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Mathematics

Quarter 4: Week 4 - Module 4
Measures of Central Tendency

AIRs - LM

Mathematics 7

Quarter 4 - Week 4: Module 4 - **Measures of Central Tendency**

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Target

After learning the uses of appropriate graphs to represent organized data, you will also discover and learn another way of analyzing a data.

This module will provide you information and activities that will help you learn on how to illustrate the measures of central tendency (mean, median, and mode) of a statistical data.

After going through this module, you are expected to:

Learning Competency

illustrate the Measures of Central Tendency (Mean, Median, and Mode) of a statistical data. **(M7SP-IVf-1)**

Subtask

1. compute the mean and median of a given data
2. determine the mode of a given data

Before going on, check how much you know about this topic.

Pre-Assessment

Directions: Choose the letter of the correct answer. Write your answer on a separate sheet of paper.

1. What is the symbol for mean?

A. $\overline{X}$ B. $\tilde{X}$ C. $\hat{X}$ D. X

2. What is the mean of 9, 4, and 5?

A. 5 B. 6 C. 7 D. 8

3. What is the median of 1, 2, and 3?

A. 1 B. 2 C. 3 D. 6

4. What is the mode of 3, 5, 10, 7, 2, 5?

A. 2 B. 5 C. 7 D. 10

5. Which is the closest to what most people would call the “average”?

A. Mean B. Median C. Mode D. Range

6. Which is the number that appears “the most often”?

A. Mean B. Median C. Mode D. Range

7. Can a data set have more than one mode?

A. True B. False C. Maybe D. Never

8. In order to find the median, does the data set must need to be sorted from least to greatest first?

A. True B. False C. Maybe D. Never

9. Which of the following is ***NOT*** a measure of central tendency?

A. Mean B. Median C. Mode D. Variation

10. Can a data set have more than one median?

A. True B. False C. Maybe D. Never

11. To find the mean of a set of numbers, add up all the items and divide by what number?

A. 2 B. The minimum C. The maximum D. The number of items

12. What is the mode of the following data sets: 20, 5, 8, 11, 15, 15, 6, 8, 8?

A. 5 B. 8 C. 11 D. 15

13. What number would you divide by to calculate the mean of 8, 10, 12?

A. 2 B. 3 C. 10 D. 30

14. What measure of central tendency is calculated by adding all the values and dividing the sum by the number of values?

A. Mean B. Median C. Mode D. Typical value

15. What is the mean of the following set of numbers: 26, 33, 46, 47, 58?

A. 32 B. 36 C. 42 D. 46

Illustrating Measures of Central Tendency (Mean, Median, and Mode) of a Statistical Data

In this module, you will illustrate the three measures of central tendency in describing the average: mean, median, and mode. To learn more, there are sets of activities to be performed. If you have questions or queries, you may ask your teacher regarding the module.

Jumpstart

Let's start by doing this activity. Let's have fun and good luck!

In this activity, you will see that the values are made to represent or describe a given set of data. You will learn more about the characteristics of each type of measures of central tendency in the next activities and discussions.

Activity 1. Watch This!

A group of students obtained the following scores in a math summative test:

18, 15, 20, 11, 12, 15, 13, 16, and 15

1. Find the average scores of the students.
2. Arranging the scores of the students in increasing order, what is the middle score?
3. Looking at the scores of the students, which score occurs most frequently?

Did you get the average, middle, and the score that most occur frequently? Then it is easier for you to understand the measures of central tendency.

Discover

In statistics, measures of central tendency are central value or a typical value for probability distribution. It is one of the important parameter in statistics which helps us to find out the average or the center of distribution. The most common measures of central tendency are the mean, median, and mode. Without the help of central tendency, we are unable to find out any results to any data.

Measures of Central Tendency

The **mean** (commonly called the average) is the most commonly used measure of central tendency. It is used to describe a set of data where the measures cluster or concentrate at a point.

The mean of a set of data values is the sum of all of the data values divided by the number of data values. That is:

$$\text{Mean} = \frac{sum\ of\ all\ data\ values}{number\ of\ data\ values}$$

Symbolically,

$$\overline{x} = \frac{\sum x}{n}$$

where $\overline{x}$ (read as 'x bar') is the mean of the set of x values,
$\sum x$ is the sum of all the x values, and
n is the number of x values.

Example:

The grades of 5 Grade Seven students in Mathematics are 88, 82, 87, 91, and 92. What is the mean grade of the 5 students?

Solution:

88 + 82 + 87 + 91 + 92 = ?

88 + 82 + 87 + 91 + 92 = 440 — Add all the grades of the 5 students

$\frac{440}{5} = 88$ — Divide the sum by the number of grades

$\boxed{88} \longrightarrow$ Mean or average grade of the 5 students

The **median** is the middle number when the number in a set of data is arranged in decreasing or increasing order. When there are even numbers of elements, the median is the mean of the two middle numbers.

Example 1:

Rodrigo's scores in 5 performance tests during the first quarter are 18, 20, 16, 15, and 19. Find the median.

Solution:

15, 16, 18, 19, 20 — Arrange the scores in increasing order.

15, 16, 18, 19, 20 — Since the numbers of measures is odd, then the median is the middle value.

$\boxed{18} \longrightarrow$ Median or middle number

Example 2:

A die was tossed 10 times with the following results:

6	5	3	4	6
3	2	1	5	3

Solution:

1, 2, 3, 3, 3, 4, 5, 5, 6, 6 — Arrange the scores in increasing order

1, 2, 3, 3, 3, 4, 5, 5, 6, 6 — Since the numbers of measures is even, then the median is the mean of the two middle numbers

$\frac{3+4}{2} = \frac{7}{2} = 3.5$ — Take the mean of the two middle values

$\boxed{3.5} \longrightarrow$ Median or middle number

The **mode** is the number or value which occurs most often in a set of data. A set of data can have more than one mode. If all the numbers appear the same number times, there is no mode for that data set.

Example 1:

The following is the number of problems that Ms. Me-ann assigned for homework on 10 different days. Find the mode.

10, 12, 8, 14, 11, 15, 14, 6, 9, 13

Solution:

6, 8, 9, 10, 11, 12, 13, 14, 14, 15 — Arrange the data in increasing order.

6, 8, 9, 10, 11, 12, 13, 14, 14, 15 — The numbers which occurs most often in a set of data.

14 → Mode of the given data

Example 2:

The scores of 12 students in a Filipino quiz are as follows:

20, 18, 18, 14, 10, 15, 11, 16, 19, 11, 17, 13

Solution:

10, 11, 11, 13, 14, 15, 16, 17, 18, 18, 19, 20 — Arrange the data in increasing order.

10, 11, 11, 13, 14, 15, 16, 17, 18, 18, 19, 20 — There are two numbers which occurs most often

11 and 18 → Modes of the given data

Example 3:

The typing speeds of 10 secretaries are recorded below (in words per minute).

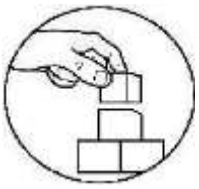
45, 40, 37, 42, 43, 46, 39, 49, 41, 36

Solution:

36, 37, 39, 40, 41, 42, 43, 45, 46, 49 — Arrange the data in increasing order.

36, 37, 39, 40, 41, 42, 43, 45, 46, 49 — The data appears the same number of times

❖ Therefore, there is no mode for this data set.



Explore

Activity 2: How Well Do You Understand?

Directions: Study and answer the questions that follows.

The following is a list of the weekly savings of ten students.

Student	Aizha	Alma	Chard	Deslene	Elma	Lily	Marlon	Rey	Tere	Wem
Weekly Savings	70	60	30	40	40	50	60	30	60	50

1. Give the total savings of the ten students.
2. What is the mean weekly savings of the students?
3. Arranging in ascending order, get the median of their weekly savings.
4. Looking at the savings of the students, what is the mode?
5. Who among the students saved more?

Activity 3: Try This!

Find the mean, median and mode of each of the following sets of data.

1. 23, 32, 36, 24, 18, 33, 37
2. 32, 12, 11, 10, 15, 18, 31, 15
3. 80, 89, 83, 81, 80, 87, 79, 85
4. 10, 12, 9, 13, 10, 7, 8, 13, 17, 11
5. 4, 6, 6, 7, 7, 9, 9, 9, 10, 13, 13, 17, 19

Good job! Let's go deeper by moving on to the next section.

Deepen

Activity 4: Think Deeper!

Directions: Read and analyze the problems then answer what is being asked.

1. Blaise' scores in 10 quizzes during the first quarter are 7, 9, 10, 8, 7, 8, 7, 10, 6, and 8. Find the mean.

2. The mean of 12 scores is 68. If two scores, 70 and 63 are removed, what is the mean of the remaining scores?

3. Me-Ann's scores on the first four examinations were 83, 87, 82, and 85. What score must she receive on the last examination in order to have a mean of 85?

4. Find n so that the mean of the set {6, 8, n, 10, 16} is 13.

5. Change one number in the set {7, 12, 19, 16} so that the median is 12.

Gauge

Post Assessment

Directions: Find out how much have you learned from the lesson. Choose the letter of the correct answer. Write your answer in a sheet of paper.

1. Which is the closest to what most people would call the "average"?

   A. Mean B. Median C. Mode D. Range

2. Which is the number that appears "the most often"?

   A. Mean B. Median C. Mode D. Range

3. What is the mean of 22, 18, and 23?

   A. 15 B. 18 C. 21 D. 23

4. Can a data set have more than one mode?

   A. True B. False C. Maybe D. Never

5. To find the mean of a set of numbers, add up all the items and divide by what number?

   A. 2 B. The minimum C. The maximum D. The number of items

6. What measure of central tendency is calculated by adding all the values and dividing the sum by the number of values?

A. Mean B. Median C. Mode D. Typical value

7. What number would you divide by to calculate the mean of 18, 15, 21, 18?

A. 4 B. 8 C. 12 D. 14

8. Determine the median of the following set of numbers: 26, 33, 58, 47, 46.

A. 33 B. 46 C. 47 D. 58

9. Czarina's scores in 8 quizzes during the first quarter are 8, 6, 10, 9, 6, 8, 7, and 8. Find the mode.

A. 6 B. 7 C. 8 D. 10

10. The mean of 10 scores is 54. If two scores, 70 and 62 are removed, what is the mean of the remaining scores?

A. 49 B. 51 C. 53 D. 55

11. Loida's scores on the first four examinations were 78, 80, 82, and 79. What score must she receive on the last examination in order to have a mean of 80?

A. 78 B. 81 C. 84 D. 87

12. Find n so that the mean of the set {12, 14, n, 10, 16} is 13.

A. 6 B. 8 C. 10 D. 13

13. Change one number in the set {16, 20, 27, 23} so that the median is 20.

A. {20, 20, 27, 23} B. {27, 20, 23, 23}

C. {16, 20, 27, 20} D. {16, 16, 20, 23}

14. Find n so that the mean of the set {16, 18, n, 20, 26} is 21.

A. 20 B. 23 C. 25 D. 28

15. The mean of 20 scores is 140. If two scores, 92 and 98 are removed, what is the mean of the remaining scores?

A. 130 B. 135 C. 140 D. 145

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