STAT 110: Quiz #3   Name: <u>SOLUTION</u>
Points: 20
Summer 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 👍 Like 3
8 +1 1

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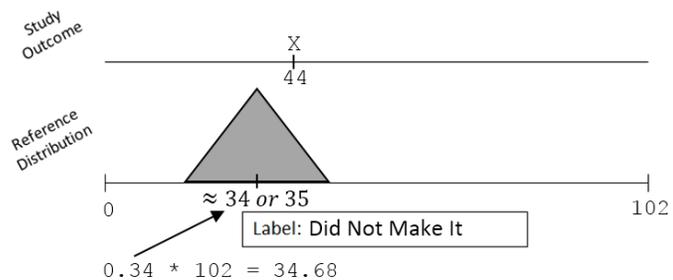
Still, by no means does that guarantee that those players will reach The Show, as only 66 percent of first-round picks play in the major leagues.

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

<u>Research Question</u>: 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

Study Outcome
              X
              |
             44

Reference Distribution

0   ≈ 34 or 35   102
            Label: Did Not Make It

0.34 * 102 = 34.68

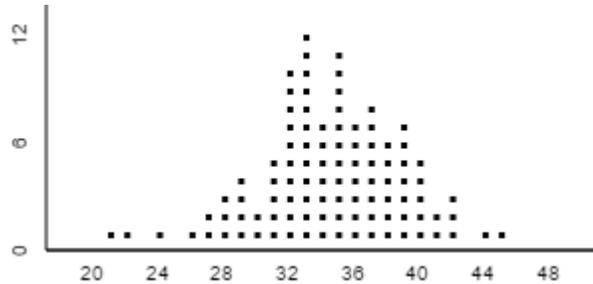2. Identify the appropriate set-up for your simulation. Suppose that 100 repeated outcomes is desired. (4 pts)

Identify the following
- Probability of heads
- Number of tosses
- Number of repetitions

Probability of heads: $\boxed{0.34}$

Number of tosses: $\boxed{102}$

Number of repetitions: $\boxed{100}$

The 100 repeated outcomes are provided below.

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.
   ⓑ 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. Identify what values are used to compute the p-value, compute the p-value, provide a decision, and give a final conclusion using everyday language. (7 pts)

1st Round Pitchers	
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?
Parameter	π = the probability that a first round pitcher will not make it to the majors
Identify the values for computing the p-value	What values are as extreme as or more extreme than the observed outcome? `If all 102 failed, then this would provide evidence that the failure rate for pitchers is higher. Thus, this is a one-tailed right example.  Values as extreme or more extreme than 44 would be 44 and above, i.e. 44, 45, 46, …, 102`
P-Value	$$\text{P-Value} = \frac{Number\ of\ dots\ at\ 44\ or\ higher}{Total\ number\ of\ dots} = \frac{2}{100} = 0.02, i.e.\ 2\% =$$
Decision	Is the p-value less than 0.05? Circle one. ⊙ If "Yes", then data is said to provide enough evidence for the research question • If "No", then data does not provide enough evidence for research question

Conclusion	Write a conclusion in laymen's terms.
	There is enough statistical evidence to say that the failure rate of high-school pitchers taken in the 1st round is higher than the general failure rate for major league baseball (p-value = 0.02).