

Math 4010 Problem Solving Activity: Sudoku

In the last few years, a pencil puzzle called “Sudoku” has become very popular. Sudoku is played (usually) on a nine-by-nine grid, divided further into nine three-by-three areas. This grid is initially populated with a few of the numbers one through nine (often with crossword symmetry). The goal is to fill the grid with the digits one through nine (nine times each) so that each number appears in each row, column, and subarea exactly once.

1. Apply Polya's problem-solving method to the following Sudoku puzzle. Do you understand the goal? Briefly write down your plan for how to solve the puzzle, and then implement it. How did you check your answer? Do you think there is more than one possible answer? Why or why not?

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

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2. Write down a guess at the following questions with a brief explanation. These are hard! Don't spend too much time, just give them a try.

a. Does every three-by-three area need to have a number in it to start in order to solve the puzzle?

b. How few numbers do you think could be given at the beginning so that the puzzle has only one solution?

Fun Fact: There are 6,670,903,752,021,072,936,960 different possible unique solution Sudoku puzzles!

3. One way to get better at problem solving is to practice writing problems. The same general rules for Sudoku can be applied to other size grids. Make a 4x4 Sudoku of your own (with four two-by-two subareas) that has no more than four numbers given and has a unique solution. Explain how you made it.