

Warm Up on the problem shown.

Warm Up!

A scientist studying the number of sodas a Halsey student drinks on the weekends randomly surveyed some Halsey students. The scientist listed the number of sodas the students he surveyed drank below.

5, 4, 10, 3, 3, 0, 0, 3, 0, 2      0 0 0 2 3 3 3 4 5 10

What is the mean, median, and mode? What would be the best measure of center for the data and why?

$$\text{Mean} = \frac{30}{10} = \textcircled{3}$$

$$\text{Range} = 10 - 0 = 10$$

$$\text{Median} = \frac{3+3}{2} = \frac{6}{2} = \textcircled{3}$$

$$\text{Mode} = 0, 3$$

## Range

The variability (spread) of data describes how spread out data is.

The range of a set of data is the largest number (maximum) in a set of data minus the smallest number (minimum). Range helps out describe the spread of data.

$$\text{Range} = \text{Maximum} - \text{Minimum}$$

Below is the ages of people of people in Mr. Suh's immediate family.

What is the range of the ages?

67, 30, 35, 63, 10

$$67 - 10 = 57$$

## 5 Number Summary

The **5-Number Summary** are numbers that help describe the distribution of data. It consists of the **minimum**, **1st quartile (Q1)**, **median**, **3rd quartile (Q3)**, and the **maximum**.

The **minimum** is the number with the least value.

The **1st quartile (Q1)** is the median between the minimum and median of a set of numbers.

The **median** is the middle number in a set.

The **3rd quartile (Q3)** is the median between the median and maximum of a set of numbers.

The **maximum** is the number with the largest value.

What is the 5-number summary for the data below?

60 120 50 150 150 50 100 200

First let's order the numbers from least to greatest.

50 50 60 100 120 150 150 200

We can now also find the median. Remember we can find the median by canceling out the smallest and largest numbers until we find the middle number. If we have two numbers in the middle we add them and divide the sum by 2.

50 50 60 100 120 150 150 200

$$\text{median} = \frac{100 + 120}{2} = \frac{220}{2} = 110$$

Now let's find the first quartile.

We have to find the median of the first half of the numbers.

50 50 60 100 | 120 150 150 200

$$Q1 = \frac{50 + 60}{2} = 55$$

Now let's find the third quartile.

We have to find the median of the second half of the numbers.

50 50 60 100 | 120 150 150 200

$$Q3 = \frac{150 + 150}{2} = 150$$

Therefore our 5-number summary is:

|                                |
|--------------------------------|
| Minimum = 50                   |
| 1 <sup>st</sup> Quartile = 55  |
| Median = 110                   |
| 3 <sup>rd</sup> Quartile = 150 |
| Maximum = 200                  |

Find the 5-number summary of the following data:

2 5 8 1 9 1 4 2 7



$$Q1 = \frac{1+2}{2} = 1.5$$

$$Q3 = \frac{7+8}{2} = 7.5$$

Minimum = 1

1<sup>st</sup> Quartile = 1.5

Median = 4

3<sup>rd</sup> Quartile = 7.5

Maximum = 9

## Box and Whisker Plots

We use the 5-number summary to create Box and Whisker Plots. It will help us look at our distribution of data and how spread out our data is.

First we have to create a number line that contains our values from the summary.

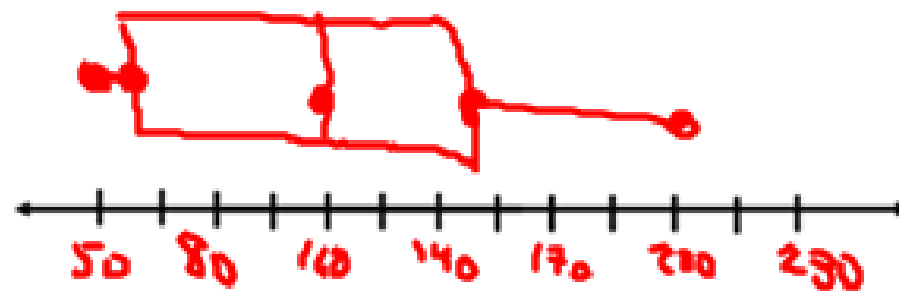
$$\text{Min} = 50$$

$$Q1 = 55$$

$$\text{median} = 110$$

$$Q3 = 150$$

$$\text{Max} = 200$$



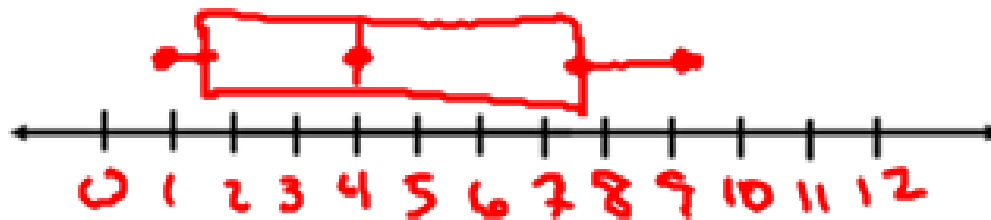
Let's look at the ranges of our data to analyze the spread.

The interquartile range (IQR) tells us the range between the first and third quartile.

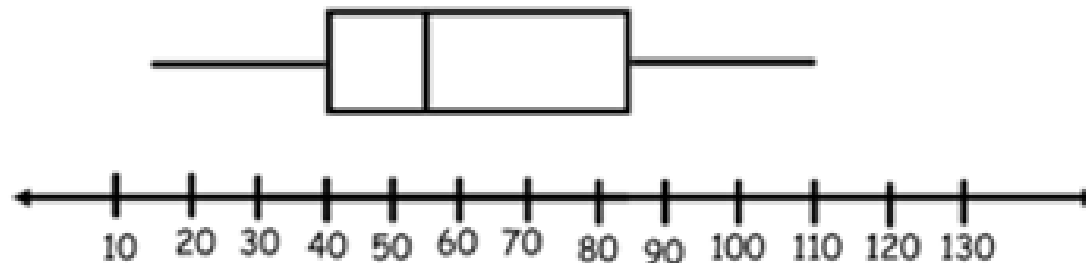
$$\text{IQR} = Q3 - Q1$$

$$150 - 55 = 95$$

Let's create a box and whisker plot from the second set of data we found a 5-number summary for.



Let's find the 5-number summary, range, and IQR from the box and whisker plot below.



|                               |
|-------------------------------|
| Minimum = 15                  |
| 1 <sup>st</sup> Quartile = 40 |
| Median = 55                   |
| 3 <sup>rd</sup> Quartile = 85 |
| Maximum = 110                 |