

*(possibly incomplete list of)*

## **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

**Formulas you will be given:**

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

$$1 - \frac{1}{k^2}$$

$$b_1 = \frac{\sum_{i=1}^n [(x_i - \bar{x})(y_i - \bar{y})]}{\sum_{i=1}^n (x_i - \bar{x})^2} \quad b_0 = \bar{y} - b_1 \bar{x}$$

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

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

$$r = \frac{\sum_{i=1}^n [(x_i - \bar{x})(y_i - \bar{y})]}{\sqrt{\sum_{i=1}^n (x_i - \bar{x})^2 \sum_{i=1}^n (y_i - \bar{y})^2}} \quad r^2 = \frac{\text{var}(y) - \left(\frac{n-2}{n-1}\right) \text{var}(\text{residuals})}{\text{var}(y)}$$