



This brainteaser was written by Derrick Niederman.

In the Sudoku grid below, only the numbers along the perimeter are shown.

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

Suppose the grid was completed according to the standard Sudoku rules — each row, column and 3×3 square contains the numbers 1–9. Would the sum of all the missing numbers be divisible by 3?



Solution: No, the sum of the missing numbers is not divisible by 3.

One way to solve this brainteaser is to complete the Sudoku grid and then find the sum of the numbers that you filled in. Unfortunately, that's the long way. As it turns out, there are lots of different ways that the grid could be filled in, and finding a valid arrangement is time-intensive. Then there's the matter of finding the sum of the interior numbers, which isn't difficult but does require precision. Despite all those potential problems, however, one valid arrangement is shown below, and the sum of the interior digits is 239, which is not divisible by 3.

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

A better solution uses logic and does not require filling in the missing numbers.

The rules of Sudoku require that each digit 1–9 must be used in each row, column, and 3×3 square, and the sum of these nine digits is $1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 = 45$. Knowing this is very helpful.

Because there are nine rows, the sum of all numbers in the completed puzzle must be $9 \times 45 = 405$. The perimeter consists of two rows and two columns, but the numbers at the corners — 1, 2, 7, and 4 — are counted twice each, once in a row and once in a column. Hence, the sum of the numbers around the perimeter is $4 \times 45 - (1 + 2 + 7 + 4) = 166$. Consequently, the sum of all the interior numbers must be $405 - 166 = 239$, and 239 is not divisible by 3.