Name: Abdikarim Jimale

Date: 01-20-2025

HW02 Leaf-size

1. Explain your data collection process.

I selected three plantes that I found at Deering Oak Park. These plants were Maple, Oak, and American Beech. I collected the width and length of ten leaves from different plants to get a diverse and representative sample. The leaf-length is measured from the base to the tip of the leaf, and the leaf-width is measured at the widest point. I used a ruler with millimeter markings to measure both the leaf-length and leaf-width.

2. What instrument did you use to collect data with?

I used a standard ruler to collect the data. The rules have millimeter markings.

3. Argue the accuracy and precision of your instrument.

Accuracy: A standard ruler is fairly accurate for basic measurements. There is chance for error especially if the leaf edges are not perfectly straight or if the leaf has an irregular shape.

Precision: The ruler provides decent precision for general measurement. The precision is limited by human eye and the ruler's scale.

4. How many data points did you collect? Why?

I collected 30 data points in total ten simples for each type. This sample size ensures that there is enough data to analyze variability with each species and make comparisons between them.

5. Define the size of your data in terms of both N (full data set size) and n (each subset size).

N (total data set size): The full dataset contains 30 data points.

N (each subset size): Each subset contains 10 data points.

6. Explain any problems that you ran into during the data collection process.

I went to some stores like Wal-Mart and Hannaford to get some plants there but most of the plants were either too small or did not have enough of them, so I decided to choose some plant that grown up at Deering Oak Park. The biggest challenge picks some plants that are not damaged from the weather change or stepped on. Some leaf was rolled over itself which made it difficult to take right measure.

4. Explain each graph in Term of Variance, Mean, Median, and Standard Deviation:

1- Histograms:

- Variance: Maples has the widest spread (highest Variance), while Oak has the smallest spread (lowest Variance).
- Mean: Maple's peak is higher on leaf-length scale than Oak and American Beech.
- Median: The median being close to the means for symmetric distributions, would fall near the center of the peak.
- Standard Deviation: Wider histograms like Maple indicate higher standard deviations (great spread). Narrower ones like Oak indicate smaller standard deviations.

2- Boxplots:

- Variance: Maples has the largest box (highest variability), and Oak the smallest.
- Mean: The boxplot doesn't directly show the mean, but the mean would lie close to the median in symmetrical data.
- Median: Maple has the highest median, Oak the lowest, and American Beech is intermediate.
- Standard Deviation: Maple has the largest standard deviation.

3- Scatterplot:

- Variance: Maple points are widely spread, indicating high variance, while Oak points are tightly clustered, showing low variance.
- Mean and Median: The median would be similar due to the roughly symmetric clustering.
- Standard Deviation: Maple has the largest spread (highest SD), while Oak has the smallest.

5- What can you infer with data and graphs that you have?

Maple leaves are the largest and most variable. Oak leavers are the smallest and most consistent. American Beech leavers are moderate in size and variability. The Leaf length and width are positively correlated across all species.