

What is the difference between "mean" and "median" ?

In some of our software we provides the mean and median statistical values (selectable on or off). Before the wide spread use of computers, the median was often used to estimate the mean. As some of the standards using the median are still in use, then for the foreseeable future we will continue to offer this summary statistic.

The statistical terms "mean" and "median" are measures of central tendency which expressed as a single value attempt to describe (or summarise) a set of data by identifying the central position within that set of data.

Mean

The mean (or average), also known as the "arithmetic mean", is the most popular and well known measure of central tendency. The mean is equal to the sum of all the values in the data set divided by the number of values in the data set. It is often expressed by the formula

$$\bar{x} = \frac{\sum x}{n}$$

Where

\bar{x} (pronounced x bar) is the arithmetic mean

$\sum x$ (pronounced sigma x, or sum of x) is the sum of all the values in the data set

n is the number of values in the data set

For example, if we obtain these results from a fabric tensile strength test

100.9, 100.3, 100.5, 100.7, 100.1

Then $\sum x = 100.9 + 100.3 + 100.5 + 100.7 + 100.1 = 502.5$

The number of values = 5

Therefore the mean = $502.5 / 5 = 100.5$

Although not shown above, you may notice that the mean is not often one of the actual values that you have observed in your test results.

Median

The median is the *middle value* for a set of data that has been arranged in order of magnitude (i.e., in ascending order). To calculate the median, consider the results we used above

$$100.1 + 100.3 + \mathbf{100.5} + 100.7 + 100.9 \text{ (arranged in ascending order)}$$

Then the median is the third value, 100.5.

In this case the median is the same as the mean but this is not always the case.

If we have an even number of data values

$$100.1 + 100.3 + \mathbf{100.5} + \mathbf{100.7} + 100.7 + 100.9 \text{ (arranged in ascending order)}$$

then the median is the mean of the two middle values

$$(100.5 + 100.7) / 2 = 100.6$$

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