

Problem 2.4

For Parts A-C, predict what will happen. Then do the computation to see whether you are correct.

Part A

The graph below shows the distribution of the amount of sugar in 20 cereals found on the top shelf. The sum of the values in this distribution is 91 grams. Use stick-on notes to make a copy of the distribution. Note the location of the mean at 4.55 grams of sugar and the median at 3 grams of sugar.

Put the line plot from page 41 here

1. Suppose you remove the 3 cereals with 6 grams of sugar per serving and add 3 new cereals, each with 9 grams of sugar per serving. What happens to the mean?

What happens to the median?

Why do you think this happens?

2.a. Use the new distribution from #1. Suppose you remove a cereal with 3 grams of sugar and add a cereal with 8 grams of sugar. How does the mean change?

How does the median change?

b. Suppose you remove another cereal with 3 grams of sugar and add a third cereal with 8 grams of sugar. How does the mean change?

Data Distributions

How does the median change?

c. Suppose you remove a third cereal with 3 grams of sugar and add a third cereal with 8 grams of sugar. How does the mean change?

How does the median change?

Part B

Use the new distribution from Part A #2. Experiment with removing data values and replacing them with new data values.

1. How does replacing smaller data values with larger data values affect the mean?

How does replacing smaller data values with larger data values affect the median?

2. How does replacing larger data values with smaller data values affect the mean?

How does replacing larger data values with smaller data values affect the median?

3. How does replacing larger and smaller data values with values that are closer to the middle of the distribution affect the mean?

How does replacing larger and smaller data values with values that are closer to the middle of the distribution affect the median?

Data Distributions

Part C

1. Sort these 8 distributions into 2 groups: one where the means and medians are the same or almost the same and one where they are not.

2. For each group of distributions, describe how the locations of the mean and median appear to be influenced by the shape of the distribution. Explain your reasoning.