

5: Describing Data: Mean, Median, and Standard Deviation --- Answers

1.
 - a) 29.5
 - b) 87
 - c) For part (b) you just need to find the middle number, for part (a) you need to find the average of the two middle numbers.
2. The mean is $49.9\bar{3}$ and the median is 46.
3.
 - a) The mean is ≈ 9.57 and the median is 8.
 - b) The mean is 2.5 and the median is 2.5.
4. \$81.50
5. An example would be: 5, 4, 3, 5, 5, 6, 7, 30, 6, 5.
6. An example would be: 1, 9, 9, 10, 11.
7. An example would be: 3, 5, 6, 7, 7, 8, 8, 9, 9, 9.
8. The mean is \approx \$54,222 and the median is \$42,000. With two salaries that are much higher than the other seven, the median would be the better measure of center.
9. 3
 - a) It looks as if the data are not skewed much in either direction so we would expect the mean and median to be close.
 - b) The mean is ≈ 71.72 and the median is 72.
10. It is better to use the median when the data are highly skewed or there are outliers.
11.
 - a) The data are skewed to the right, so the mean is pulled to the right. A is the median, B is the mean.
 - b) The data are skewed to the left, so A is the mean, B is the median.
 - c) The graph is nearly symmetric, so A is both the mean and the median, B is neither.
12. $\sqrt{441} = 21$
13. The mean is \$9393.60, the total of the prices divided by the number of cars. The median is \$9747.50, or the middle value in a order list. The standard deviation is \$4161.46, which is approximately the average distance of the prices from the mean.
14. The range is 10 and the standard deviation, σ , is ≈ 3.59 .
15. 85% of the scores were less than yours.
16. The data have a large spread. (Specifically the middle half of the data set has a large spread.)
17. $\min X = 152$; $Q_1 = 161.5$; $\text{Med} = 172.5$; $Q_3 = 186.5$; $\max X = 210$.
18.
 - a) $\sigma \approx 4.37$; $Q_3 - Q_1 = 10$.
 - b) $\sigma \approx 2.11$; $Q_3 - Q_1 = 2.9$
19. The mean is ≈ 69.17 and the standard deviation is ≈ 1.46 . The minimum value is 66, Q_1 is 68, median is 69, Q_3 is 70, and maximum value is 72. With the mean and the median close together, it indicates that the data set is fairly symmetric. The data set also has more values in the middle than out at the ends giving it a shape similar to a normal distribution.
20. 70-130

21. To find the percent of values within one standard deviation of the mean we use $99.43 \pm 2(12.46)$ to get 86.97 to 111.89. Since there is a total frequency of 80 between 87 and 111, 80% are within 1σ of the mean.

For 2σ from the mean we use $99.43 \pm 2(12.46)$. Thus the range we are considering is between 74 and 124. In this range there are 13 more data points for a total of 93. So 93% of the data is within 2σ of the mean. N

For 3σ from the mean we use $99.43 \pm 3(12.46)$. Thus the range we are considering is between 62 and 137. In this range there are 4 more data points for a total of 97. So 97% of the data is within 3σ of the mean.

We have 80% – 93%– 97%, which is fairly close to the 68% - 95% - 99.7% rule (we would probably do better with a larger sample).

22. Adding a 300 will be an outlier on the high side. This will make the mean larger. The median will not be affected since there was also one data point added on the low side.