

How do you calculate the percentile rank for grouped data?

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The percentile rank for grouped data is a method used to determine the relative position of a particular data point within a larger set of data that has been grouped into categories. This is typically done in order to gain a better understanding of the distribution of the data. The percentile rank is calculated by first determining the cumulative frequency for each group, then finding the group that contains the desired data point. The percentile rank is then calculated by taking the cumulative frequency of the group below the desired data point, adding it to the percentage of the group that the data point falls into, and finally multiplying by 100 to get the percentile rank. This method allows for a more accurate representation of the data, especially when dealing with large sets of data.

Calculate Percentile Rank for Grouped Data

You can use the following formula to calculate percentile rank for grouped data:

$$\text{Percentile Rank} = L + (RN/100 - M) / F * C$$

where:

L: The lower bound of the interval that contains the percentile rank
R: The percentile rank
N: The total frequency
M: The cumulative frequency leading up to the interval that contains the percentile rank
F: The frequency of the interval that contains the percentile rank
C: The class width

The following example shows how to use this formula in practice.

Example: Calculate Percentile Rank for Grouped Data

Suppose we have the following frequency distribution:

Class Interval	Frequency	Cumulative Frequency
1-5	6	6
6-10	19	25
11-15	13	38
16-20	20	58
21-25	12	70
26-30	11	81
31-35	6	87
36-40	5	92

Now suppose we'd like to calculate the value at the 64th percentile of this distribution.

The interval that contains the 64th percentile will be the 21-25 interval since 64 is between the cumulative frequencies of 58 and 70.

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64 is between 58 and 70

Knowing this, we can find each of the values necessary to plug into our formula:

L: The lower bound of the interval that contains the percentile rank

The lower bound of the interval is 21.

R: The percentile rank

The percentile we're interested in is 64.

N: The total frequency

The total cumulative frequency in the table is 92.

M: The cumulative frequency leading up to the interval that contains the percentile rank

The cumulative frequency leading up to the 21-25 class is 58.

F: The frequency of the interval that contains the percentile rank

The frequency of the 21-25 class is 12.

C: The class width

The class width is calculated as $25 - 21 = 4$.

We can then plug in all of these values into the formula from earlier to find the value at the 64th percentile:

Percentile Rank = $L + (RN/100 - M) / F * C$
64th Percentile Rank = $21 + (64 * 92/100 - 58) / 12 * 4$
Percentile Rank = 21.293

The value at the 64th percentile is 21.293.

Additional Resources

The following tutorials provide additional information for working with grouped data: