Re: A card game probability

Source: http://sci.tech−archive.net/Archive/sci.math/2007−01/msg05961.html

- *From*: "Faton Berisha" <fberisha@xxxxxxxxxx>
- *Date*: 27 Jan 2007 05:16:26 −0800

On Jan 27, 2:09 am, matt271829−n...@xxxxxxxxxxx wrote:

> I don't quite follow this. I'm guessing that "bar" signifies the
> complement, so "bar p_n" means the probability of *not* getting the
> first match at card n. Is that right?

Not exactly. Here bar p_n is just a notation. I explained what
precisely it means.
If it troubles you, just denote it by another symbol, say q_n.

> So if n = 1 should we have bar
> p_n = 12/13? I don't see how to get to that.

If you substitute n=1, that's exactly what you'll get: \bar p_1=12/13.
(See the computation in my previous message.)

> What does binom{n−1}i
> mean? Initially I thought it might mean "n−1 choose i" but that seems
> not to work.

Yes, it means {n − 1} chose i, and yes it does work.

> And what does "A" signify?

Denote by A an event. Then bar A is the complement of A.
Denote by Pr(A | B) the conditional probability of an event A given
the occurrence of event B.

Denote by A_n: The card flipped in the n−th trial matches its pair.
Then,

Pr(bar A_n | bar A_1 bar A_2 ... bar A_{n−1})

is the probability of not having a match in the n−th trial, given that no match occurred in previous trials; i.e., the probability of not having a match after n trials given the fact that no match occurred in n−1 first trials.

> p_n = 1 − prod_{n=1}^n bar p_n.This equation does not make a whole lot of sense as written. I'm
>
> guessing that you mean something like q_n = 1 − prod_{k=1}^n bar p_k,

You are, of course, right here. I mistakenly used the same symbol for the iterator and the upper limit.
It should be

p_i = prod_{i=1}^n \bar p_i

for the limit of having at least one match in n trials.

> But then why are you multiplying the complementary probabilities and subtracting from one? If p_k is the probability of getting the first match at card k, then the probability of getting at least one match in the first n cards is sum_k=1^n p_k, isn't it?
> ...

Be careful here. In my notation \bar p and p are not complementary probabilities (although A and \bar A are complementary events).

Regards
Faton Berisha

.