Guide to TI-83/84

Statistics Functions

Histograms

Enter a list of data in L1 by pressing [STAT], then **EDIT** and [ENTER]. Select the **STAT PLOT** function by pressing [2nd] [Y=]. Press [ENTER] and use the arrow keys to turn Plot1 to the **On** state and also highlight the graph with bars. Press [ZOOM][9] to get a histogram with default settings. (You can also use your own class with and class boundaries by choosing [WINDOW] and resetting values.)

Scatter diagrams

Follow instructions for Histogram above, and instead choose scatter plot picture.

Box & Whisker Plots/Modified Box Plots

Follow instructions for Histogram above, and instead choose the appropriate picture.

Mean (average)

Enter data into a list by pressing [STAT], then **EDIT** and [ENTER]. Then press [STAT] and select **CALC** , and then **1-Var Stats** and press [ENTER]. The mean value will be displayed as $\bar{x}$.

Standard Deviation

Enter data into a list by pressing [STAT], then **EDIT** and [ENTER]. Then press [STAT] and select **CALC** , and then **1-Var Stats** and press [ENTER]. The *sample* standard deviation value will be displayed as Sx. (Do not use σx.)

All values calculated using 1-Var Stats

$\bar{x}$ - The mean value of the data in the list
Σx – The sum of the values entered into the list (used to calculate standard deviation)
Σx^2 – The sum of the squares of the values entered into the list (used to calculate s.d.)
Sx – Sample standard deviation of the data in the list
σx – Population standard deviation - - not used for sample data entered into lists
n – The number of items in your list (sample size)
minX – The minimum value in your data set
Q_1 – The value of the first quartile
Med – The value of the median (or Q_2)
Q_3 – The value of the third quartile
maxX – The maximum value in your data set

Creating a Probability Distribution

THIS EXAMPLE IS FOR A DISTRIBUTION OF SIZE 12 WITH A PROBABILITY OF 0.8.

1) Steps to create a complete table of values 0 through 12.
   a) Pull up the window for lists: [STAT]→**Edit**
   b) With L1 highlighted, press [2nd] [STAT] and arrow over to **OPS**.
   c) Choose 5 – **seq(**
   d) Type so that you should see L1=seq(X, X, 0, 12)
      This should have filled-in L1 with the values 0 through 12
2) Steps to generate the probabilities associated with each value in L1
   a) Highlight L2
   b) Press [2nd][VARS] and arrow down to find **binompdf**
   c) Type so that you see L2=binompdf(12,0.8) where n = 12 and p = 0.8.
      In L2 you will see the probabilities.

NOTE: The values in L1 represent your x values. The values in L2 are your probabilities. Your calculator will show small numbers in scientific notation,
i.e. 4.1E-9. This means that you need to move the decimal point 9 positions to the left to see the number in standard form. So, 4.1E-9 is 0.000000041 in standard form. The book uses 0+ to indicate very small values.

Mean, Variance, and Standard Deviation of Probability Distributions

You will need to use the values generated using above process, in L1 and L2 showing x values and P(x) values.

1) Press [STAT] →**CALC**→ **1-Var Stats**
2) Type so you see 1-Var Stats L1, L2
   Use the standard deviation to calculate variance.

***** Make sure that n = 1. This is a double-check that your frequencies are correct and add up to 1, as is a requirement for probability distributions.**

Expected Value of Probability Distribution

1) Return to your list menu, using the values in L1 and L2 from above. Highlight L3 and multiply the first two columns:
   L3 = L1*L2
2) Press [2nd][MODE] to quit and return to the home screen.
3) Then press [2nd][STAT] and arrow over to MATH. Choose 5. Type so you have sum(L3) and press enter. The answer provided is your Expected Value.

Binomial Distributions

[2nd][VARS] →binompdf(n, p, x)

or

[2nd][VARS] →binomcdf(n, p, x)

*binomcdf finds from 0 to the x value

- Use binompdf when you want to find EXACTLY
- Use binomcdf when you want to find NO MORE THAN
- Use 1-binomcdf when you want to find AT LEAST

Finding Area between two values

[2nd][VARS]→2

normalcdf(left value, right value, mean, standard deviation)

If you leave the 3rd & 4th positions empty, it assumes a Standard Normal where mean = 0 and standard deviation = 1.

Finding the value corresponding to a known Area

[2nd][VARS]→3

invNorm(total area to left of the value, mean, standard deviation)

*The default mean is 0, standard deviation is 1.

With $\mu = 0$ and $\sigma = 1$, can just type in invNorm(area to left)

Finding Confidence Intervals

[STAT]→ TESTS and select A: 1-PropZInt.

You need to enter an "x" value.

If you are given a %, turn the percentage to its decimal form and multiply by n. Then round to the nearest whole number.

Enter "n"

Enter your confidence level

Calculate

Can also use ZInterval and TInterval as needed.

There is not a built-in function to find confidence intervals for variance.

Testing Claims about Proportion, Mean, and Variance

Proportion

Use [STAT]→TESTS and select 1-PropZTest

Mean, σ known

Use [STAT]→TESTS and select ZTest

Mean, σ not known

Use [STAT]→TESTS and select TTest

Can't use calculator for χ^2

Testing Claims about Two Populations

Proportion

Use [STAT]→TESTS and select 2-PropZTest

Independent Samples (mean)

Use [STAT]→TESTS and select 2-SampTTest

Matched Pairs (mean)

Enter data into lists L1 & L2

Highlight L3 and enter L3=L1 – L2. Press [ENTER].

Use [STAT]→TESTS and select TTest

Inpt: Data

$\mu_0 = 0$

List: L3 this is the location of the differences between the 2 lists

Freq: 1

complete remaining details as appropriate

Variance/Standard Deviation

Use [STAT]→TESTS and select 2-SampFTest

Calculating the Linear Correlation Coefficient *r*

Enter the paired data into L1 and L2.

Use [STAT]→TESTS and select LinRegTTest.

$\beta \& \rho \neq 0$

RegEq: (leave empty)

Can compare the p value to α to determine if there is a linear correlation.

Calculating the Regression Line

Follow the directions above, but instead you will enter information in to RegEq.

RegEq: Y1 [VARS]→Y-Vars→Function→Y1

When you press [Y=] you will see the equation as Y1.

Goodness-of-Fit

Enter Observed Frequency into L1.

Enter Expected Proportions into L2.

Highlight L3 and type L2*sum(L1) then [ENTER]

To get sum(press [2nd][STAT]→MATH→sum(

****FOR TI-83 USERS****

Highlight L4 and type $(L1-L3)^2/L3$ then [ENTER].

[2nd][MODE] to quit and go to the home screen, then enter Sum(L4) to get χ^2 statistic.

To find p-value: χ^2cdf(left, right, df)

****FOR TI-84 USERS****

[STATS]→TESTS→χ^2GOF

Observed:L1 Expected:L3

Testing a Claim of Independence – Contingency Tables

We will enter the contingency table into a matrix.

[2nd][x-1] (MATRIX) → EDIT→[A]

Set the dimensions of the matrix row by column

MATRIX[A] 2 x3 (or as appropriate)

enter the data - - - - calculator will duplicate table

Quit the editor [2nd][MODE]

[STAT]→TESTS→χ^2-Test

Observed: [A]

Expected: [B] *- data is created during test process*

Calculate

One-Way Analysis of Variance (ANOVA)

Enter data into lists

[STAT]→Tests→ANOVA(L1, L2, L3, L4) - or as appropriate