# Application of Sampling Distributions
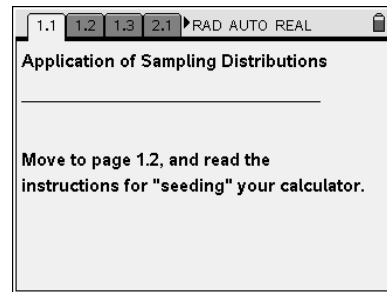## Student Activity

**Name** _____

**Class** _____

**Open the TI-Nspire document**
*Application_of_Sampling_Distributions.*

What is a sampling distribution of a statistic? A **sampling distribution** is the distribution of values of a given statistic based on all possible samples of a given size from a given population. In this activity, you will explore and describe the sampling distribution of the sample mean by creating and observing the means of different samples from a given population.

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1.1  1.2  1.3  2.1 ▶RAD AUTO REAL      🔋

Application of Sampling Distributions
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Move to page 1.2, and read the
instructions for "seeding" your calculator.
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**Move to page 1.2.**

Press ⟨ctrl⟩ ▶ and ⟨ctrl⟩ ◀ to navigate through the lesson.

This activity involves generating a number of random samples from a population. In order to avoid having your results be identical to another student in the room, it is necessary to "seed" the random number generator. Read the instructions on page 1.2 for seeding your random number generator.

**Move to page 2.1.**
ABC Food Company packages 10-ounce boxes of crackers. The company is sampling the weights of the boxes coming off the packaging line.

The sample weights are normally distributed. On page 2.2, each time you click the up arrow for **draw**, you will generate a random sample of size *n* from the population of boxes.

1.  Move to page 2.2. Click the up arrow (▲) for **draw** once. What is shown in the top graph? How does it relate to the scenario?

2.  Click the up arrow 19 more times. Observe the bottom graph.
    a.  How are the sample means distributed?

    b.  If you were the president of the company, would you be happy with this distribution? Explain your answer.

**Move to page. 2.3.**
3.  Use the sliders to fit the curve to the histogram. Record *m*, the mean, and *sd*, the standard deviation.

4.  a.  Move back to page 2.2. Press ⟨enter⟩ in the *Calculator* application to reset the data. Increase *n* to 15. Press the up arrow for **draw** 20 times. Go to page 2.3 and match the curve to the histogram. Record *m* and *sd*.

    b.  Repeat part a using *n* = 20.

    c.  Repeat part a using *n* = 25.

    d.  How did the distribution of the sample means change as you increased *n*, the sample size? Explain in terms of the scenario.

    e.  As president of the company, if you were presenting data to stockholders, which set of data that you generated in Question 2 and Question 4, parts a, b, and c, would you use? Why?