

Activity 9

Measures of Central Tendency and Dispersion

TEACHER NOTES

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-9750G Plus calculator to determine measures of central tendency and dispersion of univariate data in the various activities included in this unit.

Introduction: This activity is designed to demonstrate the procedure to enter univariate data into the Casio-fx9750G Plus graphing calculator in order to determine the common measures of central tendency and dispersion that students are required to calculate on state tests.

The students should be familiar with the following vocabulary.

Mean

Median

Mode

Quartiles

Range

Standard Deviation

Univariate Data

Calculator Notes for Activity 9

Objective: The student will be able to utilize the Casio fx-9750G Plus calculator to determine measures of central tendency and dispersion of univariate data in the various activities included in this unit.

Steps for Determining the Measures of Central Tendency and Dispersion

Problem: The following are scores that students received on a 25 point quiz: 24, 23, 22, 22, 24, 19, 25, 20, 20, 19, 14, 12, 23, 22, 22, 20, 18, 22, 25, 24, 23, 23, 21, 22, 25, 22, 21, 20, 24, 25.

1. The first step is to enter this data into the calculator. To do this, turn the calculator on, then use the arrow keys to highlight the STAT Menu, press EXE. Notice that there is an arrow over F6 which means there are more choices. Press F6 to see the other choices. The screens should look like the following.



If you need to remove any data from the lists, use the arrow keys to move the cursor to the column you need to delete, press **F4** on the second screen (DEL-A), then press **F1**.

Use the arrow keys to move the cursor to **List 1**, enter the data by pressing **24**, **EXE**, **23**, **EXE**, **22**, **EXE**, and so on until all data is entered into **List 1**.

Don't forget to press **EXE** after every number. When all numbers are entered, your screen should look like the following screen.



Once the data is entered into the list, your calculator will list all the measures of central tendency and dispersion that you will need. To

get these numbers, press **F2** (CALC). Since you only filled data into one list, press **F1** (1 VAR), one variable or univariate. You can use the arrow keys to scroll down the calculations to display other calculations. Your screens should look like the following displays.

```

1-Variable
x̄ = 21.5333333
Σx = 646
Σx² = 14176
xσn = 2.9747082
xσn-1 = 3.02556159
n = 30
[1VAR] [2VAR] [REG] [SET]

```

```

1-Variable
minX = 12
Q1 = 20
Med = 22
Q3 = 24
x̄-xσn = 18.5586251
x̄+xσn = 24.5080415
[1VAR] [2VAR] [REG] [SET]

```

```

1-Variable
Med = 22
Q3 = 24
x̄-xσn = 18.5586251
x̄+xσn = 24.5080415
maxX = 25
Mod = 22
[1VAR] [2VAR] [REG] [SET]

```

2. You will not need to know all these measures for the purpose of state testing. The ones you will probably need are listed below, in order as it is displayed on the screens.

\bar{x} = mean = 21.5333333

$\sum X$ = the sum of your data = 646

s_n = standard deviation = 2.9747082

n = number of data entries = 30

minX = smallest number in the list = 12

Q1 = quartile 1 = 20

Med = median or quartile 2 = 22

Q3 = quartile 3 = 24

maxX = largest number in the list = 25

Mod = mode = 22 (be careful, if the data has more than one mode, the calculator will only list one mode!)

3. There are a few more measures of dispersion you may need to know:

RANGE can be calculated by taking maxX – minx.

INTERQUARTILE RANGE can be calculated by taking Q3 – Q1.

Name _____ Class _____ Date _____

Activity 9: Worksheet

Measures of Central Tendency and Dispersion

For each list of data, find the mean, mode, median, range, minimum, maximum, quartile 1, quartile 2, quartile 3, interquartile range, and standard deviation.

1.) 42, 43, 46, 46, 47, 48, 49, 49, 50, 51, 51, 51, 51, 51, 52, 52, 54, 54, 54, 54, 55, 55, 55, 55, 56, 56, 56, 57, 57, 57, 57, 58, 60, 61, 61, 61, 62, 64, 64, 65, 68, 69.

2.) 36, 40, 41, 42, 42, 42, 44, 45, 45, 46, 48, 49, 49, 50, 50, 51, 51, 51, 52, 52, 52, 52, 53, 53, 53, 53, 53, 54, 55, 55, 55, 56, 56, 56, 56, 57, 57, 57, 57, 57, 59, 59, 59, 60, 60, 61, 62, 62, 64, 68, 70, 71.

3.) 24, 33, 4, 10, 10, 21, 33, 33, 34, 37, 36, 42, 43, 35, 24, 5, 21, 20, 27, 36, 48, 31, 23, 22, 28, 29, 27, 31, 39, 30, 32, 31, 26, 16, 26, 34, 37, 38, 23, 38, 45, 34, 16, 25, 28, 39, 33.

4.) 1, 3, 2, 5, 3, 4, 6, 5, 9, 4, 5, 5, 5, 6, 8, 2, 6, 9, 5, 9, 2, 4, 5, 7, 6, 5, 4, 3, 6, 6, 4, 5, 3, 8, 5, 8, 5, 9, 3, 4, 5, 5, 7, 8, 6, 7, 8, 9, 2, 1, 3, 4.

Solutions to Activity 9 Worksheet

1. mean = 54.8571428

mode = 51
median = 55
range = 27
minimum = 42
maximum = 69
quartile 1 = 51
quartile 2 = 55
quartile 3 = 58
interquartile range = 7
standard deviation = 6.21661149

2. mean = 53.4230769
mode = 53, 57
median = 53
range = 35
minimum = 36
maximum = 71
quartile 1 = 49.5
quartile 2 = 53
quartile 3 = 57
interquartile range = 7.5
standard deviation = 7.37027855

3. mean = 28.8723404
mode = 33
median = 31
range = 44
minimum = 4
maximum = 48
quartile 1 = 23
quartile 2 = 31
quartile 3 = 36
interquartile range = 13
standard deviation = 9.73175766

4. mean = 5.17307692
mode = 5
median = 5
range = 8
minimum = 1
maximum = 9
quartile 1 = 4
quartile 2 = 5
quartile 3 = 6.5
interquartile range = .5
standard deviation = 2.15479031