College Bound Math Problems #19
week of March 23, 2015

Note: Gambling is a losing game. For more, see "house advantage"' and "gambler's fallacy" at Wikipedia.org . However, gambling is where probability theory began.

1. On Feb 15, 2015, *SuperBook* posted predictions for the 2015 Major League Baseball season. They say the most likely number of wins for the Washington Nationals is 93, a higher number than for any other team. Each of the 30 teams plays 162 games. Last year four teams won more than 93 games.

    (a) Write $\frac{93}{162}$ as a *decimal* to the nearest *thousandth*.

    (b) If a team wins 93 out of 162 games, what is their *percentage* of wins?

    (c) In many league standings of sports teams during the season, three-place decimals like the one in part (a) are called "percentages." Is that correct?

2. *SuperBook* also rated the Nationals as a 6-to-1 shot to win the playoffs, by going all the way to the World Series and winning it. Being 6-to-1 means that their probability is considered to be $\frac{1}{7}$, big enough to make them the favorite.

    Two days later, a sports writer in a major Washington newspaper wrote that all of this was a bad omen for the Nationals, because although the top-rated team did win the World Series in 2009, it has not happened in the 5 seasons since then. Some readers criticized the writer for not understanding odds and probabilities.

    (a) Suppose you are one of 30 students in your math class and there is a contest in which each of you takes a very long True-False test. However, all of you have to do it *entirely by guessing, without seeing any of the questions*. Explain why the odds are 29-to-1 against you winning.

    (b) As a fraction, what is the probability that you will win?

    (c) Suppose this contest is repeated 30 times and you only win once. Would you say that this is a bad omen for you in future contests of this sort?

3. A "fair coin" is one with probability $\frac{1}{2}$ of heads and $\frac{1}{2}$ of tails. Suppose that instead of playing those baseball games, a fair coin is flipped 162 times.

    (a) Take a guess at the probability of getting heads 93 or more times.

    (b) Suppose you did a Google search with the following terms, together:
    baseball odds coin-flip and 162.
    How many hits do you think you would get? Try it and see!

    Read the titles and brief descriptions of the first few hits. Go to the first article, "*162 games aren't enough...*" Scroll down to the chart. Carefully read the paragraph right before the chart. Try to understand it. Also read the three paragraphs just before the one before the chart.

    (c) Try question (a) again, using what you learned from part (b).