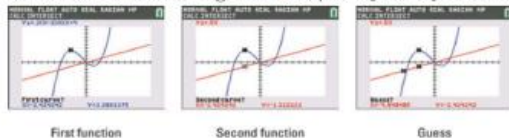


TI GRAPHING CALCULATOR BASIC REFERENCE DOCUMENT (Pre-Calculus Functions)

Finding Intersections

- Graph the functions in a viewing window that contains the point of intersection of the functions.
- Press [2nd][TRACE] to access the Calculate menu.
- Press [5] to select the intersect option.
- Select the first function.
If the name of one of the intersecting functions does not appear in the border at the top of the screen, repeatedly press the up- and down-arrow keys until it does. This is illustrated in the first screen. When the cursor is on one of the intersecting functions, press [ENTER] to select it.
- Select the second function.
If the calculator does not automatically display the name of the second intersecting function in the border at the top of the screen, repeatedly press the up- and down-arrow keys until it does. This is illustrated in the second screen. When the cursor is on the second intersecting function, press [ENTER] to select it.
- Use the right- and left-arrow keys to move the cursor as close to the point of intersection as possible.
This is illustrated in the third screen.
- Press [ENTER] to display the coordinates of the point of intersection.



Storing Numbers in the Calculator

- If necessary, press [2nd][MODE] to enter the Home screen.
- Enter the number you want to store in a variable.
You can store the number as an arithmetic expression. This is illustrated in the first picture. After you complete the steps for storing the number, the calculator evaluates that expression.
- Press
[STO→]
The result of this action is shown in the first picture.
- Press [ALPHA] and then press the key corresponding to the letter of the variable in which you want to store the number.
The second picture shows this process. The letters used for storing variables are the letters of the alphabet and the Greek letter θ .
- Press [ENTER] to store the value.
This is illustrated in the third picture.



Hint: If you want to store the most previous calculation (even if it is a value from the graph) you can immediately hit the STO key and it will store the most recent value.

Finding zeros:

- Graph the function in a viewing window that contains the zeros of the function.
To get a viewing window containing a zero of the function, that zero must be between **Xmin** and **Xmax** and the x-intercept at that zero must be visible on the graph.
- Press [2nd][TRACE] to access the Calculate menu.
- Press [2] to select the zero option.
- If necessary, repeatedly press the up- and down-arrow keys until the appropriate function appears in the border at the top of the screen.
- Set the Left Bound for the zero you desire to find.
(Determine a number that is left of your estimated zero (for example if the zero is between 2 and 3, choose 1 and type it in manually.)
- Set the Right Bound for the zero.
(Determine a number that is right of your estimated zero (for example if the zero is between 2 and 3, choose 4 and type it in manually.)

- Tell the calculator where you guess the zero is located.
Move the cursor to your estimated zero and press [ENTER].



The calculator uses scientific notation to denote really large or small numbers. For example, -0.00000001 is displayed on the calculator as $-1E-8$, and 0.000000005 is displayed as $5E-8$.

so if you see this number - your calculator is telling you the value is 0.

Finding Maximum/Minimum

1 Graph the function in a viewing window that contains the minimum and/or maximum values of the function.

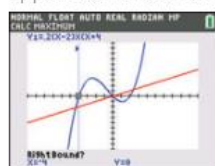
2 Press [2nd][TRACE] to access the Calculate menu.

3 Press [3] to find the minimum, or press [4] to find the maximum.

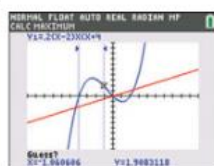
4 If necessary, repeatedly press the up- and down-arrow keys until the appropriate function appears in the border at the top of the screen.

5 Set the Left Bound of the minimum or maximum point.

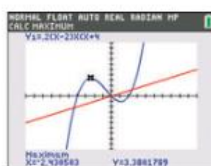
To do so, use the left- and right-arrow keys to place the cursor on the graph a little to the left of the location of the minimum or maximum point, and then press [ENTER]. A *Left Bound indicator* (the dotted line with a triangular indicator shown in the first screen) appears on the screen.



Left Bound indicator



Right Bound indicator



Guess

6 Set the Right Bound for the zero.

To do so, use the left- and right-arrow keys to place the cursor on the graph a little to the right of the location of the minimum or maximum point, and then press [ENTER]. A *Right Bound indicator* (the rightmost dotted line with the triangular indicator in the second screen) appears on the screen.

7 Tell the calculator where you guess the min or max is located.

To do so, use the left- and right-arrow keys to place the cursor on the graph as close to the location of the minimum or maximum point as possible, and then press [ENTER]. The coordinates of the minimum or maximum point appears in the border at the bottom of the screen (as shown in the third screen).

Setting the Display Brightness

This section covers how to set the display brightness and explains automatic dimming.

Adjusting the Display Brightness

You can adjust the display brightness to suit your viewing angle and lighting conditions.

To adjust the brightness, follow these steps.

- ▶ Press [2nd] [] to darken the screen one level at a time.
- ▶ Press [2nd] [] to lighten the screen one level at a time.

The TI-84 Plus CE retains the brightness setting in memory when it is turned off.

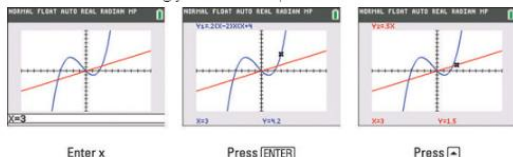
Using your graph to find the value of a function

The **CALC** menu can be used to evaluate a function at any specified x -value. To access and use this command, perform the following steps:

- 1 Graph the functions in a viewing window that contains the specified value of x .
To get a viewing window containing the specified value of x , that value must be between **Xmin** and **Xmax**.
- 2 Press $[2^{nd}][TRACE]$ to access the Calculate menu.
- 3 Press $[ENTER]$ to select the value option.
- 4 Enter the specified value of x .

When using the **value** command to evaluate a function at a specified value of x , that value must be an x -value that appears on the x -axis of the displayed graph — that is, it must be between **Xmin** and **Xmax**. If it isn't, you get an error message.

Use the keypad to enter the value of x (as illustrated in the first screen). If you make a mistake when entering your number, press $[CLEAR]$ and re-enter the number.



Enter x

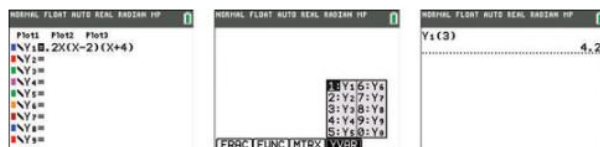
Press $[ENTER]$

Press $[=]$

Using your calculator to find the value of a function

Another way to find the value of a function involves using your calculator. This method is easy and doesn't have the restrictions the graphing method has (the x -value has to be between the **Xmin** and **Xmax**).

- 5 Press $[ENTER]$.
After you press $[ENTER]$, the first highlighted function in the **Y=** editor appears in the border at the top of the screen, the cursor appears on the graph of that function at the specified value of x , and the coordinates of the cursor appear in the border at the bottom of the screen. See the second screen.
You can also find the value of a function by pressing $[TRACE]$, entering an x -value, and pressing $[ENTER]$.
- 1 Enter your function in the **Y=** editor.
You need to remember the name of the function you enter. An equation is entered in **Y₁** as shown in the first screen.



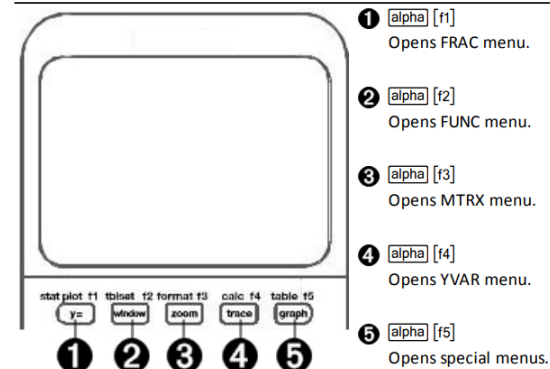
Y= editor

Y-VAR menu

Press $[ENTER]$

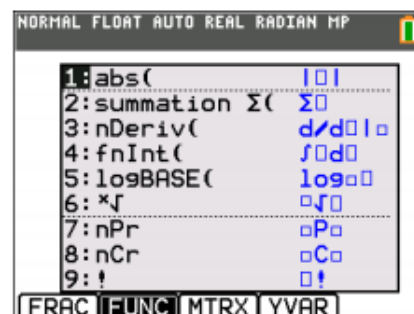
- 2 Press $[2^{nd}][MODE]$ to access the Home screen.
- 3 Press $[ALPHA][TRACE]$ to access the **Y-VAR** menu and choose the function you need.
See the second screen.
- 4 Press $[()]$ and enter the x -value you would like evaluated.
- 5 Press $[)]$ and then press $[Enter]$.
See the third screen.

Using Shortcut Menus



FUNC shortcut menu

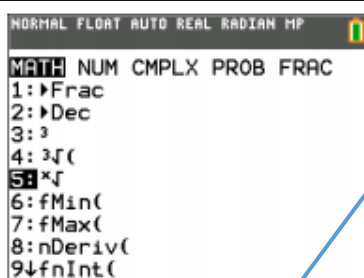
α [f2]



Fractions

The most efficient way to work with fractions is to use the function key. Press alpha, f1 (y=), for the options.

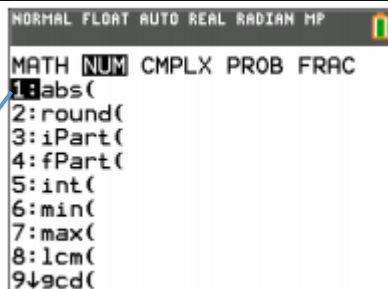
- n/d is a template for a fraction.
- Un/d is a template for a mixed number.
- Option 3 converts a number between a fraction and mixed number.



NORMAL FLOAT AUTO REAL RADIAN MP

MATH NUM CMPLX PROB FRAC


1:1/Frac
2:1/Dec
3:1/3
4:1/4
5:1/5
6:fMin(
7:fMax(
8:nDeriv(
9:fnInt(



NORMAL FLOAT AUTO REAL RADIAN MP

MATH NUM CMPLX PROB FRAC

1:abs(
2:round(
3:iPart(
4:fPart(
5:int(
6:min(
7:max(
8:lcm(
9:gcd(



SCI FLOAT AUTO REAL RADIAN MP

MATH NUM CMPLX PROB FRAC

4:1/4
5:1/5
6:fMin(
7:fMax(
8:nDeriv(
9:fnInt(
0:summation Σ(
A:logBASE(
B:Numeric Solver...

Evaluating the nth root of a number

Press the math key. Scroll down to 5: $\sqrt[n]{}$ and press enter, or simply press the number 5. This will paste a template onto the home screen. An alternative method of evaluating roots is to use the function key. Press alpha, f2 (window key), and select option 6.

Evaluating the absolute value of a number

To evaluate the absolute value of a number or expression, press the math key arrow over to NUM and select 1: abs(. This will place a template on the home screen. An alternative method of evaluating absolute value is to use the function key. Press alpha then the f2 (window key), and select option 1: abs(.

Logs

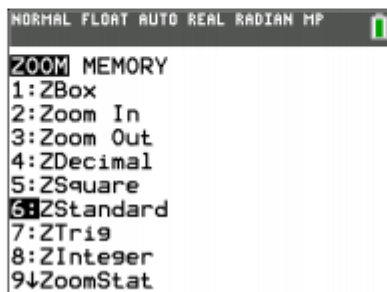
Logs with any base can be evaluated using a template on the TI-84 Plus CE.

1. Press MATH, scroll down to A:logBASE(, and press enter to paste the template onto the home screen.
2. Press alpha, f2, 5: logBASE(, and enter to paste the template onto the home screen.

Setting the window

The window of a graph refers to the range of values of the x- and y-coordinates shown on the graph.

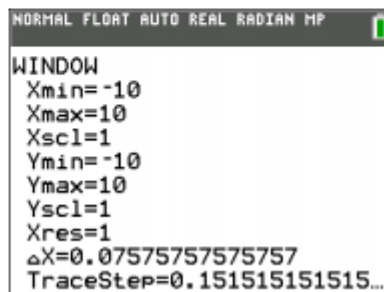
There are preset windows that can be accessed by pressing zoom. For standardized tests, it is best to start in 6:ZStandard (X: [-10, 10] and Y: [-10, 10]). The other windows might be helpful as well, depending on the problem. If the window in your graph appears to be "messed up", consider an appropriate domain (x-values) for the problem and set the window to that domain. The window settings can also be changed by pressing the window key.



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ZOOM MEMORY

1:ZBox
2:Zoom In
3:Zoom Out
4:ZDecimal
5:ZSquare
6:ZStandard
7:ZTrig
8:ZInteger
9:ZoomStat



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WINDOW

Xmin=-10
Xmax=10
Xscl=1
Ymin=-10
Ymax=10
Yscl=1
Xres=1
ΔX=0.07575757575757
TraceStep=0.1515151515...