# Box-and-Whisker Plot:

Five number summary:

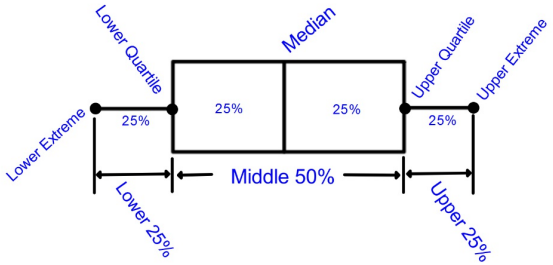
Upper Extreme: The largest number

Lower Extreme: The smallest number

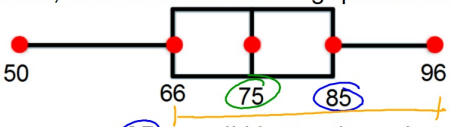
Median: Middle number of the entire data set

Lower Quartile: The middle number of the half of the data below the median

Upper Quartile: This middle number of the half of the data above the median




Use the Box-and-Whisker Plot shown below, made from the test scores of a teacher's class, to answer the following questions.




1. If your score was 85, you did better than what percent of the class?

75%

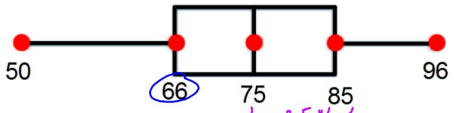
2. If your score was 75, what percent of the class did better than you?

50%

3. What percent of the class had scores between 66 and 96?

75%

Use the Box-and-Whisker Plot shown below, made from the test scores of a teacher's class, to answer the following questions.




4. What is the probability that if you randomly chose one of the scores it would be below 66?

25%

5. If your score was 57, what percent of the class did worse than you?

< 25% or between 0% & 25%

6. If there were 20 students in this class how many of them scored from 75 to 85?

25% of 20 → 5

## Some Statistics Vocabulary:

### Measures of Central Tendency (the 3 M's):

- Mean
- Median
- Mode

Gives and indication of where the "middle" of the data is.

Other statistics we will discuss are:

- Outlier
- Percentiles

Measures of Variability:

- Range
- Interquartile range
- Standard Deviation
- Z-score

Gives an indication of how spread out the data is, or how much variation there is in the data.

Other terms you'll encounter:

- Sample
- Sample Proportion
- Margin of Error

- Normal Distributions
- Standard Normal Curve

What is the mode of this set of data?

41, 47, 46, 47, 39, 41, 39, 46

NO MODE (they all appear twice)

What is the mode of this set of data?

13, 17, 21, 17, 13, 21, 13

MODE = 13

13 appears more than either 17 or 21.

Given a set of data, how many Modes could there be?

- None
- One
- Many

Set 1: 16, 23, 30, 18, 19, 85, 23, 17, 9, 14

Outlier: An item that is substantially different from the other items in the set.

What statistic is usually affected the most by an outlier?

Usually the Mean

If there is an outlier what could this indicate?

- A mistake was made collecting the data
- A piece of equip needs to be checked
- Data is ok there is just one of the values that is quite different from the others

Find the Mean, Median, and Mode of this set of data.

2,13, 27, 19, 21, 8, 14, 25, 15, 32

$\bar{x}$ = 17.6 Median = 17

Mode = NONE

Using the graphing calculator to find median and mean:

2,13, 27, 19, 21, 8, 14, 25, 15, 32

1. Enter the data into a list (usually $L_1$) → STAT → 1:Edit...
2. Press STAT
3. Arrow to CALC
4. 1: 1-Var Stats
5. ENTER

The first thing to appear will be $\bar{x}$. If you scroll down further you will see the five number summary that can be used to make a Box-and-Whisker plot (which includes the Median)

Using the graphing calculator to find the mode.

2,13, 27, 19, 21, 8, 14, 25, 15, 32

1. Enter the data into a list (usually $L_1$) → STAT → 1:Edit...
2. Press STAT
3. Pick Option 2: Sort(A
4. Press: 2nd then 1
5. ENTER

This will put the data in ascending order. You can then press STAT → 1:Edit and see the data in order and find if any number or numbers repeat and how many times.

If you don't have a graphing calculator:

- find by hand
- use the internet (see my blog)
- use spreadsheet software