Re: probability problem

Source: http://sci.tech−archive.net/Archive/sci.math/2005−12/msg01712.html

- *From*: "mensanator@xxxxxxxxxxx" <mensanator@xxxxxxx>
- *Date*: 7 Dec 2005 17:26:06 −0800

Greenleaf@xxxxxxxxxxxxxx wrote:
> How do you do a question of the type, 2 players are throwing dice,

Does "dice" mean 2 six−sided dice?

> taking turns, and the first to get a 6 wins the game.
> What are the chances that the first person to throw the dice
> will win,

Slightly higher since the first player goes first (because this is
random selection WITH replacement, i.e., the numbers on the
dice don't change from player to player).

>and of the second person?

Lower. The chances could be equal if you do random selection
WITHOUT replacement, say by placing 6 slips of paper in a hat
and draw and discard until someone gets the 6.

That's important if you find yourself in a Russian Roulette
tournament. If they spin the chamber before EACH trigger pull,
you will want to go last. If the chamber is spun only once, then
it doesn't matter.

>
> I get an answer of 7/12 for the first person,

That's why I asked if there was one or 2 dice. Either way, I don't
know how you came up with 7/12. The odds of 2 dice showing 6
is 5/36.

> but an answer of 5/12 + (1/12) * (5/6)^n for the second person.

But the (5/6)^n makes me think perhaps you're using just one die.

>It makes
> sense if n tends to infinity but if not (and in a real game it wouldn't)
> then how would you interpret the result, since then the chances
> that either of the two players will win is greater than 1.

A clue!

> I think there was a mistake or something.

Yep, for 2 dice the odds of a 6 showing on the first throw are 5/36.

Same odds for the second throw. BUT...

....there is only a second throw IF the first throw is NOT a 6. And the odds of that are 31/36. So to win on the second throw you must roll a 6 (5/36) AND the previous throw must NOT be a 6 (31/36).

Same for throws 3, 4, 5, 6, etc. To win on throw N, the odds are

(5/36) * (31/36)^N

you must roll a 6 and ALL previous throws must NOT be 6.

Now to figure up what A's total chances are, sum to infinity all the odd numbered throws. And for B, sum the even throws.

These sums will not exceed 1. In fact, the two added together will equal 1.

>
> Thanks in advance.

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- ***Follow−Ups***:
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    - ◊ *From:* mensanator@xxxxxxxxxx
  - ♦ ***Re: probability problem***
    - ◊ *From:* mensanator@xxxxxxxxxx

- ***References***:
  - ♦ ***probability problem***
    - ◊ *From:* Greenleaf

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