Épreuve de section européenne

The median

Another form of average that is sometimes used for convenience is the *median*. This, as its name implies, is the middle observation and it is easily found in ungrouped data by ranking the sample of observations in the order of their size and finding the central observation, if N [the number of observations] is odd, or the mean of the two central observations, if N is even.

If N is odd, the median will be the $(N+1)/2$th observation. If N is even, it will be the mean of the $N/2$th and the $N/2 + 1$th observations. For example, the median of 2, 4, 6, 8, 10, 12 is the mean of the 3rd and 4th readings, i.e. $(6+8)/2 = 7$.

The median is representative of a set of observations in the sense that there are exactly as many observations greater than it as there are less. If the distribution is perfectly symmetrical, the median is equal to the mean.

From *Statistical Calculation For Beginners*, by E.G. Chambers, Cambridge University Press

Questions

1. According to the author, what is the median of a set of observations and how is it found?

2. Explain the main difference between the median when N is odd and when N is even.

3. Consider the set of numbers 2, 4, 6, 8, 10, 12 given as an example in the text.

   (a) Check the median given in the text, then compute the arithmetic mean.
   (b) What would be the median if the set had included an extra value equal to 14?
   (c) What would be the median if the set had included an extra value equal to 200? What would be the arithmetic mean in that case?
   (d) What property of the median, that the arithmetic mean doesn't share, is highlighted by the answers to the previous questions?

4. In what precise way is the median representative of a set of observations? Illustrate this property with an example.

5. (a) Give an example of a set of 5 observations whose median is equal to the mean.
   (b) Give an example of a set of 5 observations whose median is not equal to the mean.