

We discovered the following formula:

Consider the following dice configuration: (a, b, c).

The outcome will be -1 if  $a = b = c$  and they are all odd.

If b is even, the formula is  $a - c + b$ ; if b is odd, the formula is simply  $a - c$ .

(Another equivalent formula to the one from else:  $a - c + b * ((b \% 2 + 1) \% 2)$ )

We utilized the following technique to arrive at these assumptions: We conducted some preliminary probing by analyzing what happens when all dice roll the same values, such as 111, 222,..., 666, and we identified the first half of the condition. After that, we experimented with different patterns and only changed one spot at a time, running tests like 211, 121, 112, 113, 316, and discovering that the results contained the first number minus the last number, but something was still off on occasion. We realized that if b is even, we need also add b after updating the number in the middle (the middle dice). With this, the formula appeared to be complete. Except that we had no means of knowing if it was any good.

To corroborate our findings, we wrote a Powershell script that tested all conceivable combinations against our formula and found that it was correct.