Standard Deviation Notes: A Way to Measure Variability

Create a dot plot for the following data sets on the respective number lines (using the same scale.) Indicate where the mean ( $\overbar{x}$ ) is in each case. In your groups, decide which set has more variability away from the mean? \_\_\_\_\_
Which set has the least? \_\_\_\_\_ Do any of the sets have the same variability? \_\_\_\_\_

Set A = {4,4,6,6,6,8,8,}

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2 4 6 8 10 12 14 16 18 20 22

Set B = {4,4,6,8,8,8}

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2 4 6 8 10 12 14 16 18 20 22

Set C = {4,4,6,6,6,8,22}

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2 4 6 8 10 12 14 16 18 20 22

Set D = {14,14,16,16,16,18,18}

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2 4 6 8 10 12 14 16 18 20 22

Another way to think about variability is with standard deviation and variance. [Click here](http://www.mathsisfun.com/data/standard-deviation.html) for more information about standard deviation. A good way to think about standard deviation is “the average distance each data point is from the mean.” Now find the standard deviation of each set following the directions below.

Set A

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | DataX | Mean | Deviation From the Mean(x – ) | Deviation From the Mean Squared(x – )2 |
| 1 |  |  |  |  |
| 2 |  |  |  |  |
| 3 |  |  |  |  |
| 4 |  |  |  |  |
| 5 |  |  |  |  |
| 6 |  |  |  |  |
| 7 |  |  |  |  |
|   =  |

\_\_\_ ==

\_\_\_2 is called the variance

Set B

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | DataX | Mean | Deviation From the Mean(x – ) | Deviation From the Mean Squared(x – )2 |
| 1 |  |  |  |  |
| 2 |  |  |  |  |
| 3 |  |  |  |  |
| 4 |  |  |  |  |
| 5 |  |  |  |  |
| 6 |  |  |  |  |
|   =  |

=

Set C

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | DataX | Mean | Deviation From the Mean(x – ) | Deviation From the Mean Squared(x – )2 |
| 1 |  |  |  |  |
| 2 |  |  |  |  |
| 3 |  |  |  |  |
| 4 |  |  |  |  |
| 5 |  |  |  |  |
| 6 |  |  |  |  |
| 7 |  |  |  |  |
|   =  |

 =

Set D

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | DataX | Mean | Deviation From the Mean(x – ) | Deviation From the Mean Squared(x – )2 |
| 1 |  |  |  |  |
| 2 |  |  |  |  |
| 3 |  |  |  |  |
| 4 |  |  |  |  |
| 5 |  |  |  |  |
| 6 |  |  |  |  |
| 7 |  |  |  |  |
|   =  |

 =

Now look back at the questions that you answered with the dot plots. Do the standard deviations that you found for the four data sets agree with the answers you originally gave? Why or why not?