Algebra Activity 2:
What is Happening to the Population?

Judy Johnson

CALCULATORS: Casio: *fx-9750G Plus* • Casio: *CFX-9850G Series*

Teaching Notes/Lesson Plan Level: Algebra 1

Objective

To familiarize students with the available data manipulations that can be performed using either Casio calculator. The operations in this lesson are entering, transferring, graphing, and exploring data lists. After graphing lists, students will be able to find the line of best fit and discuss the results.

Engage

Discuss with students where information on populations can be collected. Discuss with the students different events that have an impact on population. Have students make a list of these events.

Explore

1. Using the data provided on the included data sheet, have students enter the numbers 1 through 10 into List 1 in the Statistics Menu and the population data into List 2.
2. The student should graph the scatter plot to represent the data.
3. The student should find the line of best fit and copy this into the Graph and Table menu.
4. The student should set the range of the x-values to go from 10 to 20.
5. The student should complete the worksheet using the given information.

Explain

Students should explain the various changes using the list of reasons previously discussed. The discussion should include an explanation of the slope and how it relates the population to time.

Elaborate

Students can compare the results of the activity to results of using the extension data and explain the differences.

Evaluate

Give students alternate lists of data to manipulate as instructed. Students should write an explanation for their data observations.

Name _____ **Date** _____

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Student Worksheet Activity 2

Objectives

The student will be able to:

1. Enter data into a List of the Statistics Function of the graphing calculator,
2. Graph the data using a scatter plot,
3. Find the Line of Best fit for the data, and
4. Copy the Line of Best fit into the Table Function and make predictions.

Data

	Population of US Citizens Aged 65 and Over									
Year	**1910**	**1920**	**1930**	**1940**	**1950**	**1960**	**1970**	**1980**	**1990**	**2000**
Percent	4.3	4.7	5.4	6.8	8.1	**9.2**	9.8	11.3	12.5	12.4

	Population of US Citizens Aged 20 to 44									
Year	**1910**	**1920**	**1930**	**1940**	**1950**	**1960**	**1970**	**1980**	**1990**	**2000**
Percent	30.0	38.4	38.3	38.9	37.6	**32.2**	31.7	31.7	40.1	37.0

Procedure

1. Turn on the calculator, highlight the **Statistics Menu**, and press **EXE**.
2. Enter the numbers 1 through 10 to represent the years 1910 to 2000 into List 1 by pressing **EXE** after each number.
3. Press the **Right Arrow** key to go to List 2 and enter the percent as written into List 2 pressing **EXE** after each data item.
4. Press **F1** and **F6** to set up the calculator to graph the scatter plot. Highlight **Graph Type** and press **F1** to select the scatter plot. Press the **Down Arrow** key and press **F1** to select List 1 for XList. Press the **Down Arrow** key again and press **F2** to select List 2 for YList. Press **EXE**.
5. Press **F1** to see the graph.
6. Press **F1** to get the equation for the Line of Best Fit. Press **F5** and **EXE** to copy this equation into the Table Function.
7. Press the grey **MENU** key and the **Down Arrow** key to get to the Table Function. Press **EXE**.
8. Press **F5** to set up the range. Enter **11**, press **EXE**, enter **20**, and press **EXE** twice.
9. Press **F6** to see the table.
10. Use the **Up** and **Down Arrow** keys to move through the table.
11. Press the grey **Menu** key and **Up Arrow** to return to the Statistics Menu. Press **EXE**.
12. Press **F2** to calculate the measures of central tendency.
13. Press **F6** and **F2** to set up List 2 as the set of data for calculating the statistics.
14. Press **F1** to see the calculations.

Name _____ **Date** _____

Student Worksheet Activity 2

Problems

1. Has the percent of U.S. citizens aged 65 and over been a linear relationship from 1910 until 2000? _____

2. What is the equation for the Line of Best Fit for this age group?

_____

What was the average change (slope) for this age group?

_____

3. What is the average percent of U.S. citizens in the 65 and over age group?

_____

What was the range of increase from 1910 until 2000?

_____

4. List two reasons that you feel might explain this increase.

a. _____

_____

b. _____

_____

5. If this pattern continues, what percent of the population will be in the 65 and over age group in 2002? _____ In 2004?_____

6. Replace the data in List 2 with the percent of population for the 20 - 44 age group and draw the scatter plot. What do you notice different about the scatter plot?

_____

7. Find the linear Line of Best Fit for the data.

What is its equation?_____ Draw the line.

What do you notice about the line?

_____

What is the r value? _____

What does this tell you about the equation?

_____

8. Press Exit and F1. Now press F3 for a cubic equation. Draw the line.

Does this curve seem to better fit the data? Why?

_____

_____

_____

9. List two reasons you feel might explain the difference in the graphs.

a. _____

_____

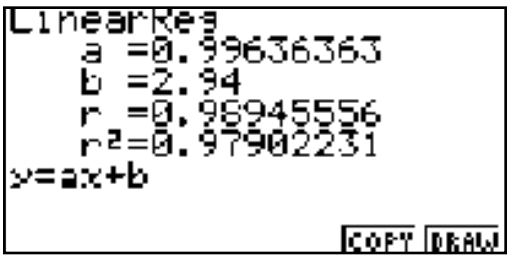
b. _____

_____

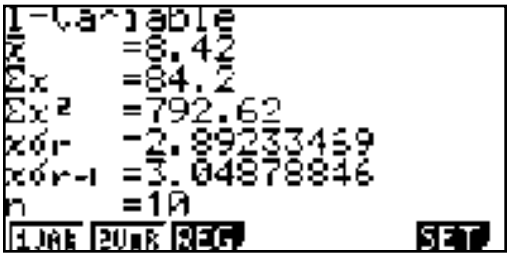
Solutions to Activity 2: What is Happening to the Population?

1. Yes

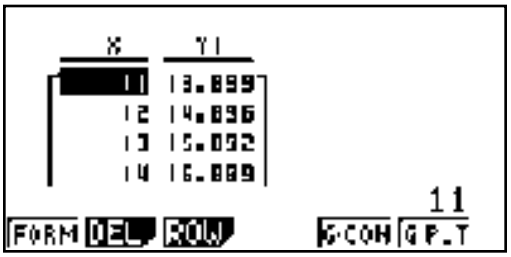
2. $y = 1.01x + 2.88$; 2.88



3. 8.45; 12.5 - 4.3 = 8.2

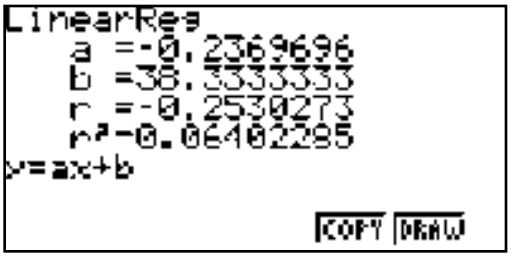


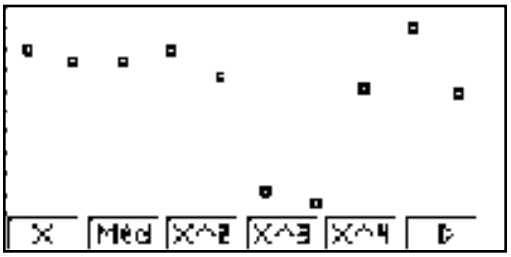
4. Answers will vary.



5. 15.0; 17.1

6. Answers will vary. Should have something such as the graph is no longer linear.





7. $y = -0.23x + 38.33$; Answers will vary.; $r = -.025$; The equation is not a good fit for the data.

8. Answers will vary.

9. Answers will vary.