

Activity 7

Standard Deviation for Frequency Distribution Tables

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 other forms of measures of variability 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 other measures of variability that students will need to evaluate for a given table of data.

The students should be familiar with the following vocabulary.

Mean deviation

Standard deviation

Standard deviation of frequency distribution tables

Variance

Calculator Notes for Activity 7

Objective: The student will be able to utilize the Casio fx-9860G Plus calculator to determine other forms of measures of variability for the data in the various activities included in this unit.

Steps for Determining Standard Deviation and Variance of Frequency distribution Tables

Problem: Use the following frequency distribution table to calculate the standard deviation and variance of a frequency distribution table:

Interval	Frequency
20-30	7
30-40	9
40-50	12
50-60	17
60-70	48
70-80	37
80-90	27
90-100	18
100-110	15

To find the standard deviation of a frequency distribution table, use the following formula.

$$s = \sqrt{\frac{\sum_{i=1}^k (X_i - \bar{X})^2 \times f_i}{\sum_{i=1}^k f_i}}$$

Start by clearing all your lists using the following key strokes:

Burq\$rq\$rq\$rq

Use the class marks (midpoint of the intervals) to store into list 1 and store the frequencies into list 2 using the following key strokes:

25|35|45|55|65|75|85|95|105|12|17|48|37|27|18|15|

Label list 1, X, and list 2, F using these key strokes to get the following screen.

NN!a+l\$Bakl

	List 1	List 2	List 3	List 4
SUB	X	F		
1	25	7		
2	35	9		
3	45	12		
4	55	17		
				7
TOOL EDIT DEL DEL-A INS D				

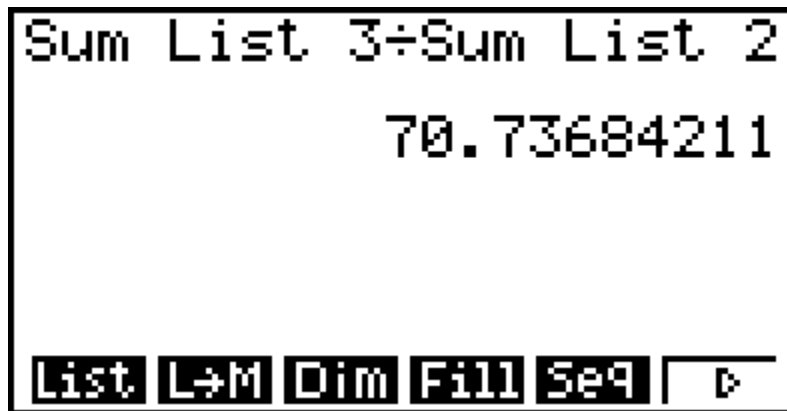
Next, you need to multiply the class marks by their frequencies and store these numbers into list 3. Label list 3 XF (which will represent X_i). Use these key strokes to get the following screen.

p!liqq1mq2bq3lp\$l\$\$\$BLa+kI

	List 1	List 2	List 3	List 4
SUB	X	F	XF	
1	25	7	175	
2	35	9	315	
3	45	12	540	
4	55	17	935	
				175
GRAPH CALC TEST INTR DIST D				

The mean of the standard distribution table is the sum of list 3 divided by the sum of list 2. Use the following key strokes to get the following screen.

p!liquuquq3Muuquq2l



The mean of this data = 70.73684211.

Next, subtract the mean from every entry in list 1 and store the answers in list 4. Label this list X-M. Use these key strokes to get the following screen.

p!liquuquq3Muuquq2lq1-Lnbq4l\$p!\$\$\$Ba+-
a7l

	List 1	List 2	List 3	List 4
SUB	X	F	XF	X-M
1	25	7	175	-45.73
2	35	9	315	-35.73
3	45	12	540	-25.73
4	55	17	935	-15.73
			-45.73684211	

GRAPH CALC TEST INTR DIST | D

Next, you need to square list 4 and store the numbers into list 5. Label this list $L4^2$. Use these key strokes to get the following screen.

p!ijqq4ksbq5lp\$|\$\$\$\$Bab q
4sl

	List 2	List 3	List 4	List 5
SUB	F	XF	X-M	$L4^2$
1	7	175	-45.73	2091.8
2	9	315	-35.73	1277.1
3	12	540	-25.73	662.38
4	17	935	-15.73	247.64
				2091.858726

GRAPH CALC TEST INTR DIST | D

The next step is to multiply the entries of list 5 by their

frequencies (list 2) and store these numbers into list 6.
 Label list 6 L5xL2. Use these key strokes to get the
 following screen.

p!liqq5mq2bq6lp\$!\$\$\$\$\$Bab5mab
 2|

	List 3	List 4	List 5	List 6
SUB	XF	X-M	L4²	L5×L2
1	175	-45.73	2091.8	14643
2	315	-35.73	1277.1	11494
3	540	-25.73	662.38	7948.6
4	935	-15.73	247.64	4210
			14643.01108	
	GRAPH	CALC	TEST	DATA
				DIST

Next, take the sum of list 6 and divide by the sum of list 2.
 Then take the square root of the answer. Use these key
 strokes to get the following screen.

p!liquuquq6Muuquq2|LsLnl

Sum List 6 ÷ Sum List 2	
	390.7728532
√Ans	19.76797544
List	L+M Dim Fill Seq ▢ ▸

The standard deviation of the frequency distribution table is 19.76797544.

Use the following formula to find Variance.

$$\text{Variance} = S^2$$

Therefore, the variance is the answer on the previous screen before you took the square root of the answer.

The variance of the frequency distribution table is 390.7728532.

Name _____ Class _____ Date _____

Activity 7: Worksheet

Standard Deviation and Variance of a Frequency Distribution Table

Find the standard deviation and variance of the following frequency distribution table.

1.

Interval	Frequency
25-30	4
30-35	9
35-40	12
40-45	16
45-50	28
50-55	12
55-60	5

Solutions to Activity 7: Worksheet

1. Standard Deviation = 7.581582606

Variance = 57.48039481