

# Teacher's Guide for MMC Sudoku Puzzles

The Sudoku puzzles located under “Codes and Puzzles” on our Do The Math page can be used as the basis for a challenging yet fun open-ended math activity for the whole class.

First, select one or more of the MMC Sudoku puzzles for your students to complete in class. When deciding which puzzles to use, keep in mind that the difficulty of the puzzles varies depending on how many spaces are initially filled in for the students; the easiest of our puzzles initially have eight spaces filled in, while the most difficult puzzles initially have only four spaces filled in.

Have a student read the rules out loud in class. Ask your students what “The same rules apply to the number puzzle” means. Make sure they understand the rules for filling in the Sudoku puzzles before they work on one. You may want to complete one puzzle as a class using the number puzzle (enlarged on your dry erase or chalk board) as a guide. Be sure to emphasize how the numbers on the board correspond to the characters in their Sudoku puzzles.

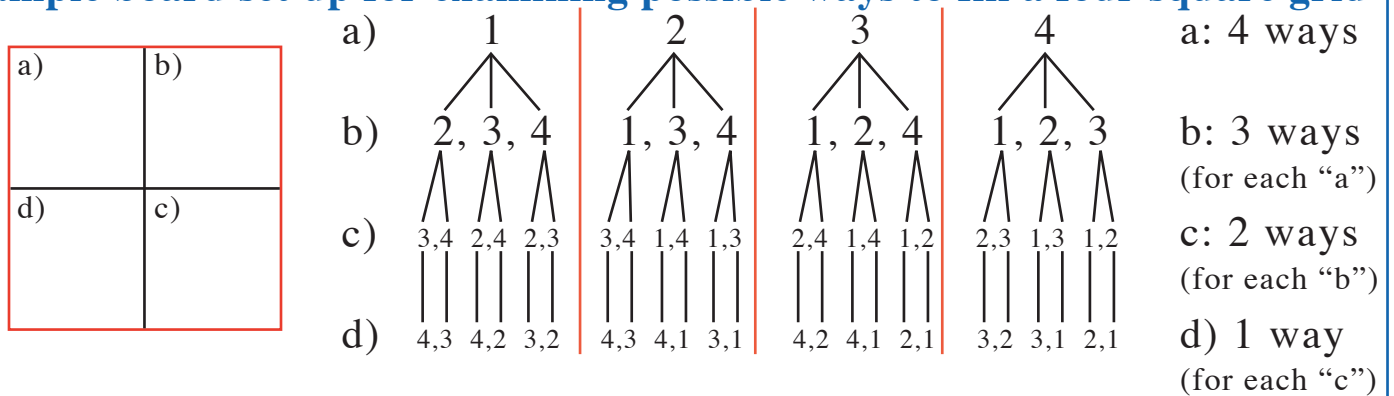
Have your students complete one or more of the puzzles individually or in small groups. Afterwards, review the students' solutions and have a classroom discussion about how the students would go about creating their own Sudoku puzzles. Would they rather use numbers or pictures in their puzzles? Could they use something else? Could you make a Sudoku puzzle using letters? How many different ways can one of the corner red squares be filled with four numbers or pictures? Use this question to launch an open-ended math exploration. Suggest that the class work together to find the answer by making a chart or drawing a picture. (See figure 1) If your students have little difficulty understanding the generalizations implicit in statements such as “for each possible way to fill square a...,” you may want to continue by asking how many different ways each of the adjoining squares can be filled. How many ways can a four square grid be filled with four numbers following the Sudoku rules? (For each of the 24 ways the first corner can be filled, there are four ways to fill each adjoining square, and only one way to fill the final square:  $24 \times 4 \times 4 \times 1 = 384$  ways in all.)

Finally, give your students time to make their own Sudoku puzzles individually or in small groups. When they have finished, instruct them to write about the strategies they used to create their puzzles and explain them to their classmates. Later, you can make copies of selected student-made Sudoku puzzles and use them in class or as part of an open house or family math night.

# Teacher's Guide for MMC Sudoku Puzzles (Continued)

**FIGURE 1**

## Sample board set up for examining possible ways to fill a four square grid



1. Label the four squares of the grid with letters.
2. Determine the options for filling square "a," and record the information on the board. (Numbers 1-4 have been used in this example.)
3. Determine the options for filling square "b," and record the information on the board.
4. Determine the options for filling square "c," and record the information on the board.
5. Determine the options for filling square "d," and record the information on the board.
6. Ask your students if they see any patterns.
7. Review the chart you made on the board: there are four ways to fill square a. For each way square a can be filled, there are three ways to fill square b. For each way square b can be filled, there are two ways to fill square c. For each way square c can be filled, there is only one way to fill square d.
8. You can count the number of possibilities listed for the last square (d) or simply multiply:  
 $4 \times 3 \times 2 \times 1 = 24$  different ways to fill one corner of the puzzle!

# MMC Sudoku Puzzles 1–20 Easy–Hard Key

Easy (8 numbers given): Puzzles 5, 6, 7, and 16

Easy (7 numbers given): Puzzles 8, 9, 10, and 17

Medium (6 numbers given): Puzzles 11, 12, 13, and 18

Medium (5 numbers given): Puzzles 1, 14, 15, and 20

Hard (4 numbers given): Puzzles 2, 3, 4, and 19

# Solutions To MMC Sudoku Puzzles 1-20

|   |   |   |   |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| 4 | 3 | 2 | 1 |
| 2 | 1 | 4 | 3 |
| 3 | 4 | 1 | 2 |

PUZZLE #1

|   |   |   |   |
|---|---|---|---|
| 4 | 3 | 1 | 2 |
| 2 | 1 | 3 | 4 |
| 3 | 2 | 4 | 1 |
| 1 | 4 | 2 | 3 |

PUZZLE #2

|   |   |   |   |
|---|---|---|---|
| 3 | 1 | 2 | 4 |
| 4 | 2 | 1 | 3 |
| 1 | 4 | 3 | 2 |
| 2 | 3 | 4 | 1 |

PUZZLE #3

|   |   |   |   |
|---|---|---|---|
| 2 | 4 | 3 | 1 |
| 3 | 1 | 4 | 2 |
| 1 | 3 | 2 | 4 |
| 4 | 2 | 1 | 3 |

PUZZLE #4

|   |   |   |   |
|---|---|---|---|
| 2 | 1 | 3 | 4 |
| 3 | 4 | 2 | 1 |
| 1 | 2 | 4 | 3 |
| 4 | 3 | 1 | 2 |

PUZZLE #5

|   |   |   |   |
|---|---|---|---|
| 4 | 2 | 3 | 1 |
| 1 | 3 | 2 | 4 |
| 3 | 1 | 4 | 2 |
| 2 | 4 | 1 | 3 |

PUZZLE #6

|   |   |   |   |
|---|---|---|---|
| 4 | 1 | 3 | 2 |
| 2 | 3 | 1 | 4 |
| 1 | 4 | 2 | 3 |
| 3 | 2 | 4 | 1 |

PUZZLE #7

|   |   |   |   |
|---|---|---|---|
| 1 | 3 | 4 | 2 |
| 2 | 4 | 3 | 1 |
| 3 | 2 | 1 | 4 |
| 4 | 1 | 2 | 3 |

PUZZLE #8

|   |   |   |   |
|---|---|---|---|
| 3 | 4 | 1 | 2 |
| 2 | 1 | 4 | 3 |
| 1 | 2 | 3 | 4 |
| 4 | 3 | 2 | 1 |

PUZZLE #9

|   |   |   |   |
|---|---|---|---|
| 1 | 2 | 4 | 3 |
| 3 | 4 | 2 | 1 |
| 2 | 3 | 1 | 4 |
| 4 | 1 | 3 | 2 |

PUZZLE #10

|   |   |   |   |
|---|---|---|---|
| 3 | 2 | 1 | 4 |
| 4 | 1 | 2 | 3 |
| 1 | 4 | 3 | 2 |
| 2 | 3 | 4 | 1 |

PUZZLE #11

|   |   |   |   |
|---|---|---|---|
| 2 | 4 | 3 | 1 |
| 1 | 3 | 4 | 2 |
| 3 | 2 | 1 | 4 |
| 4 | 1 | 2 | 3 |

PUZZLE #12

|   |   |   |   |
|---|---|---|---|
| 1 | 4 | 2 | 3 |
| 3 | 2 | 4 | 1 |
| 4 | 1 | 3 | 2 |
| 2 | 3 | 1 | 4 |

PUZZLE #13

|   |   |   |   |
|---|---|---|---|
| 3 | 4 | 2 | 1 |
| 2 | 1 | 4 | 3 |
| 4 | 3 | 1 | 2 |
| 1 | 2 | 3 | 4 |

PUZZLE #14

|   |   |   |   |
|---|---|---|---|
| 2 | 1 | 4 | 3 |
| 3 | 4 | 1 | 2 |
| 4 | 2 | 3 | 1 |
| 1 | 3 | 2 | 4 |

PUZZLE #15

|   |   |   |   |
|---|---|---|---|
| 1 | 2 | 4 | 3 |
| 3 | 4 | 1 | 2 |
| 4 | 3 | 2 | 1 |
| 2 | 1 | 3 | 4 |

PUZZLE #16

|   |   |   |   |
|---|---|---|---|
| 4 | 2 | 1 | 3 |
| 1 | 3 | 2 | 4 |
| 2 | 4 | 3 | 1 |
| 3 | 1 | 4 | 2 |

PUZZLE #17

|   |   |   |   |
|---|---|---|---|
| 4 | 3 | 1 | 2 |
| 1 | 2 | 4 | 3 |
| 2 | 1 | 3 | 4 |
| 3 | 4 | 2 | 1 |

PUZZLE #18

|   |   |   |   |
|---|---|---|---|
| 1 | 3 | 4 | 2 |
| 4 | 2 | 3 | 1 |
| 2 | 4 | 1 | 3 |
| 3 | 1 | 2 | 4 |

PUZZLE #19

|   |   |   |   |
|---|---|---|---|
| 2 | 4 | 1 | 3 |
| 1 | 3 | 2 | 4 |
| 4 | 2 | 3 | 1 |
| 3 | 1 | 4 | 2 |

PUZZLE #20