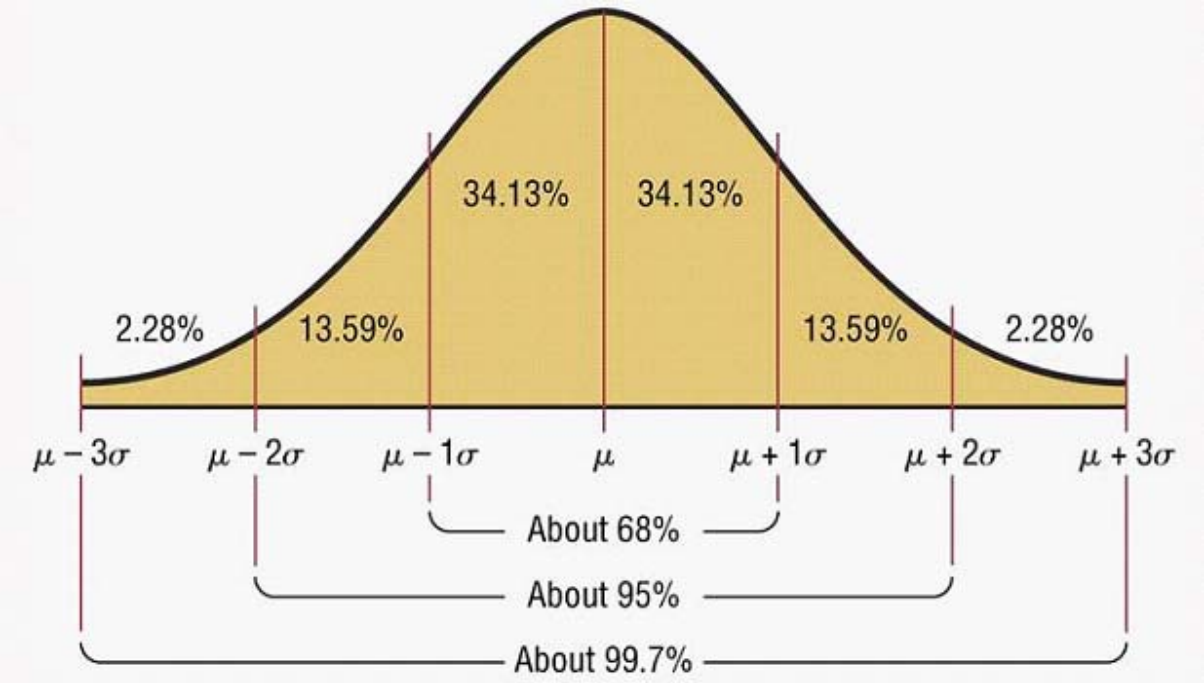
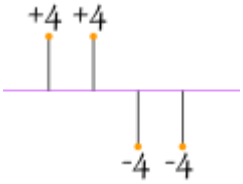
Standard Deviation Why Square the Difference ?



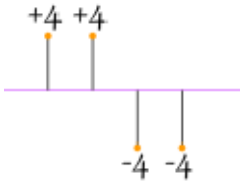
Why square the differences?

If we just added up the differences from the mean ... the negatives would cancel the positives:



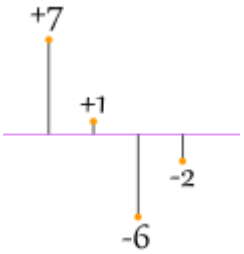
$$\frac{4 + 4 - 4 - 4}{4} = 0$$

So that won't work. How about we use absolute values ?



$$\frac{|4| + |4| + |-4| + |-4|}{4} = \frac{4 + 4 + 4 + 4}{4} = 4$$

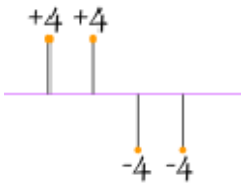
That looks good (and is the Mean Deviation), but what about this case:



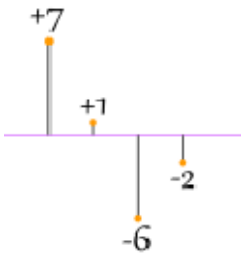
$$\frac{|7| + |1| + |-6| + |-2|}{4} = \frac{7 + 1 + 6 + 2}{4} = 4$$

Oh No! It also gives a value of 4, Even though the differences are more spread out!

So let us try squaring each difference (and taking the square root at the end):



$$\sqrt{\frac{4^2 + 4^2 + 4^2 + 4^2}{4}} = \sqrt{\frac{64}{4}} = 4$$



$$\sqrt{\frac{7^2 + 1^2 + 6^2 + 2^2}{4}} = \sqrt{\frac{90}{4}} = 4.74...$$

That is nice! The Standard Deviation is bigger when the differences are more spread out ... just what we want!

The more practical way to compute it...

In Microsoft Excel, type the following code into the cell where you want the Standard Deviation result, using the "unbiased," or "n-1" method:

=STDEV(A1:Z99) (substitute the cell name of the first value in your dataset for A1, and the cell name of the last value for Z99.)