Measures of Non-Central Tendency

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Measures of Non-Central Tendency

Quartiles … the three values which divide the distribution into four equal parts

Deciles … the nine values which divide the distribution into ten equal parts

Percentiles … the ninety-nine values which divide the distribution into hundred equal parts

Measures of Non-Central Tendency

Quartiles …

Q_1…lower quartile… is a value that has one forth or 25%

Q_2…Median… is a value that has two forth or 50%

Q_3…upper quartile… is a value that has three forth or 75%

Deciles …

D_1…first decile… is a value that has one tenth or 10%

D_2…second decile… is a value that has two tenth or 20%

and so on

Percentiles …

P_1…first percentile… is a value that has one hundredth or 1%

P_2…second percentile… is a value that has two hundredth or 2% and so on

Measures of Non-Central Tendency

To find the measures of non central tendency of a group of items:

- Order the n observations from smallest to largest.
- Determine the product *np.*
  - if *np* is not an integer, round it up to the next integer and find the corresponding ordered value.
  - If *np* is an integer, say *k*, calculate the mean of the *kth* and *(k+1)th* ordered observations.

Example 1

An engineer uses a thermocouple to monitor the temperature of a stable reaction. The ordered values of 24 observations (Courtesy of Scott Sanders), in tenths of ◦C, are 1.11, 1.13, 1.17, 1.21, 1.23, 1.24, 1.25, 1.25, 1.27, 1.27, 1.28, 1.29, 1.30, 1.31, 1.31, 1.32, 1.33, 1.34, 1.35, 1.36, 1.36, 1.37, 1.38, and 1.39.

Find lower and upper quartile, 3^{rd} decile, and 57^{th} percentile.

Measures of Non-Central Tendency (Grouped Data)

In grouped data measures of non central tendency are calculated in the same way as median

$l + \frac{h}{f})np_i$-c)

$where\ n = \sum f$

Firstly, we calculate np_i, for finding desired class

$l =$ lower class boundary of the desired class

$h =$class interval

$f =$frequency of the desired class

$c =$cumulative frequency corresponding to the group preceding desired class

Question 1

The frequency distribution of 160 determinations of the daily emission (in tons) of sulfur oxides from an industrial plant is given below. Find the 1^{st}quartile,6^{th} decile and 89^{th} percentile.

Class Limits	Frequency
5-8.9	8
9-12.9	20
13-16.9	29
17-20.9	45
21-24.9	32
25-28.9	19
29-32.9	7
Total	160