Introduction to Modern Statistics Chapter 5: Exploring Numerical Data

### Section 5.1: Scatterplots for Paired Data

Define the following terms:

Scatterplot:

Linear Relationship:

Nonlinear Relationship:

#### Notes:

What are two variables that would have a horseshoe-shaped association in a scatterplot (∩ or ⌢)?

### Section 5.2: Dot Plots and the Mean

Define the following terms:

Dot plot:

Distribution:

Point Estimate:

### Section 5.3: Histograms and Shape

Define the following terms:

Histogram:

What is the tail of a distribution?

How does a right skewed distribution look?

How does a left skewed distribution look?

How does a symmetric distribution look?

**Density Plot:**

Can can you tell where (what value) the mode of a distribution is?

How does a unimodal distribution look?

How does a bimodal distribution look?

How does a multimodal distribution look?

### Section 5.4: Variance and Standard Deviation

What is variability?

Statistically, what is the meaning of “deviation”?

What is the variance of a numerical variable? How is it calculated?

How is the standard deviation related to the variance?

What does represent?

### Section 5.5: Boxplots, Quartiles & The Median

Sketch how a boxplot looks:

What is the inner quartile range (IQR)?

What is the first quartile (Q1)? How is this value calculated?

What is the third quartile (Q3)? How is this value calculated?

What do the whiskers of a boxplot correspond to? (e.g., the median? the mean?)

How are “outliers” plotted in a boxplot?

#### Notes:

How can you mathematically determine if an observation is an “outlier”?

### Section 5.6: Robust Statistics

What makes a statistic “robust”?

What are some examples of robust statistics?

#### Notes:

What are the two ways to measure the “center” of a distribution? Which one is considered robust to skew / outliers?

What are the three ways to measure the “variability” of a distribution? Which one is considered robust to skew / outliers?

### Section 5.7: Transforming Data

What is a variable transformation?

Why would you decide to transform a variable?

### Wrap-up

What type of plot(s) are appropriate for displaying **one quantitative** variable?

What type of plot(s) are appropriate for displaying **two quantitative** variables?

Fill in the following table with the appropriate notation.

| Summary Measure | Parameter | Statistic |
| --- | --- | --- |
| Mean |  |  |
| Variance |  |  |
| Standard deviation |  |  |

Statistics summarize \_\_\_\_\_\_\_\_\_\_\_\_\_ .

Parameters summarize \_\_\_\_\_\_\_\_\_\_\_\_\_.