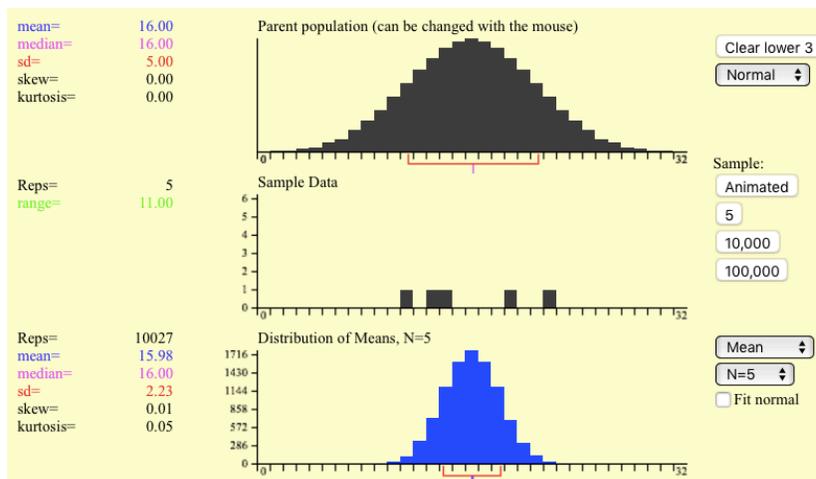


We have seen what the sampling distribution of the sample mean looks like for a normal distribution. I demonstrated these properties using the modeler shown below.



Today, you are going to experiment with this modeler and look at distributions that are not normal.

1. Get a Chrome book and go to my AP Statistics school page. Open the link on the right called Sampling Distrib. This should bring you to this modeler. Click on the BEGIN button to start.
2. Press some of the buttons while on the Normal distribution just to get familiar with the layout. What do the “animated”, “5”, “10,000” and “100,000” buttons do?

We can adjust the sample size by using the pull-down menu next to the graph of the distribution of the sample mean. You can use sample sizes of 2, 5, 10, 16, 20, and 25.

### 3. Skewed Distributions:

Select the “skewed” population from the menu on the top right. You are going to look at the sample means for each of the 6 possible sample sizes allowed here and fill in the table below. Make sure that you use at least 10,000 samples for each of the sample sizes.

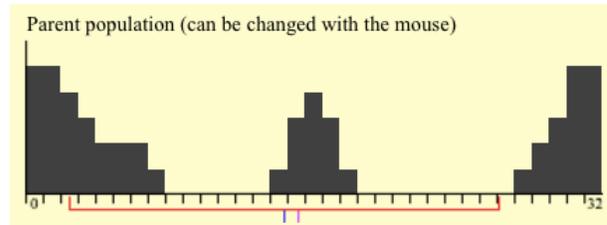
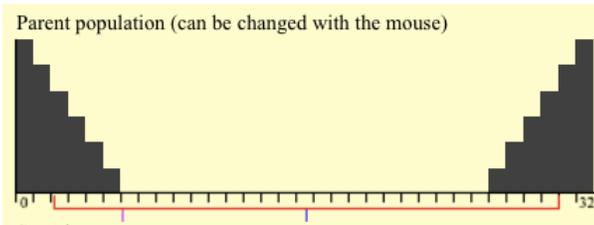
PARENT POPULATION: Skewed right with  $\mu = \underline{\hspace{1cm}}$  and  $\sigma = \underline{\hspace{1cm}}$ .

Sample size ( $n$ )	Mean of approximate sampling distribution of $\bar{x}$	SD of approximate sampling distribution of $\bar{x}$	Shape of approximate sampling distribution of $\bar{x}$
2			
5			
10			
16			
20			
25			

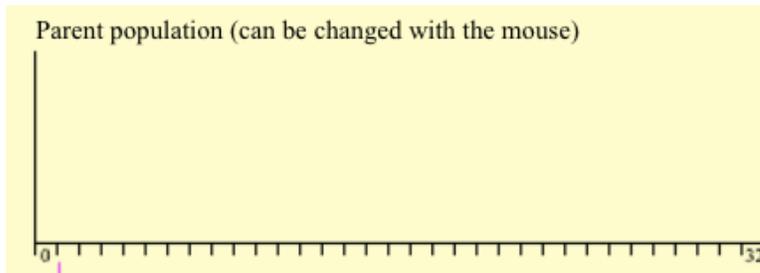
What shapes do the sampling distributions have? As the sample size increases from 2 to 25, what happens to the center? What happens to the spread of the sampling distribution? What can you say about the quantity  $\sigma/\sqrt{n}$ ?

### 3. Custom-made Distribution:

Repeat this analysis with a custom-made distribution. Select “Custom” from the top drop-down box and then use the mouse to insert a graph with variable heights/shape. For example, you could create one like the following:



Be creative... Make a rough sketch of your own design below and then fill in the table with the values for your sampling distribution of the sample mean.



PARENT POPULATION: \_\_\_\_\_ with  $\mu = \underline{\quad}$  and  $\sigma = \underline{\quad}$ .

Sample size ( $n$ )	Mean of approximate sampling distribution of $\bar{x}$	SD of approximate sampling distribution of $\bar{x}$	Shape of approximate sampling distribution of $\bar{x}$
2			
5			
10			
16			
20			
25			

What can you say about the center, spread and shape of your sampling distribution?

### Central Limit Theorem:

#### Normal/Large Condition for Sample Means

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