CDC Writing Cannon Spidle Mrs. Joshi

Question:

Will the mean or median increase if the last number in the data set is increased?

Claim:

To begin, this question is asking if the outlier will increase the mean or the median. Well, in a summary, we know that if a number increases in a data set then the mean will increase. But why does it happen and what is an outlier?

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Data: Mean

Mean without outlier:
(without the last number increased.)

$$\frac{23+25+27}{3}$$

$23+25+27 = 75$

$75 \div 3 = 25$

Mean = (25)

Mean with outlier:
(with last number increased)

$$\frac{23+25+66}{3}$$ ← new outlier

$23+25+66 = 114$

$114 \div 3 = 38$

Mean = (38) ← significant increase

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Median without outlier:
(Without the last number increased.)

23 + 25 + 27
Median

Median = (25)

Median with outlier:
(With last number increased)

23 + 25 + 66 ← Outlier
Median

Median = (25) ← stays the same.

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Commentary:

To start off, we know that a data set consists of a set of numbers, (or data.) One thing you can do with this set is find the mean. But first, what is mean? Mean is the average of the numbers in a data set. (Or any source of data.) The way to find the mean of a data set is very simple. The first thing you do is allign you data set like this.

$$23+25+27$$

↖ Add this line.

The next thing you do is you divide the numbers

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in the set by how many numbers are in the set.

$$\frac{23+25+27}{3}$$ ← 3 numbers
← Divide by 3.

Then, you now want to add the numbers in the set. (In this case $23+25+27=75$) You now need to divide the sum of those numbers by the number below them. ($75 \div 3$.) After you found the quotient you now have your mean, or average. The steps of this process should look like this:

1.

$23+25+27$ ← Data set.

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[2.]

$$\frac{23+25+27}{3}$$

[3.] $\frac{23+25+27}{3}$

$23+25+27 = 75$

$75 \div 3 = 25$

Mean = (25)

Now that you know what mean is you can know the average of any data set. Moving on, now you need to know how to calculate the median.

The median is the middle number of your data set. So, let's say you have 3 numbers in your set. (23+25+27). The middle number, 25, will be your median.

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This only works if there is an odd amount of numbers in the set. If there is an even amount of numbers you need to find the mean of the two middle numbers. There are the steps:

1. (Odd amount.)

$23+25+27$

middle number

Median = (25)

2. (Even amount.)

$\frac{23+25+26+27}{2}$

$25+26=51$

$51 \div 2 = 25$

Median = (25.5)

NOTE: The numbers in a data set when calculating median must be in order.

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However, what if there is an outlier, will it affect the mean and/or the median, and what is an outlier? Well, first, the outlier is a value that is much smaller or larger than the rest of the data set. For example, let's say we have values of 56, 58, 60, and 18. 18 will be the the outlier because it is much less than the rest of the values. But, moving on, will an outlier affect the mean and/or the median? The outlier can drastically affect the mean. This is because there is such a consistent average with all of the other values but then this outlier can raise the average way up or way down. Moving on, can the outlier affect the median?

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The answer, in this case, is no. This is because you are only changing the last number into an outlier. You are not adding nor removing any numbers. So, the median will stay the same.

23+25+27 (without Outlier.)
median

23+25+66 (With Outlier.)
still the median.

This shows that the mean will be affected but the median will not.

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To end, the ending result shows that the mean will be affected by the outlier but the median will not be. Also, I hope you now what mean and median mean. I also hope I showed you what an outlier is and that it can affect the mean greatly.

End