## Hot Dog Spread

# Dataset: Hot Dog Contest Winners

Copy your hot dog series from the previous exercise. Use the correct Python commands to determine and print out the answers to the following questions.

1. What is the variance of hot dogs eaten?
2. What is the standard deviation of hot dogs eaten?
3. What is the range of hot dogs eaten?
4. What is the interquartile range of hot dogs eaten?

Standard deviation and variance are both determined by using the mean of a group of numbers in question. The mean is the average of a group of numbers, and the variance measures the average degree to which each number is different from the mean. The extent of the variance correlates to the size of the overall range of numbers—meaning the variance is greater when there is a wider range of numbers in the group, and the variance is less when there is a narrower range of numbers.

**Standard Deviation**

Standard deviation is a statistic that looks at how far from the mean a group of numbers is, by using the square root of the variance. The calculation of variance uses squares because it weighs outliers more heavily than data closer to the mean. This calculation also prevents differences above the mean from canceling out those below, which would result in a variance of zero.

Standard deviation is calculated as the square root of variance by figuring out the variation between each data point relative to the mean. If the points are further from the mean, there is a higher deviation within the date; if they are closer to the mean, there is a lower deviation. So the more spread out the group of numbers are, the higher the standard deviation.

**Variance**

The variance is the average of the squared differences from the mean. To figure out the variance, first calculate the difference between each point and the mean; then, square and average the results.

For example, if a group of numbers ranges from 1 to 10, it will have a mean of 5.5. If you square the differences between each number and the mean, and then find their sum, the result is 82.5﻿. To figure out the variance, divide the sum, 82.5, by N-1, which is the sample size (in this case 10) minus 1. The result is a variance of 82.5/9 = 9.17. Standard deviation is the square root of the variance so that the standard deviation would be about 3.03.

Because of this squaring, the variance is no longer in the same unit of measurement as the original data. Taking the root of the variance means the standard deviation is restored to the original unit of measure and therefore much easier to interpret.