

Measures of central tendency: mean, median, mode, midrange.

Mean: average value. **Median:** middle value. **Mode:** most frequent value. **Midrange:** Average of the two extremes: max and min values.

Sample 1: 0, 11, 17, 28, 40.		
Mean	$\bar{x} = \frac{\sum x}{n}$	$\bar{x} = \frac{0 + 11 + 17 + 28 + 40}{5} = 19.2$
Median	Middle value	0, 11, <u>17</u> , 28, 40. $med = 17$
Mode	Most freq value	None
Midrange	$= \frac{max + min}{2}$	$\frac{40 + 0}{2} = 20$

Sample 2: 6, 9, 13, 14, 20, 20, 20, 24, 33, 33		
Mean	$\bar{x} = \frac{\sum x}{n}$	$\bar{x} = \frac{6 + 9 + 13 + 14 + 20 + 20 + 20 + 24 + 33 + 33}{10} = 19.2$
Median	Middle value	6, 9, 13, 14, <u>20</u> , <u>20</u> , 20, 24, 33, 33 $med = \frac{20+20}{2} = 20$
Mode	Most freq value	20
Midrange	$= \frac{max + min}{2}$	$\frac{33 + 6}{2} = 19.5$

Measures of Variation: Range, Variance, Standard deviation, Coefficient of Variation.

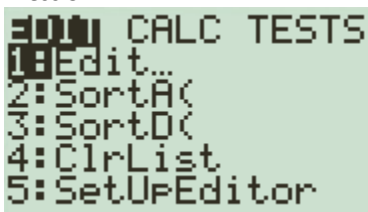

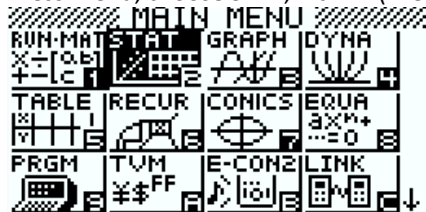

Sample 1: 0, 11, 17, 28, 40.		
Variance	$s^2 = \frac{\sum(x - \bar{x})^2}{n - 1}$	$s^2 = \frac{(0 - 19.2)^2 + (11 - 19.2)^2 + (17 - 19.2)^2 + (28 - 19.2)^2 + (40 - 19.2)^2}{4} = 237.7$
Standard Deviation	$s = \sqrt{\frac{\sum(x - \bar{x})^2}{n - 1}}$	$s = \sqrt{\frac{(0 - 19.2)^2 + (11 - 19.2)^2 + (17 - 19.2)^2 + (28 - 19.2)^2 + (40 - 19.2)^2}{4}} = 15.4$
Coefficient of Variation	$CV = \frac{s}{\bar{x}} \cdot 100$	$CV = \frac{15.4}{19.2} \cdot 100 = 80.2\%$
Range	Max-Min	$40 - 0 = 40$

Using the alternative formula for Variance and the Standard deviation. Both formulas are algebraically equivalent:

Sample 2: 6, 9, 13, 14, 20, 20, 20, 24, 33, 33		
Variance	$s^2 = \frac{n \sum x^2 - (\sum x)^2}{n(n-1)}$	<p>sum of $x^2 = 6^2 + 9^2 + 13^2 + 14^2 + 3(20^2) + 24^2 + 2(33^2) = 4436$ sum of $x = 6 + 9 + 13 + 14 + 3(20) + 24 + 2(33) = 192$</p> $s^2 = \frac{10(4436) - (192)^2}{10(9)} = 83.3$
Standard Deviation	$s = \sqrt{\frac{n \sum x^2 - (\sum x)^2}{n(n-1)}}$	$s = \sqrt{\frac{10(4426) - 192^2}{10(9)}} = 9.1$
Coefficient of Variation	$CV = \frac{s}{\bar{x}} \cdot 100$	$CV = \frac{9.1}{19.2} \cdot 100 = 47.4\%$
Range	Max-Min	$33 - 6 = 27$

Notice that while both samples have the same mean, the variation within the dataset is higher for sample 1.

Sample 1 in TI 83 and Casio fx 9750

<p>TI 83 similar to TI84</p> <p>Press STAT</p>  <p>Press Enter, and enter the data:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>L1</th> <th>L2</th> <th>L3</th> <th>1</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>-----</td> <td>-----</td> <td></td> </tr> <tr> <td>11</td> <td></td> <td></td> <td></td> </tr> <tr> <td>17</td> <td></td> <td></td> <td></td> </tr> <tr> <td>28</td> <td></td> <td></td> <td></td> </tr> <tr> <td>40</td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>L1(6)=</p> <p>Press STAT again, and use the arrow keys:</p>  <p>....to move over CALC:</p>	L1	L2	L3	1	0	-----	-----		11				17				28				40				<p>Casio fx 9750</p> <p>Press Menu, choose STAT, hit EXE (Execute):</p>  <p>Enter the dataset in List 1:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>List 1</th> <th>List 2</th> <th>List 3</th> <th>List 4</th> </tr> </thead> <tbody> <tr> <td>SUB</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>1</td> <td>0</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>11</td> <td></td> <td></td> <td></td> </tr> <tr> <td>3</td> <td>17</td> <td></td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>28</td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>GRAPH CALC TEST INTR DIST</p>  <p>Press F2, it is the key that corresponds to CALC:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>List 1</th> <th>List 2</th> <th>List 3</th> <th>List 4</th> </tr> </thead> <tbody> <tr> <td>SUB</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>1</td> <td>0</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2</td> <td>11</td> <td></td> <td></td> <td></td> </tr> <tr> <td>3</td> <td>17</td> <td></td> <td></td> <td></td> </tr> <tr> <td>4</td> <td>28</td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>VAR REG SET</p>		List 1	List 2	List 3	List 4	SUB					1	0				2	11				3	17				4	28					List 1	List 2	List 3	List 4	SUB					1	0				2	11				3	17				4	28			
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```

EDIT  [F2] TESTS
1:1-Var Stats
2:2-Var Stats
3:Med-Med
4:LinReg(ax+b)
5:QuadReg
6:CubicReg
7↓QuartReg

```

Press Enter:

```
1-Var Stats
```

We are working on one variable Statistics and the data was entered in List 1; therefore, keep 1-Var Stats, do not specify List 1: Press Enter again:

```

1-Var Stats
x̄=19.2
Σx=96
Σx²=2794
Sx=15.4175225
σx=13.78985134
↓n=5

```

Results:

\bar{x} : Sample mean

S_x : Sample Standard Deviation

σ_x : population Standard Deviation

Scroll down using the arrow keys to obtain:

```

1-Var Stats
↑n=5
minX=0
Q1=5.5
Med=17
Q3=34
maxX=40

```

$MinX$: minimum

Q_1 : First Quartile

Med : median

Q_3 : Third Quartile

$MaxX$: maximum

For two lists:

L1	L2
0	2
1	2
2	2
3	2

Press STAT, then enter L1,L2:

```
1-Var Stats L1,L2
```

Press enter to obtain 1-Var Stats

We are working on 1 Variable Statistics. We need to check SET, the corresponding key is F6. SET deals with how the user set up the lists. We have only List 1; therefore, press F6:

```

1Var XList :List1
1Var Freq  :1
2Var XList :List1
2Var YList :List2
2Var Freq  :1

```

1 LIST

This is what we need. The frequency of each data value on list 1 is 1. This is not a frequency table; in that case we would have List 2 updated. So, if you see this:

```

1Var XList :List1
1Var Freq  :List2
2Var XList :List1
2Var YList :List2
2Var Freq  :1

```

1 LIST

It means that you have a List2 of frequencies. Since we don't have it in this case, press F1 which correspond to 1. Now press EXIT key,

	List 1	List 2	List 3	List 4
SUB				
1	0			
2	11			
3	17			
4	28			

1VAR 2VAR REG SET

And then F1 for 1 Var.

```

1-Variable
x̄ =19.2
Σx =96
Σx² =2794
σx =13.7898513
Sx =15.4175224
n =5

```

(Description of variables same as T1, see left column)

Scroll down using the navigation keys to obtain:

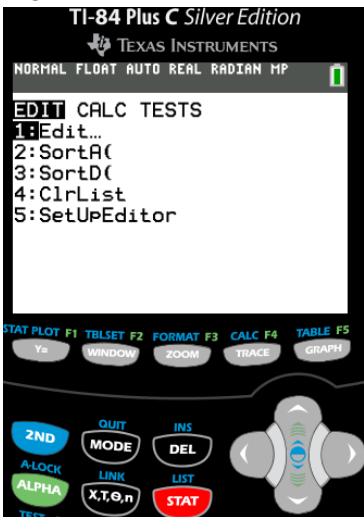
```

1-Variable
minX =0
Q1 =5.5
Med =17
Q3 =34
maxX =40
Mod =0

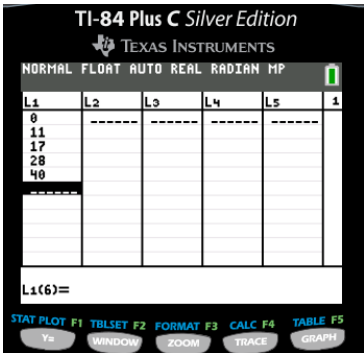
```

(Description of variables same as T1, see left column)

TI 84

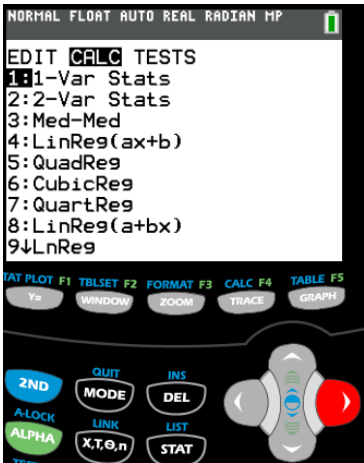


Press STAT (key in red)
Enter



Enter values: 0, 11, 17, 28, 40 on list1

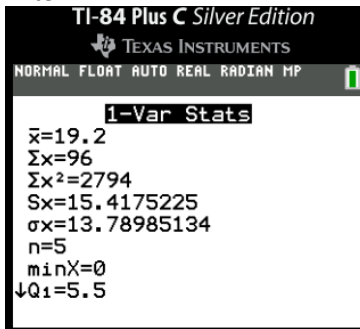
Press STAT again and using the navigation keys move over CALC:



and press Enter:

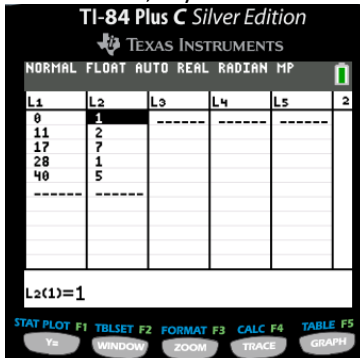


Since we have only one list, list 1, keep pressing enter or use the navigation keys, once on Calculate, press Enter.



Scroll down using navigation keys for Med, Q3, Max.

For two lists, say:



Input list2 for freqList by pressing 2nd, 2 (L2 in blue):

