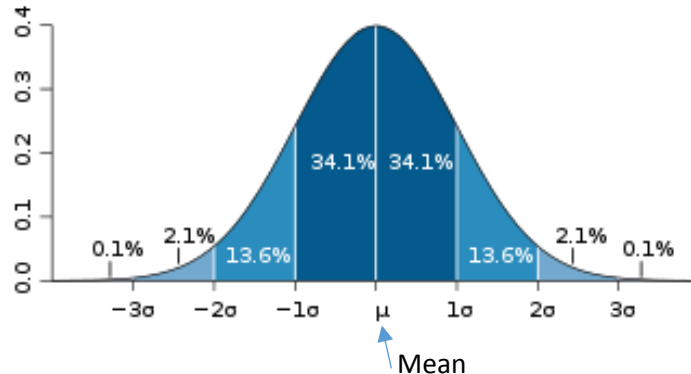


Copy in to your Standard Deviation Tab  
Complete Example 2 & Follow up question in your notes

### Standard Deviation Notes & Practice

**$\sigma$**  Standard Deviation: how far from the normal (or mean) the numbers are. It is denoted by the Greek letter “sigma” to the left

It is associated with the bell curve. The data in one standard deviation away from the mean ( $\mu$ ) in either direction on the horizontal axis accounts for around 68 percent of the data (34.1% above the mean and 34.1% below). Two standard deviations away from the mean accounts for roughly 95 percent of the data with three standard deviations representing about 99 percent of the data.



Formula for Standard Deviation:

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

In real people language:

1. Find the mean of the data
2. Subtract the mean from each value in the data
3. Square each deviation of the mean
4. Find the sum of the squares
5. Divide the total by the number of values
6. Take the square root.

Essentially, you are finding how far away each piece of data is from the mean, squaring them individually, taking the mean or average of those squared differences and then taking the square root.

Ex 1: The math test scores of five students are: 92, 88, 80, 68, and 52. Find the standard deviation.

1. Find the mean:  $\frac{92+88+80+68+52}{5} = 76$
2. Find the deviations from the mean:  
 $92 - 76 = 16$   
 $88 - 76 = 12$   
 $80 - 76 = 4$   
 $68 - 76 = -8$   
 $52 - 76 = -24$
3. Square each deviation:  
 $16^2 = 256$   
 $12^2 = 144$   
 $4^2 = 16$   
 $(-8)^2 = 64$   
 $(-24)^2 = 576$

4. Find the sum of the squares:

$$256 + 144 + 16 + 64 + 576 = 1056$$

5. Divide by the number of data values:

$$\frac{1056}{5} = 211.2$$

6. Find the square root:

$$\sqrt{211.2} = 14.53$$

**14.53 is the standard deviation!!**

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Ex 2: A different math class took the same test with these five test scores: 92, 92, 92, 52, 52.  
Find the standard deviation for this class.

Consider both sets of scores. Both classes have the same mean, 76. However, each class does not have the same scores. Thus we use the standard deviation to show the variation in the scores. With a standard variation of 14.53 for the first class and 19.6 for the second class, what does this tell us?

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**Penny Project:**

Find the standard deviation of your set of pennies.

What does this tell you about your data set?