Chapter 8-9 Study Guide

Here is a checklist of major skills should have acquired by studying chapter 8 – 9.

A. Sampling Distribution

1. Identify parameters and statistics in a sample or experiment.
2. Recognize the fact of sampling variability: a statistic will take different values when you repeat a sample or experiment.
3. Interpret a sampling distribution as describing the values taken by a statistic in all possible repetitions of a sample or experiment under the same condition (i.e, same sample size).
4. Describe the bias and variability of a statistic in terms of the mean and spread of its sampling distribution.
5. Understand that the variability of a statistic is controlled by the size of the sample. Statistics from larger samples are less variable.

B. Sample Proportions

1. Recognize when a problem involves from a sample proportion $\hat{p}$.
2. Find the mean and standard deviation of the sampling distribution of a sample proportion $\hat{p}$ for an SRS of size *n* from a population having population proportion *p*.
3. Know that the standard deviation (spread) of the sampling distribution of $\hat{p}$ gets smaller as the sample size *n* gets larger.
4. Recognize when you can use the Normal approximation to the sampling distribution of $\hat{p}$. Use the Normal approximation to calculate the probabilities that concern $\hat{p}$.

C. Sample Means

1. Recognize when a problem involves the mean $\bar{x}$ of a sample.
2. Find the mean and standard deviation of the sampling distribution of a sample mean $\bar{x}$ from an SRS of size *n* when the mean μ and standard deviation σ of the population are known.
3. Know that the standard deviation (spread) of the sampling distribution of $\bar{x}$ gets smaller as the sample size *n* gets larger.
4. Understand that $\bar{x}$ has approximately a Normal distribution when the sample is large (Central Limit Theorem). Use this Normal distribution to calculate probabilities involving $\bar{x}$.

D. Confidence Intervals for *p*

1. Use the 4-step z procedure to give a confidence interval for a population proportion *p*.
2. Determine the sample size required to obtain a level C confidence interval with a specified margin of error.
3. Give the interpretation of the confidence level.

E. Confidence Intervals for μ (σ known)

1. Use the 4-step z procedure to calculate a confidence interval for the mean μ of a Normal population with known standard deviation σ, using the recipe $\bar{x} \pm z^* \frac{\sigma}{\sqrt{n}}$

2. Give the interpretation of the confidence level.
3. Recognize when you can safely use this confidence interval and when the data collection design or a small sample from a skewed population makes it inaccurate.
4. Understand how the margin of error of a confidence interval changes with the sample size and the level of confidence C.
5. Find the sample size required to obtain a confidence interval of specified margin of error m when the confidence level and other information are given.

F. Confidence intervals for μ (σ unknown)

1. Use the 4-step t-procedure to obtain a confidence interval at a stated level of confidence for the mean μ of a population.
2. Give the interpretation of the confidence level.
3. Recognize when the t-interval is appropriate in practice.