Spread Out

An Exploration of Variance with the TI-89

Teacher Notes

An activity in support of the NCTM Data Analysis and Probability Standard: To select and use appropriate statistical methods to analyze data, with expectation: for univariate measurement data...select and calculate summary statistics.

Statistics Scope and Sequence Topic: Univariate Data, Measures of Spread.

This exploration uses baseball's slugging average, to explore variance and standard deviation. Students compute the mean of the slugging averages. Note that this is different than the slugging average for the entire league because the teams do not have an equal number of at-bats.

Solutions:

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An Exploration of Variance

In a previous exploration, we examined the statistic slugging average, used in the game of baseball. To review, slugging average is defined as the number of total bases divided by the number of at-bats. If a player reaches first base safely, a single, the player would be credited with one base. A two base hit, a double is worth two total bases, a triple is worth three and a home run is worth four. An at-bat is each attempt for a hit.

The following table shows the slugging average for each of 16 teams.

Bears	Bulls	Cougars	Dolphins	Eagles	Hawks
.412	.442	.430	.419	.483	.423
Hornets	Lions	Manatees	Monkeys	Panthers	Ravens
.451	.425	.426	.396	.387	.414
Rhinos	Sharks	Tigers	Vultures		
.393	.399	.460	.441		

Type the 16 values in list1. Compute the mean, using the mean command. Record the value of the mean: _____

We are interested in knowing the *spread* of this data, that is how the values vary from the mean. To get the deviations from the mean, define list2=list1-mean(list1):

Now compute the sum of list2. What do you discover?

This discovery suggests we need to measure the spread a bit differently. One way is to square the deviations. Define list3=list2^2.

Now compute the sum of list3 and record the sum:

Divide the sum by 15, one less than the number of data values. This value is called the *variance* of the data. Record the variance:

The *standard deviation* of a data set is the square root of the variance. Compute and record the standard deviation:

Now let's check our work by using built in command. To compute the variance of list1, use [2nd] [MATH] [6] [5] to get the variance command.

Type the list name list1 in the parentheses and [ENTER].
 Record the value of the variance.

To compute the standard deviation of list1, use [2nd] [MATH] [6] [6] to get the stdDev command.

Type the list name list1 in the parentheses and [ENTER]. Record the value of the standard deviation.