Name: _____ Date: _____ **Unit 2 Class Work**

Introduction to Sample Means, Standard Deviation, and Z-Scores Class Work

Objective: You will be able to explain the relationships between sample means, standard deviation, and z-scores. You will also be able to estimate and interpret z-scores given a data collection.

☆ Quantities Used to Evaluate Data

★ ***Mean*** (_____):

ex. The heights of three sunflower plants in a field are: 3.7 ft, 4.8 ft, & 5.0 ft. Calculate the mean of these sunflower heights.

★ ***Standard Deviation*** (_____ or _____):

99.7% of data *typically* falls within 3 standard deviations of the mean. If the mean height of a group of people is 70 inches, with a standard deviation of 2.5, between which two heights would you expect most of the people to fall?

*We will learn how to calculate standard deviation tomorrow!

★ ***Z-Score*** (_____):

★ **Z-Score Formula**:

Guided Example:

1. The mean amount of data usage on a family cell phone plan is 3GB, with a standard deviation of .5 GB. Sasha's family used 2.8 GB worth of data this month, and Karmine's family used 4.5 GB worth of data this month. Determine the z-score for each family's data usage. What can you conclude? Sketch a representation of the data distribution.

✎ ***Now You Try Some:***

2. At a certain gas station, the mean amount spent per visit when a customer fills up his/her tank using regular gasoline is $44.50, with a standard deviation of $5.50. Mary spends $42.20 when filling up her tank, Eddie spends $48.00, and Olivia spends $45.40. Determine the z-score for each person's cost of a regular gasoline fill up. What can you conclude? Sketch a representation of the data distribution.

3. Circle the correct option to complete each blank:

In general, if $z = 0$, the value at hand is less than / greater than / equal to the mean.
In general, if $z > 0$, the value at hand is less than / greater than / equal to the mean.
In general, if $z < 0$, the value at hand is less than / greater than / equal to the mean.

4. a. The mean speed on a given street is 35 mph (the speed limit), with a standard deviation of 2 mph. A police officer is told to pull over any cars traveling outside of two standard deviations of the mean. A red Toyota was traveling 39 mph, a blue Honda was traveling 43 mph, a silver Acura was traveling 37 mph, and a black Impala was driving 30 mph. Which cars should the police officer have pulled over? Support your answer.

b. Determine the z-score for each car in part a, if you have not already.

5. Consider the batting average for two baseball players, Derek and Matt. Derek's standard deviation is .8, and Matt's standard deviation is 1.4. Based solely on this data, who would you expect to be more likely to make it on base (by hitting the ball, not by walk or error), at his next at bat? Support your reasoning.

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Closure for First Day (half of period):

With a partner, discuss the steps involved in the example, as well as the importance of each step.

OR

Which set of data would you consider to be more dispersed? Explain why.

<u>Set A</u>: Mean speed of 25 mph, with standard deviation of 2.5 mph.

<u>Set B</u>: Mean speed of 50 mph, with standard deviation of 5 mph.

Assume a normal distribution, and support your answer with mathematical calculations if you have not already.