Name: _____ Hour: _____ Date: _____

Who has better ACT scores?

VS

The ACT test is scored with whole numbers from 0 to 36. We will use the applet at http://onlinestatbook.com/stat_sim/sampling_dist/ to take samples of ACT scores from EK and Rockford.

Click "Begin" and you will see the population distribution of ACT scores from EK.

1. Describe the shape, center, and variability of the distribution of ACT scores for EK.

2. Click "Animated" to take a sample of 5 ACT scores.

List 5 estimated scores here:_____ Estimated mean (blue box):_____

Click "Animated" several more times. Then click "10,000" to take 10,000 samples of size 5.

3. The blue boxes make the sampling distribution of $\bar{x}$. How do we know that the sampling distribution of $\bar{x}$ is approximately normal (hint: see previous lesson)?

4. Now let's look at the distribution of ACT scores for Rockford. Click "Clear lower 3" and then change the distribution from "Normal" to "Skewed". What is the shape of this distribution? Why does this distribution make sense for our archrival Rockford?

Change both of the bottom two dropdown menus to "Mean". The first one should be "N=2" and the second one should be "N=25". The click "10,000" to take 10,000 samples.

5. Describe the shape of the sampling distribution of $\bar{x}$ when N = 2.

6. Describe the shape of the sampling distribution of $\bar{x}$ when N = 25.

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The Central Limit Theorem

Important ideas:

Check Your Understanding

Among iPhone users who share their data with Apple, the weekly screen time is skewed to the right with μ = 13.5 hours and σ = 3.75 hours. A random sample of 100 iPhone users are selected and the mean weekly screen time ($\bar{x}$) of the sample is calculated.

a. Describe the shape of the sampling distribution of $\bar{x}$ for samples of 100 randomly selected iPhone users. Justify your answer.

b. Find the mean and standard deviation of the sampling distribution of $\bar{x}$. Be sure to check the 10% condition.

c. Calculate the probability that the weekly screen time for the sample is between 12 and 13 hours.