

Stat 3233 – Applied Statistics
Measures of Center – Extra Problems

1. Consider the following alternative measures of center of a distribution:
- *trimmed mean*: the mean of the observations after removing the largest 5% and smallest 5%
 - *midrange*: the average of the minimum and maximum
 - *midhinge*: the average of the first and third quartiles, Q_1 and Q_3

For each alternative measure of center, indicate whether it is resistant or not resistant. Explain your answers based on how the measures are defined and the meaning of “resistant.” (Note: You are not being asked to decide if they are “good” measures of center – only to discuss resistance.)

2. A real estate agent notes that the mean housing price for an area is \$125,780 and concludes that half of the houses in the area cost more than that. Explain why the agent’s conclusion is not necessarily true.
3. A company executive concludes that an accountant must have made a mistake because she prepared a report stating that 90% of the company’s employees earn less than the mean salary. Explain how it is possible that the accountant’s report is correct.
4. A restaurant owner decides that more than half of her customers prefer chocolate ice cream because chocolate is the mode when customers are offered their choice of chocolate, vanilla, and strawberry. Explain why the restaurant owner’s conclusion is not necessarily true.

5. If you had data for all students in your school on the amount of money spent in the previous year on overnight stays in a hospital, probably the median and mode would be 0 but the mean would be positive. Explain why. Make reference to the definitions of median, mode, and mean in your explanation. (You can use an example to explain, if you want.)

6. A sample of 99 distances has a mean of 24 feet and a median of 24.5 feet. Unfortunately, it has just been discovered that an observation which was erroneously recorded as "30" actually had a value of "35." If we make this correction to the data, then:

- A) the mean remains the same, but the median is increased.
- B) the mean and median remain the same
- C) the median remains the same, but the mean is increased
- D) the mean and median are both increased.
- E) we do not know how the mean and median are affected without further calculations; but the standard deviation is increased.

7. When testing water for chemical impurities, results are often reported as "bdl," which means "below detection limit." The following are nine measurements of the amount of lead in a series of water samples taken from inner city households (measured in parts per million, ppm).

5 7 12 bdl 10 8 bdl 20 6

Which of the following is correct?

- A) The mean lead level in the water is about 10 ppm.
- B) The mean lead level in the water is about 8 ppm.
- C) The median lead level in the water is 7 ppm.
- D) The median lead level in the water is 8 ppm.
- E) Neither the mean nor the median can be computed because some values are unknown.