

Name _____

Date _____

Aim: Measures of Center

Directions: Read the following review on the measures of central tendency.

The measures of center, also known as the **measures of central tendency** are the three M's: mean, median, and mode.

The **mean** is the *average* of a data set. You add all of the numbers in the data set and divide by the number of values.

Example: Test grades: 90, 93, 95, 96

$$\frac{90+93+95+96}{4} = 93.5$$

The **median** is the *middle* number in a data set (after it has been ordered from least to greatest). If there is an *odd* amount of values, there will be ONE middle number. If there is an *even* amount of values, you take the TWO middle numbers, add them together and divide by two.

Example 1: 1, 2, 3, 4, 5

3 is the median

Example 2: 1, 2, 3, 4, 5, 6

$$\frac{3+4}{2} = 3.5 \text{ is the median}$$

The **mode** is the value that occurs *most often*. There can be one mode (example: 3, 3, 3, 4, 5). There can be more than one mode: (example: 3, 3, 4, 4, 5, 6, 7, 8) or there can be no mode at all (1, 2, 3, 4, 5).

Directions: In the examples below, find the measures of center. Round any values to the nearest tenth where necessary.

1.) Consider the following sets of grades during a marking quarter. Find the mean, median, mode for each set of data.

Student 1 {70, 88, 77, 82, 82, 75}

Mean:

Median:

Mode:

Student 2 {0, 70, 88, 77, 82, 82, 75}

Mean:

Median:

Mode:

Sometimes datasets have **outliers**. These are values that are either *much higher* or *much lower* than the rest of the data.

Example: Test grades: 60, 98, 94, 92, 95 **60 would be an outlier**

75, 72, 76, 81, 100 **100 would be an outlier**

Outliers can have an effect on our *mean* by either making it too high or too low to describe the data. Therefore, we use the mean, median, or mode, in different situations:

Median: Use this measure of center when there ***is*** an outlier.

Mean: Use this measure of center when there is ***no*** outlier.

Mode: Use this measure of center when data is not numerical (eye color)

2.) Mr. Scott asked his class what their favorite colors were. The class answered with **blue, blue, red, green, yellow, blue, blue, blue, blue**. Which measure of center tendency (mean, median or mode) would make the most sense to use in this example? Explain.

3.) John's test grades this quarter in math are: 45, 87, 88, 85, 84. Why do you think John may want to use the **median** instead of the **mean** to describe to his friends how he is doing this quarter in math?

Multiple Choice

4.) The ages of five children in a family are 3, 3, 5, 8, and 18. Which statement is true for this group of data?

- A. mode > mean
mean
- B. mean > median
- C. median = mode
- D. median >

5.) Given the following list of students' scores on a quiz: 5, 12, 7, 15, 20, 14, 7. The teacher decides to adjust these scores by *adding three points to each score*. Explain the effect, if any, that this will have on the median and mode of these scores.

A. median increases by 3, mode stays the same
increase by 3

B. Both median and mode

C. Nothing changes
increase by 6

D. Median and mode

6. Cassandra's Candles sold the following number of candles over the last six days: 25, 48, 25, 33, 57, 50. What was the **average** number of candles sold each day?

7. Mrs. Smith surveyed her classes and asked every student the ages of their oldest siblings. The results were: 15, 21, 26, 25, 21, 23, 28, 21. What is the **mode** of this data?

8. What number would you **divide** by to calculate the mean of 3, 4, 5, and 6?

A. 6

B. 3

C. 5

D. 4

9. Which measure of central tendency is calculated by finding the middle number of an ordered data set?

A. Mean

B. Median

C. Mode

D. Range

10. Find the **mean** of the following set of numbers:

40, 61, 95, 79, 9, 50, 80, 63, 109, 42

11. Find the **median** of the following set of numbers (remember to put them in order first!)

40, 61, 95, 79, 9, 50, 80, 63, 109, 42

12. The front row in a movie theatre has 23 seats numbered 1 to 23. If you were asked to sit in the seat that occupied the *median* position, in which seat would you have to sit?

A. 1

B. 11

C. 23

D. 12

13. A set of four numbers that begins with the number 32 is arranged from smallest to largest. If the median is 35, which of the following could possibly be the set of numbers?

- A. 32, 32, 36, 38 B. 32, 35, 38, 41 C. 32, 34, 36, 35 D. 32, 36, 40, 44

14. Which measure of center is best for non-numerical data (data with words, such as favorite colors)?

- A. Mean B. Median C. Mode D. All of these

15. What is the mode of the following numbers? 12, 11, 14, 10, 8, 13, 11, 9

- A. 11 B. 10 C. 14 D. 8

16. Calculate the modes, if any, of the following sets of numbers:

A. 3, 13, 6, 8, 10, 5, 6

B. 12, 0, 15, 15, 13, 19, 16, 13, 16, 16