Statistics on the TI-83

These functions are already "built-in" to the TI-83,
except for the "extra programs".
Extra programs are available in the TI-83 APPENDIX of this book.

TI-83 Contents Page

To make the screen darker & easier to read, Adjust the Contrast:

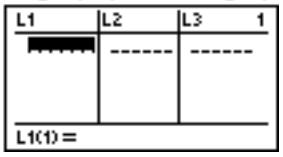
1) Quickly alternate between [2nd] UpArrow [2nd] UpArrow ...
2) If the screen gets too dark, then use [2nd] DownArrow ...
3) If the number flashing in the top-right corner is "9"
   then the battery is almost out. Change all 4 batteries at once.

Entering one-variable raw data into a single LIST:

1) Press the [STAT] key.
2) Choose #1 (Edit...) to get to the "List Edit" screen.
3) To clear an unwanted list, highlight L1 (or L2 or...), press the [CLEAR]
   key, and move the cursor back down, again.
4) Enter each datum one at a time with the [ENTER] key into just 1 LIST.
5) To return to the Home Screen, press [2nd] [MODE] (QUIT)

step 1)

step 2) (for example)

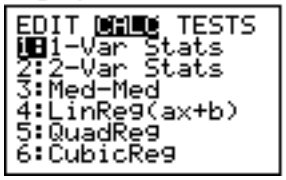


Finding the mean, median, Q_1, Q_3 & standard deviation for one-variable raw data in a single LIST:

After the data have been entered into a single LIST, then

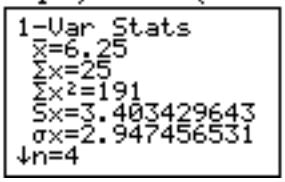
1) Press the [STAT] key.
2) RightArrow to CALC.
3) Either choose #1 (1-Var Stats) or [ENTER]
4) On the home screen, specify which LIST is to be used.
   For example, press [2nd] [1] (L1)
5) Press [ENTER]
6) Then scroll with the DownArrow to see everything.

step 2)



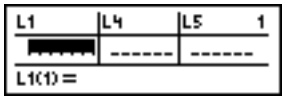
step 4)

step 6) results (for example)



Setting Up the List Editor:

Sometimes a list (or lists) is accidentally deleted (for example L2 & L3):



If so, then start on a clear home screen & press [STAT] #5 (SetUpEditor) & the [ENTER] key.

Operations on LISTs:

For example, 3*L1 [ENTER] on the "Home Screen" will create a new list with each value of L1 tripled. Or in the "List Edit" screen, move the cursor on top of a list name (ex. L2), then type 3*L1 [ENTER]

Entering one-variable "grouped" data into two LISTs:

1) See the instructions on entering data into a single LIST.
2) Enter the x-values in L1 and the frequencies in L2 , for example.

Note: An error will occur if the lengths of L1 & L2 are different.

Finding the mean, median, Q_1, Q_3 & standard deviation for one-variable "grouped" data in two LISTs:

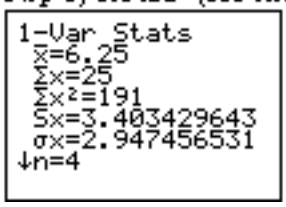
After the data have been entered into two LISTs, then

1) Press the [STAT] key.
2) RightArrow to CALC.
3) Either choose #1 (1-Var Stats) or [ENTER]
4) On the home screen, specify which LIST is to be used.
   For example, press [2nd] [1] (L1) [,] [2nd] [2] (L2)
5) Press [ENTER]
6) Then scroll with the DownArrow to see everything.

step 2)

step 4)

step 6) results (for example)



Entering two-variable raw data into two LISTs :

1) See the instructions on entering data into a single LIST.
2) Enter the x-values in L_1 and the y-values in L_2 , for example.

Note: An error will occur if the lengths of L_1 & L_2 are different.

Finding the means, sums & standard deviations for two-variable raw data in 2 LISTS:

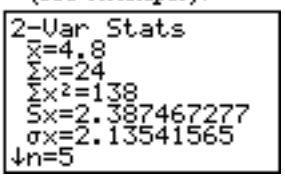
After the data have been entered into two LISTs, then

1) Press the [STAT] key.
2) RightArrow to CALC.
3) Choose #2 (2-var stats).
4) On the home screen, specify which LISTs are to be used.
   For example, press [2nd] [1] (L_1) [,] [2nd] [2] (L_2)
5) Press [ENTER]
6) Then scroll with the DownArrow to see everything.

step 4) home screen:

step 5) press [ENTER]

step 6) result (for example):



Finding the median, Q_1, & Q_3 for two-variable raw data in 2 LISTS:

After the data have been entered into two LISTs, then

1) See the instructions on finding the median, Q_1 & Q_3 for a "single" list.
2) Repeat step #1 for the second list.

Finding a Regression Equation or the correlation coefficient (r) :

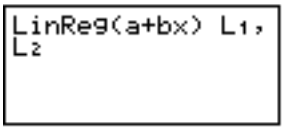
After the data have been entered into two LISTs, then

1) Press the [STAT] key.
2) RightArrow to CALC
3) Choose one of the following: (never choose #4 for this class)

#8 Linear Regression	$y = a + bx$
#5 Quadratic Regression	$y = ax^2 + bx + c$
#6 Cubic Regression	$y = ax^3 + bx^2 + cx + d$
#7 Quartic Regression	$y = ax^4 + bx^3 + cx^2 + dx + e$
#9 Natural Log Regression	y = a + b*ln x
#0 Exponential Regression	y = a*b^x
#A Power Regression	y = a*x^b
#B Logistic Regression	y = c / (1+a*e^(-bx))
#C Sine Regression	y = a*sin(bx+d) + d

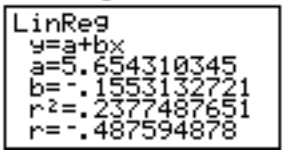
4) Then on the home screen, specify which LISTs are to be used.
   For example, press [2nd] [1] (L_1) [,] [2nd] [2] (L_2)
5) Press [ENTER]

step 4) home screen:



step 5) press [ENTER]

resulting home screen (for example):

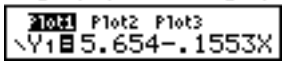


(with Diagnostic On)
(see the next page)

Graphing a Regression Equation by hand :

1) Press [Y=] and choose a function (for example, Y_1).
2) If necessary, then [CLEAR] out any old functions.
3) Enter the numbers and symbols and x-variable in the function.
4) Either set the [WINDOW] by hand or [ZOOM] automatically.
5) Optionally [TRACE] on Y_1 moving left & right.

step 3) (for example)



Note: remember to turn "Off" regular [Y=] functions for "Stat Plots".

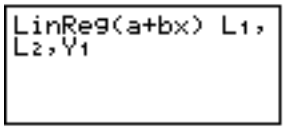
Note: remember to turn "Off" a "Stat Plot" for regular [Y=] graphing.

Graphing a Regression Equation automatically :

After the data have been entered into two LISTs, then

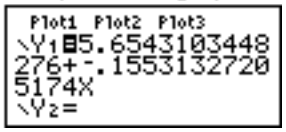
1) Press the [STAT] key.
2) RightArrow to CALC .
3) Choose an equation (for example, #8 Linear Regression, y = a + bx)
4) Then on the home screen, specify which LISTs are to be used.
   For example, press [2nd] [1] (L_1) [,] [2nd] [2] (L_2)
5) Press [,] again.
6) Also specify which [Y=] function to use for the equation.
   For example, press [VARS] & RightArrow to Y-VARS .
   Choose #1 (Function) & #1 (Y_1)
7) When on the homescreen again, then press [ENTER]

step 6) home screen:



step 7) press [ENTER]

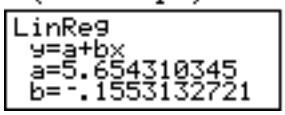
resulting [Y=] editor (for example):



DiagnosticOn mode :

If your TI-83 result includes a & b but not r^2 & r like this

resulting home screen (for example):



(with Diagnostic Off)

then start on a clear line of the home screen and

1) Press [2nd] [0] (CATALOG)
2) Press [x⁻¹] (D)
3) DownArrow to the line that says DiagnosticOn
4) Press [ENTER] once to get to the home screen.
5) Press [ENTER] once more to execute the command.

(setting "DiagnosticOn" needs to be done just once in the lifetime of the calculator's batteries)

Drawing a histogram:

After the data have been entered into a LIST, then

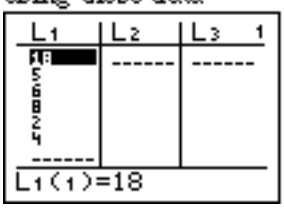
1) Press [2nd] [Y=] (Stat Plot).
2) We will not need all 3 of them, but just Stat Plot #1 ([ENTER]).
3) Be sure that "On" is selected (& stays highlighted) ([ENTER]).
4) Move to the icon that looks like a histogram ([ENTER]).
5) Choose the LIST you want. For example, use L1 ([ENTER]).
6) The "Frequency" is always "1". (To use each and every datum).
7) Press [WINDOW] and make some Adjustments.

Adjustments to a histogram (in [WINDOW]) :

1) XMin is the starting point for the first class. Ex. let it be 0 .
2) XMax should be bigger than the largest datum.
   For example, let XMax = 100 if the highest # in the data is 98.
3) XScl is the <u>width</u> of the classes (rectangles).
   For example, if XScl = 5 , then classes will be 0-4 , 5-9 , 10-14 , ...
   Or if XScl = 10 , then classes will be 0-9 , 10-19 , 20-29, ...
4) YMin should start at -3. Adjust as needed.
5) YMax should start at 10. Adjust as needed.
6) YScl does not affect the histogram.
7) Now [TRACE]

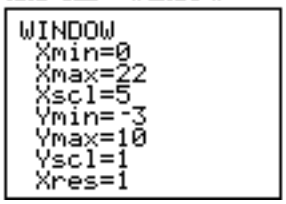
<u>Note</u>: Do Not [ZOOM] on a histogram, since that will change the [WINDOW]

(for example)
using these data

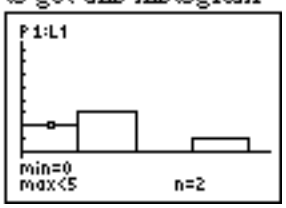


and this "Stat Plot"

and this "window"



to get this histogram



<u>Note</u>: remember to turn "Off" regular [Y=] functions for "Stat Plots".

<u>Note</u>: remember to turn "Off" a "Stat Plot" for regular [Y=] graphing.

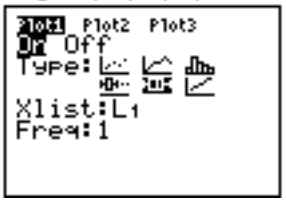
Drawing a box-plot:

After the data have been entered into a LIST, then

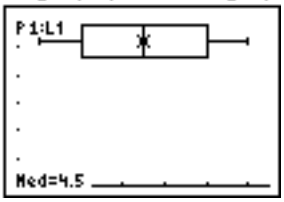
1) Press [2nd] [Y=] (Stat Plot).
2) We will not need all 3 of them, but just Stat Plot #1 ([ENTER]).
3) Be sure that "On" is selected (& stays highlighted) ([ENTER]).
4) Move to the icon that looks like a box-and-whisker plot ([ENTER]).
5) Choose the LIST you want. For example, use L1 ([ENTER]).
6) The "Frequency" is always "1". (To use each and every datum).
7) If the [WINDOW] is not yet set, then [ZOOM] #9 (ZOOMSTAT).
8) Press [TRACE]

step 1) (for example)

steps 3, 4, 5, 6)



step 8) (for example)

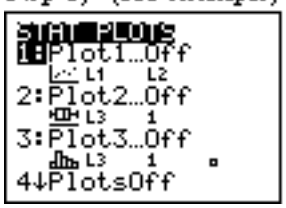


Drawing a connected scatterplot (or a non-connected scatterplot):

After the data have been entered into two LISTs, then

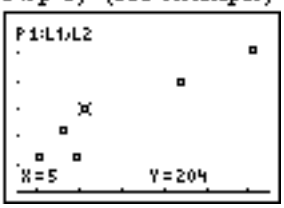
1) Press [2nd] [Y=] (Stat Plot).
2) We will not need all 3 of them, but just Stat Plot #1 ([ENTER]).
3) Be sure that "On" is selected (& stays highlighted) ([ENTER]).
4) Move to the icon that looks like a scatterplot ([ENTER]).
5) Choose the LISTs you want. For example, use L1 & L2 ([ENTER]).
6) Choose the "Mark" that you like. Little squares look nice ([ENTER]).
7) If the [WINDOW] is not yet set, then [ZOOM] #9 (ZOOMSTAT).
8) Press [TRACE]

step 1) (for example)



steps 3, 4, 5, 6)

step 8) (for example)



Note: remember to turn "Off" regular [Y=] functions for "Stat Plots".

Note: remember to turn "Off" a "Stat Plot" for regular [Y=] graphing.

Random number between 0 & 1 :

1) On a clear line of the "home screen", press MATH
3) LeftArrow (or RightArrow) to the PRB menu.
4) Either choose #1 or ENTER (rand)
5) Once on the "home screen" again, then press ENTER

Random <u>decimal</u> between 0 & 7 (or for some number other than 7) :

1) On a clear line of the "home screen", press 7 (or some other #).
2) Press × to multiply.
3) Press MATH
4) LeftArrow (or RightArrow) to the PRB menu.
5) Either choose #1 or ENTER (rand)
6) Once on the "home screen" again, then press ENTER

Random <u>integer</u> between 0 & 7 (or for some number other than 7) :

1) On a clear line of the "home screen", press MATH
2) LeftArrow (or RightArrow) to the PRB menu.
3) Choose #5 [RandInt( ]
4) Once on the "home screen" again, then press 0 , 7
5) Press ENTER

<u>Note</u>: any home screen command (including random numbers) can be repeated simply by pressing ENTER again and again...

Permutations (nPr or Pn,r) :

1) On a clear line of the "home screen", press the first number (n)
2) Press MATH
3) LeftArrow (or RightArrow) to the PRB menu.
4) Choose #2 (nPr)
5) Once on the "home screen" again, then press the 2nd. number (r)
6) Press ENTER

Combinations (nCr or Cn,r) :

Do the same as with Permutations (nPr), except choose #3 (nCr)

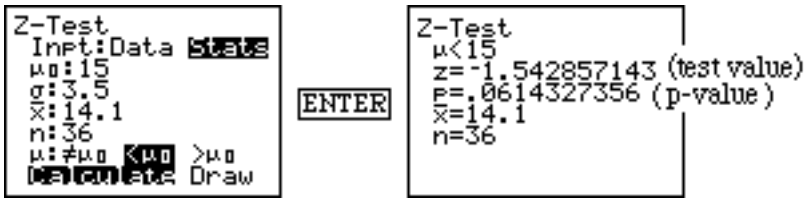
To find the pvalue for a hypothesis test
for a <u>single mean</u> with a <u>large</u> sample size :

1) Press the [STAT] key.
2) RightArrow twice (or LeftArrow once) to TESTS .
3) Either [ENTER] or choose #1 (Z-Test...)
4) If necessary, RightArrow to (Stats) and [ENTER]

<u>Note</u>: DownArrow between each line, one-at-a-time.

5) Press the number for μ_o (given in the "claim" H_o)
6) Press the number for σ (or use s if necessary)
7) Press the number for $\bar{x}$ (from the "sample")
8) Press the number for n (the sample size)
9) If necessary, use the LeftArrow & RightArrow & [ENTER] to choose H1
10) Once (CALUCLATE) is highlighted, then press [ENTER]

For example,



To find the pvalue for a hypothesis test
for a <u>single mean</u> with a <u>small</u> sample size :

1) Press the [STAT] key.
2) Arrow key to TESTS .
3) Choose #2 (T-Test...)
4) Proceed the same as with the "Z-Test..." .

<u>Special Note</u> about using pvalues with a 2-tail test (H_1 with $\neq$) :

In this case, (pvalue) = 2·(Probability of being in one tail)
So when solving these problems by hand, it is necessary to multiply by 2.
But when using the TI-83, do not multiply anything by 2.
Always simply compare the "pvalue" directly to "α" .

To find the pvalue for a hypothesis test for the difference between 2 means (only large samples in this class) :

1) Press the [STAT] key.
2) Arrow key to TESTS .
3) Choose #3 (2-SampZTest...)

Note: DownArrow between each line, one-at-a-time.

4) Proceed the same as with the "Z-Test..." .

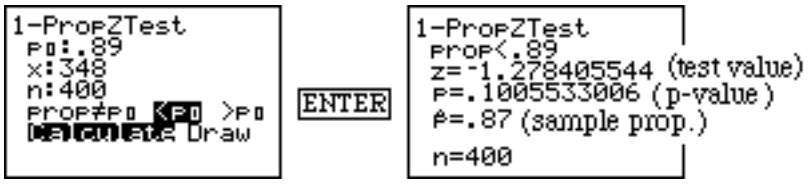
To find the pvalue for a hypothesis test for a single proportion (only a large sample in this class) :

1) Press the [STAT] key.
2) Arrow key to TESTS .
3) Choose #5 (1-PropZTest...)

Note: DownArrow between each line, one-at-a-time.

4) Press the number for p_o (given in the "claim" H_o)
5) Press the number for x (number of "successes")
6) Press the number for n (total number of events in the sample)
7) If necessary, use the LeftArrow & RightArrow & [ENTER] to choose H1
8) Once (CALUCLATE) is highlighted, then press [ENTER]

For example,



To find the pvalue for a hypothesis test for the difference between 2 proportions (only large samples in this class):

1) Press the [STAT] key.
2) Arrow key to TESTS .
3) Choose #6 (2-PropZTest...)

Note: DownArrow between each line, one-at-a-time.

4) Proceed the same as with the "1-PropZTest..." .

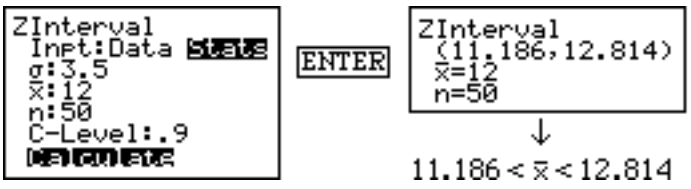
To find a "confidence interval"
for a <u>single mean</u> with a <u>large</u> sample size :

1) Press the STAT key.
2) RightArrow twice (or LeftArrow once) to TESTS .
3) Choose #7 (ZInterval...)
4) If necessary, RightArrow to (Stats) and ENTER

<u>Note</u>: DownArrow between each line, one-at-a-time.

5) Press the number for σ (or use s if necessary)
6) Press the number for $\bar{x}$ (from the "sample")
7) Press the number for n (the sample size)
8) Press the Confidence-Level (for example: 0.90 or 0.95 or 0.99)
9) Once (CALUCLATE) is highlighted, then press ENTER

For example,



To find a "confidence interval"
for a <u>single mean</u> with a <u>small</u> sample size :

Proceed the same as above, except: Choose #8 (TInterval...)

To find a "confidence interval"
for <u>2 means</u> (only large samples in this class) :

Proceed the same as above, except: Choose #9 (2-SampInt...)

To find a "confidence interval"
for a <u>single proportion</u> (only large samples in this class) :

Proceed the same as above, except: Choose #A (1-PropZInt...)

To find a "confidence interval"
for <u>2 proportions</u> (only large samples in this class) :

Proceed the same as above, except: Choose #B (2-PropZInt...)

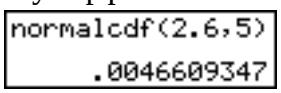
Finding the Area under a normal curve between 2 <u>z-axis</u> numbers:

Start on a clear line of the home screen. Then

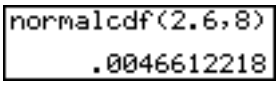
1) Press [2nd] [VARS] (DISTR)
2) Choose #2 [normalcdf( ] (z cumulative distribution function)
3) Once on the home screen again,
   then press the left-end z axis number (lower bound).
4) Press the [,] key.
5) Press the right-end z axis number (upper bound).
6) Press [ENTER]

For example, find P(0 < z < 3) with:

<u>Note</u>: if necessary, create an arbitrary upper bound. For example, find P(z > 2.6) with either of these:



&



Since there is no upper bound given, then we could choose any sufficiently large upper bound. If we are rounding to 5 decimal places, we have gone "far enough", already to say that the answer is .00466

Do this "twice" in order to assure that we have gone "far enough".

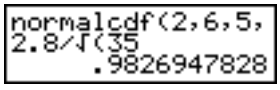
Finding the Area under a normal curve between 2 <u>x-axis</u> numbers:

Start on a clear line of the home screen. Then

1) Press [2nd] [VARS] (DISTR)
2) Choose #2 [normalcdf( ] (z cumulative distribution function)
3) Once on the home screen again,
   then press the left-end z axis number (lower bound).
4) Press the [,] key.
5) Press the right-end z axis number (upper bound).
6) Press the [,] key.
7) Press the population mean (μ)
8) Press the [,] key.
9) Depending on the question, press either just σ OR σ÷√n
10) Press [ENTER]

For example, let μ=5 pounds , σ=2.8 pounds & n=35

then find P(2 < $\bar{x}$ < 6) with:



Finding the z-axis number (critical z) for a given Area :

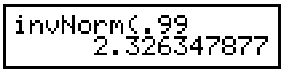
Start on a clear line of the home screen. Then

1) Press [2nd] [VARS] (DISTR)
2) Choose #3 [invNorm( ]
3) Once on the home screen again, then press the tail area (which must be between 0.00 & 1.00)
4) Press [ENTER]

For example, solve for k given P (z < k) = .01 with

.

For example, solve for k given P (z > k) = .01 with



.

Finding the Area under a (t) curve between 2 t-axis numbers :

Start on a clear line of the home screen. Then

1) Press [2nd] [VARS] (DISTR)
2) Choose #5 [tcdf( ] (t cumulative distribution function)
3) Once on the home screen again, then press the left-end t axis number (lower bound) [,] the right-end t axis number (upper bound) [,] the degrees of freedom (df = n−1)
4) Press [ENTER]

For example, let n=9 & find P(0 < t < 3) with:

Finding the Area under a χ^2 (chi square) curve between 2 χ^2-axis #s :

Start on a clear line of the home screen. Then

1) Press [2nd] [VARS] (DISTR)
2) Choose #7 [χ^2cdf( ] (χ^2 cumulative distribution function)
3) Once on the home screen again, then press the right-end t axis number (lower bound) [,] the left-end t axis number (upper bound) [,] the degrees of freedom (df = n−1)
4) Press [ENTER]

For example, let n=9 & find P(0 < χ^2 < 3) with:

Finding one exact binomial probability :

Start on a clear line of the home screen. Then

1) Press [2nd] [VARS] (DISTR)
2) Choose #0 [binompdf( ] (probability distribution function)
3) Press the number of trials (n)
4) Press [,]
5) Press the probability of success on 1 trial (p)
6) Press [,]
7) Press the number of successes (r)
8) Press [ENTER]

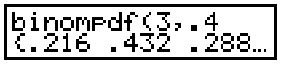
For ex, let p=0.4 then P(3 successes out of 6 trials) is 

.

Finding all exact binomial probabilities from 0 to n :

Start either on a clear line of the home screen or in the LIST editor.

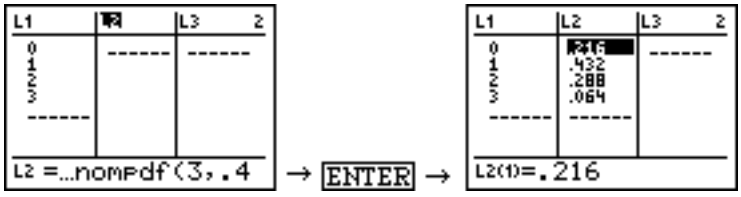
1) Press [2nd] [VARS] (DISTR)
2) Choose #0 [binompdf( ] (probability distribution function)
3) Press the # of trials (n) [,] the probability of success on 1 trial (p)
4) Press [ENTER]
5) RightArrow to see the complete LIST of probabilities.

For example, let p=0.4 then this result 

means that P(0 successes out of 3 trials) is 0.216
and P(1 success out of 3 trials) is 0.432

Also for example, press [STAT] [ENTER] & enter {0, 1, 2, 3} into "L1" manually.

Then use the above method to show the entire distribution all at once:



Graphing the Area under a normal (z) curve between 2 axis #s :

3 steps: Prepare the window & clear old drawings & ShadeNorm(

To prepare the window,

1) Press [Y=] & de-select (turn off) any functions & "stat plots".

2) Press [WINDOW] & let Xmin=-4, Xmax=4, Xscl=1, Ymin=-0.1, Ymax=0.4

Note: do not [ZOOM] since that will change the [WINDOW] settings.

To clear old drawings from the graph,

1) Start on a clear line of the home screen.

2) Then press [2nd] [PRGM] (DRAW)

3) Either [ENTER] or choose #1 (ClearDraw)

Note: if you have done these previous 2 steps recently, then an option is to press [2nd] [ENTER] [2nd] [ENTER] ... often enough to bring back the "Entry"

4) Press [ENTER]

After preparing the window and clearing old drawings, then

1) Press [2nd] [MODE] (QUIT) to get to a clear line of the home screen.

2) Press [2nd] [VARS] (DISTR)

3) RightArrow to DRAW

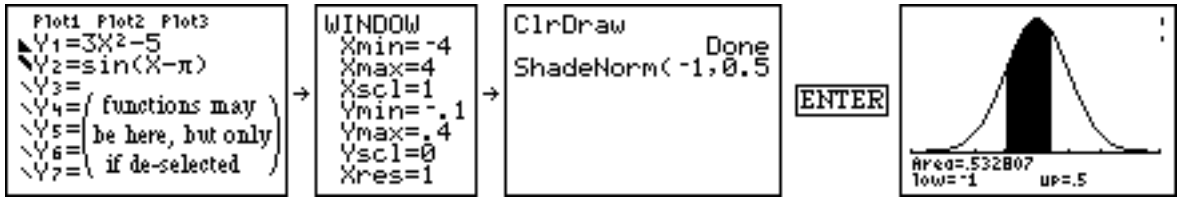
4) Either [ENTER] or choose #1 [ShadeNorm( ]

5) Press (the lower bound) [,] (the upper bound)

6) Press [ENTER]

7) Use [2nd] [MODE] (QUIT) to return to the home screen when finished.

For example, to graph P(-1< z < 0.5)



Graphing the Area under a (t) curve between 2 axis #s :

To prepare the window, do the same as with a (z) curve.

To clear old drawings from the graph, do the same as with a (z) curve.

After preparing the window and clearing old drawings, then

1) Press [2nd] [MODE] (QUIT) to get to a clear line of the home screen.
2) Press [2nd] [VARS] (DISTR)
3) RightArrow to DRAW
4) Choose #2 [Shade_t( ]
5) (the lower bound) [,] (the upper bound) [,] (d.f. [n−1])
6) Press [ENTER]
7) Use [2nd] [MODE] (QUIT) to return to the home screen when finished.

Finding (& graph) the Area under a χ^2 (chi square) curve b/w 2 axis #s :

To prepare the window,

1) Press [Y=] & de-select (turn off) any functions & "stat plots".
2) Press [WINDOW] , let Xmin=0, Xmax=30, Ymin=-0.05, Ymax=0.15

To clear old drawings from the graph, do the same as with a (t) curve.

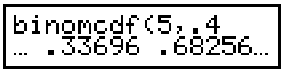
Then do the same as with a (t) curve, except: Choose #3 [Shade χ^2( ]

Finding all sums of binomial probabilities from 0 to r :

Start either on a clear line of the home screen or in the LIST editor.

1) Press [2nd] [VARS] (DISTR)
2) Choose #A [binomcdf( ] (cumulative distribution function)
3) Press the # of trials (n) [,] the probability of success on 1 trial (p)
4) Press [ENTER]
5) RightArrow to see the complete LIST of probabilities.

For example, let p=0.4 then this result



means that P(at most 1 success out of 5 trials) is 0.33696
and P(at most 2 successes out of 5 trials) is 0.68256

How to run an "extra program" :

1) If necessary, then enter the program into the calculator (see the TI-83 Appendix of this book for details).
2) On a clear line of the "home screen", press the PRGM key.
3) Choose which program you want.
4) Once on the "home screen" again, then press ENTER

** Note: if at anytime you see a screen like this **

or this

** then you want to get back to the "home screen" right away before **
** your program is destroyed. The safest way to get out of the **
** "program editor" and on to the "home screen" is to press 2nd QUIT **

Extra program: DEFAULTS

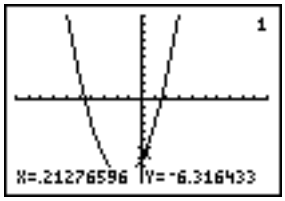
* Every calculator owner should put this program on their calculator! *
This is used as a "sub-program" at the beginning of some "regular" programs, such as prgmBELL . So if prgmDEFAULTS is missing from your calculator, then prgmBELL (for example) will not work. These are some of the default modes that prgmDEFAULTS sets:

&

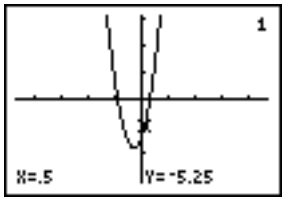
Extra program: FRNDLYWN

When using the TRACE feature on a Y= function, this program makes the numbers nice and FRIENDLY in the WINDOW.

For example, let Y1=X²+3X−7 . Then ZOOM #6 (Standard) and TRACE and RightArrow once to get:



, instead of this:



which used the program (center x = 0 , center y = 0 , x-factor = .5 , y-factor = .5) .

Extra program: POLYDIV

We will not use this in Statistics class. But if you ever need to DIVIDE a POLYNOMIAL again in a math class, then try this.

For example, if you are given $\frac{2n^3 + 9n^2 - 2}{2n + 1}$, then input {2, 9, 0, -2} and {2,1} to get these 2 outputs:

{1, 4, -2} (quotient)
{0, 0, 0, 0} (remainder)

In this example, the reduces completely to the answer: $n^2 + 4n - 2$.

Extra program: POYLMULT

We will not use this in Statistics class. But if you ever need to MULTIPLY a POLYNOMIAL again in a math class, then try this. (Use the same instructions as with PolyDiv).

TI-83 APPENDIX

There are 4 ways to get "extra programs" onto your TI-83. From:

- another TI-83 that already has the programs.
- a math department computer that has them on disk.
- either email or the internet to your personal computer.
- manually entering each line of the program from this Appendix.

Sending programs from a TI-83 to another TI-83 :

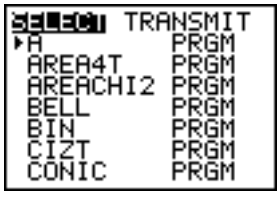
1) Link the 2 calculators with a black cable provided with purchase.
Note: push the cable in FAR , not just in a little bit.

On the receiving calculator:

2) Press [2nd] [X,T,θ] (LINK)
3) RightArrow to RECEIVE
4) Press [ENTER]

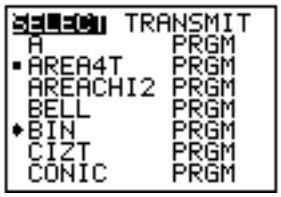
On the sending calculator:

5) Press [2nd] [X,T,θ] (LINK)
6) Choose option #3 (Prgm...)
7) Note how nothing is selected yet:



8) DownArrow & UpArrow as necessary to each program to be sent, pressing [ENTER] at each one to be selected. For example:

only AREA4T & BIN are selected



9) RightArrow to TRANSMIT & [ENTER]
10) Press [2nd] [MODE] (QUIT) to return to the home screen.

Sending programs from a computer to a TI-83 :

1) Link the calculator the the computer with a big grey "LINK" cable, sold separately from the calculator. Call for details: 1-800-TI-CARES (It's different than the small black calc-to-calc cable).

Note: push the cable in FAR , not just in a little bit.

On the receiving calculator:

** Do nothing. Simply stay on the home screen. **
Do not use the "LINK" key for computer-to-TI-83 transfer.

On the sending computer:

2) Open the "TI-GRAPH LINK (83)" software.
3) Move the mouse pointer to: LINK
4) Click-&-Drag the mouse pointer to: Send...
5) Observe the programs in the left column of the computer which may be sent from the computer.
6) Choose the program files to be sent by using 

7) When ready to send, then press 

8) Observe the programs in the right column of the computer which are currently on the TI-83.
9) When completed, then press 

Note: The TI-83 receives items from a computer more easily than from another TI-83 and also more easily than the TI-82 does.

Obtaining programs from email or the internet :

1) Write the author (Mark Harbison): mhfractal@aol.com
(Please allow up to 2 weeks for a response. Thank you.)
OR point a web browser to: http://www.ti.com/calc
and go to the "program archive".
2) If necessary, use "File" "Utilities..." "UUDecode File..." to translate the file from email-friendly code into calculator code.
3) Follow the above instructions for getting programs from the computer into the calculator.

Manually entering each line of the program from this Appendix.

This should be a last-resort method only. Any of the 3 previous methods is preferrable to this. Editing programs is not recommended, except for experienced programmers.

However, the "Programming" chapter of the TI-83 Owner's Manual can get you started with this, if you are interested. Good luck.

```
DEFAULTS          • Program.83
  :Normal
  :Float
  :Radian
  :Func
  :Connected
  :Sequential
  :Full
  :ExprOn
  :Real
  :RectGC
  :CoordOn
  :GridOff
  :AxesOn
  :LabelOff
  :PlotsOff
  :FnOff
  :ClrDraw
  :4→XFact
  :4→YFact
  :1→ΔTbl
  :0→TblStart
  :ClrHome
```

```
POLYDIV           • Program.83
  :ClrHome
  :Disp "   TO DIVIDE,","INPUT
COEFFICNTS","  AS {A,B,...}"
  :Prompt L1,L2
  :If L1(1)=0 or L2(1)=0:Then
  :Disp "","THE FIRST COEF.","MUST
NOT BE ZERO",""
  :Stop:End
  :dim(L1→S:dim(L2→T
  :S-T+1→A
  :A→dim(L3
  :L2→L4
  :S→dim(L4
  :L1→L5
  :For(I,1,A,1)
  :L5(I)/L2(1)→M
  :M→L3(I)
  :L5-(M*L4)→L5
  :Fill(0,L4)
  :For(J,1,T,1)
  :L2(J)→L4(I+J)
  :End
  :End
  :Disp L3ᶜFrac,L5ᶜFrac
```

```
FRNDLYWN          • Program.83
  :Float
  :
  :Lbl A
  :Disp "CENTER"
  :Input "X=",X
  :Input "Y=",Y
  :Input "X-FACTOR=",F
  :Input "Y-FACTOR=",G
  :
  :X-47*F→Xmin
  :X+47*F→Xmax
  :10*F→Xscl
  :Y-31*G→Ymin
  :Y+31*G→Ymax
  :10*G→Yscl
  :DispGraph
  :Pause
  :Menu("RESCL?","YES",A,"NO",B)
  :
  :Lbl B
  :DispGraph
  :Stop
```

```
POLYMULT          • Program.83
  :ClrHome
  :Disp "  TO MULTIPLY,","INPUT
COEFFICNTS","  AS {A,B,...}"
  :Prompt L1,L2
  :dim(L1→S
  :dim(L2→T
  :S+T-1→dim(L3
  :Fill(0,L3)
  :L3→L4
  :For(I,1,T,1)
  :Fill(0,L3)
  :For(J,1,S,1)
  :L1(J)→L3(J+I-1)
  :End
  :L2(I)*L3+L4→L4
  :End
  :L4
```