Measures of Central Tendency

Measures of Central Tendency are used to generalize data sets and identify common values. Typically referred to by the Mean or the Median.

Mean	**Definition:** Average of a numerical data set, denoted as $\bar{x}$ **Calculation:** Add up all the data values and divide by the number of data values **Useful When:** - Data values do not vary greatly - No outliers - Distribution is symmetric

Example: Find the mean of the following numbers.
a. 76 77 79 80 82 88 90 92 95 b. 15, 10, 12, 18, 10, 22

Median	**Definition:** The middle number when the values are written in numerical order **Calculation:** Rewrite your data values in numerical order to find the middle number. o If your data set is **ODD**, then the median will be the number that falls directly in the middle. o If your data set is **EVEN**, then the median is the average of the two middle numbers. **Useful When**: - Distribution is skewed - Data values contain an outlier

Example: Find the median of the following numbers.
a. 76 77 79 80 82 88 90 92 95 b. 15, 10, 12, 18, 10, 22

First and Third Quartiles	**Definition:** Quartiles are values that divide a list of numbers into quarters • **First (Q1) Quartile:** Median of the lower half of a data set o **Calculation:** Find the middle number of the values to the left of the median • **Third (Q3) Quartile:** Median of the upper half of a data set o **Calculation:** Find the middle number of the values to the right of the median

Example: Find the lower and upper quartiles of the following numbers.
a. 76 77 79 80 82 88 90 92 95 b. 15, 10, 12, 18, 10, 22

Mode	**Definition:** Value that occurs most frequently. There can be no, one, or several modes **Calculation:** Find the numbers that are repeated o *NO MODE* (No numbers repeat) ▪ Say "no mode" o *ONE MODE* (One number repeats) ▪ State the number that repeats o *MORE THAN ONE MODE* (Several numbers repeat the same amount of times) ▪ State the numbers that repeat. **Useful When:** - Data set contains categorical data

Example: Find the mode of the following numbers.
a. 76 77 79 80 82 88 90 92 95 b. 15, 10, 12, 18, 10, 22

Measures of Spread

Measures of Spread describe the "diversity" of the values in a data set. Measures of spread are used to help explain whether data values are very similar or very different.

Range	**Definition:** Difference between the greatest and least values in the set **Calculation:** Subtract the smallest data value from the biggest data value Range = Biggest # - Smallest #

Example: Find the range of the following numbers.
a. 76 77 79 80 82 88 90 92 95 b. 15, 10, 12, 18, 10, 22

Interquartile Range (IQR)	**Definition:** The difference between the third and first quartiles ($Q_3 - Q_1$). It finds the distance between two data values that represent the middle 50% of the data. **Calculation:** Subtract the first quartile value from the third quartile value ($Q_3 - Q_1$).

Example: Find the interquartile range of the following numbers.

a. 76 77 79 80 82 88 90 92 95

b. 15, 10, 12, 18, 10, 22