

What is the difference between Range and Interquartile Range?

Authored by
stats writer

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Range and Interquartile Range are two measures of dispersion used in statistics to describe the spread of a data set.

Range refers to the difference between the highest and lowest values in a data set. It gives a general idea of how spread out the data is, but it can be affected by extreme values and may not accurately represent the variability of the majority of the data.

Interquartile Range, on the other hand, is a more robust measure of dispersion that is less affected by extreme values. It is calculated by finding the difference between the 75th and 25th percentiles of the data set. This means that the data is divided into four equal parts, with 25% of the data falling below the lower quartile and 25% above the upper quartile. The Interquartile Range represents the middle 50% of the data and is a better indicator of the spread of the majority of the data.

In summary, the main difference between Range and Interquartile Range is that Range considers all the values in a data set, while Interquartile Range focuses only on the middle 50% of the data, making it a more reliable measure of dispersion.

Range vs. Interquartile Range: What's the Difference?

In statistics, the range and interquartile range are two ways to measure of values in a dataset.

The range measures the difference between the minimum value and the maximum value in a dataset.

The interquartile range measures the difference between the first quartile (25th percentile) and third quartile (75th percentile) in a dataset. This represents the spread of the middle 50% of values.

Example: How to Calculate Range & Interquartile Range

Suppose we have the following dataset:

Dataset: 1, 4, 8, 11, 13, 17, 19, 19, 20, 23, 24, 24, 25, 28, 29, 31, 32

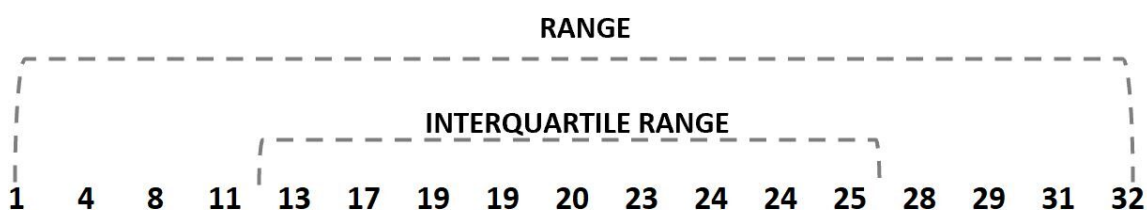
We can use the following steps to calculate the range:

Range = Maximum value - Minimum value
Range = 32 - 1
Range = 31

We can use the to help us calculate the interquartile range:

Interquartile Range = 3rd Quartile - 1st Quartile
Interquartile Range = 26.5 - 12
Interquartile Range = 14.5

The range tells us the spread of the entire dataset while the interquartile range tells us the spread of the middle half of the dataset.



Range vs. Interquartile Range: Similarities & Differences

The range and interquartile range share the following similarity:

Both metrics measure the spread of values in a dataset.

However, the range and interquartile range have the following difference:

The range tells us the difference between the largest and smallest value in the entire dataset. The interquartile range tells us the spread of the middle 50% of values in the dataset.

Range vs. Interquartile Range: When to Use Each

We should use the range when we're interested in understanding the difference between the largest and smallest values in a dataset.

For example, suppose a professor administers an exam to 100 students. She can use the range to understand the difference between the highest score and the lowest score received by all of the students in the class.

Conversely, we should use the interquartile range when

we're interested in understanding the spread between the 75th percentile and 25th percentile of a dataset.

For example, if a professor administers an exam to 100 students, she can use the interquartile range to quickly understand the difference in exam score between a student who scored at the 75th percentile of scores and a student who scored at the 25th percentile.

It's worth noting that we don't have to choose between using the range or the interquartile range to describe the spread of values in a dataset.

We can use both metrics since they provide us with completely different information.

The Drawback of Using the Range

The range suffers from one drawback: It is influenced by outliers.

To illustrate this, consider the following dataset:

Dataset: 1, 4, 8, 11, 13, 17, 19, 19, 20, 23, 24, 24, 25, 28, 29, 31, 32

The range of this dataset is $32 - 1 = 31$.

However, consider if the dataset had one extreme outlier:

Dataset: 1, 4, 8, 11, 13, 17, 19, 19, 20, 23, 24, 24, 25, 28, 29, 31, 32, 378

The range of this dataset would now be $378 - 1 = 377$.

Notice how the range changes dramatically as a result of one outlier.

Before calculating the range of any dataset, it's a good idea to first check if there are any outliers that could cause the range to be misleading.

Additional Resources

The following tutorials provide additional information about the interquartile range: