

NTI DAY #7
(weather-closed school day)

7th grade
Long
&
Persinger

PACKET
SEVEN
(Math)

General Directions:

Due to weather, Harrison County Schools are closed. In an effort to utilize this day on the school calendar, your child is assigned and should work on this “packet” of school work today. It will count as a grade for this subject. The work attached is specific to the subject listed above. Please contact your child’s teacher of this subject at 234-7123 in the event you/your student have questions on this packet. Staff and teachers reported to HCMS today and are available should you have questions.

While this is DUE no later than the last school day before the 3rd nine-weeks ends, we *strongly encourage* students to turn it in to their teacher as soon as it’s complete (soon after the NTI day) to avoid it being lost, eaten by the family pet, burned to keep warm, etc 😊

Lesson 27: Measures of Central Tendency

The mean, median, and mode are measures of central tendency. A measure of central tendency is a single number used to represent all the values in a data set.

Mean



That MEAN teacher, makes you add them all up and divide!

The mean is the sum of the values in a data set divided by the number of values in the set. It is affected by all the numbers in the set.

Median



That MEDIAN is in the MIDDLE of the road.

The median is the middle number in a data set that has been arranged in order of value. If the number of data values is odd, the median is the middle value. If the number of data values is even, the median is the average of the two middle values.

Mode

MOde and MOst. MO-MO ☺

The mode is the number that appears most often in a data set. A data set may contain one mode, more than one mode (if two or more values appear most often), or no mode at all (if no value appears more than once in the set).

EXAMPLE 1

Find the mean, median, and mode of the following data set.

70, 71, 71, 71, 75, 77, 82, 83, 83, 87

Mean

To find the mean, add the values and divide by the number of addends.

$$\text{mean} = \frac{70 + 71 + 71 + 71 + 75 + 77 + 82 + 83 + 83 + 87}{10} = \frac{770}{10} = 77$$

Median

There is an even number of data values. The two middle values are 75 and 77.

$$\text{median} = \frac{75 + 77}{2} = \frac{152}{2} = 76$$

Mode

The number 71 occurs 3 times.

$$\text{mode} = 71$$

Although the mean is usually the most accurate measure of central tendency for describing a data set, it is sometimes better to use the median or the mode.

EXAMPLE 2

The following table shows the number of tickets sold over one week for a play.

Day	Number of Tickets Sold
Sunday	230
Monday	175
Tuesday	160
Wednesday	180
Thursday	210
Friday	230
Saturday	460

Find the mean number of tickets sold for the week.

$$\text{mean} = \frac{230 + 175 + 160 + 180 + 210 + 230 + 460}{7} = \frac{1645}{7} = 235$$

Find the mode.

Since the number 230 occurs twice, it is the mode.

Find the median.

Arrange the numbers in order from least to greatest.

160, 175, 180, 210, 230, 230, 460

The median, the middle number, is 210.

The mean number of tickets sold, 235, is higher than six of the seven numbers. The mean is not representative of this data set, because its value is influenced by one extremely high value, 460.

The mean is usually the measure of central tendency that best represents a data set. However, if a data set includes an **outlier**, the median or mode will most likely be a better choice. An outlier is a value that is noticeably smaller or larger than the rest of the data values. In this example, the median number of tickets sold, 210, is a more accurate measure of central tendency.

"out lying by itself"

Sometimes two measures of central tendency can represent a data set better than any single measure.

EXAMPLE 3

Emilio manages a restaurant. He is getting ready to order more supplies.

The list below shows the number of customers who visited Emilio's restaurant each day last week.

88, 220, 253, 305, 310, 310, 306

mean: 256 median: 305 mode: 310

Emilio needs to use the best measure of central tendency to predict how many customers will visit the restaurant next week. Which measure of central tendency (mean, median, or mode) is best for him to use?

The mean (256) represents the average number of customers Emilio had each day. If Emilio uses the mean when ordering supplies, he may not order enough. Emilio had at least 256 customers on four of the seven days last week. If Emilio assumes an average of 256 customers each day, he will probably run out of supplies. In this case, the mean has been lowered by an outlier. The number 88 is an outlier, which makes the mean not very accurate in describing this data set.

The median (305) represents the middle value of Emilio's data set and gives a more accurate representation of the number of customers Emilio will have each day.

The mode (310) represents the number of customers that Emilio had "most often" in one day. It also seems to be an accurate representation of the number of customers Emilio will have each day.

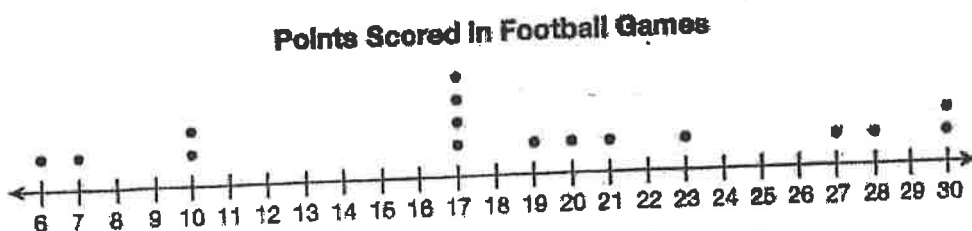
Therefore, either the median or the mode is the best measure for Emilio to use when ordering supplies.

A dot plot is often used to display data. A dot plot uses a number line and dots to indicate data values. The number of dots above each value shows how many times that value occurs in the data set. A dot plot shows the spread of the numbers in a data set. It allows you to quickly identify the mode, any clusters of data values, and any outliers.

EXAMPLE 4

The following list shows the number of points scored by a football team in the 16 games it played this season.
17, 7, 30, 28, 30, 17, 20, 10, 27, 21, 6, 19, 17, 10, 23, 17

The data from the list are displayed in the following dot plot.



The dot plot shows the spread of the data values in an organized way. It also allows you to see the data differently than you would with a list. From the dot plot, you can quickly see that the mode is 17.

You can also see that the data is clustered between 17 and 23.

You can find the median number of points scored by finding the middle dot. Since there is an even number of scores, the two middle scores are 17 and 19. The median is $\frac{17 + 19}{2} = \frac{36}{2} = 18$.

Another common measure of a set of data is its measure of variation. It allows you to see how the values in a set of data are spread out. **Range** is one of these measures. It is the difference between the largest and smallest values in the data set.

➤ **EXAMPLE 5**

The table below shows the high temperatures for the week. Find the range.

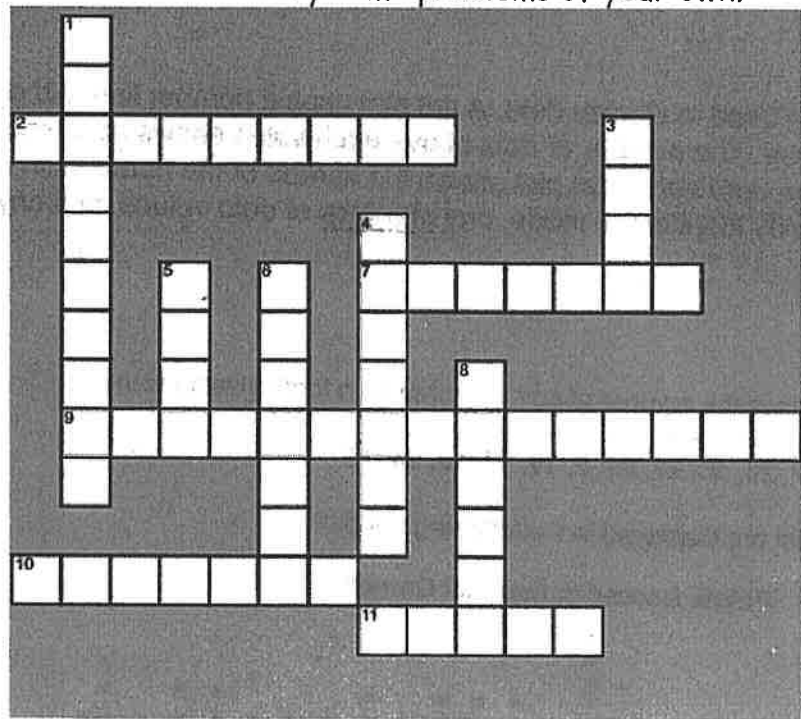
Day	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
High Temps	53°F	56°F	38°F	44°F	49°F	55°F	47°F

Range is the difference between the largest value and the smallest value in the data set.
 $56 - 38 = 18$

This week the temperatures had a range of 18°.

➤ **YOUR TURN**

Now complete the crossword and try some problems of your own.



Across

- 2 A number that describes the spread of a data set. The range in a data set.
- 7 A piece of data that is noticeably smaller or larger than the rest of the data.
- 9 A number that is used to represent all the values in that data set. The mean, median, and mode of a set of numbers.
- 10 A group of numbers bunched close together.
- 11 The difference between the largest value in the data set and the smallest.

Down

- 1 The collecting, organizing, and summarizing of data.
- 3 The number that appears most often in a data set.
- 4 A way to organize a set of data using a number line and dots to indicate data values.
- 5 The sum of the values in a data set divided by the number of values in the set.
- 6 Another term used for the mean.
- 8 The middle number in a set of data that has been arranged in order from least to greatest.

Find the mean, median, mode and range for the following questions. Round your answer to the nearest tenth when necessary.

1. 70, 53, 42, 23, 53, 1, 45, 29, 28, 56

Mean _____ Median _____ Mode _____ Range _____

2. 346, 272, 316, 287, 346, 1081, 401, 316

Mean _____ Median _____ Mode _____ Range _____

3. 35, 104, 57, 92, 29, 46, 57

Mean _____ Median _____ Mode _____ Range _____

4. SHORT ANSWER

a. Identify any outliers for question number 3. Explain how you know.

b. Does the outlier change the mean, median, mode or range? If so, how?

Do not write outside this box.

A large rectangular grid for writing answers, consisting of 20 columns and 20 rows. The grid is empty and occupies the bottom half of the page.

5. The following list shows the scores that Alicia received on her math test.

94 86 92 100 66 99 91 99 83

Find the mean, median, and mode for this set of data.

Which measure of central tendency would be appropriate to describe her test scores? Explain your answer.

6. The teacher decides not to count the lowest test score. Find the mean, median, and mode using the remaining 8 scores.

Which measure of central tendency is affected by a very low score? Explain your answer.

MULTIPLE CHOICE

7. At the vet's office where Terry works, she was asked to find the median and mode weights of a litter of puppies. The following list shows the weights of the puppies, in ounces.

18, 24, 20, 16, 14, 27, 24

What are the median and mode weights?

- A. Both measures are 24.
- B. The median is 20 and the mode is 24.
- C. Both measures are 20.
- D. The median is 24 and the mode is 20.

EXTENDED RESPONSE

The table shows the number of points each player scored in 7 basketball games. Use the table to answer the questions.

	Game 1	Game 2	Game 3	Game 4	Game 5	Game 6	Game 7
Bryce	7	10	5	7	12	8	7
Hannah	11	13	12	16	7	15	10

10. a. Calculate the mean, median, and mode for EACH player.
- b. Identify which measure of central tendency would be appropriate to describe EACH player. Explain your answers.

Do not write outside this box.

A large grid for writing answers, consisting of 20 columns and 25 rows of small squares. The grid is intended for students to show their work for calculating the mean, median, and mode for each player, and to identify the appropriate measure of central tendency and explain their answers.