Topics Covered from Chapter 1 to Chapter 3

Chapter One: Statistics

Descriptive Statistics vs. Inferential Statistics
Population vs. Sample
Parameter vs. Statistic
Variable vs. Observation
Qualitative vs. Quantitative
Nominal vs. Ordinal
Discrete vs. Continuous
Biased
Why randomness is important
If a “judgment sample” is used, what could go wrong?
If a “systematic sample” is used, what could go wrong?

Chapter Two: Descriptive Statistics for a Single Variable

Class, Class Frequency, and Relative Class Frequency
Bar Graph and Histogram (How to draw, Area=Relative Frequency)
Pareto Diagram
How to read a stem-and-leaf plot
Skewness vs. Symmetry
Mean, Median, Mode, and Midrange of a sample - how to calculate and what weaknesses they have
Range, Variance, and Standard Deviation of a sample
Quartiles, the Five Number Summary, and Box and Whiskers Display
Percentiles (What the mean, not how to find them)
Standard Score or Z-score
What a Q-Q plot is for
Chebyshev’s Theorem and the Empirical Rule

Chapter Three: Descriptive Statistics for Two Variables

What to do for two qualitative variables... or for one qualitative and one quantitative variable
Purpose of Regression
What do we mean by “slices of x” and why do we care about them
What do we mean by “regression to the mean”
How do we judge what line is best
How we use a regression line for predicting
How we use the standard deviation of the residuals
What the sign of r tells us
What $r^2$ tells us
How to read the Minitab output
Formula you will be given:

\[ s^2 = \frac{\sum_{i=1}^{n} (x_i - \bar{x})^2}{n-1} \]

\[ 1 - \frac{1}{k^2} \]

\[ b_1 = \frac{\sum_{i=1}^{n} [(x_i - \bar{x})(y_i - \bar{y})]}{\sum_{i=1}^{n} (x_i - \bar{x})^2} \]

\[ b_0 = \bar{y} - b_1 \bar{x} \]

Sum of Squared Errors = \[ \sum_{i=1}^{n} (y_i - (b_0 + b_1 x))^2 \]

Standard Deviation of the Residuals = \[ \sqrt{\frac{\sum_{i=1}^{n} (y_i - (b_0 + b_1 x))^2}{n-2}} \]

\[ r = \frac{\sum_{i=1}^{n} [(x_i - \bar{x})(y_i - \bar{y})]}{\sqrt{\sum_{i=1}^{n} (x_i - \bar{x})^2 \sum_{i=1}^{n} (y_i - \bar{y})^2}} \]

\[ r^2 = \frac{\text{var}(y) - \left( \frac{n-2}{n-1} \right) \text{var(residuals)}}{\text{var}(y)} \]