Batters Box

An Exploration of Boxplots 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, understand...boxplots...and use them to display data.

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

This exploration uses baseball's slugging average, to explore quartiles and boxplots. Students compute the median and quartiles of the slugging averages, and sketch a boxplot. Outliers are described.

Solutions:

Median: .421

Q1: .4055

Q3: .4415

Batters Box

An Exploration of Boxplots

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.

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		

We typed the 16 values in list1.

We are interested in additional measures of *spread* of this data.

Sort the data from low to high. Press 2nd [MATH] 3 4. Type the list name list1 or paste from VARLINK, and ENTER.

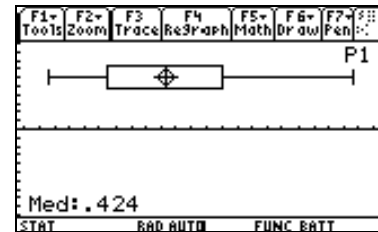The list is sorted from high to low. Scroll down the list. Compute and record the median.

There are eight values below the median and eight above the median. Scroll and record the first and third quartiles.

Use the min, max, quartiles, and median to sketch a boxplot with an accurate scale.

Define Plot 1 to create a boxplot and compare.

Press $\boxed{\text{F3}}$ to Trace and check the five number summary.

Usually to complete a sketch of a boxplot, we check for *outliers*, unusually high or low values. To determine outliers we first need to determine the inter-quartile range (IQR) by subtracting the first quartile from the third quartile. The usual description of an outlier is any point:

$< Q_1$ - 1.5*IQR   or $> Q_3$ + 1.5*IQR

To investigate this possibility, enter the value .52 as a 17th value in the list. Compute the five number summary and the IQR. Check for outliers and sketch the new boxplot. Compare with the calculator graph.