

Mathematical Magic

By Nancy
Blachman
JRMF.org



Inspire Curiosity

How can you inspire
curiosity about
mathematics?

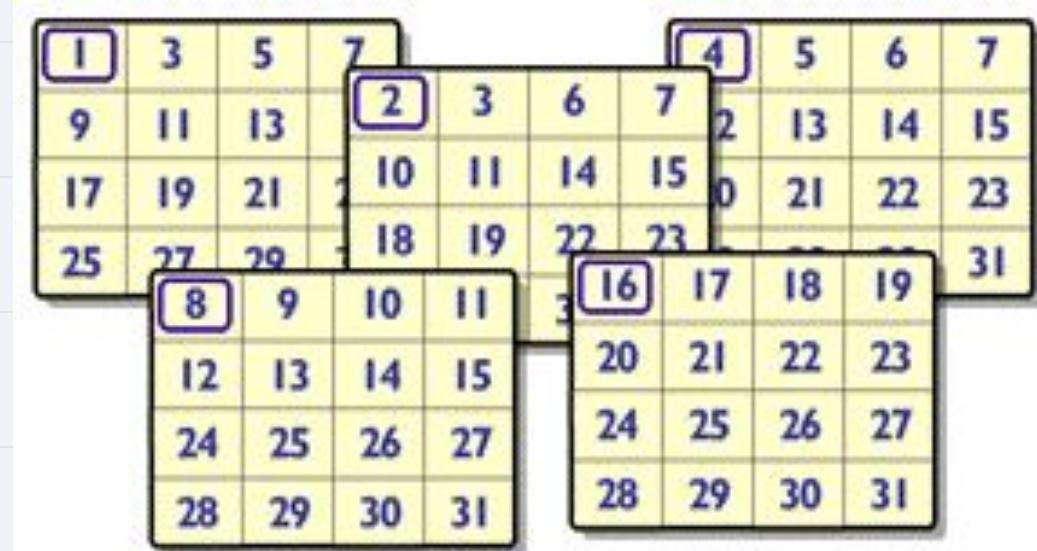
Make it enticing,
engaging, and fun.



@NancyBlachman
Cat, Dog, and Mouse Magic

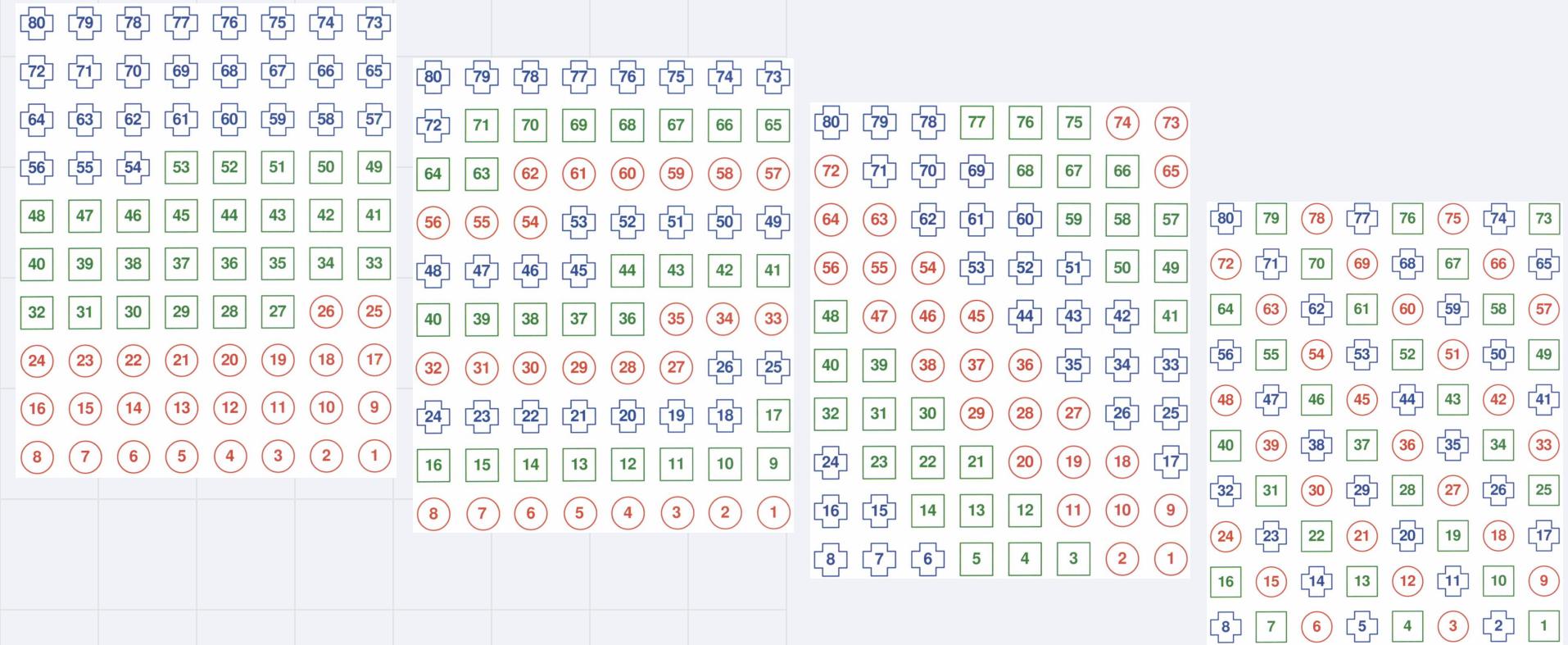
Guess the Number

When searching for activities, I found *Guess the Number Magic Trick.*



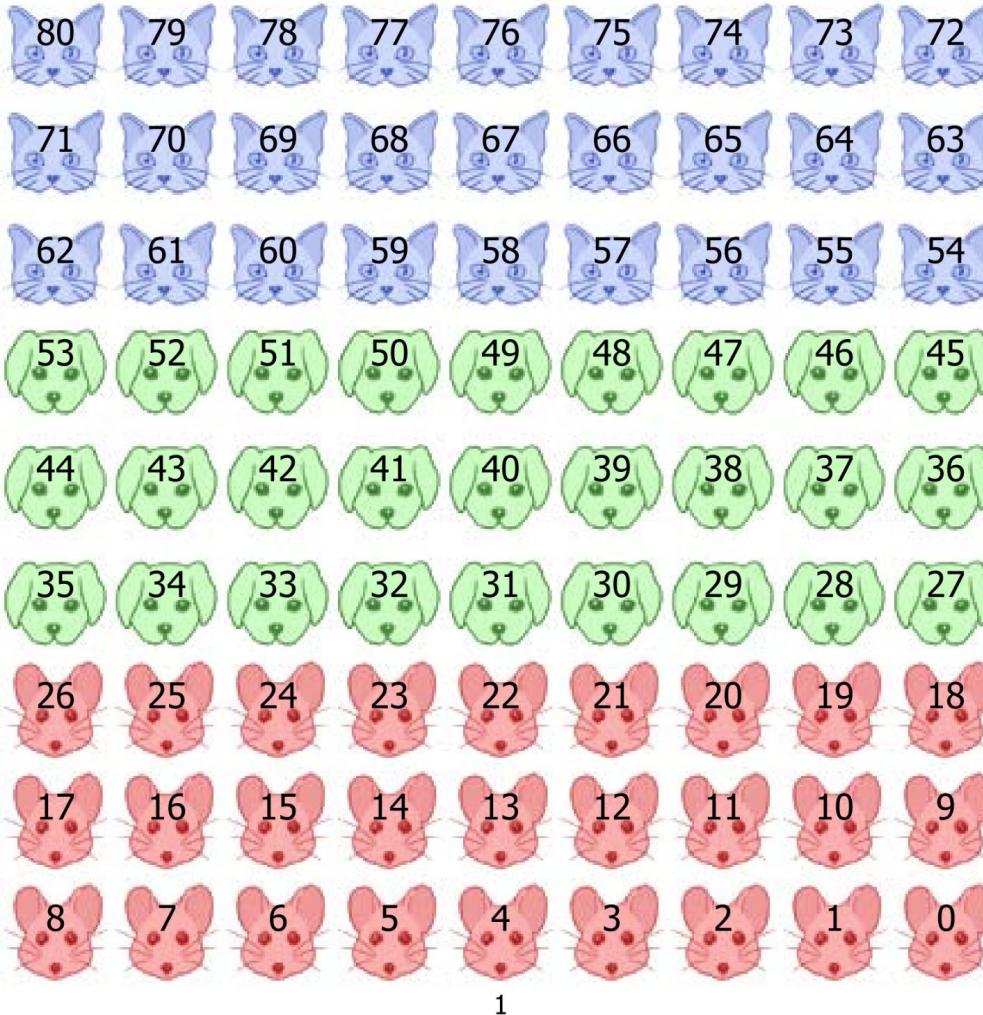
Magic: Add up the numbers in the left upper corners of the cards specified.

A Variation of the Trick



Making it friendly





Instructions

Ask someone to choose a secret number between **0 and 80**.

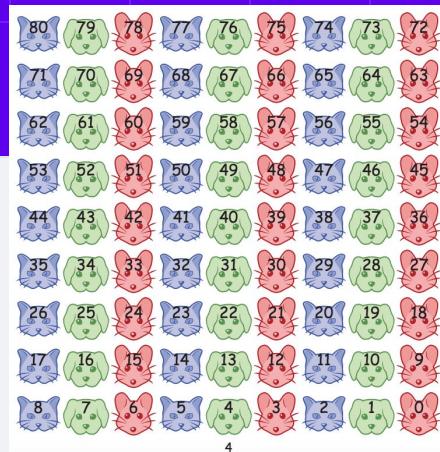
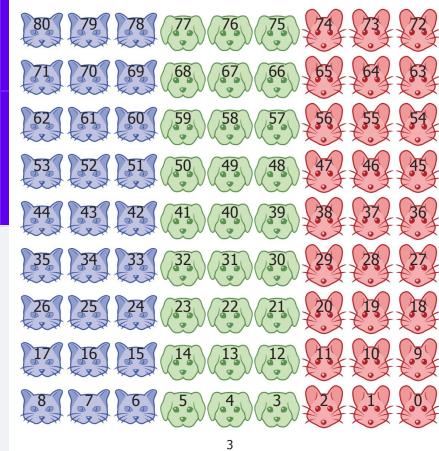
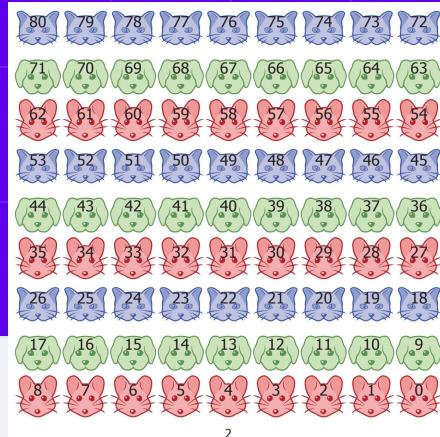
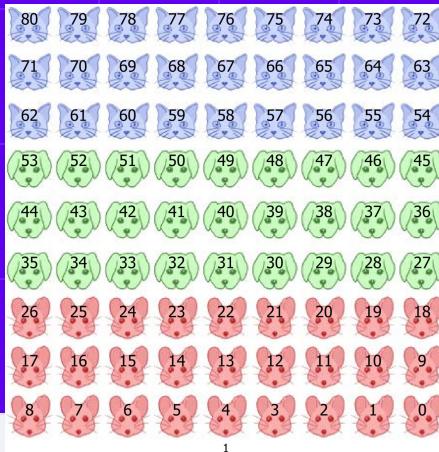
Ask them tell you the **animal or color** that is on their **number**

on each of the four cards.

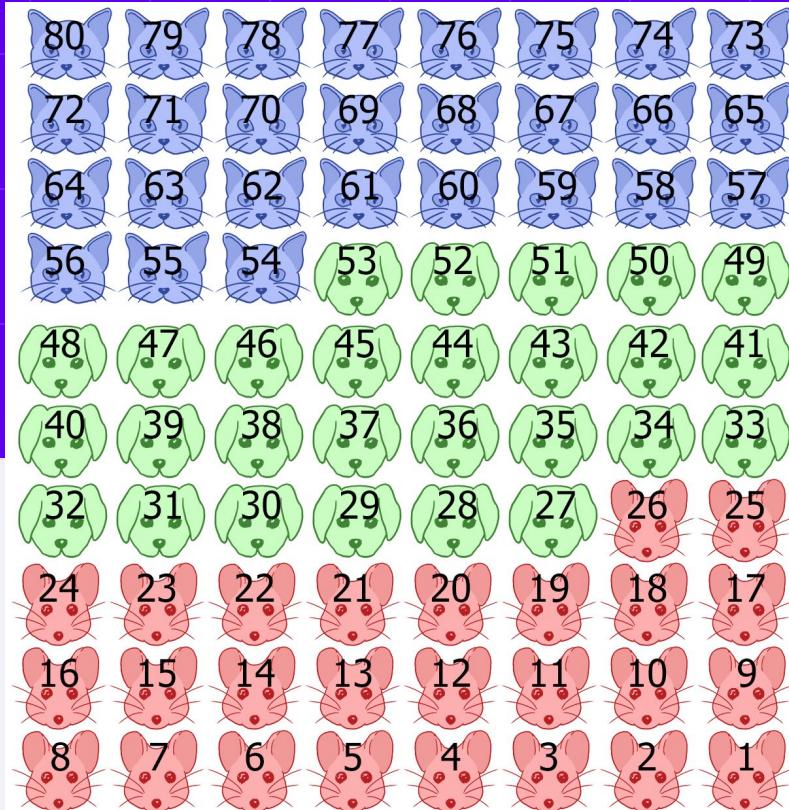


42

Cat, Dog, & Mouse Magic Cards

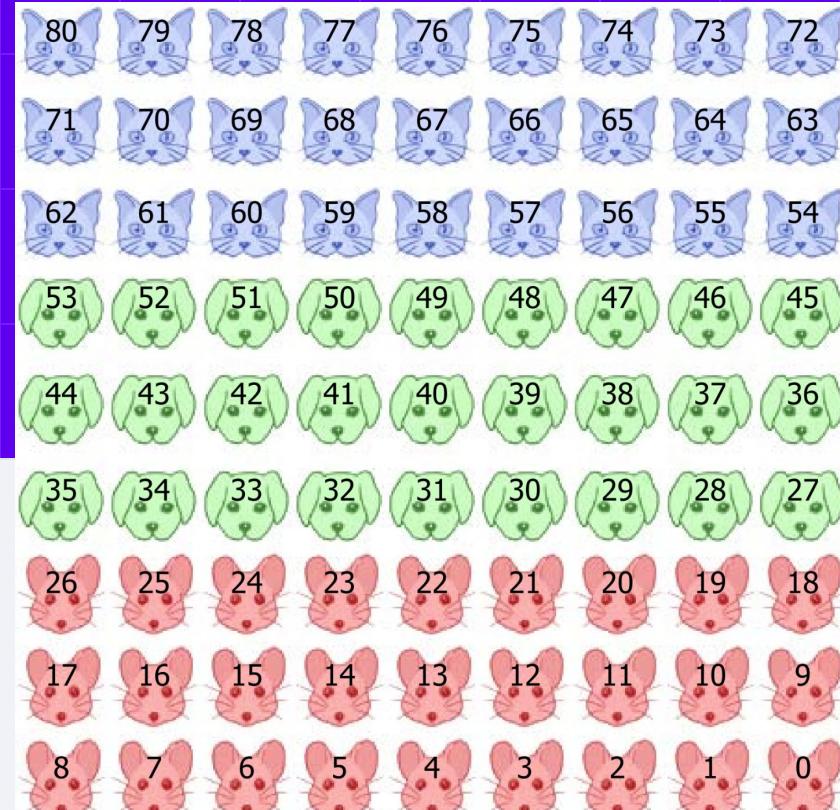


Revised version Numbers 1 - 80



1

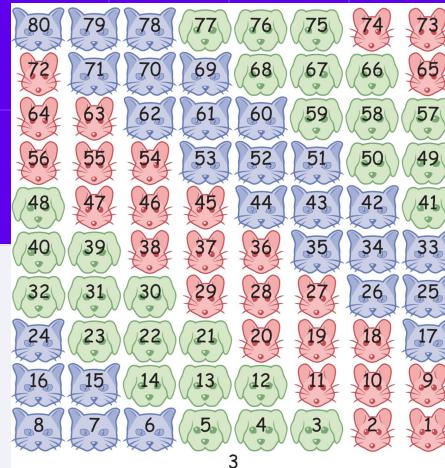
Original Version Numbers 0 - 80



9

Cat, Dog, & Mouse Magic Cards

Version 2



Which layout do you prefer?

80	79	78	77	76	75	74	73
72	71	70	69	68	67	66	65
64	63	62	61	60	59	58	57
56	55	54	53	52	51	50	49
48	47	46	45	44	43	42	41
40	39	38	37	36	35	34	33
32	31	30	29	28	27	26	25
24	23	22	21	20	19	18	17
16	15	14	13	12	11	10	9
8	7	6	5	4	3	2	1
1							

80	79	78	77	76	75	74	73
72	71	70	69	68	67	66	65
64	63	62	61	60	59	58	57
56	55	54	53	52	51	50	49
48	47	46	45	44	43	42	41
40	39	38	37	36	35	34	33
32	31	30	29	28	27	26	25
24	23	22	21	20	19	18	17
16	15	14	13	12	11	10	9
8	7	6	5	4	3	2	1
2							

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

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32	31	30	29	28	27	26	25
24	23	22	21	20	19	18	17
16	15	14	13	12	11	10	9
8	7	6	5	4	3	2	1
4							

80	79	78	77	76	75	74	73
71	70	69	68	67	66	65	63
62	61	60	59	58	57	56	54
53	52	51	50	49	48	47	45
44	43	42	41	40	39	38	36
35	34	33	32	31	30	29	27
26	25	24	23	22	21	20	18
17	16	15	14	13	12	11	9
8	7	6	5	4	3	2	0
1							

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35	34	33	32	31	30	29	27
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17	16	15	14	13	12	11	9
8	7	6	5	4	3	2	0
2							

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3							

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35	34	33	32	31	30	29	27
26	25	24	23	22	21	20	18
17	16	15	14	13	12	11	10
8	7	6	5	4	3	2	0
4							



A portrait of Nancy Blachman, a woman with short, wavy grey hair and blue-rimmed glasses, smiling. She is wearing a dark top with a colorful, floral and bird-themed pattern. The background is solid black.

Questions or comments

Nancy Blachman

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Method: Calculate the secret number as follows: Start off with the number 0 in your head. If Rowan specifies **blue** (cat ) , **green** (dog ) or **red** (mouse ) , find the smallest **blue** (cat) or **green** (dog) number on the card, and add that number to the sum in your head. Don't add anything if **red** (mouse) is specified. Repeat this procedure for the next three cards. After the 4th card, the sum is the secret number!

Example: Suppose the player chooses the number 42.

- On card 1, the number 42 is **green** (dog) and the smallest **green** (dog) on that card is 27. So start with 27 as the number in your head.
- On card 2, the number 42 is **green** (dog) and the smallest **green** (dog) number on card 2 is 9. So add 9 to the sum in your head to get 36.

Cat, Dog, & Mouse Magic

How does it work?

$$\begin{aligned} 326 &= 3 * 10^2 + 2 * 10^1 + 6 * 10^0 \\ &= 3 * 100 + 2 * 10 + 6 * 1 \\ &= 300 + 20 + 6 = 326 \end{aligned}$$

$$\begin{aligned} 42 &= 1 * 3^3 + 1 * 3^2 + 2 * 3^1 + 0 * 3^0 \\ &= 1(\text{dog } 42) * 27 + 1(\text{dog } 42) * 9 + 2(\text{cat } 42) * 3 + 0(\text{mouse } 42) \\ &= 27 + 9 + 6 = 36 + 6 = 42 \end{aligned}$$