This question is about games that you can't win.

1. Yakov gambles at a slot machine with three wheels. If the three wheels each have a 1/6, 1/8, and 1/15 chance of rolling a cherry, what is the chance that all three will roll cherries? ★

2. Wen Li rolls three dice. He multiplies the three numbers together and wins if their product is a prime. How likely is it for Wen Li to win? ★★

3. A box contains k black marbles and 1 red marble. Connie and James draw without replacement from this box, and the winner is the one to draw the single red marble.
    a. Suppose James goes first. What is the chance he draws the red marble on his first try? ★
    b. James, being a gentleman, offers Connie the option to go first. Should Connie go first or second? ★★★

4. Jerry is an amateur in the game Dawn of War. In order to rise up through the ranks, he has to win two consecutive games in a match of three games against Will and Josh alternatively – that is, his choices are Will-Josh-Will or Josh-Will-Josh. Suppose Josh is a better player than Will. Which series should Jerry choose to maximize his chances of winning? ★★★★

5. Julian and Belinda play a game. Belinda thinks of some integer that's greater or equal to 100 but does not tell Julian. Each turn, Julian names a number greater than 1. If Belinda's number is divisible by Julian's, then Julian wins. Otherwise, Belinda subtracts Julian's number from her own, and the difference is her new number. This game continues until Belinda's number is divisible by Julian's (in which case Julian wins) or Belinda's number is negative (in which case Belinda wins).
    a. Obviously Belinda does not have a winning strategy: whatever number she chooses, Julian might get lucky. Does Julian have a winning strategy? ★★
    b. Suppose that Julian cannot try the same number twice. Does he still have a winning strategy? ★★★★★

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