

Activity 3

Measures of Central Tendency

Topic Area: Data Analysis and Probability

NCTM Standard: Select and use appropriate statistical methods to analyze data.

Objective: The student will be able to utilize the Casio fx-9860G Plus calculator to determine the measures of central tendency and to construct a stem-and-leaf plot for the data in the various activities included in this unit.

Introduction: This activity is designed to demonstrate the procedure to enter data into the Casio fx-9860G Plus graphing calculator in order to determine the measures of central tendency that students will need to evaluate a given set of data.

The students should be familiar with the following vocabulary.

Arithmetic mean

Array

Bimodal

Measures of central tendency

Median

Mode

Stem-and-leaf plot

Calculator Notes for Activity 3

Objective: The student will be able to utilize the Casio fx-9860G Plus calculator to determine the measures of central tendency and to construct a stem-and-leaf plot for the data in the various activities included in this unit.

Steps for Determining Measures of Central Tendency

Problem: The following are scores that 75 students received on a 100 point exam. Use the fx-9860G Plus graphing calculator to determine the mean, mode and median of the data. Then, arrange the data in an array from smallest to largest to facilitate in the construction of a stem-and-leaf plot.

98, 85, 76, 83, 74, 85, 62, 79, 85, 89, 98, 87, 92, 84, 63, 28, 49, 88, 87, 92, 83, 79, 75, 68, 75, 96, 90, 83, 85, 68, 82, 85, 95, 100, 83, 79, 63, 85, 68, 86, 86, 85, 94, 89, 69, 98, 89, 89, 67, 84, 75, 76, 79, 87, 89, 95, 93, 86, 87, 88, 96, 57, 78, 64, 89, 75, 79, 82, 94, 96, 85, 95, 87, 88, 75

1. The first step is to enter this data into the calculator. To do this, turn the calculator on and go to the Stat menu. Use the following key strokes.

Op\$I

Your screen should look like the following screen:

	List 1	List 2	List 3	List 4
SUB				
1				
2				
3				
4				

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If your screen has numbers in the lists, you will need to delete them. To do this press the following keys to get the previous screen.

urq

Next, you can label the list column as SCORES. To do this, press the following keys:

BLamG96jml

Your screen should look like this:

	List 1	List 2	List 3	List 4
SUB	SCORES			
1	0			
2				
3				
4				

TOOL EDIT DEL DELA INS

To enter the data into list 1, enter each of the numbers and press execute after each one. Your key strokes are as follows:

98|85|76|83|74|85|62|79|85|89|98|87|9
 2|84|63|28|49|88|87|92|83|79|75|68|75|
 96|90|83|85|68|82|85|95|100|83|79|63|
 85|68|86|86|85|94|89|69|98|89|89|67|8
 4|75|76|79|87|89|95|93|86|87|88|96|57|
 78|64|89|75|79|82|94|96|85|95|87|88|7
 5|

Your final screen should look like the following. Notice that the last number entered is the 75th number in the list.

	List 1	List 2	List 3	List 4
SUB	SCORES			
73	87			
74	88			
75	75			
76				

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To determine the mean, mode and median of the data, you need to go to Calculations (CALC) and then 1VAR (since all the data is in one list). Your keystrokes are as follows:

uwq

The screens you should see are as follows:

	List 1	List 2	List 3	List 4
SUB	SCORES			
73	87			
74	88			
75	75			
76				

GRAPH CALC TEST INTG DIST ▸

	List 1	List 2	List 3	List 4
SUB	SCORES			
73	87			
74	88			
75	75			
76				

1VAR 2VAR REG SET

```
1-Variable
x̄      =82.0933333
Σx     =6157
Σx²    =516467
xσn    =12.1206967
xσn-1  =12.2023184
n      =75                ↓
```

Notice that the first item in the list of calculations is the mean (\bar{x}). Scroll down until you see the following screen:

```
1-Variable
Med     =85                ↑
Q3      =89
maxX    =100
Mod     =85
Mod:n=1
Mod:F=8
```

The Med represents median and Mod represents Mode. Mod:n=1 means that there is only 1 mode. If there are two modes, it would be bimodal. The Mod:F=8 means there were eight entries of 85.

Therefore, mean = 82,0933333; median = 85; mode = 85

To put the data into an array, use the following key strokes:

dduqq1|1|

Your screen should look like this:

	List 1	List 2	List 3	List 4
SUB	SCORES			
73	98			
74	98			
75	100			
76				

SRTA SRTD TOP BTM

Notice that the numbers are in order from least to greatest. This makes it easier to construct the stem-and-leaf plot. A stem-and-leaf plot has two columns. The first is the stem which contains all digits except the units digit. The second column is the leaf which contains only the units digit.

Therefore, your stem-and-leaf plot will look like the following.

Stem	Leaves
2	8
4	9
5	7
6	2,3,3,4,7,8,8,8,9

7	4,5,5,5,5,5,6,6,8,9,9,9,9,9
8	2,2,3,3,3,3,4,4,5,5,5,5,5,5,5,5,6,6,6,7,7,7,7,7,8,8,8,9,9,9,9,9,9
9	0,2,2,3,4,4,5,5,5,6,6,6,8,8,8
10	0

Name _____ Class _____ Date _____

Activity 3: Worksheet Measures of Central Tendency

For each list of data, determine the mean, mode, and median using the fx-9860G Plus graphing calculator. Next, construct a stem-and-leaf plot of the data.

1. 32, 45, 46, 33, 25, 58, 55, 52, 31, 29, 36, 45, 51, 56, 51, 43, 32, 29, 31, 40, 42, 30, 35, 35, 39, 47, 26, 51, 57, 55, 42, 46, 53, 42, 41, 33, 35, 38, 50, 51, 52, 37, 38, 43, 47, 44, 52, 52, 38, 32, 53, 39, 31, 49, 48, 48, 45, 43, 46, 39, 52, 49, 38.
2. 20, 62, 55, 58, 53, 43, 39, 23, 16, 21, 28, 53, 61, 62, 60, 50, 45, 55, 53, 58, 57, 58, 58, 51, 37, 36, 29, 45, 33, 32, 26, 25, 17, 26, 29, 39, 33, 37, 48, 42, 26, 47, 42, 49, 39, 40, 42, 38, 37, 30, 21, 20, 19, 29, 52, 47, 36, 31, 52, 28, 37, 41, 49.
3. 19, 26, 23, 22, 34, 43, 41, 43, 43, 42, 39, 26, 27, 31, 42, 40, 39, 37, 33, 30, 22, 19, 20, 30, 34, 34, 38, 27, 22, 29, 39, 41, 42, 45, 46, 44, 42, 47, 21, 29, 22, 28, 30, 31, 43, 41, 39, 33, 34, 34, 38, 27, 22, 26, 23, 34, 32, 31, 41, 42, 33.
4. 12, 88, 81, 83, 34, 23, 18, 19, 34, 22, 20, 19, 55, 67, 66, 36, 84, 76, 72, 64, 81, 84, 76, 78, 68, 46, 55, 50, 24, 42, 76, 56, 43, 49, 50, 58, 56, 75, 24, 15, 41, 30, 53, 76, 81, 86, 49, 42, 55, 59, 62, 63, 74, 68, 60, 71, 37, 38, 39, 37, 49, 25, 72, 66, 77, 45, 59, 57, 62, 73, 57, 47, 24, 29, 38, 49, 82, 13, 16, 63, 56, 52, 59, 64, 78, 24.

Solutions to Activity 3 Worksheet

5. mean = 42.5873015
 median = 43
 mode = 52

Stem-and-leaf plot:

Stem	Leaves
2	5,6,9,9
3	0,1,1,1,2,2,2,3,3,5,5,5,6,7,8,8,8,8,9,9,9
4	0,1,2,2,2,3,3,3,4,5,5,5,6,6,6,7,7,8,8,9,9
5	0,1,1,1,1,2,2,2,2,2,3,3,5,5,6,7,8

6. mean = 40.079365
 median = 39
 mode = 37 and 58 (bimodal)

Stem-and-leaf plot:

Stem	Leaves
1	6,7,9
2	0,0,1,1,3,5,6,6,6,8,8,9,9,9
3	0,1,2,3,3,6,6,7,7,7,7,8,9,9,9
4	0,1,2,2,2,3,5,5,7,7,8,9,9
5	0,1,2,2,3,3,3,5,5,7,8,8,8,8
6	0,1,2,2

7. mean = 33.3606557
 median = 34
 mode = 34

Stem-and-leaf plot:

Stem	Leaves
1	9,9
2	0,1,2,2,2,2,2,3,3,6,6,6,7,7,7,8,9,9
3	0,0,0,1,1,1,2,3,3,3,4,4,4,4,4,4,7,8,8,9,9,9,9
4	0,1,1,1,1,2,2,2,2,2,3,3,3,3,3,4,5,6,7

8. mean = 52.744186
 median = 55.5
 mode = 24, 49, and 76 (trimodal)

Stem-and-leaf plot:

Stem	Leaves
1	2,3,5,6,8,9,9
2	0,2,3,4,4,4,4,5,9
3	0,4,4,6,7,7,8,8,9
4	1,2,2,3,5,6,7,9,9,9,9
5	0,0,2,3,5,5,5,6,6,6,7,7,8,9,9,9
6	0,2,2,3,3,4,4,6,6,7,8,8
7	1,2,2,3,4,5,6,6,6,6,7,8,8
8	1,1,1,2,3,4,4,6,8