History of Math	Homework 2	Karan Amin

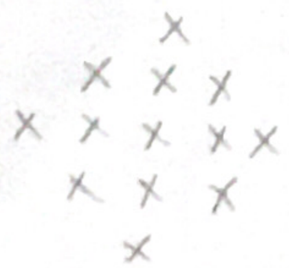
You can post this on website *

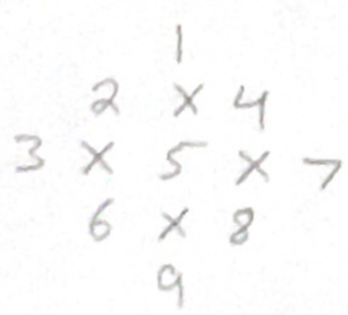
① The amount each column, row adds up to is

$$\frac{1+2+3+\cdots+n^2}{n} = \frac{n^2(n^2+1)}{2n} = \boxed{\frac{n(n^2+1)}{2}}$$

We know this must be the value because each row be the same value and the sum of all rows must add up to $1+2+3+\cdots+n^2$. We know that $1+2+3+\cdots+k = \frac{k(k+1)}{2}$ hence why $1+2+3+\cdots+n^2 = \frac{n^2(n^2+1)}{2}$

② 3 by 3 magic square

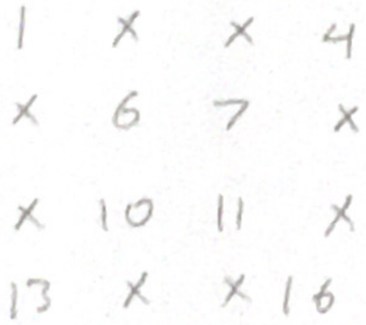




2	9	4
7	5	3
6	1	8

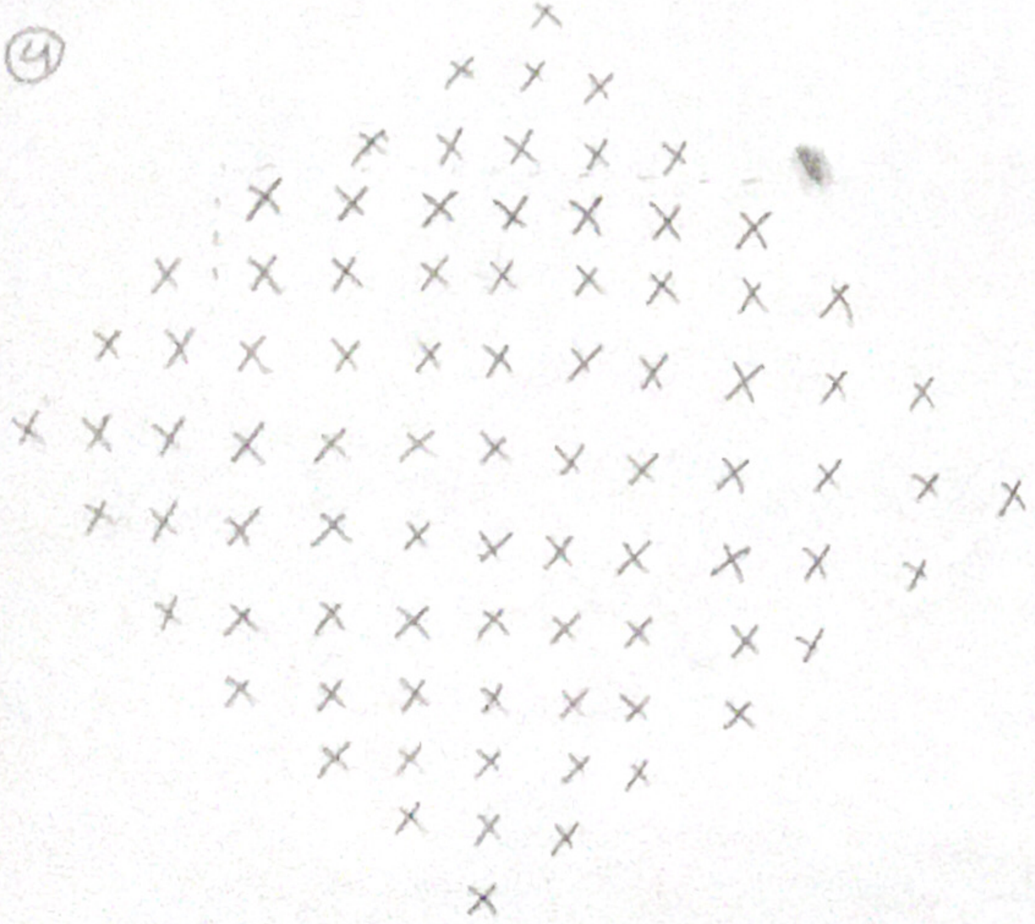
③ 4 by 4 magic square

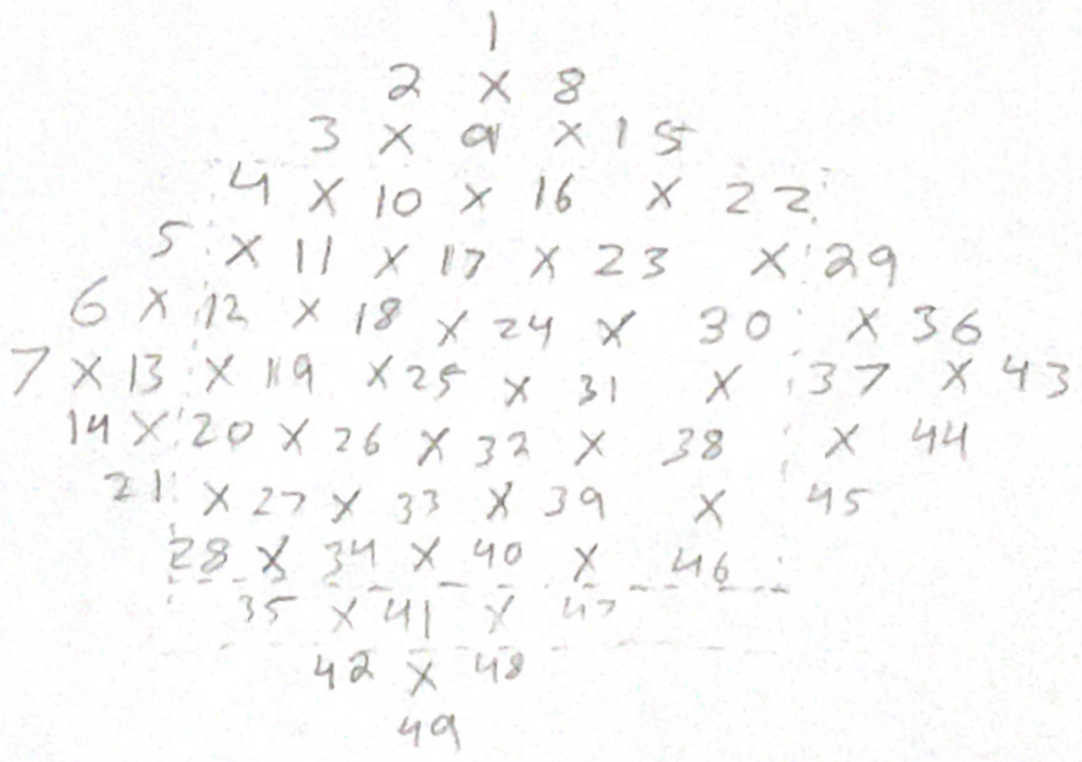
1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16



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

7 by 7 magic square

⑤

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

$P(A) = 6/12$

$P(B) = 6/12$

Neither player is more likely to win, they both have 1/2 probability of winning

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

2	9	4	
7	5	3	
6	1	8	

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

$P(A) = 4/9$

$P(B) = 5/9$

B is more likely to win when its A vs B $B > A$

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

$P(B) = 4/9$

$P(C) = 5/9$

C is more likely to win when its B vs C $C > B$

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

$P(A) = 5/9$

$P(C) = 4/9$

A is more likely to win when its A vs C. $A > C$

Yes it does constitute a sucker's paradox because whatever Deck the sucker chooses, you can always find a deck with a higher probability of winning

$A < B < C < A$