

# Re: probability problem

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*Source:* <http://sci.tech--archive.net/Archive/sci.math/2005-12/msg01735.html>

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- *From:* "mensanator@xxxxxxxxxxxx" <mensanator@xxxxxxx>
  - *Date:* 7 Dec 2005 18:45:13 -0800
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mensanator@xxxxxxxxxxxx wrote:

> Greenleaf@xxxxxxxxxxxxxxxx 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)

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

Starting with N=0.

>  
> 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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• **References:**

- ◆ **probability problem**  
    ◇ From: Greenleaf
- ◆ **Re: probability problem**  
    ◇ From: mensanator@xxxxxxxxxxxx

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