Notes: Standard Deviation

A measure of how the values in a data set vary or deviate from the mean.

Formula for calculating Standard Deviation:

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

σ – Greek letter sigma represents standard deviation
Σ – Capital sigma represents the sum of a series of numbers
x – a value in the data set
$\bar{x}$ - the mean of the data set
n – the number of values in the data set

Step 1: Calculate mean

Step 2: Find the difference between the data value and the mean

Step 3: Square each difference

Step 4: Find the average (mean of these squares)

Step 5: Take the square root of the mean of the squares to find the standard deviation

Data Set 1			
x	$\bar{x}$	$x-\bar{x}$	$(x-\bar{x})^2$
12.6	15	-2.4	5.76
15.1	15	0.1	0.01
11.2	15	-3.8	14.44
17.9	15	2.9	8.41
18.2	15	3.2	10.24
$\frac{\sum(x-\bar{x})^2}{n}$			7.772
Standard Deviation: $\sqrt{\frac{\sum(x-\bar{x})^2}{n}}$			≈ 2.79

Which set of data has a greater standard of deviation?

The data set with the larger standard of deviation has a larger more spread out range of values.

If many of the data values are close to the mean, then the data would have a relatively small standard deviation. This would tell you that the data is not very spread out.

Data Set 2			
x	$\bar{x}$	$x-\bar{x}$	$(x-\bar{x})^2$
13.4			
11.7			
18.3			
14.8			
14.3			
$\frac{\sum(x-\bar{x})^2}{n}$			
Standard Deviation: $\sqrt{\frac{\sum(x-\bar{x})^2}{n}}$			

Homework: Practice finding Standard Deviation Name ________________________ Per_____

Find the standard deviation for each data set by filling in the tables.

1. Data set 1: 4, 8, 5, 12, 3, 9, 5, 2
   Data set 2: 5, 9, 11, 4, 6, 11, 2, 7

Data Set 1			
x	$\bar{x}$	$x - \bar{x}$	$(x - \bar{x})^2$
$\frac{\sum(x - \bar{x})^2}{n}$			
Standard Deviation: $\sqrt{\frac{\sum(x-\bar{x})^2}{n}}$			

Data Set 2			
x	$\bar{x}$	$x - \bar{x}$	$(x - \bar{x})^2$
$\frac{\sum(x - \bar{x})^2}{n}$			
Standard Deviation: $\sqrt{\frac{\sum(x-\bar{x})^2}{n}}$			

Which data set has a greater standard deviation? ___________

2. Data set 1: 102, 98, 103, 86, 101, 110
   Data set 2: 90, 89, 100, 97, 102, 97

Data Set 1			
x	$\bar{x}$	$x - \bar{x}$	$(x - \bar{x})^2$
$\frac{\sum(x - \bar{x})^2}{n}$			
Standard Deviation: $\sqrt{\frac{\sum(x-\bar{x})^2}{n}}$			

Data Set 2			
x	$\bar{x}$	$x - \bar{x}$	$(x - \bar{x})^2$
$\frac{\sum(x - \bar{x})^2}{n}$			
Standard Deviation: $\sqrt{\frac{\sum(x-\bar{x})^2}{n}}$			

Which data set has a greater standard deviation? ___________

3. Data set 1: 32, 40, 35, 28, 42, 32, 44
Data set 2: 40, 38, 51, 39, 46, 40, 52

Data Set 1			
x	$\bar{x}$	$x - \bar{x}$	$(x - \bar{x})^2$
$\frac{\sum(x - \bar{x})^2}{n}$			
Standard Deviation: $\sqrt{\frac{\sum(x-\bar{x})^2}{n}}$			

Data Set 2			
x	$\bar{x}$	$x - \bar{x}$	$(x - \bar{x})^2$
$\frac{\sum(x - \bar{x})^2}{n}$			
Standard Deviation: $\sqrt{\frac{\sum(x-\bar{x})^2}{n}}$			

Which data set has a greater standard deviation? ___________