

Analyzing and Interpreting Statistics

Reporting Category Statistics

Topic Analyzing and interpreting descriptive statistics

Primary SOL A.9 The student, given a set of data, will interpret variation in real-world contexts and calculate and interpret mean absolute deviation, standard deviation, and z-scores.

Related SOL

Materials

- Graphing calculators
- Interpreting Descriptive Statistics activity sheet (attached)

Vocabulary

mean (earlier grades)

dispersion, mean absolute deviation, standard deviation, summation notation, variance, z-score (A.9)

Student/Teacher Actions (what students and teachers should be doing to facilitate learning)

1. Review key vocabulary and its associated ideas, as needed.
2. Distribute copies of the Interpreting Descriptive Statistics activity sheet, and have students work collaboratively in small groups to complete it. As students are working, monitor their conversations, and make note of good discussions or ideas to bring forth in the final discussion.
3. When students have finished, discuss the items on the activity sheet. Be sure to have students explain their strategies and reasoning. Also, be sure to highlight any good discussions or debates you observed as groups were working.

Assessment

• **Questions**

- On which measure of dispersion do outliers have a greater affect?
- How can you determine how many elements fall within one standard deviation of the mean, given the mean and standard deviation as well as a set of data or histogram?
- How does the shape of the graph of data relate to the value of the standard deviation and/or the mean absolute deviation?

• **Journal/Writing Prompts**

- Given two sets of data or two graphical representations with the same mean, describe how you can tell which would have the greater standard deviation or absolute mean deviation.
- Describe a real-life situation in which knowing the standard deviation or absolute mean deviation would be beneficial, and explain why.

- **Other**

- Ask students to examine the test score data from Mrs. Smith’s First Block Class and determine how many values fall one standard deviation below the mean. (Note: Students should realize that one standard deviation below the mean falls inside the interval and that there is no way to tell how many values in that interval are one standard deviation below the mean.) Ask students what additional data they would need in order to figure this out. (Different graphical representation, such as a line plot, or the actual data set)

Extensions and Connections (for all students)

- Have students create their own graphs and descriptive statistics based on their personal interests, topics in history, or topics in science. Then, have them create questions that they would be able to answer based on the data. Have students exchange graphs, descriptive statistics, and questions, and answer the questions.

Strategies for Differentiation

- If they have not already done so, have students create a graphic organizer for specific terms and formulas and use it for reference.
- If the level of the students suggests, have them complete the Interpreting Descriptive Statistics activity sheet as a guided activity for the whole class.

Interpreting Descriptive Statistics

Name _____ Date _____

Problem A

Descriptive statistics for two data sets are shown below:

Data Set A

Mean = 83

Absolute Mean Deviation = 7.68

Variance = 94.96

Standard Deviation = 9.74

Data Set B

Mean = 83

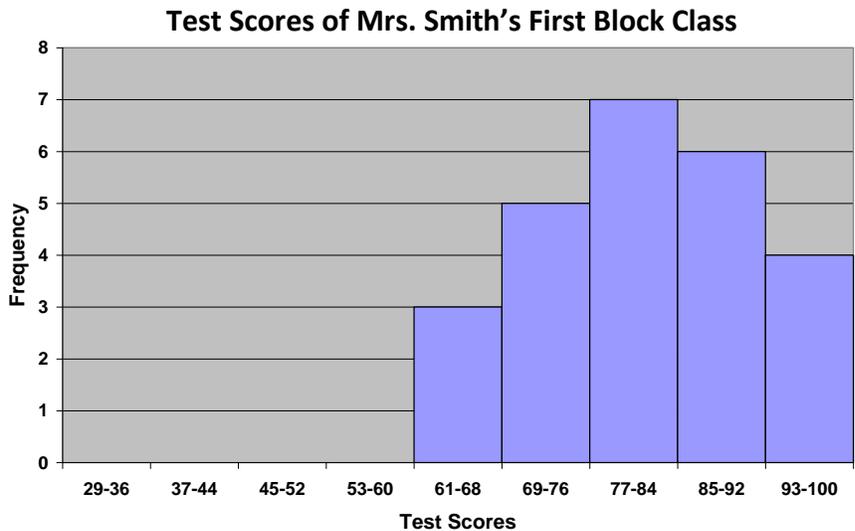
Absolute Mean Deviation = 10.24

Variance = 219.04

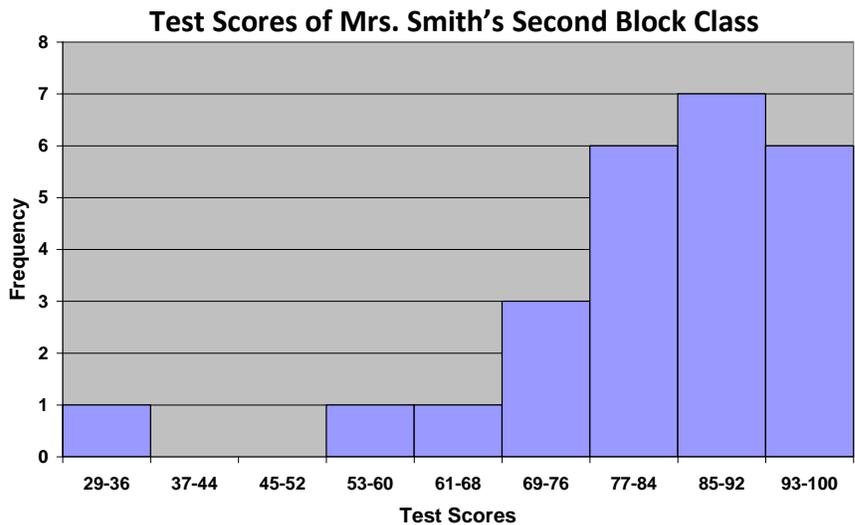
Standard Deviation = 14.8

- Which histogram below matches the descriptive statistics of data set A, and which matches the descriptive statistics of data set B? How do you know?

Data Set _____



Data Set _____



2. Which of the two histograms contains an outlier(s)? _____
How do you know?

3. Examine the absolute mean deviation and the standard deviation of both data sets. Which measure of dispersion was least affected by the outlier(s)? _____
How do you know?

4. How many elements in data set A fall one standard deviation above the mean? _____
Why?

5. What is the z-score for the element 91 in data set B? _____

6. What is the z-score for the element 91 in data set A? _____

7. Which of the following data sets would you expect to have a greater standard of deviation?

<u>Data Set C</u>	<u>Data Set D</u>
0, 5, 10, 15, 20, 25, 30	10, 10, 15, 15, 15, 20, 20

Why?

8. In a set of test scores, an 89 has a z-score of 1.5, and a 93 has a z-score of 2. What is the mean test score? _____ What is the standard deviation? _____

