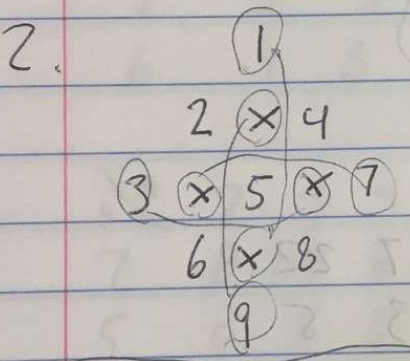
Daniel Rogers Due 9/19

Homework 2

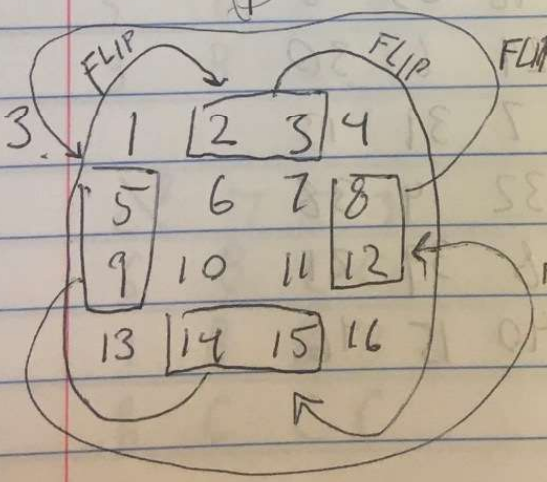
1. Each row & column adds to $(\sum_{i=1}^{n^2} i)/n$
   This is because the sum of all numbers included in the square (n^2, since there is always n^2 cells in a $n \times n$ square) will be divided evenly n ways. Therefore, all magic squares are represented in the above equation.

2.



$\Rightarrow$

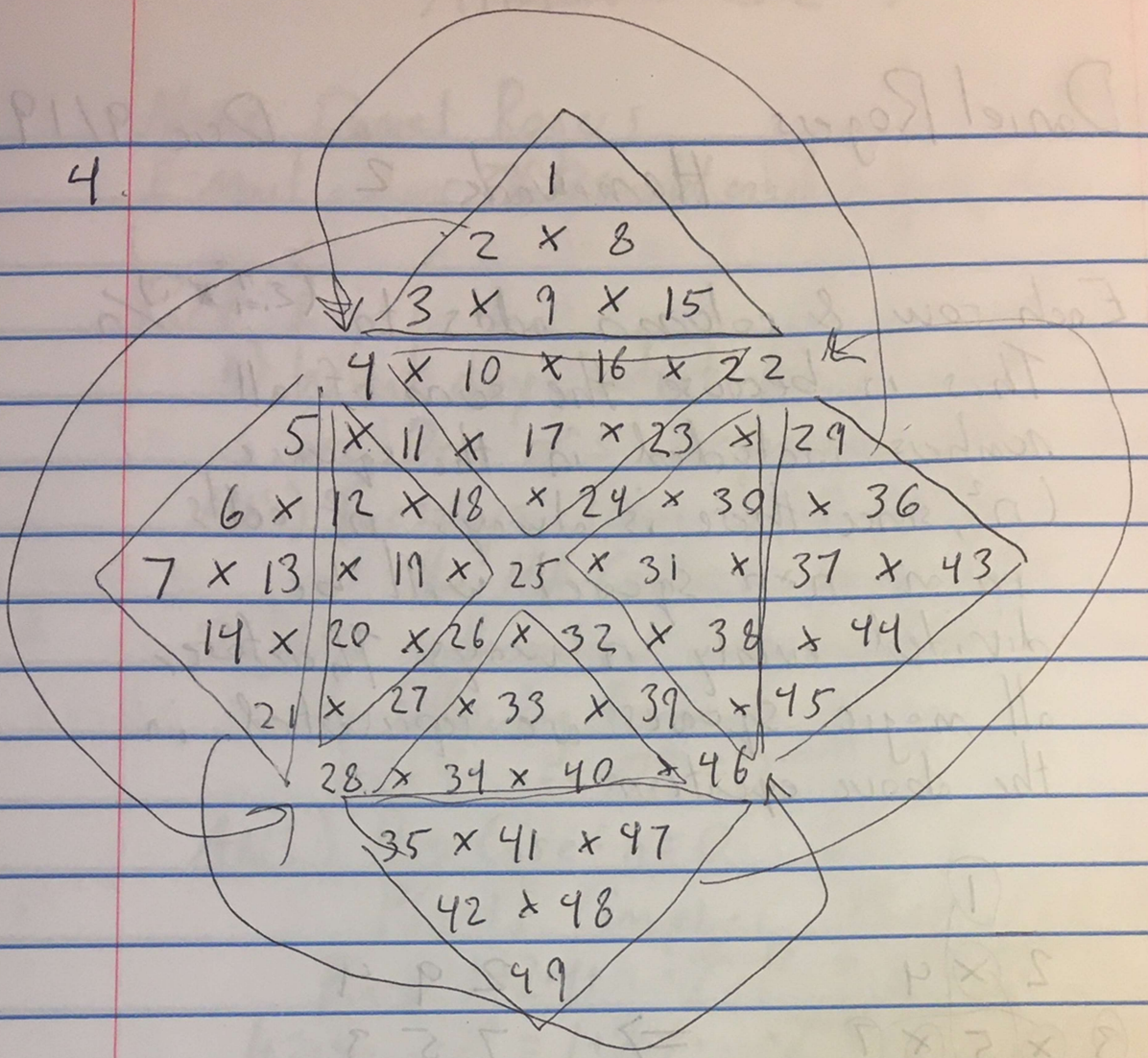
2	9	4
7	5	3
6	1	8



$\Rightarrow$

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

4.



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

5.

B \ A	1	3	5	7
2	B	A	A	A
4	B	B	A	A
6	B	B	B	A

50-50 split
each wins ½ the time

Both person A and person B have a 50% chance of winning. They are equally likely to win.

6.

2 9 4 - Deck A
7 5 3 - Deck B
6 1 8 - Deck C

B \ A	2	9	4
7	B	A	B
5	B	A	B
3	B	A	A

B more likely to win
wins 5/9

C \ B	7	5	3
6	B	C	C
1	B	B	B
8	C	C	C

C more likely to win
wins 5/9

C \ A	2	9	4
6	C	A	C
1	A	A	A
8	C	A	C

A more likely to win
wins 5/9

This constitutes a sucker's paradox since $B > A > C > B > A > C > \dots$. Each deck is "better" than the next, but it contradicts itself in a loop.