**MA 207 Sampling Distribution of a Sample Proportion**

1. Suppose that 80% of cell phone charging cables work properly. Suppose we take random samples of size 100. The applet below shows the population distribution with a population proportion of  and a data distribution from just one sample that was drawn that happened to have a sample proportion of  and the *sampling distribution* of the sample proportion which you can see is approximately normal (the sampling distribution is actually the distribution of all possible samples, but the illustration has 90,000 samples drawn).



* 1. What is the mean of the sampling distribution of the sample proportion  when the samples are of size   **μp̂ = .80**
  2. What is the standard deviation of the sampling distribution of the sample proportion  when the samples are of size 100? **σ p̂ = [.8\*.2/100] ½ = .04**
  3. Suppose that you take a SRS of size 100. What is the probability that the sample proportion is less than 0.75? Shade a region under a labeled normal curve to represent your answer.

**P( p̂ < .75) = P( Z < (.75-.8)/.04) = P(Z < -1.25) = .1056 <- from the SNT**

* 1. Suppose that you take a SRS of size 100. What is the probability that the sample proportion is greater than 0.85? Shade a region under a labeled normal curve to represent your answer.

**Using symmetry, the answer must be .1056. P(Z > 1.25) = .1056**

* 1. Suppose that you take a SRS of size 100. What is the probability that the sample proportion is more extreme than the sample we got (meaning the sample proportion is less than 0.75 or greater than 0.85)? Shade a region under a labeled normal curve to represent your answer.

**Using the answers above, about 21% of samples are more extreme than the one given.**