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1. The sum of each row/column of an $n \mathrm{x} n$ magic square is $\frac{n^{3}+n}{2}$. Proof
An $n x n$ magic square contains the numbers $1,2 . . n^{2}$, each used exactly once. The sum of all the numbers in the square is then $\left(n^{2}\right)\left(n^{2}+1\right) / 2$. The numbers in the square are divided across $n$ rows of equal size that each have the same sum. So the sum of each row is the total of sum of the numbers across all rows divided by the number of rows: $\frac{\left(n^{2}\right)\left(n^{2}+1\right)}{2}\left(\frac{1}{n}\right)$, or $\frac{n^{3}+n}{2}$.
2. $3 \times 3$ :
$2 \quad 9 \quad 4$
$\begin{array}{lll}7 & 5 & 3\end{array}$
$\begin{array}{lll}6 & 1 & 8\end{array}$
3. 4 x 4 :

| 1 | 15 | 14 | 4 |
| :---: | :---: | :---: | :---: |
| 12 | 6 | 7 | 9 |
| 8 | 10 | 11 | 5 |
| 13 | 3 | 2 | 16 |

4. $7 \times 7$ :

| 4 | 35 | 10 | 49 | 16 | 47 | 22 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 29 | 11 | 42 | 17 | 48 | 23 | 5 |
| 12 | 36 | 18 | 41 | 24 | 6 | 30 |
| 37 | 19 | 43 | 25 | 7 | 31 | 13 |
| 20 | 44 | 26 | 9 | 32 | 14 | 38 |
| 45 | 27 | 2 | 33 | 8 | 39 | 21 |
| 28 | 3 | 34 | 1 | 40 | 15 | 46 |

5. Decks

| $A:$ | 2 | 9 | 4 |
| :--- | :--- | :--- | :--- |
| $B:$ | 7 | 5 | 3 |
| $C:$ | 6 | 1 | 8 |

A vs B :
B will win, with $5 / 9>4 / 9$
A vs C:
A will win, with $5 / 9>4 / 9$
B vs C:
C will win, with $5 / 9>4 / 9$

This does constitute a sucker's paradox, as no one deck will win all the time. Someone looking to cheat some sucker could always let them choose a deck first and then choose their own deck and be assured of victory in the long run.

