Warmups

Ken Ken!

Ken Ken is a number puzzle played on square - say $n \times n$ - grid. The grid is partitioned into 'cages', which are initially empty. Each cage has an addition, subtraction, multiplication, or division rule. Your goal is to fill in the squares with integers 1 through $n$ such that:

- The rule in each cage is satisfied by the numbers inside it. For example, in a $4 \times 4$ puzzle, if a cage has two squares with the rule $2-$, it must either have a 1 and a 3 or a 2 and a 4.
- No number appears twice in any row or column (every number 1 through $n$ appears exactly once)

Here is a $3 \times 3$ example.

All these puzzles have unique solutions. Try to find the solution by making one logical deduction at a time.

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More puzzles:

```
\[\begin{array}{cccc}
3 \times & 2 \div & & \\
& 12 \times & 8 + & \\
2 \div & 1 - & & 1 \\
& & & \\
\end{array}\]
```

```
\[\begin{array}{cccc}
1 - & & 3 - & 6 + \\
2 \div & 12 \times & & \\
& 2 - & & 2 \div \\
\end{array}\]
```

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\[\begin{array}{cccc}
5 + & 15 \times & 3 - & \\
& 2 \div & 4 - & \\
20 \times & 12 \times & 12 \times & 5 \\
& 2 \div & & \\
6 + & 1 - & & \\
\end{array}\]
```