

Lesson 7.3: The Effects of Outliers on Average

1. The following data represent math test scores:
45, 100, 61, 65, 50, 99, 70, 80, 25, 53, 83, 70, 57, 78, 70, 72, 69
 - a) Calculate the mean, median, and mode.
 - b) Identify the outliers.
 - c) Calculate the mean, median, and mode without the outliers. How is each measure of central tendency affected when the outliers are not included?

2. Below are the commission earnings for the employees of *Cars To Go* during the month of December:
\$1120, \$1380, \$1250, \$120, \$3500, \$1250, \$1500, \$1790, \$1860
 - a) Determine the measures of central tendency.
 - b) Identify the outliers. How do the outliers affect the mean, median, and mode?
 - c) Should the outliers be included when reporting the average commission earned? Explain.

3. Is each conclusion correct? Explain.
 - a) The mode size of women's shoes sold in a particular week was 7.5. So, size 7.5 was sold the most that week.
 - b) The mean number of students who buy their lunch in the cafeteria each day is 235. So, exactly 235 students buy their lunch in the cafeteria each day.

4. Grade 7 students in a class at St. Leonard's School were asked how much time they spent doing homework Tuesday night.
The results, in minutes, are shown.
90, 10, 0, 40, 45, 50, 45, 50, 55, 30, 45, 60, 10, 45, 35, 30, 45, 55, 60, 35, 30, 45, 40, 55, 35, 40, 45
 - a) Calculate the mean, median, and mode times.
 - b) Identify the outliers. How do the outliers affect the mean, median, and mode?
 - c) Should the outliers be included when reporting the average time spent doing homework? Explain.

Extra Practice 3 – Master 7.21

1.
 - a) Mean: about 67.47, median: 70, mode: 70
 - b) The outliers are 25, 99, 100.
 - c) Mean: about 65.9, median: 69.5, mode: 70
The mean and the median decreased slightly. The mode remained the same.
2.
 - a) Mean: \$1530, median: \$1380, mode: \$1250
 - b) The outliers are \$120 and \$3500.
Mean: \$1450; median: \$1380; mode: \$1250
Only the mean is affected by the outliers; the median and mode are not affected by the outliers.
 - c) Answers may vary. I would not include \$120. I assumed the employee had been sick. I would include \$3500 because an employee did earn this amount of commission.
3.
 - a) The conclusion is correct because the mode represents the number that occurs most often, so, in this case, it is the shoe size that is sold most often.
 - b) The conclusion is incorrect because the mean is the sum of the data values divided by the number of data values. So there could be more or less than 235 students buying their lunch on a given day.
4.
 - a) Mean: about 41.7, median: 45, mode: 45
 - b) 0, 90
Mean: 41.4, median: 45, mode: 45
The mean decreased slightly. The median and mode remained the same.
 - c) Yes, to understand how much time the class is spending doing homework, all times should be included.