

Hitpoint Arrows – Full Solution Guide

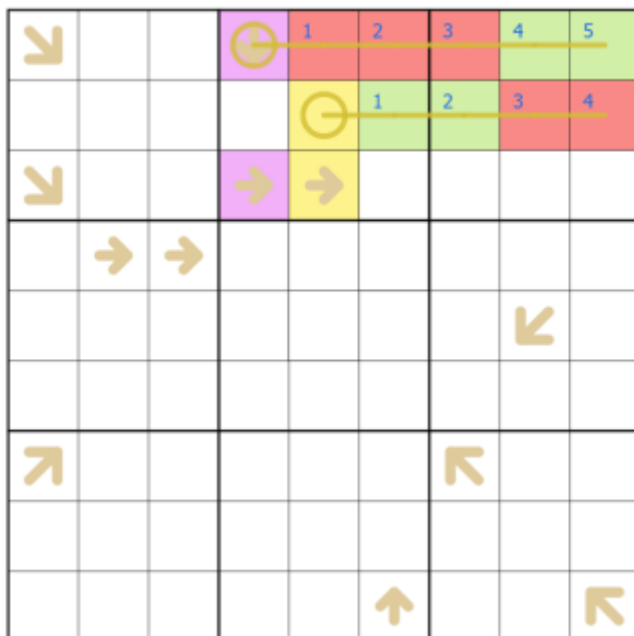
This is a full solution guide to my puzzle *Hitpoint Arrows*, and so spoilers are ahead.

Rules

- Normal sudoku rules apply: Place the digits 1 to 9 once each in every row, column, and 3x3 box
- Hitpoint Arrows: A digit on an arrow is the sum of all digits that are the correct number of steps away from that arrow. For example, if the digits in the direction of an arrow were 32947 then the arrow would contain a 6 (2 + 4) because the 2 is 2 steps away, the 4 is 4 steps away, and all other digits are the wrong number of steps away.)

Solve Path

- Generic point: An arrow pointing along a row or column must have at least two hits, otherwise the arrow digit is 0, or the arrow digit is repeated in the row/column
- Consider the two arrows stacked in R3C45. R3C5 can't be a 1 to provide a hit for R3C4. These need two hits each, and no cell could be a correct hit for both, so all four cells from R3C6789 must be hits for one of the arrows
- Consider whether R3C6 can be a 2. This would be a hit for R3C4, but remove the possibility of R3C7 being a hit for R3C5. Hence R3C7 must be a 3. But this removes the possibility of R3C8 being a hit for R3C5, and we run out of possible hits for R3C5..
- (Trying to visualise this here, R1 showing the hits for R3C4, R2 showing the hits for R3C5..)



- Hence R3C6789 go 1245 making R3C4 a 9 and R3C5 a 3
- 678 triple in R3 box 1
- R1C4 can't have hits in positions 1 or 2, and can't be a 9, so this is 34 or 35 making R1C4 7 or 8 and definitely R4C4 is a 3

↘			78					
678	678	678	9	3	1	2	4	5
	→	→	3					
			4				↙	
			5					
↗						↖		
					↑			↖

- R4C2 can't have 1, 2 or 3 as hits, so 4 and 5 are hits and R4C2 is a 9
- R4C3 needs 2 as a hit, and then only R4C9 as a 6 remains making R4C3 a 6
- Resolves R1C4 as 8 with a 5 in R6C4

↘			8					
678	678	67	9	3	1	2	4	5
17	9	8	3	2	4	5	17	6
							↙	
			5					
↗						↖		
					↑			↖

- R9C6 can't have 1, 3, 4, 5, 6 as hits, so this only leaves 2 and 7, making R9C6 a 9
- Places 3 in box 8 and 2 in box 2 by sudoku
- Places 5 in column 6, and leaves pairs, triples in box 2 and 5

↘			8	46	5			
			2	46	7			
678	678	67	9	3	1	2	4	5
17	9	8	3	2	4	5	17	6
			17	9 179	68		↙	
			5	9 179	68			
↗					2	↖		
					3			
					9			↖

- R9C9 cant have 2, 3, 4, 5, 7, 8 as hits (note the 678 triple in box 1)
- This definitely needs to hit 6 in R3C3, but R9C9 isn't a 6, so R8C8 is a 1 and R9C9 is a 7
- Resolves 17 pair in R4
- R3C1 can't have 1, 3, 4, 5 as hits, so it definitely needs a 6 in R9C7
- As R3C1 now can't be a 6, then it is 8, and places 2 in R5C3
- R7C7 definitely hits 3, and may also hit 5, so this is 3 or 8

↘			8	46	5			
			2	46	7			
8	7	6	9	3	1	2	4	5
1	9	8	3	2	4	5	7	6
		2	17	9 179	68		↙	
			5	9 179	68			
↗					2	↖		
					3		1	
					9	6		7

- R5C8 definitely hits 2, and 1 and 4 are also potentially available
- However, as R5C8 now can't be 2, 6 or 7 by sudoku, only 3 is available, and R6C7 is a 1
- R7C1 definitely hits 2 and 3, and no other digits are possible hits along that diagonal, so R7C1 is a 5
- Places 5 in box 4 then box 1, 9, 8
- Places 2 in box 9
- Places 7 in box 3

- R7C7 now is 3 as hitting 5 in R2C2 is no longer available
- R1C1 definitely hits 3, and may also hit 1, so this is 3 or 4

34			8	46	5	7		
		5	2	46	7			
8	7	6	9	3	1	2	4	5
1	9	8	3	2	4	5	7	6
467	5	2	17	⁹ 179	68	489	3	489
3467	346	347	5	⁹ 79	68	1	2	489
5					2	3	89	489
					3	489	1	2
					9	6	5	7

- By sudoku places 7 in box 3, 2 in box 1 and 7, and the rest of the grid can be pencilmarked

34	2	1349	8	46	5	7	69	13
349	134	5	2	46	7	89	689	13
8	7	6	9	3	1	2	4	5
1	9	8	3	2	4	5	7	6
467	5	2	17	⁹ 179	68	489	3	489
3467	346	347	5	⁹ 79	68	1	2	489
5	1468	1479	1467	178	2	3	89	489
4679	468	479	467	5	3	489	1	2
2	1348	134	14	18	9	6	5	7

- I have so far ignored remaining hitpoints, however we can note that in order to avoid getting the wrong total, R7C4 isn't a 6 for the R1C4 arrow, R9C4 isn't a 4 for the R5C8 arrow, resolving C4

34	2	1349	8	46	5	7	69	13
349	134	5	2	46	7	89	689	13
8	7	6	9	3	1	2	4	5
1	9	8	3	2	4	5	7	6
46	5	2	7	1	68	489	3	489
3467	346	347	5	9	68	1	2	48
5	168	19	4	7	2	3	89	89
479	48	479	6	5	3	489	1	2
2	34	34	1	8	9	6	5	7

- 34 pair in box 7 places 4 in box 9, then 1, 6 in box 7

34	2	349	8	46	5	7	69	13
349	134	5	2	46	7	89	689	13
8	7	6	9	3	1	2	4	5
1	9	8	3	2	4	5	7	6
46	5	2	7	1	68	89	3	489
3467	34	347	5	9	68	1	2	48
5	6	1	4	7	2	3	89	89
79	8	79	6	5	3	4	1	2
2	34	34	1	8	9	6	5	7

- 34 pair in C2 places 1 in box 1
- Means that R1C1 definitely hits 1, so R1C1 is a 4
- (NB: Can also note that 3 in R1C1 forces 1 into R1C3, and this would break R1C9, so R1C1 is a 4, forcing 1 in to R2C2)
- Remaining resolves by sudoku

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