

Who Has Better ACT Scores?

The ACT test is scored with whole numbers from 0 to 36. We will use [this website](#) 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 the 5 estimated scores here:	What is the estimated mean (blue box)?
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Click “Animated” several more times. Then click “10,000” to take 10,000 samples of size 5.

Use the [Snipping Tool](#) to insert a photo in this box.

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?

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”. Click “Animated” to take 10,000 samples of size 5.

Insert a snip of the graphs.

How do the distributions of the means compare for EK (problem #2) and 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”. Then click “10,000” to take 10,000 samples.

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

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

Check Your Understanding

Keith is the manager of an auto-care center. Based on service records of 3500 customers from the past year, the time (in hours) that a technician requires to complete a standard oil change and inspection follows a right-skewed distribution with $\mu = 30$ minutes and $\sigma = 20$ minutes. For a promotion, Keith randomly selects 40 current customers and offers them a free oil change and inspection if they redeem the offer during the next month. Keith budgets an average of 35 minutes per customer for a technician to complete the work. Will this be enough?

(a) Describe the shape of the sampling distribution of $\bar{x}$ for samples of 40 randomly selected customers. 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 average time it takes to complete the work exceeds 35 minutes.

(d) How much average time per customer should Keith budget if he wants to be 99% certain that he doesn't go “over budget”?

Upload a photo of your work here.