

Study Guide for Exam 1

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:** 7.1, 7.3, 7.5

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.
- **Practice problems:** 2.39, 2.41, 7.9, 7.11

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:** 3.3, 3.9, 3.13, 7.15, 7.17

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:** 4.39, 7.19

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.
- Be able to calculate and interpret r^2 .
- Know the limitations of the regression line (lurking variables, extrapolation, etc.)
- **Practice problems:** 7.20, 7.21, 7.31

Formulas to know

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

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

Residual = observed value – predicted value = $y - \hat{y}$

Formulas provided

Correlation $r = \frac{1}{(n-1)s_x s_y} [(x_1 - \bar{x})(y_1 - \bar{y}) + (x_2 - \bar{x})(y_2 - \bar{y}) + \dots + (x_n - \bar{x})(y_n - \bar{y})]$

Regression line $b = r \frac{s_y}{s_x}$

$$a = \bar{y} - b\bar{x}$$