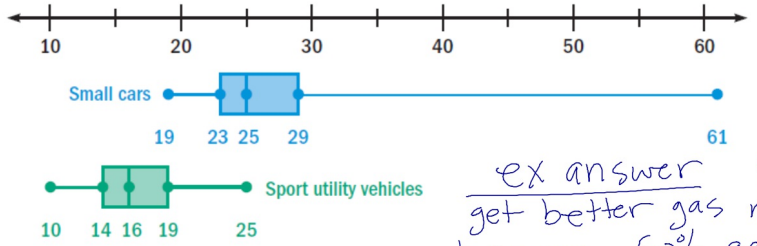
3. Tell which kind of vehicle gets better gas mileage. Use the box-and-whisker plots below to give two reasons for your choice using the percents found in a box-and-whisker plot

Fuel Economy **The box-and-whisker plots show the average miles per gallon of gasoline used in city driving for 2002 models of small cars and sport utility vehicles.**



ex answer Small cars get better gas mileage because 50% get 25 mpg or higher when NO SUV gets over 25 mpg.

On a standardized test your score was reported to be in the 90th percentile.

What does this mean?

Your score was better than 90% of all those who took the test.

Percentile:

A number that represents the percent of data that falls below a given value.

If you tested at the 85th percentile that means that you scored higher than 85% of those taking the test.

Or you could say that 85% of those testing ended up below your score.

12, 9, 8, 15, 20, 3, 17, 9, 10, 14 3, 8, 9, 9, 10, 12, 14, 15, 17, 20

1. 17 is at what percentile?
   First put the data in order!
2. What number is at the 40th percentile?
3. 9 is at what percentile?

$\frac{8}{10}$ 80th %-tile

$10(.40) = 4 \rightarrow$ 10 10 has 4 #'s below it.

$\frac{2}{10} \Rightarrow$ 20th %-tile

24,28,29,32,33,38,38,39,41,43,44,56|57,60,68

1. What percentile is 38 at?

$\frac{5}{15} =$ 33rd %-tile

2. What value is at the 80th percentile?

$15(.80) = 12$

57 has 12 #'s below it.

57

Using our definition of Percentile:

Could your score be at the 100th percentile?

No, 100% of the scores couldn't be below yours because you are one of the scores. (You can't be below yourself!)

Could your score be at the 0th percentile?

Yes, if your's was the lowest score then no scores are below yours.

You can now finish Hwk #25:

Sec 12-3 Due Wednesday

Pages 664-665

Problems 1, 2, 9-11, 14, 16-18

Measures of Central Tendancy:

- Mean
- Median
- Mode

These give a general location for the "middle" of the data

Measures of Variability:

- Range
- Interquartile Range
- Standard Deviation

These given and idea of how spread out the data is and how much variation there is amongst the data

Range: Max Value - Min Value

Gives a measure of the Spread in a data set

Range by itself doesn't describe the whole data set because it is found using only 2 data values.

Which would be more significant?
A small range OR A large range?

How can you find the Range of a set of data using a Box-and-Whisker plot?

Range = Upper Extreme - Lower Extreme
Max - Min

It's the total length of a Box-and-Whisker Plot

Interquartile Range:

Upper Quartile - Lower Quartile

Gives a measure of
1. Where the middle 50% lies
2. How spread out the middle 50% is

Similar to Range is doesn't tell the whole story because it is found using only 2 data values.

Standard Deviation:

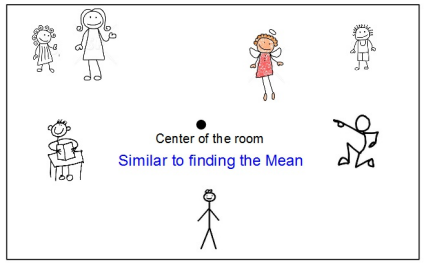
A measure of how much variation there is in a set of data.

Used by itself it doesn't tell you that much about a data set

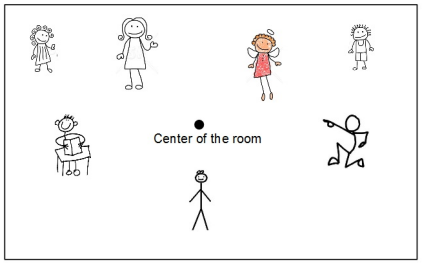
Best used to compare sets of data

Standard Deviation is a measure of how far on average each data value is from the mean.

Bigger Standard Deviation means more variation

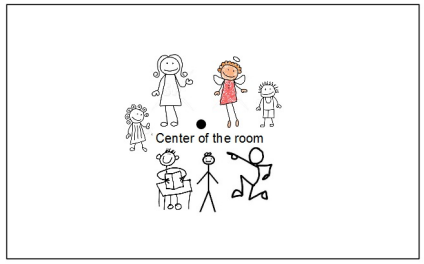


Standard Deviation is similar to the average distance each person is from the center of the room



Large or small Standard Deviation?

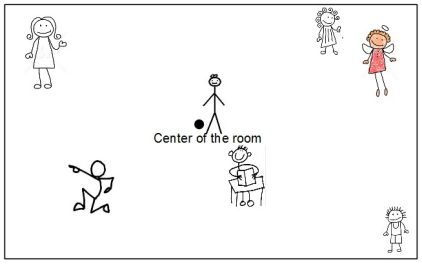
Is there a little or a lot of variation in the data set?



Small standard dev.
There is little variation in there distance from the center of the room. (they're all about the same dist. away)

Large or small Standard Deviation?

Is there a little or a lot of variation in the data set?



Large standard dev
There is more variation in their distance from the middle of the room.

Symbol for Standard Deviation: σ Lower case Sigma

Standard Deviation Formula:

$$\sigma = \sqrt{\frac{\sum(x-\overline{x})^2}{n}}$$

1. Find the mean $\overline{x}$
2. Find the difference between each value & the mean $x - \overline{x}$
3. Square the difference $(x-\overline{x})^2$
4. Find the sum of these squares $\sum(x-\overline{x})^2$
5. Find the mean of these squares $\frac{\sum(x-\overline{x})^2}{n}$
6. Take the square root. $\sqrt{\frac{\sum(x-\overline{x})^2}{n}}$