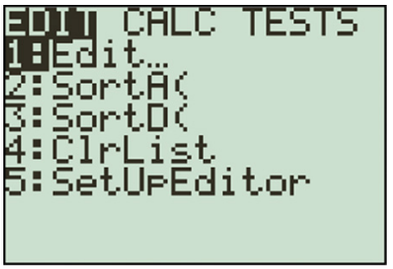
Calculator Guide
TI-83/84 Skills for Unit 6

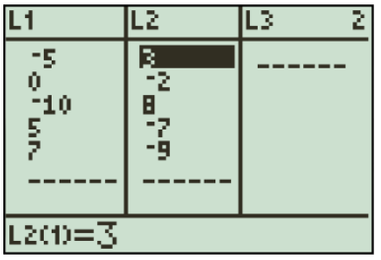
Lesson 6.1: Distributions and Standard Deviation

The **1-Var Stats** command on the TI-83/84 calculator can be used to calculate the mean and standard deviation of a data set or a frequency distribution.

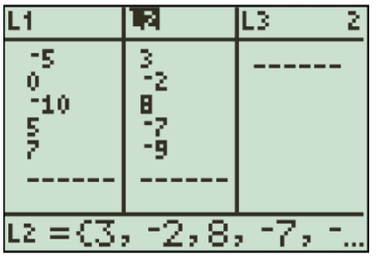
A. Entering Data into the TI-83/84 Calculator



- Press [STAT]
  Hint: Column 3 Row 3

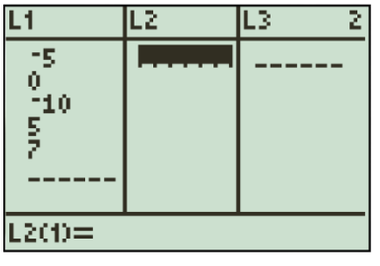


- Press 1:Edit
- Press [ENTER]



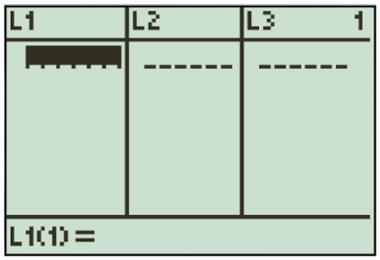
If there is data in List 1 and 2, clear all of the data from one list at a time.

Highlight the top of the list.
- Press [Arrow keys] to highlight L1 or L2

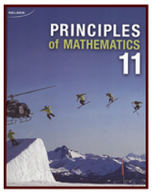


- Press [CLEAR]
  Hint: Column 5 Row 4, just under the arrow keys.
- Press [ENTER]

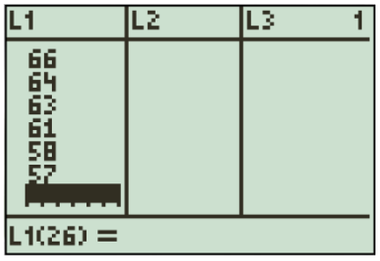
The data is cleared from the entire list.



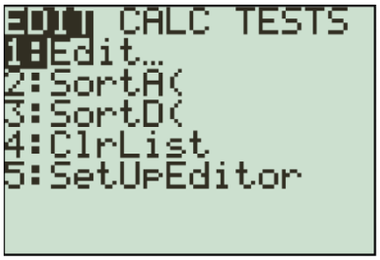
- Press [Arrow keys] to highlight L1
- Press [CLEAR]
  Hint: Column 5 Row 4, just under the arrow keys.
- Press [ENTER]
  You have now cleared the lists in the editor. Now you can enter new data.



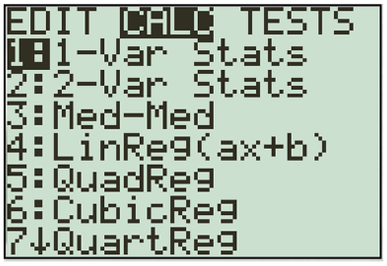
Turn to page 240, question 2, in *Principles of Mathematics 11*.



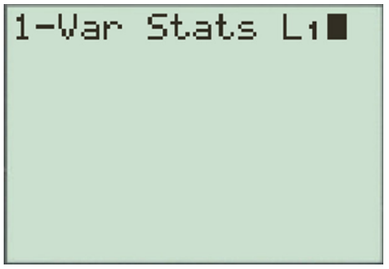
Enter the data in List 1 from the table, *Unit 1 Test,* on page 240 of *Principles of Mathematics 11*.
Press the UP arrow key to review the data.



- Press [STAT]
  Hint: Column 3 Row 3

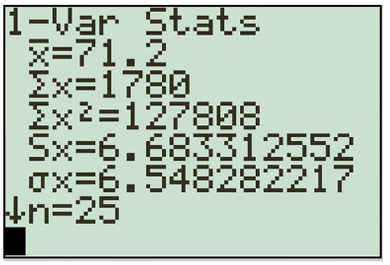


- Press [Right Arrow] to highlight the **CALC** menu.
- Press 1: 1-Var Stats
- Press [ENTER]



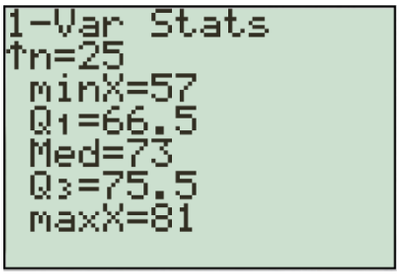
- Press [2nd] and [1] for L1, then Press [ENTER]

By selecting L1, you are telling your calculator to determine the mean and standard deviation from the data listed in L1.
If you had put the data in L2, you would press [2nd] and [2] for L2.



- Press [ENTER]

$\bar{x}$ = 71.2, which is the mean, or average.
σx = 6.548282217, which is the standard deviation.
$\downarrow n$ = 25, which is the total number of data values.



- Press [Down Arrow] several times to see all of the information provided.

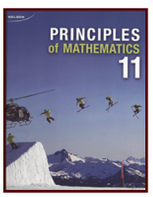
minX = 57 and **maxX** = 81; the difference between 81 and 57 is the range, 24.
The median value is **Med** = 73; the median, 73, is the middle value when the values are arranged from lowest to highest, or highest to lowest, as shown in the table.

The **median** which is the middle value is 73 as seen in the table.

B. Frequency Tables and Histograms

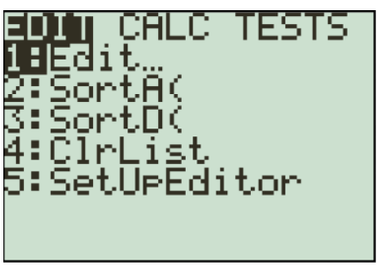
A **frequency table** is one way to organize large quantities of data. You can make a graph to display the information in a frequency table. This type of graph is called a **histogram**.

A histogram is a graph made of adjacent rectangles that displays a set of data that has been organized into equal intervals called classes.

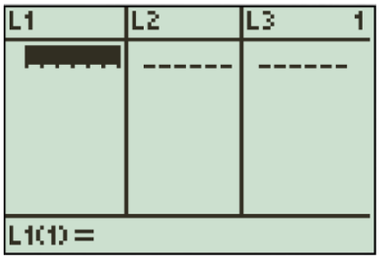


Turn to page 249 in *Principles of Mathematics 11*. Use the TI-83/84 calculator to enter the data for the length of the walk provided in question 2 into List L1 and the frequency into List L2.

1. Entering data into the TI-83/84 calculator.

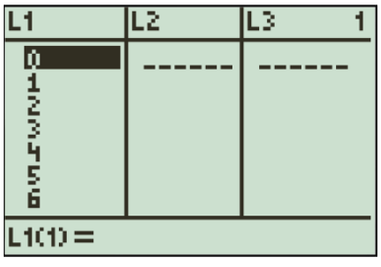


- Press [STAT]
  Hint: Column 3 Row 3



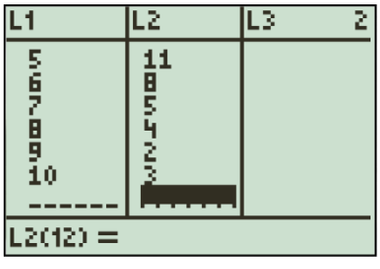
- Press 1:Edit
- Press [ENTER]

If there is data in List 1 and/or List 2, clear the data.



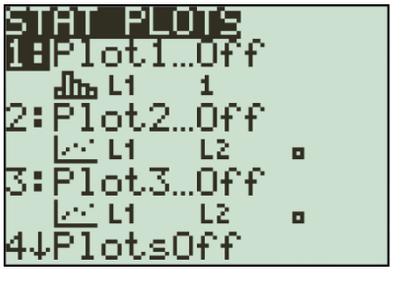
Enter the data from the table in question 2 on page 249 of *Principles of Mathematics 11* into List 1 in the form of intervals as described below. Press the UP arrow key to review the data.

Enter intervals for "Length of Walk (min)" into L1.
Enter 0, 1, 2, 3, 4,… to 10 into L1 since there are 11 intervals.



Enter the frequency data from the table in question 2 on page 249 of *Principles of Mathematics 11* into List 2. Press the UP arrow key to review the data.

Enter the frequency data into L2.
Enter the data from the second column 1, 3, 7, 10,… to 3 into L2.

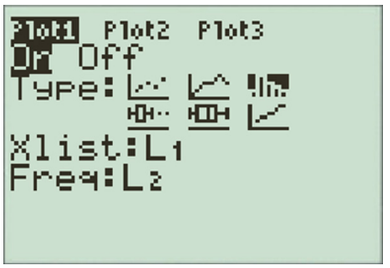


To graph a histogram, turn STAT PLOT on.

- Press [2nd] function key located in column 1, row 2
- Press [Y=] column 1, row 1
- Press [ENTER]

To turn Plot1 on:

- Press [Left arrow], highlight **On**
- Press [ENTER]



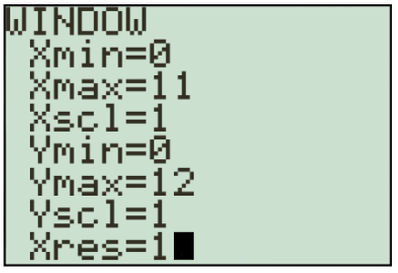
To select a histogram graph:

- Press [Down arrow] to Type:
- Press [Right arrow] twice to highlight the histogram icon. Press [ENTER]
- Press [Down arrow] to make sure the histogram icon is highlighted.
- Press [Down arrow] to change the Xlist: to L1. Press [2nd] [1].
- Press [Down arrow] to change the Freq: to L2. Press [2nd] [2].
  Make sure Xlist: is set to L1 and Freq: is set to L2.

- Press [Y=]
  Hint: Column 1, Row 1

Clear any equations in the equation editor by pressing [CLEAR] and [Down Arrow].

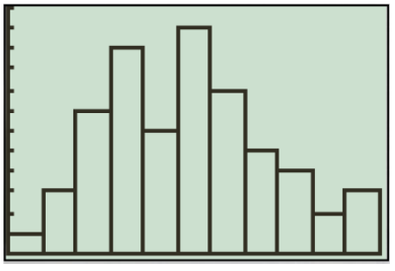
You can see that you have turned on STAT PLOT because Plot1 is highlighted in the top left hand corner of the equation editor.



- Press [WINDOW]
  Hint: Column 2, Row 1

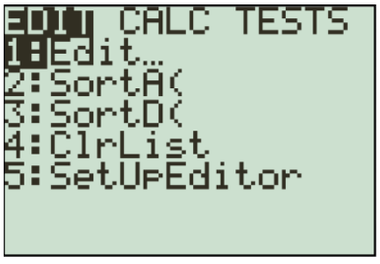
Type in the following values for the domain (x) and range (y) for this histogram, as shown in the screen to the left.
Note that these window values correspond to the values in L1 (domain) and L2 (range).

Use the [Down arrow] keys to enter values.



- Press [GRAPH]
  Hint: Column 5, Row 1

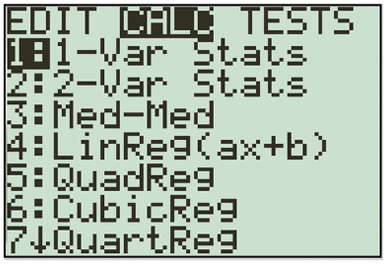
Notice that the left-most rectangle (interval 1) corresponds to a 5-10 minute walk, which had a frequency of 1. The adjacent rectangle (interval 2) corresponds to a 10-15 minute walk, which had a frequency of 3. Because the calculator does not label the horizontal axis according to the data in the table, interpreting this graph requires that you refer to the original data in the table provided.



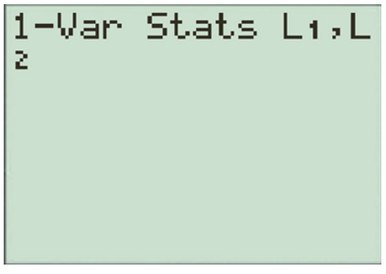
1-Var Stats can also be used on a frequency table like the one you just entered.

- Press [STAT]
  Hint: Column 3, Row 3

  Enter the midpoints of each interval in L1 and the frequencies in L2.



- Press [Right Arrow] to highlight the **CALC** menu.



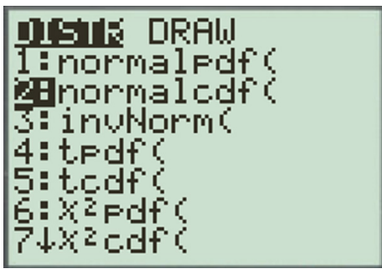
- Press [2nd] and [1] for L1
- Press [,]
- Press [2nd] and [2] for L2
  then Press [ENTER]

  By selecting L1, L2 you are telling your calculator to determine the mean and standard deviation from the frequency table in L1 and L2 where the values are in L1 and the frequencies are in L2.

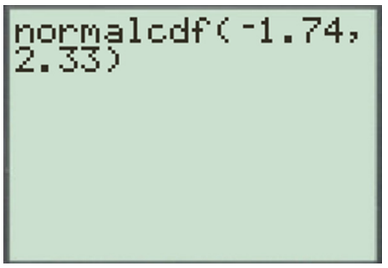
Lesson 6.3: *Z*-Scores

A. Area Under a Normal Curve

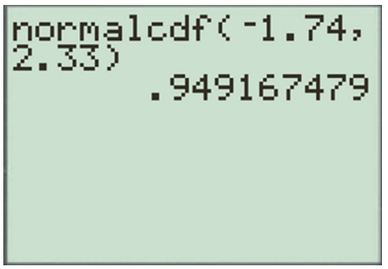
The area under a normal curve between two values can be determined using the **normalcdf(** command. You will use the TI-83/84 calculator to determine the area below a normal curve between *z*-scores of –1.74 and 2.33



- Press [2nd][DISTR]
  Hint: Column 4, Row 4
- Press [Down Arrow key] for **2: normalcdf(**
- Press [ENTER]

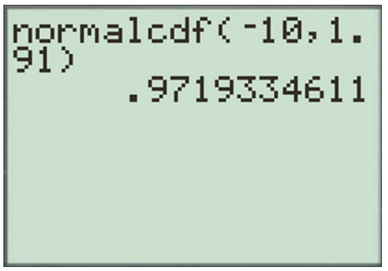


- Enter the lower *z*-score, –1.74
- Press [,]
- Enter the upper *z*-score, 2.33
- Press [)]
- Press [ENTER]



The area between $z = -1.74$ and $z = 2.33$ is approximately 0.9492.

To determine the area below a *z*-score you will still need to enter a lower limit. There is essentially no area below $z = -5$, so use a *z*-score below –5.



Determine the area below $z = 1.91$

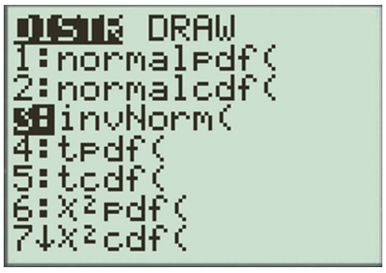
- Press [2nd][DISTR]
  Hint: Column 4, Row 4
- Press [Down Arrow key] for **2: normalcdf(**
- Press [ENTER]
- Enter the lower *z*-score, –10 (a value below –5)
- Press [,]
- Enter the upper *z*-score, 1.91
- Press [)]
- Press [ENTER]

Similarly, a *z*-score above 5 can be used to determine an area without an upper limit.

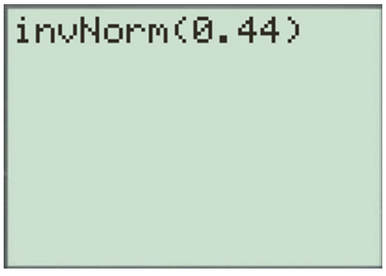
A. *Z*-Score from an Area

If you know the area under a normal curve to the left of a *z*-score, that *z*-score can be determined using the **invNorm** command.

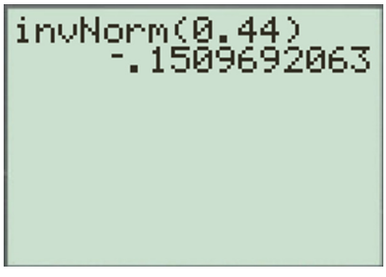
Determine the *z*-score such that 44% of data lie below it.



- Press [2nd][DISTR]
  Hint: Column 4, Row 4
- Press [Down Arrow key] for 3: **invNorm(**
- Press [ENTER]

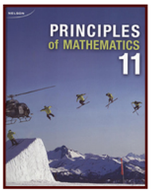


- Enter the area 0.44 (0.44 is 44% as a decimal)
- Press [ENTER]

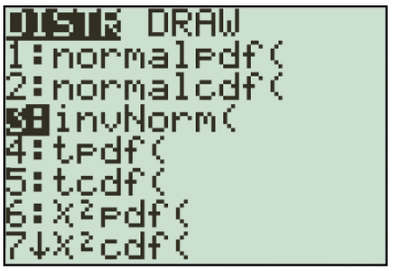


–0.151 is the *z*-score that 44% of data lies below

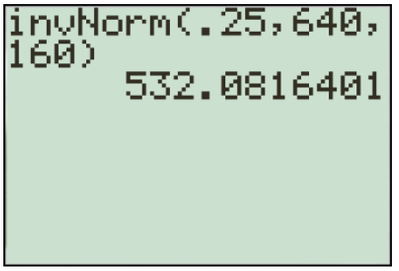
The invnorm(command can also be used with a mean and standard deviation.
invNorm(Percentile, Mean, Standard Deviation)



Turn to page 287 and 288 of *Principles of Mathematics 11* and try Zack's solution and Quinn's solution using the TI-83/84 graphing calculator.



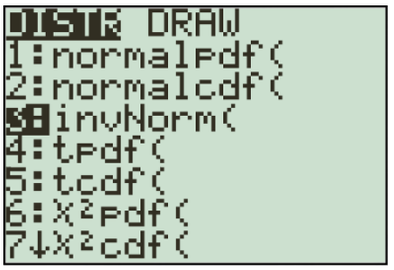
- Press [2nd] [VARS]
  Hint: Column 4, Row 4 Just under the arrow keys.
- Press [Down Arrow] twice Select 3:invNorm(
- Press [ENTER]



Enter Zack's solution on page 288 into the graphing calculator.

- Press [.] [2] [5] [,] [6] [4] [0] [,] [1] [6] [0] [)]
- Press [ENTER]

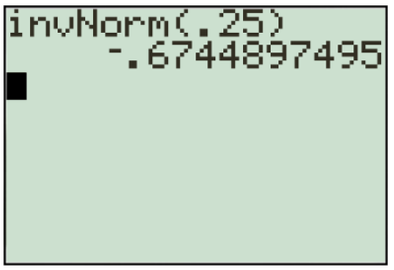
Zack should replace his running shoes after 532 km.



- Press [2nd] [VARS]
  Hint: Column 4, Row 4 Just under the arrow keys.

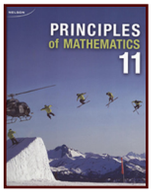
- Press [Down Arrow] twice Select 3:invNorm(
- Press [ENTER]

Enter Zack's percentage of 25% into the graphing calculator as found on page 287 of the textbook.

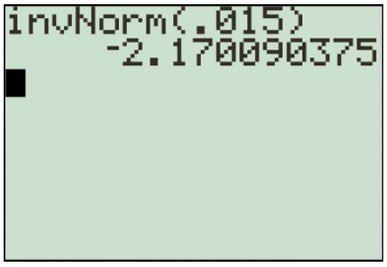


invNorm(Percentile) gives the *z*-score.

Therefore 25% of people replace their running shoes after 532 km and they have a *z*-score of – 0.6745 or – 0.68.



Turn to page 290 of *Principles of Mathematics 11* and calculate the *z*-score that corresponds to an area under the normal curve of 1.5%.



- Press [2nd] [VARS]
  Hint: Column 4, Row 4 Just under the arrow keys.
- Press [Down Arrow] twice Select 3:invNorm(
- Press [ENTER]
- Press [.] [0] [5] [)]
- Press [ENTER]

–2.17 is the *z*-score that corresponds to the area under the normal curve of 1.5%.