

Introduction

Resistance is used to describe a measure of central tendency, dispersion, or position that is not affected by points at the extremes (really high or really low numbers). Resistance is most important when discussing measures of central tendency, because these measures describe the overall feel of the data. If one of these measures is affected by extremes, it will skew the overall feel of the data.

The Empirical Rule describes how data is centered around the mean if the data is bell-shaped. The Empirical Rule states that when data is bell-shaped 68% of the data will fall within 1 standard deviation of the mean, 95% within 2 standard deviations of the mean, and 99.7% within 3 standard deviations of the mean.

Objectives

Discover the measures of central tendency that are resistant.
Describe a data set using the Empirical Rule.

Materials

Resistance_and_ER.tns

Highlighter (optional)

Procedure

1) How would you describe the data on page 1.3 (Fig. 1)? Any extremes? What is the mean, median and standard deviations?

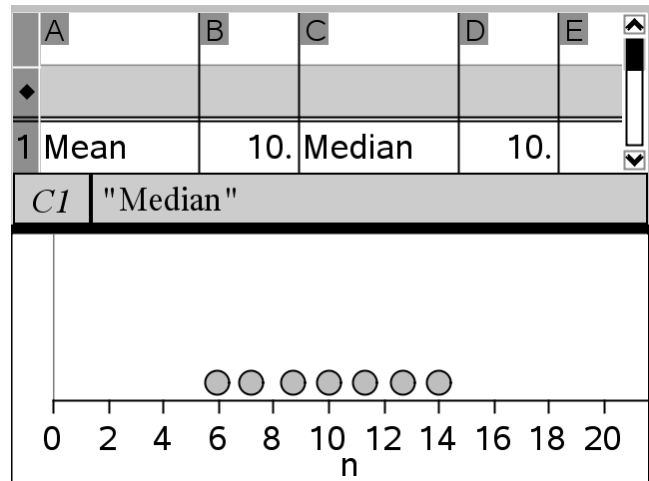


Figure 1

2) Change the minimum data point from 6 to 2. How would you describe the data now? Any extremes? What are the new mean, median, and standard deviations?

3) Change the minimum data point back to 6, and change the maximum data point from 14 to 20. How would you describe the data now? Any extremes? What are the new mean, median, and standard deviations?

4) Which measure of central tendency is resistant? Why do you think it is the resistant measure? What about the standard deviations?

5) Were the standard deviations resistant? If they were not, did the population and sample standard deviations change in the same way?

6) Record the mean, median, and standard deviations for each of the data set on pages 2.2 and 2.3.

	Data Set A	Data Set B
Mean		
Median		
σ		
s		

7) What is the same about each data set? What is different?

8) Which set of data is more dispersed? How can you tell?

9) The Empirical Rule describes how much data will be k numbers of standard deviations away from the mean. Let's examine one standard deviation. Complete the table below by adding or subtracting the standard deviation from the mean (write in the mean) for each data set.

	1 Stand Dev to Left	Mean	1 Stand Dev to Right
Data Set A			
Data Set B			

10) Listed below is the data in each of the sets. Highlight (or circle) each of the numbers that falls within the appropriate range from above.

A: 10 20 20 30 30 30 40 40 40 40 50 50 50 50 50 50 60 60
60 60 70 70 70 80 80 90

B: 45 46 46 47 47 47 48 48 48 48 49 49 49 49 49 50 50 50
50 50 50 51 51 51 51 51 52 52 52 52 53 53 53 54 54 55

11) What percentage of the data in each set was within one standard deviation? (Hint: Find the number of points you highlighted and divide by the total number of points.)

12) How closely do the data sets follow the Empirical Rule?

13) If the Empirical Rule applies to every bell-shaped set of data, why might a normal data set not strictly follow it?