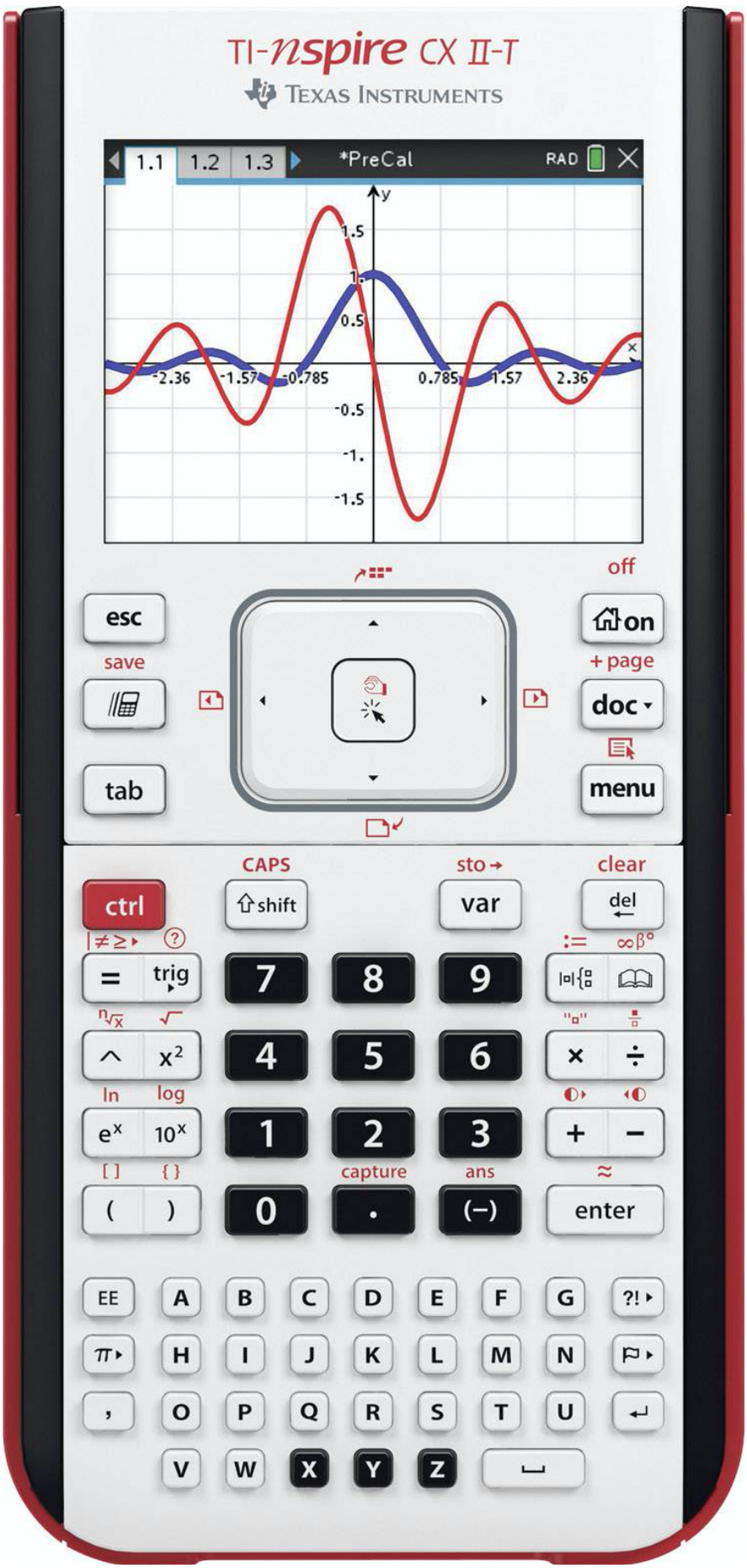
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Table of Contents

1 Basics 4

1.1 Getting started 4

1.2 Navigating 4

1.3 2 Main Modes 4

1.4 Settings 5

1.5 Clearing Defined Variables 5

1.6 Clearing The Entire Screen/History 6

1.7 Using Your Previous Answer (Recycle Answer) 6

1.8 Editing a Previously Typed Equation (copy and paste) 6

1.9 Quick Substitute 6

1.10 Getting into Radians or Degrees Quickly 6

2 Commonly used 7

2.1 Solving 7

2.2 Permutation and Combination Buttons 7

2.3 Finding Value Of A Sum or Product 7

3 Data 8

3.1 Creating a List 8

3.2 Calculating Mean and Quartiles 8

3.3 Drawing Dot Plot/Boxplots/Histograms/Normal Probability Plot 8

4 Linear Regression 9

4.1 To Draw A Scatter Plot And Line Of Best Fit 9

4.2 To Find The Line of Best Fit and **r** value 10

4.3 To Draw A Residual Plot 10

5 Differentiation & Integration 11

5.1 Differentiation 11

5.2 Integration 11

6 Graphing Basics 12

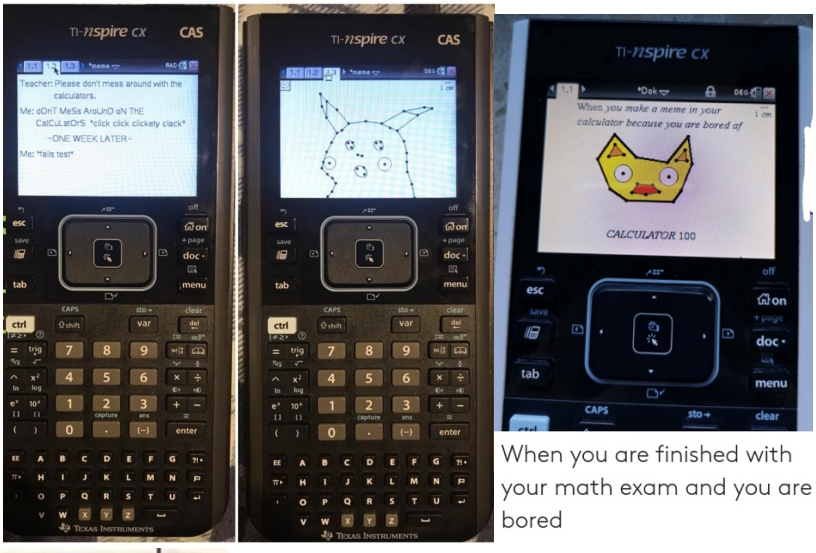
6.1 Graphing Any Function 12

6.2 To Insert Grid 12

6.3 To Change Window 12

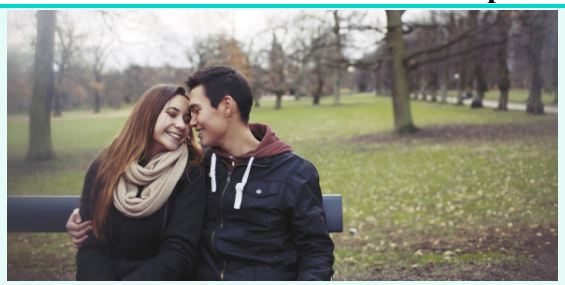
6.4 To Trace 12

6.5 To Find Max/Min/Intersection/Zeros/Derivative/Integral/Bounded Area 12
7 Distributions 13
7.1 Binomial, Normal etc 13
7.2 Hypothesis Testing 13
7.3 Confidence Intervals 13



When you are finished with your math exam and you are bored

Reasons a TI-Nspire is better than a girlfriend



- Probably failed her Maths exam
- Spends too much of your money
- Probably can't integrate into your family
- Breaks up with you after 2 months

- Saves your life in exams
- Only a one-off cost of £140
- Can easily integrate complex equations
- Can last you for almost 8 years

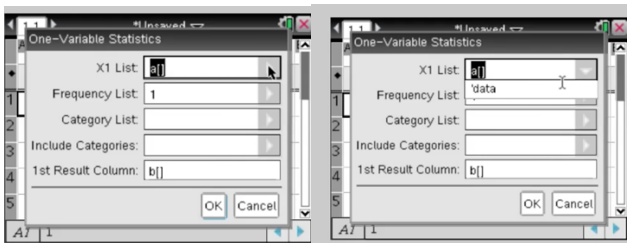
1 Basics

1.1 Getting started

- Turning on: Press on (top right)
- Turning off: Press ctrl on
- Go back: Press esc (top left)
- Delete: Press del (under menu button)
- Clear: Press ctrl del (in red)
- Home button: top right
- Menu button: Top right underneath doc button
- Scratchpad Button: Top left underneath esc button
- Trigonometry
  Click the trig button under next to = under ctrl button
  Note: You can also type the word out using the keyboard instead if you want to
- Fraction to decimal:
  There are several ways to do this.
  - The default answers are exact as fractions. To convert to decimal press ctrl enter (≈)
  - Force a decimal point into your calculation (insert it somewhere but make sure it makes sense). e.g. $\frac{7.}{8}$
  - Press Menu, 2: Number and then 1: convert to decimal
- To type certain forms such as fraction/modulus/root or any power:
  Click the button underneath del next to the book (to the right of the button 9)

1.2 Navigating

- Navigate: clicks arrows on the trackpad
  Note: You can use the trackpad CENTRE SQUARE with hand grab icon like an apple trackpad to scroll around
- When in menu you can use the numbers or letters next to the option to navigate the menus rather than scrolling and selecting which takes longer
- When you find yourself a drop-down box (such as after you've entered a list in spreadsheet and selected 1 Var stats)



  use up and down arrows to move between boxes, right arrow to open a box (see right image) and esc if you want to get out of it
  Note: Rather than scrolling to select ok always you can just hit enter!
- To move an equation on a graph you can hold the grab tool down for a few seconds and then you'll be able to move it after

1.3 2 Main Modes

There are 2 main modes: Scratchpad versus Document
Press home button (top right) to find these 2 modes
You can either work on a scratchpad (left column) or document mode (right column)

Scratchpad	**Document**
This mode is more concise and confined and less likely to build up tons of pages that in doc mode. In doc mode, if you've defined a variable on a certain page, it will still reference this definition for as long as you're on a page in that doc (you can just create a new doc on a regular basis or actively clear the variables to get round this though). You mainly use scratchpad to do calculations quickly or graph without creating multiple new pages in doc mode. **To access scratchpad: 2 ways**	You can use this to save documents or if you want more features for analysis. You will work in this mode a lot more! **Note: The parts below will make more sense once you've gone through how to do all types, so don't worry too much if you don't get this yet** **To create new doc: 2 ways** Press home button and then • Select 1: new

- Press the calculator icon button underneath esc button (you can toggle back and forth between calculate and graph by just pressing this button)

OR

- Press home button (top right) and then select calculate or graph on left).
  (just typing A and B here works also)

Note: For all the methods below, I've used the 1st way as its quicker!

(just typing the number 1 works also)

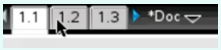
OR

- Select one of the icons apps at the bottom
  Your options are:
  calculator/graph/geometry/lists & spreadsheet/data and stats/Notes/Vernier Dataquest. We won't use the latter two.

To create a new page once you're in a doc: 2 ways

- Press ctrl and then doc button and choose what you want to add
  OR
- Press home and then add calculator or whatever type of page you wish to add (or select one of bottom icons)

To delete pages once you're in a doc: 2 ways



- You can just create a new doc by selecting home button and then press 1 (this will create a completely new doc, so save anything first if there is something you want to keep)
- Once you're in a doc, press ctrl button then up arrow and use left and right arrows to select pages. Press del button to delete (this only works once you have 2 or more pages)

To select certain pages once you're in a doc with multiple pages:
Use trackpad square (hand grab) to scroll to and select which tab you want (the tabs are on the top left)

1.4 Settings

press home button (top right)
navigate to documents column
5:settings
2: Document settings
OR
3: Handheld setup
(handheld setup can change font size, power standby time, hibernate, pointer speed, dim and make the mouse act like on a laptop where if you tap it, it will click)
Trick: You can just have the calculator set to radians all the time since there is a π button (bottom left above the comma button) on the calculator to type degrees when in radian mode (eg type $sin\ (30°)$) when in radian mode without having to even go into settings.
You can also use the trackpad square to scroll (hand grab) and click on the RAD next to the battery (top right) to toggle between rad and deg.

There are separate graph settings (this is a completely separate setting to the one mentioned above)
Once on graph in doc or scratchpad mode
Press menu
settings
Here you can select degrees or radians etc

1.5 Clearing Defined Variables

Once you're on a document and have added a calculator
Press menu
1: Actions
You will now see options to
3: Delete variable
4: Clear A-Z

5: Clear history
The safest way to clear variables is to just start a new document regularly!

1.6 Clearing The Entire Screen/History

There are 2 ways to do this
create on a doc or go to scratchpad mode

Click menu 1: Actions 5: Clear history	press ctrl then menu 1: Clear history

This seems long just to clear the screen, but just remember Menu 1 5
Remember you can press the numbers instead of navigating and selecting!

1.7 Using Your Previous Answer (Recycle Answer)

Press ctrl
Press $(-)$ button which has ans at the top

1.8 Editing a Previously Typed Equation (copy and paste)

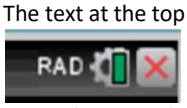
Highlight what you want to copy by pressing up twice so that the equation is highlighted in blue and then press enter. It drops it to the next line so you can edit using the arrows!

1.9 Quick Substitute

Go to scratchpad
Let's say you have $4x^2 + 9x - 3$ and you want to let x=-1.3
Put $x = -1.3$ at the end, so it should look exactly like $4x^2 + 9x - 3 \mid x = -1.3$
Note: The | button is located under the ctrl button (press ctrl =)
To type the x just use the keyboard

1.10 Getting into Radians or Degrees Quickly

The text at the top right next to the battery sign tells you what mode you're in.



Way 1 (Best way): You can also use the trackpad square to SCROLL WITH THE HAND (hand grab) and click on the RAD next to the battery (top right). Pressing will toggle between rad and deg.

Way 2: Even in radian mode you can type $sin\ (30°))$ without having to even go into settings. To type °, press the π button on the bottom left
Note: You can either type the trig function out using the keyboard or press the trig button under ctrl

You can of course also change this under settings!

2 Commonly used

2.1 Solving

Polynomials	**Simultaneous**	**Any type of equation**
Press scratchpad button Press menu button 3: Algebra 3: polynomial tools 1: Find the roots of a polynomial Input the degree roots	Press scratchpad button Press menu button 3: Algebra 2: solve system of linear equations Enter how many equations and which variables Press enter You will see 2 boxes that pop up Types the equations in exactly as they look	Press scratchpad button Press menu button 3: Algebra 1: Numerical Solve Type the equation in, then a comma and then the variable used and press enter $e.g$ $nsolve\ (2x + 5 = 8, x)$ Press enter Note: the = button is next to trig button and comma is bottom left

2.2 Permutation and Combination Buttons

$^{n}C_{r}$, $^{n}P_{r}$ or !

Press scratchpad button
Press menu
5: probability
Select whichever you want out of
1: Factorial
2: Permutations
3: Combinations

2.3 Finding Value Of A Sum or Product

$\sum$ or $\prod$

Press scratchpad button
Press menu
4: Calculus
3: Sum and then fill into template given
4: Product and then fill into template given

3 Data

Remember when doing anything
To go back: we press esc
To navigate between pages: Use hand grab to select which page top left 1.1, 1.2 etc
To create a new doc and start again: press home button (top right) and then press 1 for new doc.

3.1 Creating a List

You should use **doc mode** to create a list

Click Home button
Select New doc
Press menu then select 4: Add lists and spreadsheet OR Navigate to 4th turquoise icon on bottom
To label a column:
Go to the very top cell of the column (you will see A, B etc) and use keyboard letters at the bottom or number buttons in the middle on the calculator to type the name you want for that column (for example scroll to very top of column A then type shift then L then 1 which gives L1) – these columns are not labelled for you unfortunately like on the ti-84.
You can use shift button to get a capital letter, but this gets defaulted to lowercase letters after. Enter data as normal after.

3.2 Calculating Mean and Quartiles

Create a list first (see table above)
Click on any empty cell in another column (I choose the first row of the first empty column right next to my entered data)
Press menu
4:statistics
1:stat calculations
1: 1 variable statistics (or 2: 2 variable statistics dependent on what you want). I'll show for 1 variable statistics.

- Select number of lists (default is 1) and click ok or press enter
- X1 list: select whatever you labelled your column from dropdown using trackpad (use right arrow to drop the box down and the up and down arrows to move between boxes)
- Frequency List: 1
- Category list: leave blank
- Include categories: leave blank
- 1st result column: this selects the column where you want all the info to appear by navigating to. You can leave it as it is

Press enter
All your data stats should appear in the column you chose it to (remember you can always use the esc button to go back)
Note: If you want to see the data in more detail (i.e. more decimal places), scroll to the cell you want so it gets a blue box around it and you will see the answer to move accuracy pop up under the box
Trick: press ctrl 7 to get to top of a long list quickly

3.3 Drawing Dot Plot/Boxplots/Histograms/Normal Probability Plot

- **Dot Plot:**
  Create a list first (see top table above)
  Press ctrl doc to add new page
  5: add data and statistics and you will see a dot plot by default
  You'll see the words "click to add variable" on both the x and y axis
  Use trackpad like a mouse (hand grab) to select "*click to add variable*" on X AXIS ONLY at the bottom of the screen and then scroll to choose the name of the labelled column from the spreadsheet that you want.
- **To draw histogram/dot plot/normal probability: (you have to create the dot plot up above first)**
  Press Menu
  1: plot type
  Then select your option (**boxplot, histogram or normal probability plot**)
  To change scale for histogram:
  Press menu
  2: Plot properties
  2:histogram properties
  Bin settings
  Equal width
  Type your chosen width and alignment (alignment is where you want first column to start)
  To improve view if can't see enough of graph (window settings):
  Press menu
  5: Window/zoom
  2: Zoom data
  Use trackpad to hover over to see detailed data for each data point or histogram block

4 Linear Regression

Remember when doing anything
To go back: we press esc
To navigate between pages: Use hand grab to select which page top left 1.1, 1.2 etc
To create a new doc and start again: press home button (top right) and then press 1 for new doc.

4.1 To Draw A Scatter Plot And Line Of Best Fit

There are 3 ways to do this
Create a list first (see top table above)

Way 1:	Way 2: **Best Way**	Way 3: Longer method (not necessary)
Press menu 3:Data 9:Quick graph This will just give you a quick scatter plot side by side with your data	Press ctrl doc to add new page 5: add data and statistics You'll see the words "click to add variable" on both the x AND y axis Use trackpad like a mouse to select *"click to add variable"* on X AXIS at the bottom of the screen and then the Y AXIS too and then scroll (using the hand grab) to choose the name of the labelled column you want **To draw line of best fit on scatter plot:** Press menu 4: Analyse (note: this will be greyed out unless you have labelled the axis as stated above) 6: Regression 1: Show linear $mx + b$ **To improve the view (window settings):** press menu 5:Window/zoom 4: Zoom out (you can zoom out multiple times if you need) OR 2: Zoom – data (you will recognise these options as they're like ti-84) **Storing the line and using the line to predict values:** Ctrl doc (crt i is shortcut) 1: add calculator 6: statistics 1: stat calculations 3: linear regression $mx + b$ X list: Y list: Save regression equation: keep f1 Click ok With keypad type f1 bracket x value bracket OR Go to the graph section where f1 is	Press ctrl doc to add new page 2: Add graphs press menu 3: Graph Entry\Edit 4: Scatter plot It asks us for which values go on x axis and which go on y axis Press VAR button Select your labelled x column for x and press enter Press VAR button Select your labelled x column for y Press enter **To draw line of best fit on scatter plot:** Use trackpad to navigate to the page you drew scatter plot on so it is up in front of you Select menu 3: Graph Entry\Edit 1: Function (you should see f2 by default if you have selected saved the linear regression above when drawing the scatter plot) Press up on trackpad once to give you f1 You can now see the function you stored under f1 which is the line of best fit Press enter and the line will be drawn **To improve the view (window settings):** select menu 4:Window/zoom 4: Zoom out (you can zoom out multiple times) OR 9: Zoom Data

4.2 To Find The Line of Best Fit and r value

Create a list (see top table above)
Note: If you're on another page after having just drawn a scatter plot just use square trackpad to navigate to the correct page tab open on top left (the tab with the list of data in spreadsheet)
Click on any empty cell in another column (I choose the one right next to it)
Press menu
4:statistics
1: stat calculations
3: Linear regression $y = mx + b$
X List: Select L1 or whatever you labelled from dropdown using trackpad
Y List: Select L2 or whatever you labelled from dropdown using trackpad
Note: You should save the regression equation here in third box if you want to do way 3 above to draw line of best fit on scatter plot:
Scroll to ok at the bottom or press enter
All your data stats should appear in the column you chose in the list in spreadsheet

4.3 To Draw A Residual Plot

Create a list
Press ctrl doc to add new page
5: add data and statistics
(Annoyingly you'll need to create a dot plot first and set the axis up before being able to create a residual plot
You'll see the words "click to add variable" on both the x and y axis
Use trackpad (hand grab) to scroll to and select *"click to add variable"* on X AXIS at the bottom of the screen and choose the name of the labelled column from your spreadsheet you want AND then do the same for *"click to add variable"* on the Y AXIS
Press Menu
4: Analyse
6: Regression
1: Show linear $mx + b$
Menu
4: Analyse
7:Residuals
Show residual plot

5 Differentiation & Integration

5.1 Differentiation

Numerical derivatives at a point

Press scratchpad button
Press menu
4: calculus
1: numerical derivative at point
Variable: x
Value: the numerical point
Derivative: select whether you want first or second deriv etc
Press enter
And type in equation into the template given
etc

5.2 Integration

Numerical integrals

Press scratchpad button
Press menu
4: calculus
1: numerical integral
type in equation into the template given
etc

6 Graphing Basics

6.1 Graphing Any Function

Press scratchpad button Press again to toggle to graph mode Press tab button if you can't see the box to write the equation Type the function in Press enter	Click home button Documents on right Select 1: New Doc and then 2: add graphs (or just select 2nd icon from left at the bottom) Type the function in Press enter

- **To type an equation in: USE TAB button and it will bring the equation editor with f_1. Use UP arrow on trackpad to scroll between equations f_1, f_2, f_3 etc**
- **To delete the equation shown on the graph use hand grab tool to select it and highlight. Now press del button**

Important: Once you press enter the equation you entered at the top disappears. To bring it back or to write another equation press tab button again. If the wrong equation is shown or you have multiple equations press the arrow up on trackpad to navigate between them.
To deselect a graph: Use the hand grab tool to click the tick inside the colour next to the equation for the graph

6.2 To Insert Grid

menu
2: View
6: grid

6.3 To Change Window

menu
4: window/zoom
1: window settings

6.4 To Trace

menu
5: Trace
1: Graph trace

6.5 To Find Max/Min/Intersection/Zeros/Derivative/Integral/Bounded Area

menu
6: Analyze graph
Select the relevant one
Etc

Method:
Use the middle square to SCROLL (hand grab) to set lower and upper boundary lines for what you want (press enter or click each time you set)
Note: You can click and move the answer given if you can't see it
To get more accurate decimal places: Menu, 8: Settings and select the float

7 Distributions

7.1 Binomial, Normal etc

Press scratchpad button
Press menu
6: Statistics
5: Distributions
etc
Note: You can access this straight after entering data into a list in doc mode by pressing Menu, 4: Statistics, 2: Distributions etc

7.2 Hypothesis Testing

Press scratchpad button
Press menu
6: Statistics
7: Stat Tests
etc
Note: You can access this straight after entering data into a list in doc mode by pressing Menu, 4: Statistics, 4: Stat Tests etc

7.3 Confidence Intervals

Press scratchpad button
Press menu
6: Statistics
6: Confidence Intervals
etc
Note: You can access this straight after entering data into a list in doc mode by pressing Menu, 3: Statistics, 3: Confidence Intervals etc