

Mathematics and Poker

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Let me begin by congratulating Randy Hewines and Dave Scharf for initiating a Canadian magazine devoted to poker. Why a Canadian magazine, you may ask, given that in some sense the game of poker is unaffiliated with any country, although there still are many places in which popular local games are played with a reduced deck instead of the standard 52-card deck. I believe the existence of a Canadian poker magazine speaks to the strength of the game in Canada, especially in the provinces of BC, Alberta and Saskatchewan. There is now a respectable schedule of major annual tournaments in Alberta and Saskatchewan.

The rules of the game are the same essentially everywhere, but there are issues surrounding the game that arise in common for Canadian venues. So it seems to me there are some compelling reasons for a Canadian poker magazine. Of course, most of the articles will be of interest to people from many countries. I shall be writing a variety of articles about mathematics and poker. The relationship between mathematics and poker is interesting and murky.

Frequently, I am asked about the perceived advantage a mathematician has in poker. The people who ask me about this almost always are not poker players. I assure them that mathematics plays a role, but there are many very successful players who have almost no formal knowledge of mathematics.

On the other hand, another feature of the people who ask that question is a lack of understanding of what mathematics is. I suspect most of the people reading this article do not share my view of what mathematics is. A thumbnail description of my view is the following: Mathematics is the attempt to discover and classify patterns. The point of this is that there are many questions I see as mathematics, whereas, most people would screw up their brows and query, "That's math?"

Pure curiosity drives one type of mathematical question that arises in poker — answering these questions is interesting, but, in truth, will have little impact upon how we play the game. This is the kind of question that a mathematician finds much more interesting than does a poker player. The mathematician will smile and think that problem sounds fun and then attempt to solve it. Meanwhile, a typical poker player, upon hearing the question, will say, "Who cares?"

Here is where my professional background comes into play because I find such problems amusing. I shall write about a variety of problems falling into that category. Hopefully, readers will find such questions fun too.

Another category of question, though much rarer than the curiosity driven questions, consists of those that go to the core of how we think about playing poker. Questions in this category are normally difficult and the subject of debate. Accurate results sometimes surprise people and cause people to shift their approaches to the game.

One last category of questions consists of those with direct applications but

no real impact on how we play the game. A typical question in this category would be: What is the probability of a bad-beat jackpot occurring under the following rules? A casino uses the answer to establish bad-beat jackpot rules fulfilling certain criteria, but the answer to the question has little impact on how an individual plays the game.

The above discussion provides an indication of the kinds of questions I shall be addressing throughout this series of articles.

Now I'd like to discuss my approach. Most of the poker authors I have read who provide numerical results give little or no information on how those results are achieved. I stood in front of too many university students throughout a 33-year teaching career to be satisfied with this approach. I am going to provide some details on how I reach whatever conclusions are present. My hope in doing so is to allow interested readers to derive all the results themselves. Normally, I shall not carry out all the details, but will attempt to have complete details at my website (www.math.sfu.ca/~alspach) under the folder entitled "Poker Computations."

Mathematicians receive training that turns them into arguably the most notorious questioners of all. We always are asking why. I want to instill some of that attitude in the reader.

In addition, I want to provide some general approaches to problem solving employed by mathematicians. Let me now give a preview of coming attractions. This is the problem I'll solve in my next article. Some of you may want to take a whack at it ahead of time or test your intuition. It is a perfect example of a curiosity driven question.

A friend at Casino Regina, call him G, told me that two of them were discussing the sum of the three cards, using the usual blackjack scheme in which an ace counts 1 or 11, appearing in the flop in hold'em. They noticed, or thought they noticed, that the cards frequently sum to 21. They made a small wager based on intuitive guesses about the probability of the sum being 21.

Just to make certain you understand the question, I'll give two examples. If the flop is 4-J-A, the sum is either 15 or 25. If the flop is 2-9-K, the sum is 21. The question then is: What is the probability the sum of the flop in hold'em is 21? If you don't want to work out the exact value, make an intuitive guess.

By the way, we are going to work out the value under the assumption that the observer knows none of the cards held by any of the players.

Let me finish by wishing Randy and Dave success with this magazine. I also wish to thank them for asking me to play a part.