7C7
- Hence the R6C3 line sums to 22

- 234 is placed in box 6
- 8 is placed in row 4
- Colouring 234s we can map these around the grid somewhat

- Pink 234 is placed in box 8 in R7C5
- We already know this digit is odd, so pink has to be 3
- The line overall sums to 19, so the remaining digits on the line sum to 16. This can't be done with 4 4s, so orange is 2, R6C5 is 6, and green is 4

- The R6C3 line sums to 22, so R6C3 and R7C4 are 8s

- Sudoku: 1 and 7 placed in box 8, 8 placed in row 8
- R8C6 is a naked single, 1 and 5 placed in box 2

3	2		6	5	78	4	1	9
	6	9	4	1	3	578		
4	4		9	2	78	5678		
4	3	2	1	8	9	567	56	57
9	1	6	5	7	2	3	4	8
57	57	8	3	6	4	2	9	1
			8	3	6	9		
8	9	3	2	4	5	1	7	6
			7	9	1	58	3	3

- Sudoku to finish

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