A puzzle about dice
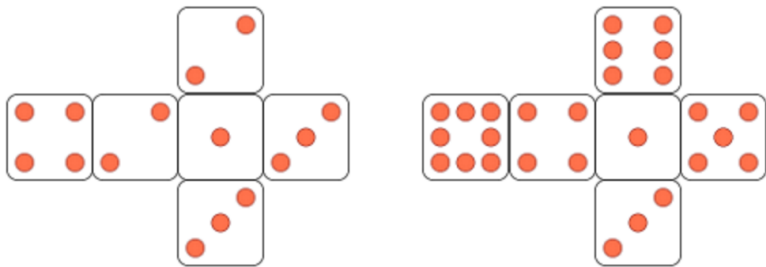
I own an unusual pair of dice. One of them has the number "1" on one face, "2" on two of the faces, "3" on two of the faces, and "4" on one of the faces. The other has the six numbers "1", "3", "4", "5", "6" and "8", one on each face.

A puzzle about dice

Other than the obvious oddity (neither dice has the usual numbers "1" through "6" on them), what is remarkable about this pair of dice? [Hint: How would a game of monopoly change if you used these dice instead of a regular pair?]

Solution

	•	••	•••	••••	•••••	••••••
•	2	3	4	5	6	7
••	3	4	5	6	7	8
•••	4	5	6	7	8	9
••••	5	6	7	8	9	10
•••••	6	7	8	9	10	11
••••••	7	8	9	10	11	12

	•	••	••	•••	•••	••••
•	2	3	3	4	4	5
••	4	5	5	6	6	7
•••	5	6	6	7	7	8
•••	6	7	7	8	8	9
••••	7	8	8	9	9	10
••••••	9	10	10	11	11	12

On the left is a table showing the different possibilities for the sum one gets rolling two ordinary dice, and on the right we see a table for the sum one gets on a roll of my two dice. The same numbers — 2 through 12 — appear in both tables, with the same frequencies — 2 appears once on both tables, 3 appears twice, 7 appears six times, etc.. So if all we care about is the sum of the numbers on a roll (as in Monopoly), my dice behave exactly the same as ordinary dice!

Sicherman dice

My dice are called *Sicherman dice*, discover by Col. George Sicherman from Buffalo NY in 1977. See e.g. http://wordplay.blogs.nytimes.com/2014/06/16/dice-3/?_r=0 or https://en.wikipedia.org/wiki/Sicherman_dice.

They are the unique "non-standard" pair of dice with positive whole numbers on the faces that behave the same as a pair of ordinary dice.