

TI-Nspire Activity: Box Plot Comparison

By: Edward C. Nolan

Activity Overview

In this activity, students will create dot plots and box-and-whisker plots of the temperatures of three different cities along the United States' East Coast: Caribou, Maine, Washington, DC, and Tampa, Florida. Students will make dot plots for each city and compare the representations to one another. Then, students will make box-and-whisker plots of different cities and make comparisons based on the real world nature of the data.

Concepts

- Dot plots
- Box-and-whisker plots
- Analyzing box-and-whisker plots

Teacher Preparation

- This activity is designed for students who have some experience with both dot and box-and-whisker plots.
- Discussion prior to the activity should include how to analyze box-and-whisker plots using the five key points (extremes, quartiles, median) as well as the importance of using the quartiles as markers for 25% of the data. The spread of data as represented by box-and-whisker plots should be included.
- Showing students where the three cities (Caribou, Maine, Washington, D.C., and Tampa, Florida) are on a map will be helpful.

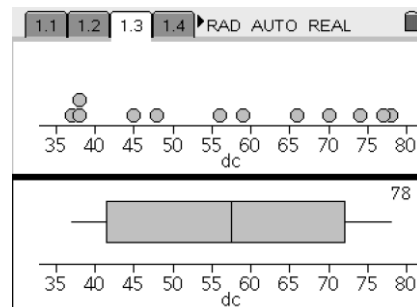
The Classroom.

- This activity is designed to be used independently by students as the teacher circulates around the room monitoring progress and answering questions.

The Lesson: Comparing Dot Plots and Box-and-Whisker Plots

Students begin the activity by creating and comparing a dot plot and box-and-whisker for the mean monthly temperatures for Washington, D.C. Students are guided to create the plots on the page which is set up for their use.

The student page should look similar to the page at the right, with the dot plot on the top of the split screen and the box-and-whisker plot on the bottom.



What comparisons can you make between the dot plot and the box plot?

Students should note the same range for the two plots and the median is the same. The dot plot preserves the values of each of the data elements, as where the box-and-whisker plot shows only a summary of the data shown in quartiles.

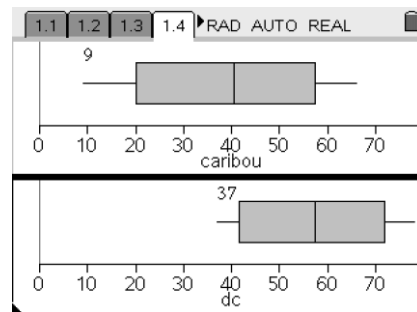
How many dots are in each quartile of the box-and-whisker plot? What does this tell you?

There are three dots for each of the quartiles, meaning that with 12 data elements, there should be 3 elements in each quartile, or 25% of the data.

What can you state about the spread of the data based on the box-and-whisker plot?

Again, the spread of the data for the two plots is identical.

Next, students compare two different box-and-whisker plots, one for the mean monthly temperatures for Caribou, Maine and the other for Washington, D.C. The page should look similar to the page at the right (the scale may vary).



Is it fair to compare the mean monthly temperatures for the two cities? Why or why not?

No, because they initially have different scales. Because they have different scales, it is difficult to interpret and compare the values.

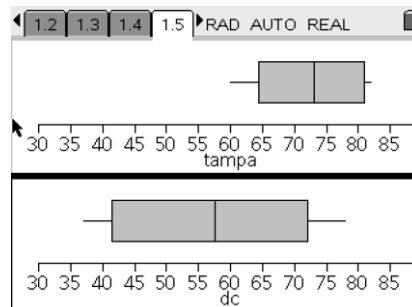
Compare the box-and-whisker plots for Caribou, Maine and Washington, D.C. What observations can you make?

The box-and-whisker plot for Caribou, ME shows that the temperatures overall are colder than they are in Washington, D.C. In fact, the median of the temperatures in Caribou are comparable to the median of Washington, D.C., meaning that about half of the monthly temperatures in Caribou are colder than any month in Washington, D.C.

What do these observations imply about the climate differences between the two cities?

From this information, we would state that the climate in Caribou is colder than in Washington, D.C. and that there would be more snow in Maine than in D.C.

Students are next asked to compare the mean monthly temperatures for Tampa, Florida and Washington, D.C. The page to the right should be similar to the student's result.



Compare the box-and-whisker plots for Tampa, Florida and Washington, D.C. What observations can you make?

The mean monthly temperatures in Tampa, Florida are higher than in Washington, D.C. The lower extreme for Tampa is higher than the median in Washington, meaning that half of the months in Washington are colder than any month in Tampa.

What do these observations imply about the climate differences between the two cities?

Here, one would assume that the climate in Tampa, Florida is warmer than in Washington, D.C., with longer periods of warm weather.

Analysis/Extension

What have you learned about comparing box-and-whisker plots?

Students can talk about the importance of comparing the five important points of box-and-whisker plots and maintaining a constant scale between box-and-whisker plots that are being compared.

Pages of the Activity

1.1 1.2 1.3 1.4 ▸ RAD AUTO REAL

Comparing
 Box-and-Whisker
 Plots

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1.1 1.2 1.3 1.4 ▸ RAD AUTO REAL

Use the split Data and Statistics page 1.3 to create a dot plot and a box-and-whisker plot for the mean monthly temperatures for Washington, D.C. using the directions on the worksheet. The data for these plots is at the end of the file.

1.1 1.2 1.3 1.4 ▸ RAD AUTO REAL

lick to add variable

Caption: dc

Click to add variable

lick to add variable

Caption: dc

Click to add variable

1.1 1.2 1.3 1.4 ▸ RAD AUTO REAL

lick to add variable

Caption: caribou

Click to add variable

lick to add variable

Caption: dc

Click to add variable

1.2 1.3 1.4 1.5 ▸ RAD AUTO REAL

lick to add variable

Caption: tampa

Click to add variable

lick to add variable

Caption: dc

Click to add variable

1.3 1.4 1.5 1.6 ▸ RAD AUTO REAL

	A month	B dc	C tampa	D ca
1	january	37	60	
2	february	38	62	
3	march	45	67	
4	april	56	71	
5	may	66	77	
A1	january			