Lesson 6: Data Analysis: Measures of Center and Range

Objectives	Terms
• To be able to calculate the mean, median, mode, and range of a data set. • To understand how changing a value affects mean and median. • To identify which measure of center best describes a data set. • To define and calculate weighted mean.	• Data Set • Mode • Range • Mean • Average • Median • Outlier • Weighted mean

Think about this: How can you identify the mode and the range of a data set?

Example: Keisha is recording the number of points she misses on each math quiz. Her results are listed in the box to the right. Find the mode and the range for the data.

Points missed on last eight quizzes:

7, 7, 6, 7, 4, 7, 5, and ____

Mode: _____ Range: _____

a. What does the mode tell you about this data?

b. What does the range tell you about this data?

Definitions:

- **Data**: information about people or things.
  - **Data set:** _____ of data (number, figures, facts, etc).
- **Mode**: an item or number that _____ in a list. There can be _____, _____, or _____ modes in a data set.
- **Range**: In a data set, range is the _____ between the _____ and _____ values.

Practice: Nine people were asked, "How many times have you been on an airplane?" Their responses are listed in the box to the right. Find the mode and range for the data.

Number of times each person has been on a plane:

2, 2, 5, 9, 4, 2, 2, 9, and _____

Mode: _____ Range: _____

a. What does the mode tell you about this data?

b. What does the range tell you about this data?

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What about this: Find the average of each set of numbers.

140 and ____	____ and 93	7, 7, 6, 7, 4, 7, 5, and ____

Definitions:

- **Mean**: In a data set, mean is when you _____ all the values together and _____ by the number of values in the set. It is also sometimes called the **_____.**
- **Median**: When data is ordered from _____ to _____, the median value is the _____ in the list. If there are an even number of values, then the median is the _____ numbers.

Practice: On a survey, 5 students reported how many minutes it takes them to travel to school. Their responses are listed in the box to the right. Find the mean and median travel time for these students. If necessary, round your answer to the nearest tenth.

Travel time for students:

16, 5, 7, 12, and _____

Mean: _____ minutes

Median: _____ minutes

a. What does the mean tell you about this data?

b. What does the median tell you about this data?

Practice: Each of the 7 cats in a pet store was weighed. Their weights (in pounds) are listed in the box to the right. Find the mean and median weights of these cats. If necessary, round your answer to the nearest tenth.

Weight of each cat:

12, 5, 7, 16, 11, 16, and _____

Mean: _____ pounds

Median: _____ pounds

Mode: _____ pounds

a. What does the mean tell you about this data?

b. What does the median tell you about this data?

c. What does the mode tell you about this data?

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Think about this: How can you choose the best measure to describe data?

- What choosing the best measure, you should look for:
  - Context of the data: What is the data describing?
  - Are there any outliers in the data?
    - **Outlier:** a value in the set that is much _____ or _____ than the rest of the data.

Answer the following questions:

(a) The following number of people attended the last 9 screenings of a movie:
195 , 203 , 204 , 205 , 206 , 207 , 208 , 211 , 296 .
Which measure should be used to summarize the data?

○ Mean ○ Median ○ Mode

(b) At a certain company, the 10 employees have the following weekly salaries:
$800 , $810 , $820 , $850 , $870 , $910 , $920 , $950 , $970 , $980 .
Which measure should be used to summarize the data?

○ Mean ○ Median ○ Mode

(c) Ravi has recorded his golf score for each round he's played this year.
Which measure gives the score he shot the most often?

○ Mean ○ Median ○ Mode

What is weighted mean?

Definition:

- **Weighted mean:** In a data set, when the same value appears _____.
  - Multiply: _____
  - Add: _____
  - Divide: _____

Example: The table to the right summarizes the number of fiction books read last summer by a sample of 38 students.

What is the mean number of books read? Round your answer to the nearest tenth.

Number of students	Number of books read per student
6	2
7	3
15	4
10	5

Steps:

1. Multiply the number of students by the number of books read.

2. Find the overall mean:

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What happens if we change a value in the data set?

Example: The weekly salaries (in dollars) for 10 employees of a small business are given below. (Note that these are already ordered from least to greatest.)

682, 708, 720, 786, 812, 820, 862, 873, 889, 898

Suppose that the $898 salary changes to $_____. Answer the questions in the box to the right.

Use the space below to show your work.

What happens to the median?	__ It decreases by: __ It increases by: __ It stays the same.
What happens to the mean?	__ It decreases by: __ It increases by: __ It stays the same.

- **Note**: When we change a value in a data set the mean and/or the median may change, depending on where the value is in the ordered set.

Practice: The monthly rents (in dollars) paid by 8 people are given below. (Note that these are already ordered from least to greatest.).

895, 985, 1000, 1020, 1035, 1075, 1110, 1120

Suppose that one of the people moves. His rent changes from $1120 to $_____. Answer the questions in the box to the right.

Use the space below to show your work.

What happens to the median?	__ It decreases by: __ It increases by: __ It stays the same.
What happens to the mean?	__ It decreases by: __ It increases by: __ It stays the same.

Where will you see this in upcoming material?	What are the calculator skills you needed?