TI-NSPIRE CAS Reference Guide – Touchpad or Color

It is imperative that your TI-Nspire CAS calculator have the latest operating system. We are currently using version 3.0.2.1791 released April 2011. (To determine your operating system press Home Settings Status. Read the number beside the word *Version*.) If yours is not this version, come to my room during DC time to get your system updated.

Calculator Organization

Your calculator needs to be set up with a folder for calculus documents. To create the folder:

(on) *My Documents* (Move the cursor up to the top of the screen so that it highlights the words *My Documents*.) (*menu*) *New Folder* (then type out the word) *Calculus* (*enter*)

Now create a document for Calculus class.

(on) *New document* (it may ask you if you want to save your current document. Respond yes or no as you wish.) *Add Calculator* (*enter*) (*doc*) *Insert Graphs* (*enter*) (*doc*) *File Save* (*enter*) At the top of the page it will ask you what folder to save the file in. If it does not read *Save In My Documents*, then follow the instructions in the parentheses. Otherwise skip the parentheses. ((*tab*) until you get to the icon that pictures an open folder with an upward arrow on it. Press (*enter*) That should change it to read *Save In My Documents* and your list of folders should be on the screen.) (*tab*) until you get to the first folder in the list of folders. Then use the down arrow to move down through the list until you get to *Calculus*. Press (*enter*) to select it. Now type the name of the file. I suggest you name it *Main Calc* (meaning it is you main document for Calculus class). When finished typing the name, press (*enter*) Now when you look at the top center of the calculator screen, it should read *Main Calc*.

I strongly suggest that you keep this document just for Calculus class and set up a different document for your science class. That way you can make the settings correspond to what you need for the particular course without having to constantly readjust the settings. When you come to Calculus class, just open your Calculus document and you will be ready to go with all the correct settings.

Once you have your *Main Calc* document saved, customize it with these settings.

(on) *Settings Settings General Display Digits: Fix 8* (NOT Float 8; scroll all the way down below the float numbers to find the fix numbers) *Angle: Radian Exponential format: Normal Real or Complex: Real Calculation Mode: Auto Vector Format: Rectangular Base: Decimal Unit System: Eng/US OK*.

The size of the font on the display can be altered by going to (on) *Settings Handheld Setup Font size*. Choose whichever size you prefer (I keep mine at medium).

(on) *Settings Settings Graphs & Geometry Display Digits: Fix 5* (NOT Float 5) *Graphing Angle: Radian Geometry Angle: Degree* ✓*Show axis end values* ✓*Show tool tips for function manipulation* ✓*Automatically find points of interest OK*. (To place a ✓ or remove a ✓, press the round center click button.)

(on) *Current* (Move to the graphing page) (*menu*) *View* *Hide Axes* *Show Grid* *Show Entry Line* *Hide Scale* *Hide Axes End Values* *Show Table* *Hide Object Selection Guides* (These selections are confusing because what you **read** is the **opposite** of what you **want**. When you see *Hide Axes*, it means that the axes are now showing and by clicking on this choice you will hide it. Conversely, *Show Grid* means that the grid is now hidden and by clicking on this choice you will show it. I have typed above how the menu list should read when you have the correct choices. I actually want the axes, scale, axes end points, and object selection guides to *show*, and the grid, entry line, and table to be *hidden*.)

Warnings

Good Habits:

Good Habits:

- Delete all function entries in the graphing window before beginning a new graphing problem.
- If you are using the rechargeable batteries, plug your calculator in overnight once a week – perhaps Sunday night.
- Always work in your *Main Calc* document when doing Calculus work.

Bad Habits:

- Opening a new graphing window every time you want to do another graph. It is best to have just one graphing window.
- Doing all work in the Scratch Pad. Not all features used in class operate in the scratch pad. It is fine for a quick calculation, but in general it is better to use your *Main Calc* file in class and for homework.

Batteries

The touchpad calculator uses four AAA batteries. Before changing batteries, be sure that the calculator is turned off. Open the access panel in the back and remove *one* old battery. Replace it with *one* new battery. Remove the next old battery and replace it with a new battery. Repeat this process until all four batteries are replaced. Always replace all four batteries at one time, using four identical brand batteries. You can also purchase a special rechargeable battery pack for the touchpad calculator. (Everything in the next paragraph describing the rechargeable battery for the color calculator applies to the touchpad if you buy the rechargeable battery pack.)

The color calculator uses a rechargeable battery. A full charge should last about 2 weeks. You can recharge it by plugging it into a normal wall outlet or by connecting it to a USB port on your computer. A full recharge seems to take about 4 or 5 hours.

To adjust the brightness of the screen, press (*ctrl*)(–) or (*ctrl*)(+).

In the upper right corner of the screen is a battery power indicator. Make a habit of checking it the night before every test.

Keyboard Shortcuts

Action	Shortcut
$\int_{\square}^{\square} \square\, d\square$	⇧*shift* +
$\frac{d}{d\square}(\square)$	⇧*shift* –
Undo	*ctrl esc*
Redo	*ctrl* Y
Cut	*ctrl* X
Copy	*ctrl* C
Paste	*ctrl* V
Highlight an entire expression	*ctrl* A
Highlight one character at a time	⇧*shift* ▶▶▶
Help	*ctrl* ?!
Save a document	*ctrl* S
≠ < ≤ > ≥ |	*ctrl* =
π i ∞ e θ r	π
? ! $ ° ′ % ″ : ; _ \	?!

Action	Shortcut
Adjust display to be darker	*ctrl* +
Adjust display to be lighter	*ctrl* –
Page Up	*ctrl* 9
Page Down	*ctrl* 3
Jump to beginning of entry line	*ctrl* 7
Jump to end of entry line	*ctrl* 1
Jump to top of page	*ctrl* 7 *ctrl* 7
Jump to bottom of page	*ctrl* 1 *ctrl* 1
Jump between two halves of a split screen	*ctrl tab*
Move from one page to another	*ctrl* ▶ or *ctrl* ◀
Move up to page view and return	*ctrl* ▲ followed by *ctrl* ▼
Move around a graphing page from entry line to graph	*tab*

Calculations - Starting from a CALCULATOR Page

Action Desired	Example Problem	Example Input	Example Output
Enter **symbols** such as: **absolute value, piecewise function, integral, derivative, limit, summation**	$\lvert 8^2 - 100 \rvert$ or $\lim_{x \to 3}(x+5)$		36 or 8
Enter a **floor** or **ceiling** function. Remember that the **greatest integer function** is the same as the floor function.	$\lfloor 3.8 \rfloor$ or $\lceil 3.8 \rceil$	2 *Number* *Number Tools* *Floor* or *Ceiling*	3 or 4
Approximate an expression.	Approximate $\sqrt{5}$.	*ctrl enter* after entering the expression	2.23607
Delete a *variable* value.	Suppose that a previous calculation has assigned the value 8 to *y*. Delete the value assigned to *y*.	*menu* *Action* *Delete Variable* *y enter*	Done
Clear the calculation page		*menu* *Action* *Clear History*	
Solve one equation in terms of *x* for a numerical solution in *exact* form.	Solve $x^3 - 2x = -1$.	*menu* *Algebra* *Solve* $x\text{^}3 - 2x = -1, x)$ *enter*	$x = \frac{-(\sqrt{5}+1)}{2}$ or $x = \frac{(\sqrt{5}-1)}{2}$ or $x = 1$
Solve one equation in terms of *x* for a numerical solution in *decimal* form.	Solve $x^3 - 2x = -1$.	*menu* *Algebra* *Solve* $x\text{^}3 - 2x = -1, x)$ *ctrl enter*	$x = 1$ or $x = .618034$ or $x = -1.61803$
Solve one equation with *multiple variables* for *y*.	Solve $2xy - y^2 = 8x$. Notice the multiplication sign in the entry line.	*menu* *Algebra* *Solve* $2x * y - y^2 = 8x, y)$ *enter*	$y = x - \sqrt{x}\sqrt{x-8}$ or $y = \sqrt{x}\sqrt{x-8} + x$

Solve a *system* of equations.	Solve the system $y - x^2 = -4$ and $2x - y = 1$.	*menu* *Algebra* *Solve System of Equations* *Solve System of Equations* Number of equations*:* 2 Variables: *x, y* *OK* Type one equation into each open box *enter*.	$x = 3$ and $y = 5$ or $x = -1$ and $y = -3$
Add (or subtract) two algebraic **fractions**.	$\frac{x-2}{x} + \frac{5}{x+3}$.	*menu* *Algebra* *Fraction Tools* *Common Denominator* Type in the expression and press *enter*	$\frac{x^2+6x-6}{x^2+3x}$
Convert an **improper fraction** into a mixed number	$\frac{2x^2-6x-8}{2x}$ or $\frac{21}{5}$	*menu* *Algebra* *Fraction Tools* *Proper Fraction* Type in the fraction and press *enter*	$x - \frac{4}{x} - 3$ or $4\frac{1}{5}$
Factor an expression in terms of *x*.	$x^2 - 5x + 6$.	*menu* *Algebra* *Factor* Type in the expression and press *enter*	$(x-3)(x-2)$
Define and evaluate a function.	$f1(x) = 2x^2$ $f1(3) = 18$	Go to the graphing page and type in the function. Return to the calculation page. *var* Choose the function and press *enter* 3	$f1(3) = 18$
Enter a **piecewise** defined function.	$y = \begin{cases} x+2 & x \le 4 \\ x^2 & x > 4. \end{cases}$	 Choose the desired format *enter*	$\begin{cases} x+2, & x \le 4 \\ x^2, & x > 4 \end{cases}$
Find a **difference quotient** of a function over the interval $[x,\ x+h]$.	Find the difference quotient of $y = x^2$ over the interval $[0.9, 1.1]$.	 1 avgRC(x^2, x, 0.2) | $x = 0.9$ *enter* (To find the vertical bar press ctrl =)	2

Find a **derivative** of a function with respect to *x* and evaluate the derivative at a *particular point*.	Find the derivative of $y = 3x^2$ at the point $(1, 3)$.	$\frac{d}{dx}\left(3x^2\right)\|x = 1$ *enter* (To find the vertical bar press ctrl =)	6
Find a **derivative** of a function y *defined implicitly* in terms of *x*.	Find the derivative implicitly of the relation $xy^2 - 4x = 5y$.	*menu* *Calculus* *Implicit Differentiation* $impDif\left(x \bullet y^2 - 4x = 5y, x, y\right)$	$\frac{-\left(y^2 - 4\right)}{2xy - 5}$
Find the *x* value where a function has an *absolute* **maximum**.	Find the *x* value of the absolute maximum of the function $y = -x^2 + x$.	*menu* *Calculus* *Function Maximum* $fMax(-x^2 + x, x)$ *enter*	$x = \frac{1}{2}$
Find the *x* value where a function has a *relative* **maximum**.	Find the *x* value of the relative maximum of the function $y = x^3 - x$. Note that first you must determine an interval on which the relative maximum is an absolute maximum, such as in the interval $[-1, 1]$.	*menu* *Calculus* *Function Maximum* $fMax(x^3 - x^2, x) \mid -1 \le x \le 1$ *enter* (To find the $\le$ symbol press ctrl =)	$x = 0$ or $x = 1$
Find the *x* value where a function has an *absolute* **minimum**.	Find the *x* value of the absolute minimum of the function $y = x^2 + x$.	*menu* *Calculus* *Function Minimum* $fMin(x^2 + x, x)$ *enter*	$x = -\frac{1}{2}$
Find the *x* value where a function has a *relative* **minimum**.	Find the *x* value of the relative minimum of the function $y = x^3 - x$. Note that first you must determine an interval on which the relative minimum is an absolute minimum, such as in the interval $(0, 3)$.	*menu* *Calculus* *Function Minimum* $fMin(x^3 - x^2, x) \mid 0 < x < 3$ *enter* (To find the < symbol press ctrl =)	$x = 4/3$
Solve a *differential equation* where *y* is a function of *x*, to obtain a *general* solution.	Solve $y' = 5y$. Note: The symbol is	*menu* *Calculus* *Differential Equation Solver* $deSolve(y' = 5y, x, y)$ *enter* (To find the ' symbol press ctrl ?!)	$y = c1 \bullet e^{5x}$ Note the expression $c1$ represents a constant C_1. Each time it displays a new constant it chooses the next integer value, so it may give you $c2$, meaning C_2.

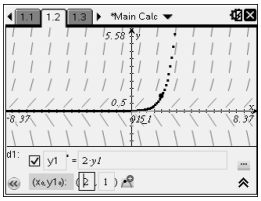
Solve a *differential equation* where y is a function of x, to obtain a *particular* solution.	Solve $y' = 5y$ where $y(2) = 4$. Note: The expression y' is only meaningful when using the deSolve command.	*menu* *Calculus* *Differential Equation Solver* $deSolve(y' = 5y$ and $y(2) = 4, x, y)$ *enter* (Just type in the letters of the word *and*, with a space before and after the word).	$y = 4e^{5x-10}$
Generate a Taylor polynomial of degree n centered at c.	Find a third order Taylor polynomial for $y = e^x$ centered at 0.	*menu* *Calculus* *Series* *Taylor Polynomial* $e^x, x, 3, 0)$ *enter*	$1 + x + \frac{x^2}{2!} + \frac{x^3}{3!}$
Generate a Taylor polynomial of degree n centered at c and evaluate it at x.	Find a third order Taylor polynomial for $y = e^x$ centered at 0 and evaluate it at $x = 0.5$	*menu* *Calculus* *Series* *Taylor Polynomial* $e^x, x, 3, 0) \mid x = 0.5$ *enter*	1.6458333

Graphing - Starting from a GRAPHS page

Action	Menu Location
Enter (or edit) a function in the graphing window	*tab* to see the entry line Move cursor up or down to desired entry line Type function *enter*
Hide a label on a graphed function with its equation	Move cursor to the label *ctrl menu* *Hide*
Unhide a label on a graphed function with its equation	Move cursor to the function *ctrl menu* *Label*
Delete a particular function and its graph in the graphing window	Move cursor to the graph *ctrl menu* *Delete*
Delete all functions and their graphs from the graphing page	*menu* *Action* *Delete All*
See the coordinates of a point in the graphing window	*ctrl menu* *Coordinates and Equations*
Slide the axes up/down or left/right without changing proportions	Move cursor to a blank place on the screen Press center button on cursor. Use arrows to move axes
Stretch or shrink the axes in all directions	Move cursor to the axes Press center button on cursor Use ◀▶▲▼ to move the axes
Turn a particular graph off/on	*tab* until the double arrow on the bottom right of the screen is highlighted. *enter* Move cursor to the desired function line and then over to the far left of the entry until the on/off symbol is highlighted (it looks like an eye) *enter*
Turn grid on/off on graph	*menu* *view* *Hide/Show Grid*
Turn axes on/off on graph	*menu* *view* *Hide/Show Axes*
Use the pointer as a device to turn on/off anything it points to in the graphing window	*menu* *Action* *Hide/Show* Now anything you click on will turn to grey to signify that it is to be hidden. Click on it again and it comes back to normal Press *esc* when finished. Then anything that was grey will be hidden and cursor will return to normal
Rectangular Function/Parametric Equations/Polar Functions/Sequences	*menu* *Graph Type* *Function or Parametric or Polar or Sequence*

Action Desired	Example Problem	Example Input	Example Output
Find a **zero, maximum, minimum, or inflection point** on a graphed curve.	Find a zero (or max, or min, or inflection) on the graphed curve $y = x^3 - 2x^2$. Problems: Does not find inflection points where the tangent line would be vertical.	*menu* *Analyze Graph* *Zero (or Max, or Min or Inflec)* Use ◀▶ to set the left boundary *enter* Use ▶ to set the right boundary *enter*	$(2, 0)$ (zero) $(0, 0)$ (maximum) $(1.3333, -1.1852)$ (minimum) $(0.66667, -0.59259)$ (inflection)
Find multiple **zeros** at once on a graphed curve.	Find all zeros on the graphed curve $y = x^3 - 5x^2 + 6$.	First, enter and graph the function $f2(x) = 0$. *menu* *Points&Lines* *Intersection Points* Move cursor close to graphed curve *enter* Move cursor close *x*-axis *enter* *esc*	$(-1, 0)$, $(1.26795, 0)$, $(4.73205, -0)$
Find points of **intersection** on two graphed curves.	Find the intersection of the graphed curves $y = x^2 - 4$ and $y = 2x - 1$. Note this method finds *all* points of intersection that occur in the visible window.	*menu* *Points&Lines* *Intersection Points* Move cursor close to one curve *enter* Move cursor close to other curve *enter* *enter* *esc*	$(3, 5)$ $(-1, -3)$
Find a point of **intersection** on two graphed curves. (alternate method)	Find the intersection of the graphed curves $y = x^2 - 4$ and $y = 2x - 1$. Note you must repeat the process for each point of intersection.	*menu* *Analyze Graph* *Intersection* Use ◀▶ to set the left boundary *enter* Use ▶ to set the right boundary *enter*	$(3, 5)$ $(-1, -3)$

Find and graph a **tangent line** to a graphed curve.	Find and graph the line tangent to the graphed curve $y = 3x^2$ at $(1, 3)$.	*menu* *Points&Lines* *Tangent* *Move cursor to the curve.* *enter* *enter* *esc* Move cursor to tangent line until "line" appears. *ctrl menu* *Coordinates and Equations* Move cursor to point of tangency until "point" appears. *ctrl menu* *Coordinates and Equations* Move cursor to *x*-coordinate of label on point until "text" appears. *enter* *enter* Delete the value there and replace it with a 1 *enter*	Tangent line is graphed and its equation, $y = 6x + 3$, is printed on the screen. Note that the slope of the curve will be the slope of the tangent line to the curve at the desired point.
Find the **slope** of a curve at a given point.	Find the slope of the graphed curve $y = 3x^2$ at $(1, 3)$.	*menu* *Analyze Graph* *dy/dx* Move the cursor to the approximate location *enter* *esc* Move cursor to the point *ctrl menu* *Coordinates and Equations* Move cursor to the *x*-coordinate of the point label *enter* *enter* Type in the desired *x*-value *enter*	The slope is the single number 6 that appears beside the point.

View the **area** under a graphed curve and find the **integral** over that interval.	View the area under the graphed curve $y = x^3$ and find the integral on $[-1, 1]$. (Note, if you place the point directly on the *x*-axis, it is possible to get exact integer values for the endpoints.)	First graph the desired function. *menu* *Analyze Graph* *Integral* Move cursor to left endpoint *enter* Move cursor to right endpoint *enter* To get more exact endpoints it may be necessary to: Move cursor to one endpoint of the region on the *x*-axis, until "point" appears. *ctrl* *menu* *Coordinates and Equations* Move cursor to *x*-coordinate of point label *enter* *enter* Type in desired *x*-value. Repeat for other endpoint.	0
Create a slope field for a differential equation and draw a particular solution.	Draw a slope field for the differential equation $\frac{dy}{dx} = 2y$ and the solution passing through the point $(2, 1)$	*menu* *Graph Type* *Diff Eq* Beside *y*1 type $2 \times y1$ In the parentheses just below type 2 1	

Menu Choices from Any Page

DOCUMENTS
- **File**
  - New Document
  - Open Document
  - Close
  - Save
  - Save As.
  - Send
  - View copyright information
- **Edit**
  - Undo
  - Redo
  - Cut
  - Copy
  - Paste
  - Delete
  - Color
- **View**
  - Back
  - Forward
  - Page Sorter
- **Insert**
  - Problem
  - Page
  - Calculator
  - Graphs
  - Geometry
  - Lists and Spreadsheet
  - Data & Statistics
  - Notes
  - Vernier DataQuest
  - Program Editor
    - New
    - Open
    - Import
    - View
  - Sensor Console
- **Page Layout**
    - Custom Split
    - Select Layout
    - Select App
    - Swap Applications
    - Delete Application
    - Delete Page
    - Group
    - Ungroup
- **Refresh Libraries**
- **Settings & Status**
  - Change Language
  - Settings
    - General
      - Display Digits
      - Angle
      - Exponential Format
      - Real or Complex
      - Auto or Approx
      - Vector Format
      - Base
      - Unit System
    - Graphs & Geometry
      - Display Digits
      - Graphing Angle
      - Geometry Angle
      - Automatically hide plot labels
      - Show axis end values
      - Show tool tips for function manipulation
      - Automatically find points of interest
    - Handheld Setup
      - Font Size
      - Power Standby
      - Hibernate
      - Pointer Speed
    - Status
      - Batteries
      - Version
      - Available Space
      - Network
      - Login status
      - About
        - Product ID Number
    - Login
  - **Login**

HOME
- **Scratchpad**
  - Calculate
  - Graph
- **Documents**
  - New Document
  - My Documents
  - Recent
  - Current
  - Settings
    - Change Language
    - Settings
      - General
        - Display Digits
        - Angle
        - Exponential Format
        - Real or Complex
        - Auto or Approx
        - Vector Format
        - Base
        - Unit System
      - Graphs & Geometry
        - Display Digits
        - Graphing Angle
        - Geometry Angle
        - Automatically hide plot labels
        - Show axis end values
        - Show tool tips for function manipulation
        - Automatically find points of interest
    - Handheld Setup
      - Font Size
      - Power Standby
      - Hibernate
      - Pointer Speed
    - Status
      - Batteries
      - Version
      - Available Space
      - Network
      - Login status
      - About
        - Product ID Number
    - Login
- **Add Page to:**
  - **Calculation**
  - **Graphs**
  - **Geometry**
  - **Lists & Spreadsheet**
  - **Data & Statistics**
  - **Notes**
  - **Vernier DataQuest**

Menu Choices from Calculator Page

CTRL MENU
- **Clear History**
- **Cut**
- **Copy**
- **Paste**
- **Delete**
- **Select Variable**
- **Symbols**
- **Math Templates**

MENU
- **Actions**
  - Define
  - Recall Definition
  - Delete Variable
  - Clear a – z
  - Clear History
  - Insert Comment
  - Library
    - Refresh Libraries
    - Insert \ character
    - Create Library Shortcut
    - Define LibPriv
    - Define LibPub
  - Lock
    - Lock Variable
    - Unlock Variable
    - Get Lock Info
- **Number**
  - Convert to Decimal
  - Approximate to Fraction
  - Factor
  - Least Common Multiple
  - Greatest Common Factor
  - Remainder
  - Fraction Tools
    - Proper Fraction
    - Get Numerator
    - Get Denominator
    - Common Denominator
  - Number Tools
    - Round
    - Integer Part
    - Fractional Part
    - Sign
    - Mod
    - Floor
    - Ceiling
  - Complex Number Tools
    - Complex Conjugate
    - Real Part
    - Imaginary Part
    - Polar Angle
    - Magnitude
    - Convert to Polar
    - Convert to Rectangular
- **Algebra**
  - Solve
  - Factor
  - Expand
  - Zeros
  - Complete the Square
  - Numerical Solve
  - Solve System of Equations
    - Solve System of Equations
    - Solve System of Linear Equations
  - Polynomial Tools
    - Find Roots of Polynomial
    - Real Roots of Polynomial
    - Complex Roots of Polynomial
    - Remainder of Polynomial
    - Quotient of Polynomial
    - Greatest Common Divisor
    - Coefficients of Polynomial
    - Degree of Polynomial
  - Fraction Tools
    - Proper Fraction
    - Get Numerator
    - Get Denominator
    - Common Denominator
  - Convert expression
    - Convert to ln
    - Convert to logbase
    - Convert to exp
    - Convert to sin
    - Convert to cos
  - Trigonometry
    - Expand
    - Collect
  - Complex
    - Solve
    - Factor
    - Zeros
  - Extract
    - Left
    - Right
- **Calculus**
  - Derivative
  - Derivative at a Point
  - Integral
  - Limit
  - Sum
  - Product
  - Function Minimum
  - Function Maximum
  - Tangent Line
  - Normal Line
  - Arc Length
  - Series
    - Taylor Polynomial
    - Generalized Series
    - Dominant Term
  - Differential Equation Solver
  - Implicit Differentiation
  - Numerical Calculations
    - Numerical Derivative at a Point
    - Central Difference Quotient with Step
    - Numerical Integral
    - Numerical Function Min
    - Numerical Function Max
- **Probability**
  - Factorial
  - Permutations
  - Combinations
  - Random
    - Number
    - Integer
    - Binomial
    - Normal
    - Sample
    - Seed
  - Distributions
    - Normal Pdf
    - Normal Cdf
    - Inverse Normal
    - t Pdf
    - t Cdf
    - Inverse t
    - X^2 Pdf
    - X^2 Cdf
    - Inverse X^2
    - F Pdf
    - F Cdf
    - Inverse F
    - Binomial Pdf
    - Binomial Cdf
    - Geometric Pdf
    - Geometric Cdf
    - Poisson Pdf
    - Poisson Cdf
- **Statistics**
  - Stat Calculations
    - One-Variable Statistics
    - Two-Variable Statistics
    - Linear Regression (mx+b)
    - Linear Regression (a+bx)
    - Median-Median Line
    - Quadratic Regression
    - Cubic Regression
    - Quartic Regression
    - Power Regression
    - Exponential Regression
    - Logarithmic Regression
    - Sinusoidal Regression
    - Logistic Regression (d=0)
    - Logistic Regression (d≠0)
    - Multiple Linear Regression
    - Correlation Matrix
  - Stat Results

MENU (continued)
- **Statistics (continued)**
  - List Math
    - Minimum
    - Maximum
    - Mean
    - Median
    - Sum of Elements
    - Product of Elements
    - Sample Standard Deviation
    - Sample Variance
    - Population Standard Deviation
    - Population Variance
  - List Operations
    - Sort Ascending
    - Sort Descending
    - Cumulative Sum List
    - Fill
    - Sequence
    - Difference List
    - Augment
    - Convert List to Matrix
    - Convert Matrix to List
    - Left
    - Mid
    - Right
  - Distributions
    - Normal Pdf
    - Normal Cdf
    - Inverse Normal
    - T Pdf
    - T Cdf
    - Inverse t
    - X^2 Pdf
    - X^2 Cdf
    - Inverse X^2
    - F Pdf
    - F Cdf
    - Inverse F
    - Binomial Pdf
    - Binomial Cdf
    - Geometric Pdf
    - Geometric Cdf
    - Poisson Pdf
    - Poisson Cdf
  - Confidence Intervals
    - z interval
    - t interval
    - 2-Sample z Interval
    - 2-Sample t Interval
    - 1-Prop z Interval
    - 2-Prop z Interval
    - Linear Reg t Intervals
    - Multiple Reg Intervals
  - Stat Tests
    - z Tes
    - t Test
    - 2-Sample z Test
    - 2-Sample z Test
    - 1-Prop z Test
    - 2-Prop z Test
    - X^2 GOF
    - X^2 2-way Test
    - 2-Sample F Test
    - Linear Reg t Test
    - Multiple Reg Tests
    - ANOVA
    - ANOVA 2-way Test
- **Matrix & Vector**
  - Create
    - Matrix
    - Zero Matrix
    - Identity
    - Diagonal
    - Random Matrix
    - Fill
    - Submatrix
    - Augment
    - Column Matrix
    - Construct Matrix
  - Transpose
  - Determinant
  - Row-Echelon Form
  - Reduced Row-Echelon Form
  - Simultaneous
  - Norms
    - Norm
    - Row
    - Column
  - Dimensions
    - Matrix
    - Row
    - Column
  - Row Operations
    - Swap Rows
    - Row Add
    - Multiply Row
    - Multiply Row & Add
  - Element Operations
    - Dot Add
    - Dot Subtract
    - Dot Multiply
    - Dot Divide
    - Dot Power
  - Advanced
    - Trace
    - LU decomposition
    - QR Decomposition
    - Eigenvalues
    - Eigenvectors
    - Characteristic Polynomial
  - Vector
    - Unit Vector
    - Cross Product
    - Dot Product
    - Convert to Polar
    - Convert to Rectangular
    - Convert to Cylindrical
    - Convert to Spherical
- **Finance**
  - Finance Solver
  - TVM Functions
    - Number of Periods
    - Interest rate Per Year
    - Present Value
    - Payment Amount
    - Future Value
  - Amortization
    - Amortization Table
    - Balance
    - Interest Paid
    - Principal Paid
  - Cash Flow
    - Net Present Value
    - Internal Rate of Return
    - Modified Internal Rate Return
  - Interest Conversion
    - Normal Interest rate
    - Effective Interest rate
  - Days between Dates
- **Functions & Programs**
  - Program Editor
    - New
    - Open
    - Import
    - View
  - Func…EndFunc
  - Prgm…EndPrgm
  - Local
  - Control
    - If
    - If…Then…Endif
    - If…Then…Else…Endif
    - Elseif…Then
    - For…EndFor
    - While…EndWhile
    - Loop…EndLoop
    - Try…Else…EndTry
    - ClrErr
    - PassErr
    - errCode
    - warnCodes
  - Transfer
    - Return
    - Cycle
    - Exit
    - Lbl
    - Go To Lbl
    - Stop
  - I/O
    - Disp
    - Request
    - Request Str
    - Text
  - Mode
    - Display Digits
    - Angle
    - Exponential Format
    - Real or Complex
    - Auto or Approx
    - Vector Format
    - Base
    - Unit System
    - Get Mode
    - Get Language Info
  - Add New Line
- **Hints**

Menu Choices from Graphs Page

CTRL MENU on a function entry line
- **Expand Entry Line**
- **Graph Type**
  - Function
  - Parametric
  - Polar
  - Scatter Plot
  - Sequence
- **Attributes**
  - Arrows: Positive/All/No
  - Zoom: User/Quadrant 1/ Trig/Data/ Standard/Decimal
  - Tic labels: Shown/Hidden
  - End Value: Shown/Hidden
- **Show Table**

CTRL MENU on a graphed function
- **Recent**
- **Label**
- **Attributes**
  - Line weight: Thin/Medium/Thick
  - Line style: Continuous/Dotted/ Dashed
  - Label style: *f* / *f*() / *f*()= / *y*=*f*() / *y*=
  - Graph: Continuous/Discrete
- **Hide/Show**
- **Delete**
- **Edit Relation**
- **Trace**
  - Graph Trace
  - Trace All
  - Trace Step
- **Analyze Graph**
  - Zero
  - Minimum
  - Maximum
  - Intersection
  - Inflection
  - *dy/dx*
  - Integral
- **Show Table**
- **Pin**
- **Color**
  - Line color
  - Fill Color
  - Text Color

CTRL MENU on an axis
- **Recent**
- **Attributes**
  - Arrows: Positive/All/No
  - Zoom: User/Quadrant 1/ Trig/Data/ Standard/Decimal
  - Tic labels: Shown/Hidden
  - End Value: Shown/Hidden
- **Hide/Show**
  - Hide Axes
  - Show Grid
- **Window Zoom**
  - Window Settings
    - XMin
    - XMax
    - XScale
    - YMin
    - YMax
    - YScale
  - Zoom Box
  - Zoom In
  - Zoom Out
  - Zoom Standard
  - Zoom Quadrant 1
  - Zoom User
  - Zoom Trig
  - Zoom Data
  - Zoom Fit
  - Zoom Square
  - Zoom Decimal
- **Pin**
- **Color**
  - Line color
  - Fill Color
  - Text Color

CTRL MENU on a point
- **Recent**
- **Label**
- **Attributes**
  - Shape: Circle/Empty Circle/Square/Empty Square/Cross/Plus/ Thin/Large/ Empty Large
  - Animation speed: Unidirectional/ Alternating
- **Hide/Show**
- **Delete**
- **Redefine**
- **Coordinates and Equations**
- **Measurement**
  - Length
  - Area
- **Geometry Trace**
- **Pin**
- **Color**
  - Line color
  - Fill Color
  - Text Color

MENU
- **Actions**
  - Pointer
  - Select
  - Hide/Show
  - Attributes
  - Delete All
  - Text
  - Coordinates and Equations
  - Calculate
  - Redefine
  - Insert Slider
- **View**
  - Graphing
  - Plane Geometry
  - 3D Graphing
  - Show/Hide Analytic Window
  - Show/Hide Axes
  - Show/Hide Grid
  - Show/Hide Entry Line
  - Show/Hide Scale
  - Show/Hide Axes End Values
  - Show/Hide Table
  - Show/Hide Object Selection Guides
- **Graph Type**
  - Function
  - Parametric
  - Polar
  - Scatter Plot
  - Sequence
    - Sequence
    - Custom
  - Diff Eq
- **Window**
  - Window Settings
    - XMin
    - XMax
    - XScale
    - YMin
    - YMax
    - YScale
  - Zoom Box
  - Zoom In
  - Zoom Out
  - Zoom Standard
  - Zoom Quadrant 1
  - Zoom User
  - Zoom Trig
  - Zoom Data
  - Zoom Fit
  - Zoom Square
  - Zoom decimal
- **Trace**
  - Graph Trace
  - Trace All
  - Trace Step
  - Geometry Trace
  - Erase Geometry Trace

Analyze Graph
- Zero
- Minimum
- Maximum
- Intersection
- Inflection
- *dy/dx*
- Integral

Points & Lines
- Point
- Point On
- Intersection Points
- Line
- Segment
- Ray
- Tangent
- Vector
- Circle Arc

Measurement
- Length
- Area
- Slope (line only)
- Angle

Shapes
- Circle
- Triangle
- Rectangle
- Polygon
- Regular Polygon

Construction
- Perpendicular
- Parallel
- Perpendicular Bisector
- Angle Bisector
- Midpoint
- Locus
- Compass
- Measurement transfer

Transformation
- Symmetry
- Reflection
- Translation
- Rotation
- Dilation

Hints

Menu Choices from Lists & Spreadsheets Page

CTRL MENU in a Table
- **Copy**
- **Delete Column**
- **Choose**
- **Edit Expression**
- **Resize**
  - Resize Column Width
  - Maximize Column Width
  - Minimize Column Width

MENU in a Table
- **Actions**
  - Resize
    - Resize Column Width
    - Minimize Column Width
- **Table**
  - Switch to Lists & Spreadsheets
  - Delete Column
  - Choose
  - Edit Expression
  - Edit Table Settings
    - Table Start
    - Table Step
    - Independent
    - Dependent
- **Hints**

CTRL MENU in a Spreadsheet
- **Cut**
- **Copy**
- **Paste**
- **Insert Cell**
- **Delete Cell**
- **Fill Down**
- **Variables**
  - Store Variable
  - Unlink
  - Link To
- **Resize**
  - Resize Column Width
  - Maximize Column Width
  - Minimize Column Width
- **Frequency Plot**
- **Quick Graph**
- **Color**
  - Line Color
  - Fill Color
  - Text Color

MENU in a Spreadsheet
- **Actions**
  - Move Column
  - Resize
    - Resize Column Width
    - Maximize Column Width
    - Minimize Column Width
    - Resize Row Height
    - Auto-size
  - Select
    - Select Row
    - Select Column
    - Select Range
  - Go To
  - Recalculate
  - Sort
- **Insert**
  - Insert Cell
  - Insert Row
  - Insert Column
- **Data**
  - Generate Sequence
  - Data Capture
    - Automated Data Capture
    - Manual Data Capture
  - Fill Down
  - Clear Data
  - Frequency Plot
  - Quick Graph
- **Statistics**
  - Stat Calculations
    - One-Variable Statistics
    - Two-Variable Statistics
    - Linear Regression (mx+b)
    - Linear Regression (a+bx)
    - Median-Median Line
    - Quadratic Regression
    - Cubic Regression
    - Quartic Regression
    - Power Regression
    - Exponential Regression
    - Logarithmic Regression
    - Sinusoidal Regression
    - Logistic Regression (d=0)
    - Logistic Regression (d≠0)
    - Multiple linear Regression
    - Correlation Matrix
  - Distributions
    - Normal Pdf
    - Normal Cdf
    - Inverse Normal
    - t Pdf
    - t Cdf
    - Inverse t
    - X^2 Pdf
    - X^2 Cdf
    - Inverse X^2
    - F Pdf
    - F Cdf
    - Inverse F
    - Binomial Pdf
    - Binomial Cdf
    - Geometric Pdf
    - Geometric Cdf
    - Poisson Pdf
    - Poisson Cdf
  - Confidence Intervals
    - z interval
    - t interval
    - 2-Sample z Interval
    - 2-Sample t Interval
    - 1-Prop z Interval
    - 2-Prop z Interval
    - Linear Reg t Intervals
    - Multiple Reg Intervals
  - Stat Tests
    - z Tes
    - t Test
    - 2-Sample z Test
    - 2-Sample z Test
    - 1-Prop z Test
    - 2-Prop z Test
    - X^2 GOF
    - X^2 2-way Test
    - 2-Sample F Test
    - Linear Reg t Test
    - Multiple Reg Tests
    - ANOVA
    - ANOVA 2-way Test
- **Table**
  - Switch to Table
  - Delete Column
  - Choose
  - Edit Expression
  - Edit Table Settings
- **Hints**