Express Riddler

31 July 2020

Riddle:

The rules are simple: Rock beats scissors, scissors beat paper, and paper beats rock. Moreover, the game is "sudden death," so the first person to win a single round is immediately declared the grand champion. If there's a tie, meaning *both* players choose the same object, then you simply play another round.

Fortunately, your opponent is someone you've studied well. Based on the motion of their arm, you can tell whether they will (1) play rock or paper with equal probability, (2) play paper or scissors with equal probability or (3) play rock or scissors with equal probability. (Every round falls into one of these three categories.)

If you strategize correctly, what are your chances of winning the tournament?

Solution:

In this scenario, there is really no way to lose. If you see (1), then you can play paper, and at worst, tie. Similarly, for (2) play scissors, and for (3) play rock. The probability of tying infinitely many times becomes vanishingly small, so the only outcome is to win, with probability $\boxed{\textbf{100\%}}$.