Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Class\_\_\_\_\_\_\_\_\_\_\_

**Guided Notes – SP.4**

The \_\_\_\_\_\_\_\_\_\_ , \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_ of a data set are used to measure where the center of a set of data lies. Other measures indicate how spread out, or how \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, data are. These measures include \_\_\_\_\_\_\_\_\_\_\_, the interquartile range (\_\_\_\_\_\_), and the mean absolute deviation (\_\_\_\_\_\_).

**Measures of Center**

\_\_\_\_\_\_\_\_\_\_\_ is the average or sum of all data points divided by the number of points.

 Example: Look at the data set: 3, 7, 4, 9, 6

1. Find the sum of all the numbers \_\_\_\_\_\_\_\_\_\_\_\_\_
2. Count how many data points are in the set \_\_\_\_\_\_\_\_\_\_\_\_
3. Divide the sum by the number of data points \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the middle value when the data points are in increasing order. This is also known as the

2nd quartile (Q2).

 Example 1: Look at the data set: 3, 7, 4, 9, 6

1. Put the data in order from least to greatest \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Find the middle number \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Example 2: Look at the data set: 3, 7, 9, 6

1. Put the data in order from least to greatest \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. If there is no middle number, find the 2 middle numbers \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Add the numbers together and divide by 2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the most often occurring number(s), if all the numbers are listed the same amount of times, there is no \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Measures of Variability**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of a set of data is the difference between the largest and the smallest number.

 Example: Look at the data set: 3, 7, 4, 9, 6, 2, 5

1. Put the data in order from least to greatest \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Subtract the smallest number from the largest \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the middle of the lower half of the data set.

 Example: Look at the data set: 3, 7, 4, 9, 6, 2, 5

1. Put the data in order from least to greatest \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Circle the median
3. Find the median of the lower half of the data and circle \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the middle of the upper half of the data set.

Example: Look at the data set: 3, 7, 4, 9, 6, 2, 5

1. Put the data in order from least to greatest \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Circle the median
3. Find the median of the upper half of the data and circle \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the value of the 1st quartile (Q1) subtracted from the value of the 3rd quartile (Q3) in a data set.

 Example: Look at the data set: 3, 9, 2, 6, 4, 7, 3, 8

1. Put the data in order from least to greatest \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Find the median (Q2) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Find the 1st quartile (Q1) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Find the 3rd quartile (Q3) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. Subtract the 1st quartile from the 3rd quartile \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the average of how much the data points in a set deviate or vary from the mean. Since distance is always positive, you must take the absolute value of each deviation.

 Example: Look at the data set: 3, 9, 2, 6, 4, 7, 3, 8

1. Put the data in order from least to greatest \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Find the mean \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Find the absolute deviation of each data point from the mean. Use the table below to organize your work.

|  |  |  |
| --- | --- | --- |
| **Data Point** | **Deviation from Mean** | **Absolute Deviation from Mean** |
| **2** |  |  |
| **3** |  |  |
| **3** |  |  |
| **4** |  |  |
| **6** |  |  |
| **7** |  |  |
| **8** |  |  |
| **9** |  |  |

1. Calculate the mean of the absolute deviations \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. The mean absolute deviation (MAD) is \_\_\_\_\_\_\_\_\_\_\_\_

Using the data set below, find the mean, median, mode, range, 1st quartile, 3rd quartile, interquartile range, and mean absolute deviation.

 3, 5, 7, 7, 8, 12, 13, 14, 18, 18, 21

Mean \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Median \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Mode \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Range \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Q1 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Q3 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

IQR \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ MAD \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Name\_\_\_Answer Key\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Class\_\_\_\_\_\_\_\_\_\_\_

**Guided Notes – SP.4**

The \_mean\_ , \_\_median\_\_\_ and \_mode\_\_ of a data set are used to measure where the center of a set of data lies. Other measures indicate how spread out, or how \_\_variable\_\_, data are. These measures include \_range\_\_\_, the interquartile range (\_IQR\_), and the mean absolute deviation (\_MAD\_\_).

**Measures of Center**

\_\_mean\_\_ is the average or sum of all data points divided by the number of points.

 Example: Look at the data set: 3, 7, 4, 9, 6

1. Find the sum of all the numbers \_3 + 7 + 4 + 9 + 6 = 29\_\_
2. Count how many data points are in the set \_there are 5 numbers\_\_\_\_
3. Divide the sum by the number of data points \_\_\_\_29 / 5 = 5.8\_is the mean\_\_\_\_\_\_

\_\_median\_\_\_\_ is the middle value when the data points are in increasing order. This is also known as the

2nd quartile (Q2).

 Example 1: Look at the data set: 3, 7, 4, 9, 6

1. Put the data in order from least to greatest \_\_\_3, 4, 6, 7, 9\_\_\_\_\_
2. Find the middle number \_\_\_6 is in the middle so this is the median\_\_\_\_\_\_\_

Example 2: Look at the data set: 3, 7, 9, 6

1. Put the data in order from least to greatest \_\_\_3, 6, 7, 9\_\_\_\_\_\_\_\_\_\_
2. If there is no middle number, find the 2 middle numbers \_\_\_6 and 7\_\_\_\_\_
3. Add the numbers together and divide by 2 \_\_\_6 + 7 = 13 / 2 = 6.5 is the median\_

\_\_mode\_\_\_ is the most often occurring number(s), if all the numbers are listed the same amount of times, there is no \_\_mode\_\_\_\_.

**Measures of Variability**

\_\_\_range\_\_\_\_\_ of a set of data is the difference between the largest and the smallest number.

 Example: Look at the data set: 3, 7, 4, 9, 6, 2, 5

1. Put the data in order from least to greatest \_\_2, 3, 4, 5, 6, 7, 9\_\_
2. Subtract the smallest number from the largest \_\_\_\_9 – 2 = 7 is the range\_\_\_\_\_\_

\_\_\_First quartile (Q1)\_\_\_\_\_\_\_ is the middle of the lower half of the data set.

 Example: Look at the data set: 3, 7, 4, 9, 6, 2, 5

1. Put the data in order from least to greatest \_\_2, 3, 4, 5, 6, 7, 9\_\_\_\_
2. Circle the median
3. Find the median of the lower half of the data and circle \_\_2, 3, 4\_ - 3 is Q1

\_\_\_Third quartile (Q3)\_\_\_\_\_ is the middle of the upper half of the data set.

Example: Look at the data set: 3, 7, 4, 9, 6, 2, 5

1. Put the data in order from least to greatest \_\_2, 3, 4, 5, 6, 7, 9\_\_\_\_\_\_\_\_
2. Circle the median
3. Find the median of the upper half of the data and circle \_6, 7, 9 - 7 is Q3\_\_\_\_\_

\_\_Interquartile range (IQR)\_\_\_\_ is the value of the 1st quartile (Q1) subtracted from the value of the 3rd quartile (Q3) in a data set.

 Example: Look at the data set: 3, 9, 2, 6, 4, 7, 3, 8

1. Put the data in order from least to greatest \_\_2, 3, 3, 4, 6, 7, 8, 9\_\_\_
2. Find the median (Q2) \_two middle numbers are 4 and 6 so 4 + 6 = 10 / 2 = 5\_\_
3. Find the 1st quartile (Q1) two middle numbers are 3 & 3 so 3 + 3 = 6 / 2 = 3\_\_
4. Find the 3rd quartile (Q3) two middle numbers are 7 & 8 so 7 + 8 = 15 / 2 = 7.5\_\_
5. Subtract the 1st quartile from the 3rd quartile 7.5 – 3 = 4.5 is IQR\_\_\_

\_\_\_\_\_\_Mean Absolute Deviation (MAD)\_\_\_\_\_\_\_ is the average of how much the data points in a set deviate or vary from the mean. Since distance is always positive, you must take the absolute value of each deviation.

 Example: Look at the data set: 3, 9, 2, 6, 4, 7, 3, 8

1. Put the data in order from least to greatest \_\_\_2, 3, 3, 4, 6, 7, 8, 9\_\_\_\_
2. Find the mean \_\_\_2 + 3 + 3 + 4 + 6 + 7 + 8 + 9 = 42 / 8 = 5.25 is the mean\_\_\_\_\_
3. Find the absolute deviation of each data point from the mean. Use the table below to organize your work.

|  |  |  |
| --- | --- | --- |
| **Data Point** | **Deviation from Mean** | **Absolute Deviation from Mean** |
| **2** | **2 – 5.25 = -3.25** | **|-3.25| = 3.25** |
| **3** | **3 – 5.25 = -2.25** | **|-2.25| = 2.25** |
| **3** | **3 – 5.25 = -2.25** | **|-2.25| = 2.25** |
| **4** | **4 – 5.25 = -1.25** | **|-1.25| = 1.25** |
| **6** | **6 – 5.25 = .75** | **|.75| = .75** |
| **7** | **7 – 5.25 = 1.75** | **|1.75| = 1.75** |
| **8** | **8 – 5.25 = 2.75** | **|2.75| = 2.75** |
| **9** | **9 – 5.25 = 3.75** | **|3.75| = 3.75** |

1. Calculate the mean of the absolute deviations 3.25 + 2.25 + 2.25 + 1.25 + .75 +

1.75 + 2.75 + 3.75 = 18 / 8 = 2.25 \_\_

1. The mean absolute deviation (MAD) is \_2.25\_\_\_

Using the data set below, find the mean, median, mode, range, 1st quartile, 3rd quartile, interquartile range, and mean absolute deviation.

 3, 5, 7, 7, 8, 12, 13, 14, 18, 18, 21

Mean \_\_126 / 11 = 11.45\_\_\_\_\_ Median \_\_\_12\_\_\_\_\_\_\_\_\_

Mode \_\_\_\_7 and 18\_\_\_\_\_\_\_ Range \_\_\_21 – 3 = 18\_\_\_\_\_\_

Q1 \_\_\_\_\_\_\_\_7\_\_\_\_\_\_\_\_\_\_\_\_ Q3 \_\_\_\_\_\_\_\_\_\_18\_\_\_\_\_\_\_\_\_\_\_\_\_

IQR \_\_\_18 – 7 = 11\_\_\_\_\_\_\_\_\_\_ MAD \_\_\_4.96\_\_\_\_\_\_\_\_\_\_\_\_