

Mean, Median, Mode, and Range

Introduction:

This lesson provides students with an opportunity to identify and apply mean, median, mode, and range.

Objectives:

- Develop a strategic approach to organizing data.
- Understand the relationship between numbers in a data set through the calculation of median, mode, mean, and range.
- Analyze data

Before the Lesson:

Defining Range, Mean, Median, and Mode through definition and example.

Sample data set: 9, 8, 9, 12, 15, 14, 15, 18, 11, 16, 13, 15

Range:

The range of a set of data is the difference between the highest and lowest values in the set.

Example: 18 (highest value) – 8 (lowest value)

$$\text{Range} = 10$$

Mean:

The mean is another term used for average. The mean is the value of all of the numbers added together divided by the total numbers in the data set.

Example:

$$\frac{9 + 8 + 9 + 12 + 15 + 14 + 15 + 18 + 11 + 16 + 13 + 15}{12 \text{ (total numbers)}} = 12.91 \text{ (mean)}$$

Median:

The median is the middle value in the list of numbers. To find the median, the numbers have to be listed in numerical order, therefore the first step is to rewrite the data set from lowest to highest value.

Example: 8, 9, 9, 11, 12, 13, 14, 15, 15, 15, 16, 18

Median Values: 13, 14

$$13 + 14 = 27 \quad \longrightarrow \quad 27/2 = 13.5 \text{ (median)}$$

* Note: When the data set has an even number of numbers, the two middle numbers will be added and divided by 2 to calculate the median.

Mean, Median, Mode, and Range

Continued

Mode:

The mode is the value that occurs most often. If no number is repeated, then there is no mode for the data set.

Example:

8, 9, 9, 11, 12, 13, 14, 15, 15, 15, 16, 18

Mode = 15 (15 is represented three times in the data set)

Lesson:

Using sample data sheet calculate the mean, median, mode and range.

1. Use sample wind speed data provided
2. Hand out "Mean, Median, Mode and Range" Worksheet
3. Have students arrange the data set from lowest to highest value
4. Use the Worksheet to guide the lesson.

Assessment:

After you have completed the worksheet, ask students to define the following terms to verify that they have an understanding of the concepts:

Definitions:

Define range:

Define mean:

Define median:

Define mode:

Mean, Median, Mode, and Range

Using the sample wind speed data sheet complete the following activity:

1. Using the sample data sheet, arrange the 24 wind speed values from the from lowest to highest.
2. What is the highest wind speed value?
3. What is the lowest?
4. Subtract the lowest from the highest. This number is the range.
5. Based on the range, would you say the data points are clustered together or spread out? (Are wind speeds consistent or based on weather, do they represent a variation over a 24 hour period?)
6. What is the middle value (with numbers ordered from lowest to highest)?
* Note: When the data set has an even number of numbers, the two middle numbers will be added and divided by 2 to calculate the median. This number is the median.
7. What is the wind speed that occurs most frequently? This number is the mode.
8. Calculate the average wind speed. To do this, add up each of the 24 hours represented and then divide by 24. This is the mean.

Sample Wind Speed Data
for Mean, Median, Mode and Range Lesson

Hour	Wind Speed (mph)
01	17
02	17
03	17
04	13
05	16
06	17
07	16
08	11
09	10
10	10
11	8
12	8
13	5
14	6
15	6
16	6
17	7
18	7
19	10
20	11
21	13
22	13
23	13
24	13

Mean, Median, Mode, and Range **ANSWER KEY**

Using the sample data sheet complete the following activity:

1. Using the sample data sheet, arrange the 24 wind speed values from the from lowest to highest.

17,17,17,17,16,16,13,13,13,13,13,11,11,10,10,10,8,8,7,7,6,6,6,5

2. What is the highest wind speed value?

17

3. What is the lowest?

5

4. Subtract the lowest from the highest. This number is the range.

12

5. Based on the range, would you say the data points are clustered together or spread out? (Are wind speeds consistent or based on weather, do they represent a variation over a 24 hour period?)

Spread out

6. What is the middle value (with numbers ordered from lowest to highest)?

* Note: When the data set has an even number of numbers, the two middle numbers will be added and divided by 2 to calculate the median. This number is the median.

11

7. What is the wind speed that occurs most frequently? This number is the mode.

13

8. Calculate the average wind speed. To do this, add up each of the 24 hours represented and then divide by 24. This is the mean.

11.25