

Percentiles:

The _____ of a distribution is a value such that $N\%$ of the data falls at or below N and $(100-N\%)$ of the data fall at or above it.

You took an English achievement test to obtain college credit in freshman English by examination.

1) If your score was at the 89th percentile, what percentage of scores are at or below yours?
At or above yours?

2) If 4000 students took the achievement test, how many students scored lower than you?
How many students scored higher than you?

3) If the scores ranged from 1 to 100 and your raw score is 95, does this mean that your score is at the 95th percentile?

Five Number Summary:

The five number summary consists of the _____, _____,

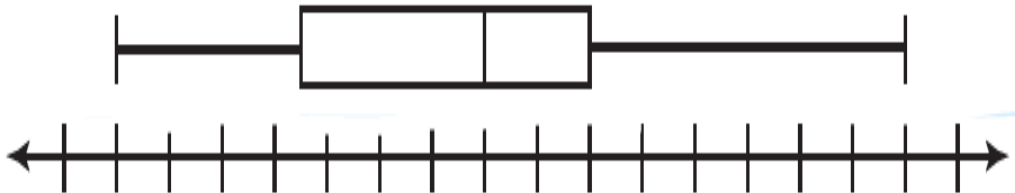
_____, _____, and the _____.

First Quartile: _____

Third Quartile: _____

Box and Whisker Plot:

The five number summaries can be visually organized as a box and whisker plot.



The _____ of the data falls between the quartiles. The difference between the quartiles will give you an idea at how much the middle of your data is spread out. This difference is known as the _____.

Example 1: The development office of a local college did a salary survey of alumni who graduated 2 years ago and have jobs. Sixteen alumni responded to the survey the first week. Their annual salaries (in thousands of dollars) are displayed below. Create a box and whisker blot for the data.

Annual Salaries:

38.5	39.5	32.0	30.5	36.8	29.2	23.7	34.1
28.3	27.9	33.6	37.0	43.5	34.6	33.8	36.1

Min: _____ Q1: _____ Median: _____ Q3: _____ Max: _____ IQR: _____



Outliers:

Sometimes when working with data, not all of the data values fit the distribution. An _____ is a data value that is _____ than the other data values.

-Outliers can often affect the statistics you calculate, _____.

-An outlier is found by calculating the _____. Any value outside of these is considered an outlier.

Lower Fence:

$$Q1 - (IQR \cdot 1.5)$$

Upper Fence:

$$Q3 + (IQR \cdot 1.5)$$

Example 2: Brenda needs to get the oil changed in her car, but she hates to wait. Quick Change and Speedy Oil are two garages near Brenda's house. Brenda chooses twelve customers at random from each garage to look at wait times.

Quick Change		Wait Times (minutes)				Speedy Oil			
10	60	22	15	5	60	45	24		
12	24	20	18	40	26	55	30		
16	23	22	15	32	85	45	30		



How do outliers affect the data?

Example 3: The table below shows the populations of the 10 largest cities in Georgia (in the thousands).

City	Population
Atlanta	420.0
Augusta	195.8
Columbus	189.9
Savannah	136.3
Athens	115.5
Sandy Springs	93.9
Macon	91.4
Roswell	88.3
Albany	77.4
Johns Creek	76.7

1) Calculate the five number summary and IQR for the data.

2) Calculate the lower and upper fences. Are there any outliers for the data.

3) Create a Box and Whisker plot for the data:



4) Calculate the mean with the outliers in the data set and without the outliers in the data set.

Mean with outliers:

Mean without the outliers:

How did the outliers affect the mean? _____

Which better represents the data? _____

Example 4: Coach Petersen's Middletown 9th grade football team is having a tough season. The team is struggling to win games. He is analyzing the data from the past two seasons.

Points Scored 2011	10	13	17	20	22	24	24	27	28	29	35
Points Scored 2012	0	7	17	17	18	24	24	24	25	27	45

- Calculate the five number summary for each year.
- Find the upper and lower fence for each set of data. Determine the outliers in each set of data.
- Construct a box and whisker plot of each year's scores using the same number line.



- Calculate the mean for each of the football seasons both with the outliers and without the outliers.