

How can we find quartiles in datasets with even and odd lengths?

Authored by
stats writer

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Quartiles are statistical measures used to divide a dataset into four equal parts, with each part containing 25% of the data. In datasets with an odd number of values, finding the quartiles is fairly straightforward as the median, which is the second quartile, can be easily identified. However, in datasets with an even number of values, the task of finding quartiles becomes more complex. In such cases, the median is the average of the two middle values, and the first and third quartiles are the medians of the first and second halves of the dataset respectively. This method can be applied to both even and odd length datasets to accurately determine the quartiles and better understand the distribution of the data.

Find Quartiles in Even and Odd Length Datasets

Quartiles are values that split up a dataset into four equal parts.

To find the first and third quartile for a dataset with an even number of values, use the following steps:

Identify the median value (the average of the two middle values)
Split dataset in half at the median
Q1 is the median value in the lower half of the dataset (not including median)
Q3 is the median value in the upper half of the dataset (not including median)

To find the first and third quartile for a dataset with an odd number of values, use the following steps:

Identify the median value (the middle value)
Split dataset in half at the median
Q1 is the median value in the lower

half of the dataset (not including median) Q3 is the median value in the upper half of the dataset (not including median)

The following examples show how to calculate quartiles for both types of datasets.

Note: When calculating quartiles, some formulas do include the median value. As noted by , there is actually no universal agreement on how to calculate quartiles for discrete distributions. The formulas shared here are used by TI-84 calculators, which is why we have chosen to use them.

Example 1: Calculate Quartiles for Even Length Dataset

Suppose we have the following dataset with ten values:

Data: 3, 3, 6, 8, 10, 14, 16, 16, 19, 24

The median value is the average of the middle two values, which is $(10 + 14) / 2 = 12$.

We will not include this median value when calculating the quartiles.

The first quartile is the median of the lower half of

values, which turns out to be 6:

Q1 = 3, 3, 6, 8, 10

The third quartile is the median of the upper half of values, which turns out to be 16:

Q3 = 14, 16, 16, 19, 24

Thus, the first and third quartiles for this dataset are 6 and 16, respectively.

Example 2: Calculate Quartiles for Odd Length Dataset

Suppose we have the following dataset with nine values:

Data: 3, 3, 6, 8, 10, 14, 16, 16, 19

The median value is the value located directly in the middle: 10.

We will not include this median value when calculating the quartiles.

The first quartile is the median of the lower half of values. Since there are two values in the middle, we will

take the average which turns out to be $(3 + 6) / 2 = 4.5$:

Q1 = 3, 3, 6, 8

The third quartile is the median of the upper half of values. Since there are two values in the middle, we will take the average which turns out to be $(16 + 16) / 2 = 16$:

Q3 = 14, 16, 16, 19

Thus, the first and third quartiles for this dataset are 4.5 and 16, respectively.

The following tutorials explain how to find the quartiles of a dataset using different statistical software: