Measures of Central Tendancy and Dispersion

BASIC DEFINITIONS	
Mean	average; sum of values divided by total values
Median	the middle number when ordered least to greatest
Mode(s)	the most occuring value
Lower Extreme	minimum; lowest value
Upper Extreme	maximum; greatest value
Lower Quartile	median of the lower half of the data; Q1
Upper Quartile	median of the upper half of the data; Q3
Range	maximum - minimum
Interquartile Range	upper quartile - lower quartile

Example: Given the data set {4, 10, 10, 14, 4, 25, 15, 22, 16, 10}, find each value.

4, 4, 10, 10, 10 | 14, 15, 16, 22, 25

12

Mean: $\frac{130}{10} = 13$

Median: $\frac{10+14}{2} = 12$

Mode: 10

Lower Extreme: 4

Upper Extreme: 25

Range: 21

- Lower Quartile: 10
- Upper Quartile: 16

Interquartile Range: 6

When to use what measure:

Mean: Use the mean to describe the middle of a set of data that does not have an outlier!

Median: Use the median to describe the middle of a set of data that does have an outlier.

Mode: Use the mode when the data are nonnumeric or when choosing the most popular item.

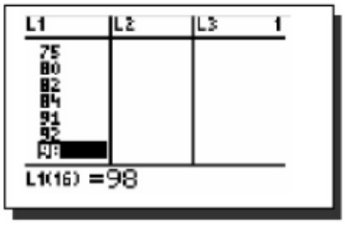
Statistics on the Graphing Calculator

The graphing calculator is a powerful tool when it comes to measuring statistics. It can perform many of the calculating that we currently do by hand.

***Exercise* #1**: Shown below are the scores 16 students received on a math quiz.

74, 98, 60, 72, 80, 91, 52, 73, 72, 66, 92, 68, 75, 66, 84, 82

Step #1: Go to **STAT**, **EDIT**, Enter the values into $\mathbf{L_1}$



Step #2: Go to **STAT**, arrow over to **CALC**, and choose **1: 1-Var Statistics**

Step #3: Hit **ENTER** twice. You are given a screen that gives information pertaining to your data set.

$\bar{x}$ = Mean = 75.31

Σx = Sum of values = 1205

n = number of values = 16

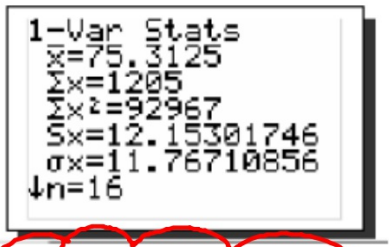
minX = minimum = 52

Q_1 = lower quartile = 67

Med = median = 73.5

Q_3 = upper quartile = 83

MaxX = maximum = 98



mode: 72

range: 46

IQR: 16

The calculator will NOT give you mode and range. You must find these by hand.

***Exercise* #2**: Biologists are studying the weight of Albacore tuna caught off the coast of Washington State. A sample of tuna is taken and their weights, in pounds, are given below:

36, 22, 41, 18, 36, 27, 31, 38, 25, 29, 22, 34, 48, 20, 12, 19, 35, 32, 41, 50

(a) Which is the greater measure of center? Mean or median?

Mean: 30.8

Median: 31.5

(b) What is the range of this data set?

max-min

50-12 = 38

Exercise #3: Dr. Wittgenstein is researching the time it takes for people to fall asleep at night. In his lab, he records the time it takes each of his subjects to fall asleep, in minutes, and compiles the data set shown below.

22, 8, 19, 14, 25, 95, 32, 7, 14, 20, 18, 10, 22, 17, 27, 16

(a) Find the mean and median amount time that it takes subjects to fall asleep.

(b) Are there any outliers in this data set? If so, which value?

(c) Determine the mean and median of this data set if this outlier is removed.

(d) Did the outlier make a significant difference in the mean and median?