

## Study Guide for Exam 2

### Chapter 8

- Know how to determine the population and the sample for a study.
- Know possible sources of bias (convenience sampling, voluntary response, undercoverage, nonresponse, response bias, etc.)
- Be able to find a simple random sample or a stratified random sample when given a list or table of random digits.
- **Practice problems:** 8.25, 8.27, 8.29, 8.31, 8.33, 8.37, 8.39

### Chapter 9

- Know how to tell the difference between an observational study and an experiment.
- Be able to determine the subjects (individuals), factors, and treatments for an experiment.
- Know what a randomized comparative experiment is, and how to assign subjects to treatments.
- Know what a double-blind experiment is.
- Be able to use a block design or matched pairs in an experiment's design.
- **Practice problems:** 9.29, 9.33, 9.35, 9.37, 9.39, 9.41

### Chapter 10

- Be able to interpret the probability of an event.
- Be able to determine a probability model (the sample space and probabilities) for a given situation.
- Know the 4 rules of probability given on page 269.
- Be able to find probabilities for discrete random variables by using the rules for probability.
- Know how to find probabilities for continuous random variables when given a graph of the density curve (or Table A when the random variable is normal).
- **Practice problems:** 10.31, 10.33, 10.35, 10.37, 10.43, 10.51

### Chapter 11

- Be able to tell the difference between a parameter and a statistic.
- Know how to use the Law of Large Numbers.
- Know the difference between a population distribution and a sampling distribution.
- Know how to find the mean and standard deviation for the sampling distribution of  $\bar{x}$  when given information about the population distribution.
- Be able to use the Central Limit Theorem to determine the sampling distribution of  $\bar{x}$ .
- **Practice problems:** 11.23, 11.25, 11.27, 11.29, 11.31, 11.33, 11.35, 11.37

### Chapter 14

- Know the conditions for the methods in this chapter to apply.
- Be able to calculate and interpret a level C confidence interval for a population mean when given data and the population standard deviation.
- Be able to determine the null and alternative hypotheses for a hypothesis test.
- Know how to calculate the test statistic for a hypothesis test when  $\sigma$  is given.
- Know how to calculate and interpret the P-value for a test.
- **Practice problems:** 14.35, 14.37, 14.38, 14.39, 14.41, 14.43, 14.47, 14.48, 14.57

## Chapter 15

- Know that statistical tests depend on data coming from a random sample or a randomized comparative experiment.
- Be aware that the margin of error decreases as the size of the sample increases and increases as the confidence level increases.
- Be able to calculate the necessary sample size for a given margin of error when a confidence level and population standard deviation are given.
- **Practice problems:** 15.28, 15.30, 15.32, 15.34

## Chapter 17

- Know the conditions for the methods in this chapter to apply.
- Be able to calculate and interpret a level  $C$  confidence interval for a population mean when given data.
- Know how to calculate the test statistic for a hypothesis test when  $\sigma$  is unknown.
- Be able to find the P-value for a t-test from Table C.
- Be able to carry out a t-test for data from a matched pairs design.
- **Practice problems:** 17.26, 17.28, 17.36, 17.37

### Formulas to know

$$\text{Mean } \bar{x} = \frac{x_1 + x_2 + \cdots + x_n}{n}$$

$$\text{Standard deviation } s = \sqrt{\frac{(x_1 - \bar{x})^2 + (x_2 - \bar{x})^2 + \cdots + (x_n - \bar{x})^2}{n - 1}}$$

$$P(A \text{ does not occur}) = 1 - P(A)$$

$$\bar{x} \pm z^* \frac{\sigma}{\sqrt{n}}$$

$$n = \left( \frac{z^* \sigma}{m} \right)^2$$

$$\bar{x} \pm t^* \frac{s}{\sqrt{n}}$$

Be able to calculate P-values for the tests in both chapters 14 and 17.

### Formulas provided

If  $A$  and  $B$  are disjoint events, then  $P(A \text{ or } B) = P(A) + P(B)$

$$z = \frac{\bar{x} - \mu_0}{\sigma / \sqrt{n}}$$

$$t = \frac{\bar{x} - \mu_0}{s / \sqrt{n}}$$

Tables A and C will be provided, along with the necessary part of Table B.