

What was the probability that Jason Kidd would miss five free throws in the final minute of Game 5 of the Eastern Conference semi-finals and that the Nets would still win? How was it that Cleveland went from one of the worst free throw teams in the NBA during the regular season, to one of the best in the play-offs? With game changing decisions on the line, how do NBA coaches decide on last-minute plays in close games? And most importantly, what do all these questions have to do with a long-dead Frenchman, the binomial theorem, and a famous triangle?

In “Basketball and the Binomial Theorem” you have students create their own free throw average. I recommend at least 50 shots (with 100 being preferred), spaced over several days. It’s a good idea to announce the activity a few weeks beforehand for those who want to practice. After determining their personal statistics, have the students visit: <http://www.nba.com/statistics/> and find the free throw statistics for their favorite player. If you haven’t visited this site before, it is a wealth of incredible data!

Then it’s time for the binomial theorem application. Recall that for $(x + y)^n$, the binomial theorem gives the coefficients of the expansion. These are typically only calculated when n is 3 or greater. Simply, plug in the made% for x and the miss% for y and you are ready to go.

For example

If I am a 70% free throw shooter, then the probability I will make my next 3 free throws is $(.07)^3$. The probability I make 2 of my next three is $3 \times (0.7)^2 \times (0.3)$. The 3 comes from the number of ways of making 2 free throws and missing 1 (a.k.a. the coefficient from Pascal’s Triangle), while the 0.7 and 0.3 are my make and miss percentages. Check out the OCTM website for a ready-made activity at the Algebra II level to go along with it.

As a great finish to the investigation, I am working on getting permission to use a video clip from our own Portland Trailblazers. My goal is to get a close game where the coach has to decide whom to foul on the opposite team and into whose hands he wants the ball for the last shot. If successful I will play a few minutes of the end of the game, stop the video and have my students determine what decision they would make based on their statistical analysis of the players on the two teams. Feel free to send me an e-mail to find out if I was successful in getting permission to use the video clip and I’ll share it with you! 📧



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