A standard deviation is an indicator of how widely distributed the data is in reference to the mean. A low standard deviation implies that data is tightly grouped around the mean, whereas a high standard deviation suggests that data is more spaced out. A standard deviation around 0 implies that the data points are relatively close to the average mean, whereas a bigger standard deviation shows that the data points are spread more out from the mean. Standard deviation is calculated as the square root of the variance σ = √(∑(x−¯x) ( x − x ¯ ) 2 /n), where n = total number of observations. Standard deviation is frequently preferred over variance. It uses the same units as the original data, making it easier to understand. Because using the square root lowers the influence of extreme numbers, standard deviation is less susceptible to outliers than variance.

Variance is a metric that measures the average value of the squared deviations between every point of data and the entire data set's mean. Variance measures the total spread of the data points. It uses units that represent the square of the initial data units, which may be confusing at times. Because squared differences magnify the influence of outliers, variance is extremely sensitive to them. ​The variance is calculated as σ² = ( Σ (x-μ)² ) / N. Step 1: Determine the mean. Step 2: Determine the standard deviation of each value from the mean. Step 3: Divide each variation from the mean by two. Step 4: Determine the total of the squares. Step 5: Multiply the total of the squares by n - 1 or N. For example Suppose we have the data set {5, 10, 15, 20} and we want to find the population variance. The mean is given as (5 + 10 + 15 + 20) / 4 = 12.5 .Then by using the definition of variance we get [(5 -12.5)2 + (10 -12.5)2 + (15 -12.5)2 + (20 - 12.5)2] / 4 = 31.25.