**Introduction to Numerical Summaries**

In this activity you will discuss the numerical summaries that you read about in more detail.

**Discuss the Following Questions**

1. In your own words, describe the difference between a mean and median.
2. What would be one reason why you would want to look at a median instead of a mean?
3. Read the article about the Hamptons Average Home Price. Provide a critique of the article. Make sure that your critique includes both positive and negative comments. Include a discussion of the mean and median in your critique.

*Hamptons Average Home Price Jumps as $5 Million Market Rebounds. Developed*[[1]](#footnote-1)

<http://www.businessweek.com/lifestyle/content/jan2011/bw20110127_099875.htm>

**Calculating a Measure for Variability**

Suppose you wanted to describe the amount of variability in a dataset. You decide that you don’t want to look at the range because it only uses the minimum and maximum values in the data. You want a measure of variability that looks at *all* observations in a dataset. Maybe you are interested in seeing how far on average the observations are from the mean of the distribution.

For sake of example, suppose you have the below dataset.

2 5 7 10

1. Calculate the mean of the dataset.
2. If you want to see how far the observations are on average from the mean, you would start by subtracting the mean from each observation. These are called *deviations*. Use the below table to show your work.

|  |  |
| --- | --- |
| **Observation** | **Observation – Mean = Deviation** |
| 2 |  |
| 5 |  |
| 7 |  |
| 10 |  |

1. Calculate how far on average the observations are from the mean.
2. What happened? Why is your average 0?
3. Write down one way that could be used to change a negative number to a positive number.

Your instructor will talk with the class about what you have done so far and step you through the next questions.

1. Calculate the squared deviations. Use the below table to show your work.

|  |  |  |
| --- | --- | --- |
| **Observation** | **Deviation** | **Squared Deviation** |
| 2 |  |  |
| 5 |  |  |
| 7 |  |  |
| 10 |  |  |

1. Calculate the average of the squared deviations (this is called the *variance*). When you calculate the average, divide by *n – 1* instead of just *n*. This is a needed adjustment that will be discussed after the activity.
2. What do you do to “un-square” a number? Do this calculation on the value that was calculated in the previous question.
3. Describe in words what the value in the previous question represents. In other words, interpret the value.
4. Based on your assigned reading, what is the name of the value you computed in question 11?

**Interpreting the Standard Deviation**

Suppose that you are interested in the lengths of words in all of Shakespeare’s works.

1. If you took a sample of data, what do you think would be the shape of the distribution?
2. The standard deviation for a particular sample of words is 3.5. Your book talks about using the 95% Rule to help interpret the standard deviation. Why would it not be appropriate to use this rule to interpret the standard deviation?
3. The following is a list of different interpretations of the standard deviation. Some of them are correct and some are incorrect. Identify which ones have correct interpretations.
   1. The typical length of words in Shakespeare’s works is 3.5 letters away from the mean.
   2. The average distance from the length of words in Shakespeare’s works to the average length is 3.5.
   3. The average distance from the typical length of words in Shakespeare’s works to the average length is 3.5.
   4. The difference in the length of words in Shakespeare’s works from the average length of words is typically 3.5 letters away.

1. Carmiel, O. (2011). Hamptons average home price jumps as $5 million market rebounds. *Bloomberg Businessweek*. Retrieved from <http://www.businessweek.com/lifestyle/content/jan2011/bw20110127_099875.htm> [↑](#footnote-ref-1)