

Why is the range important in statistics?

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June 28, 2024

RECOMMENDED CITATION

stats writer (2024). *Why is the range important in statistics?*. PSYCHOLOGICAL SCALES.
Retrieved from <https://scales.arabpsychology.com/?p=155746>

The range is an important statistical measure that provides valuable information about the spread or variability of a dataset. It is calculated by subtracting the lowest value from the highest value in a dataset and represents the total span of the data. The range helps to identify the minimum and maximum values within a dataset, giving a clear understanding of the overall distribution of the data. This information is crucial in making informed decisions and drawing accurate conclusions from statistical analysis. Additionally, the range can be used to identify outliers or extreme values, which can significantly impact the results of a statistical study. Therefore, understanding the range is essential in accurately interpreting and analyzing data in various fields such as economics, psychology, and science.

Why is the Range Important in Statistics?

In statistics, the range represents the difference between the smallest and largest value in a dataset.

For example, suppose we have the following dataset:

Dataset: 3, 4, 11, 15, 19, 19, 19, 22, 22, 23, 23, 26

We can use the following formula to calculate the range:

Range = Maximum value - Minimum value
Range = 26 - 3
Range = 23

The range is 23. This represents the difference between the smallest and largest values in the dataset.

In statistics, the range is important for the following

reasons:

Reason 1: It tell us the spread of the entire dataset.

Reason 2: It tells us what extreme values are possible in a given dataset.

The following examples illustrate each of these reasons in practice.

Reason 1: The Range Tells Us the Spread of an Entire Dataset

The range tells us the spread of an entire dataset.

For example, suppose we have the following dataset that shows the exam scores of 20 different students in a class:

Student	Score
1	68
2	72
3	72
4	74
5	77
6	79
7	80
8	81
9	82
10	82
11	82
12	84
13	85
14	87
15	88
16	90
17	91
18	92
19	95
20	98

The range for the exam scores would be calculated as:

$$\text{Range} = \text{Maximum value} - \text{Minimum value} \\ \text{Range} = 98 - 68 \\ \text{Range} = 30$$

The range turns out to be 30. This represents the difference between the highest exam score and the lowest exam score in the class.

Reason 2: The Range tells us what extreme values are possible in a given dataset

The range tells us what extreme values are possible in a given dataset.

For example, suppose a realtor has access to a database that contains the selling price of 100,000 houses in a certain city in the United States:

House	Selling Price
1	\$224,000
2	\$340,000
3	\$395,000
4	\$239,000
5	\$560,000
...	
100,000	\$400,000

Suppose we use some statistical software (like , , , etc.) to calculate the range of this dataset and find the following:

Range = Maximum Value - Minimum Value
Range = 854,000 - 194,000
Range = 660,000

If the realtor has a client who has a purchasing budget

of less than \$194,000 or greater than \$854,000, the realtor can immediately know that there will be no houses in this particular city that meet the purchasing criteria.

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 explain the importance of other metrics in statistics:

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