Express Riddler

15 May 2020

Riddle:

As you sit down to pass the time with a sudoku puzzle, you immediately notice that the grid is oddly sparse—only a handful of numbers are initially filled in. But it gets worse. While there aren't any numbers that occur more than once in the same row, column, or square (i.e., the grid doesn't *ostensibly* break any of the sudoku rules), upon closer inspection, you can see that the puzzle is impossible.

What is the *smallest* possible sum of the initial numbers in the grid? (Note that multiple instances of the same number count separately. So if your impossible grid happened to consist of eight 4s and two 5s, the sum would be 42.)

Solution:

Here is my solution:

It is impossible because the single 2 is occupying the only spot where the upper-right 1 must be. The sum of these numbers is a mere 6, which intuitively seems impossible to beat. I don't think this can be improved because there need to be at least four numbers to specify a fifth position, and just having a single other number to block it seems to be the minimum required to create an impossible scenario. Therefore, using four 1s and a single 2 gives the minimum sum, so the solution to the riddle is 6 .