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HW2 - 437

0. ✓

(1.) An $n \times n$ magic square has the columns and rows add up to

$$P_n = \frac{n(n^2+1)}{2},$$

In an $n \times n$ magic square there are entries from 1 to n^2.

The sum of all the entries is S_n

$S_n = \frac{n^2(n^2+1)}{2}$, now we say that $P_n = \frac{S_n}{n}$. So $P_n = \frac{\left(\frac{n^2(n^2+1)}{2}\right)}{n}$

$$= \boxed{\frac{n(n^2+1)}{2}}$$

(2.) 3x3 magic square:

8	1	6
3	5	7
4	9	2

X

X X X

X X X X X

X X X

X

→

8	1	6
3	5	7
4	9	2

(3.)

A B

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

C D

(4.) 7x7

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

Jacob McClure

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6

1,2 L

1,4 L

1,6 L

3,2 W

3,4 L

3,6 L

5,2 W

5. $A = \{1,3,5,7\}$ Person A and Person B are equally likely to win.
$B = \{2,4,6\}$ They both have a 50/50 chance of winning.

6. $\begin{bmatrix} 8 & 1 & 6 \\ 3 & 5 & 7 \\ 4 & 9 & 2 \end{bmatrix}$ Each deck is just as likely to win because the expected value is the same for all of them!

This does constitute a Simpson's paradox because every outcome is equally likely.

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