STAT 110: Quiz #3 Name: SOLUTION
Points: 20
Fall 2017

Consider the following snip-it of an article published in Sports Illustrated regarding young pitchers in Major League Baseball. This article is centered on 19 year-old pitching prospect that was drafted by the Baltimore Orioles in the 1st round. From 1981 through 2000, a total of 102 high school pitchers were selected in the first round. Of these, 44 never reached the majors.

> **THERE IS NO SPORTS GENUS** with a greater risk-reward ratio than high school pitchers. Like supermodels, they look great, but the chances of entering into a long-term relationship with one are slim. Teams keep drafting them for their visceral gifts, but the toll of throwing so hard so young, their incomplete physical development and the few opportunities to measure them against top competition leave teams spending millions on veritable lottery tickets.
>
> Major league teams signed 102 high school pitchers taken in the first round from 1981 through 2000 (not including supplemental first-round picks). Of those 102 high school first-rounders, 44 never reached the majors.

In an effort to determine whether or not pitchers are of a greater risk of failure, we must compare this against the general failure rate. The article to the right provided these figures.

Success/Failure Rate for 1st Round Draft Picks
- 66% of 1st round picks play in the major leagues, and
- 34% never play in the major leagues.

Examining the Percentage of MLB Draft Picks Who Reach the Major Leagues

By Mike Rosenbaum (MLB Prospects Lead Writer) on June 12, 2012 — 5,336 reads 3

1st Round — Prev 2 of 8 Next

The first round of MLB's first-year player draft represents the cream of the crop, the top talent within the United States.

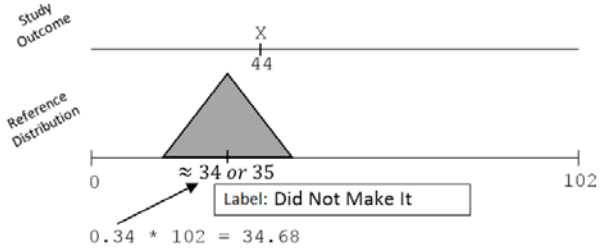
Still, by no means does that guarantee that those players will reach The Show, as only 66 percent of first-round picks play in the major leagues.

Carlos Correa: No. 1 pick in the 2012 draft // Courtesy of PerfectGame.org

Research Question: Is the failure rate of high-school pitchers taken in the 1st round higher than the general failure rate for major league baseball?

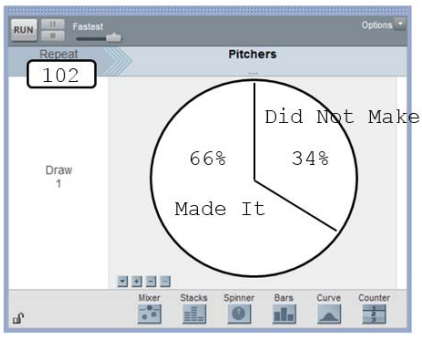
1. Identify the smallest possible value, largest possible value, location of the pyramid, and the outcome from the study for this situation on the number lines below. (6 pts)

- Smallest possible value
- Largest possible value
- Location of pyramid
- Outcome from study

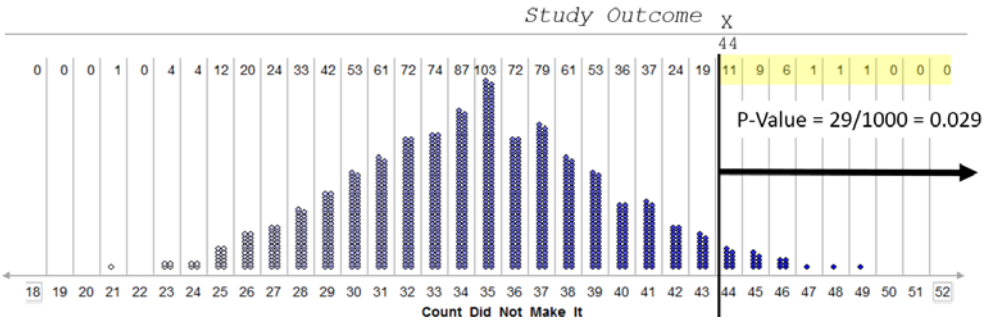


2. Identify the appropriate set-up for your spinner. (5 pts)

- Labels on spinner
- Percentages
- Repeat value



I ran a simulation in Tinkerplots and obtained a total of 1000 simulated outcomes. This are provided here.



3. Which of the following statements is most correct regarding the reference distribution? (3 pts)
   a. The dots on this reference distribution were constructed under the assumption that high-school pitchers taken in the 1st round have a higher failure rate than others.
   b. The dots on this reference distribution were constructed under the assumption that high-school pitchers taken in the 1st round have the same failure rate as others.
   c. The dots on this reference distribution were constructed under the assumption that high-school pitchers taken in the 1st round have a 50% failure rate and 50% success rate.

4. Compute the appropriate p-value for this research question. (3 pts)

$$\text{P-Value: } = \frac{\#\ Dots\ at\ 44\ or\ above}{Total\ \#\ dots} = \frac{29}{1000} = 0.029 = 2.9\%$$

5. Use the 5% rule to determine whether or not the outcome from this study is an outlier. That is, is the p-value computed above in the top 5%, bottom 5% or outside 5%? Does the study outcome support the research question? Discuss. (3 pts)

Yes, 44 does indeed sit in the top 5%. In fact, 44 is in the top 2.9% of this reference distribution. 44 is a statistical outlier. The study outcome does provided enough statistical evidence to suggest that the failure rate for high-school pitchers picked in the 1st round have a higher rate of failure than others picked in the 1st round.