

# What is the difference between Percentile, Quartile, and Quantile?

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April 29, 2024

## RECOMMENDED CITATION

stats writer (2024). *What is the difference between Percentile, Quartile, and Quantile?*. PSYCHOLOGICAL SCALES. Retrieved from <https://scales.arabpsychology.com/?p=140940>

Percentile, quartile, and quantile are all statistical measures that are used to divide a set of data into equal parts. However, each measure differs in the number of parts it divides the data into and the purpose for which it is used.

Percentile divides the data into 100 equal parts, with each part representing a percentage of the total data. For example, the 50th percentile would represent the median, or the middle value of the data set. Percentile is commonly used in ranking and comparing data, such as in standardized tests.

Quartile divides the data into four equal parts, with each part representing a quarter of the data. The first quartile (Q1) represents the 25th percentile, the second quartile (Q2) represents the 50th percentile, and the third quartile (Q3) represents the 75th percentile. Quartile is commonly used in descriptive statistics to understand the spread of data and identify any outliers.

Quantile divides the data into any number of equal parts, with each part representing a certain percentage of the data. Unlike percentile and quartile, the number of parts in a quantile is not fixed. This measure is used to understand the distribution of data and identify specific data points that fall within certain ranges.

In summary, the main difference between percentile, quartile, and quantile lies in the number of parts they divide the data into and their specific purpose in statistical analysis. While percentile and quartile are fixed measures, quantile allows for more flexibility in dividing the data into equal parts.

## **Percentile vs. Quartile vs. Quantile: What's the Difference?**

**Three terms that students often confuse in statistics are percentiles, quartiles, and quantiles.**

**Here's a simple definition of each:**

**Percentiles: Range from 0 to 100.**

**Quartiles: Range from 0 to 4.**

**Quantiles: Range from any value to any other value.**

**Note that percentiles and quartiles are simply *types* of quantiles.**

**Some types of quantiles even have specific names, including:**

**4-quantiles are called *quartiles*. 5-quantiles are called *quintiles*. 8-quantiles are called *octiles*. 10-quantiles are called *deciles*. 100-quantiles are called *percentiles*.**

**Note that percentiles and quartiles share the following relationship:**

**0 percentile = 0 quartile (also called the minimum)  
25th percentile = 1st quartile  
50th percentile = 2nd quartile (also called the median)  
75th percentile = 3rd quartile  
100th percentile = 4th quartile (also called the maximum)**

**Example: Find Percentiles & Quartiles**

**Suppose we have the following dataset with 20 values:**

Data
3
4
4
6
7
9
12
13
14
16
17
19
22
23
23
25
28
29
34
37

**Using statistical software (like Excel, R, Python, etc.) we can find the following percentiles and quartiles for this dataset:**

Data	Percentile	Quartile	Value
3	0	0	3
4	25	1	8.5
4	50	2	16.5
6	75	3	23.5
7	100	4	37
9			
12			
13			
14			
16			
17			
19			
22			
23			
23			
25			
28			
29			
34			
37			

**Here's how to interpret these values:**

**The 0 percentile and 0 quartile is 3. The 25th percentile and 1st quartile is 8.5. The 50th percentile and 2nd quartile is 16.5. The 75th percentile and 3rd quartile is 23.5. The 100th percentile and 4th quartile is 37.**

**When to Use Percentiles vs. Quartiles**

**Percentiles can be used to answer questions such as:**

**What score does a student need to earn on a particular test to be in the top 10% of scores?**

To answer this, we would find the 90th percentile of all scores, which is the value that separates the bottom 90% of values from the top 10%.

**What heights encompass the middle 40% of heights for students at a particular school?**

To answer this, we would find the 70th percentile of heights and 30th percentile of heights, which are the two values that determine the upper and lower bounds for the middle 40% of heights.

**Quartiles can be used to answer questions such as:**

**What score does a student need to earn on a test to be in the top quarter of scores?**

To answer this, we would find the 3rd quartile of all scores, which is the value that separates the bottom 75% of values from the top 25%.

**What is the interquartile range of a given dataset?**

**The interquartile range (IQR) is the range of the middle 50% of data values. To find the IQR for a given dataset, we can calculate 3rd quartile - 1st quartile.**

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