

Study Guide for Final Exam

Chapter 1

- Know how to determine the individuals for a study.
- Know how to tell the difference between a categorical variable and a quantitative variable.
- Be able to draw pie charts and bar graphs for categorical data.
- Be able to draw a histogram for quantitative data.
- Be able to describe a distribution given a histogram (shape, center, spread).
- Be able to determine whether a distribution is symmetric, skewed left, or skewed right.
- **Practice problems:** 1.23, 1.24, 1.25, 1.26, 1.27, 1.32, 1.34

Chapter 2

- Be able to find the mean of quantitative data.
- Know how to find the five-number summary (minimum, first quartile, median, third quartile, maximum).
- Be able to draw a boxplot when given a five-number summary.
- Be able to find the interquartile range and use the 1.5IQR criteria to find suspected outliers.
- Be able to calculate the standard deviation.
- Know when to use a five-number summary or the mean and standard deviation to describe a data set.
- **Practice problems:** 2.25, 2.27, 2.30, 2.31, 2.32, 2.35, 2.38, 2.43

Chapter 3

- Know the requirements a curve must meet in order for it to be a density curve.
- Be able to use a density curve to determine that fraction of observations that fall in a particular range of numbers, and to approximate the mean and median of the distribution.
- Be able to use the 68-95-99.7 rule for Normal distributions.
- Be able to calculate the z-score of an observation from a normal distribution and use these to find cumulative proportions using a table.
- Know how to use cumulative proportions to find the proportions of observations falling between two numbers or above a number for a normal distribution.
- When given a cumulative proportion, be able to find the observation associated with that proportion.
- **Practice problems:** 3.26, 3.27, 3.28, 3.29, 3.30, 3.31, 3.32, 3.33, 3.40

Chapter 4

- Be able to determine the response and explanatory variables for a study.
- Know how to draw a scatterplot when given data, and be able to use it to determine whether there is a positive or negative association between the variables, and to find suspected outliers.
- Be able to calculate correlation and know how to interpret it.
- **Practice problems:** 4.24, 4.25, 4.26, 4.27, 4.33, 4.35

Chapter 5

- Be able to calculate a regression line and use it to predict values for the response variable.
- Be able to calculate the residual for an observation.
- Be able to calculate and interpret r^2 .
- Know the limitations of the regression line (lurking variables, extrapolation, etc.)
- **Practice problems:** 5.27, 5.28, 5.29, 5.33, 5.40

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, 8.26, 8.27, 8.29, 8.31, 8.32, 8.33, 8.36, 8.37, 8.42

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:** 9.28, 9.29, 9.30, 9.33, 9.39, 9.41, 9.44, 9.47

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, 10.32, 10.35, 10.37, 10.38, 10.39, 10.41, 10.42, 10.43, 10.49, 10.50, 10.51, 10.52, 10.53

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 and probabilities for \bar{x} .
- **Practice problems:** 11.22, 11.23, 11.24, 11.25, 11.26, 11.27, 11.29, 11.31, 11.38, 11.40

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 about the population mean when σ is given.
- Know how to calculate and interpret the P-value for a test.
- **Practice problems:** 14.34, 14.35, 14.36, 14.37, 14.38, 14.39, 14.40, 14.41, 14.42, 14.43

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, 15.29, 15.30, 15.31, 15.34, 15.35, 15.39, 15.41

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 about the population mean when σ 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:** 17.25, 17.26, 17.27, 17.18, 17.29, 17.31b, 17.37

Chapter 18

- Be able to decide when to use a one-sample t-test, a matched pairs design, or a two-sample t-test.
- Know the conditions for the methods in this chapter to apply.
- Be able to calculate and interpret a level C confidence interval for the difference in 2 population means when given data.
- Know how to calculate the test statistic, degrees of freedom, and P-value for a hypothesis test involving the difference of 2 population means.
- **Practice problems:** 18.26, 18.27, 18.28, 18.29

Chapter 19

- 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 proportion.
- Be able to calculate the necessary sample size for a given margin of error when a confidence level and approximate proportion are given.
- Know how to calculate the test statistic and P-value for a hypothesis test involving population proportions.
- **Practice problems:** 19.29, 19.32, 19.33, 19.35

Chapter 20

- Know the conditions for the methods in this chapter to apply.
- Be able to calculate and interpret a level C confidence interval for the difference in 2 population proportions when given data.
- Know how to calculate the test statistic and P-value for a hypothesis test involving the difference of 2 population proportions.
- **Practice problems:** 20.17, 20.29, 20.30, 20.31, 20.32, 22.28

Chapter 22

- Know the necessary conditions for the method in this chapter to apply.
- Know how to read and interpret a two-way table.
- Be able to calculate the expected counts for each cell of a two-way table if there is no relationship between the variables.
- Be able to calculate the Chi-square test statistic, degrees of freedom, and P-value for a hypothesis test to determine if there is a relationship between two categorical variables.
- **Practice problems:** 22.30, 22.31, 22.32, 22.37, 22.39