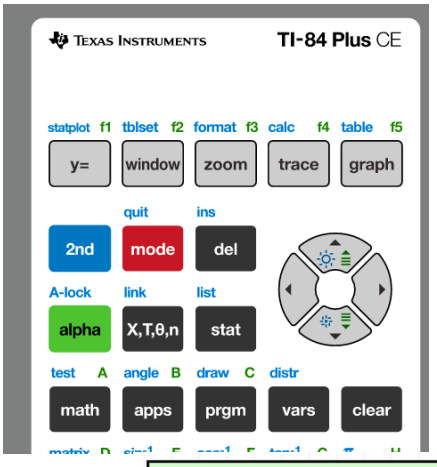
ap-calc.github.io

A brief tutorial of the TI-83/84 Graphing Calculator

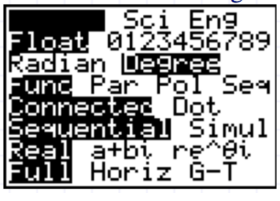
Mode (Settings)



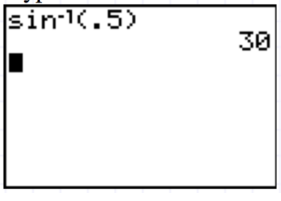
Radian vs Degree

Find $\sin^{-1}(0.5)$ in degrees

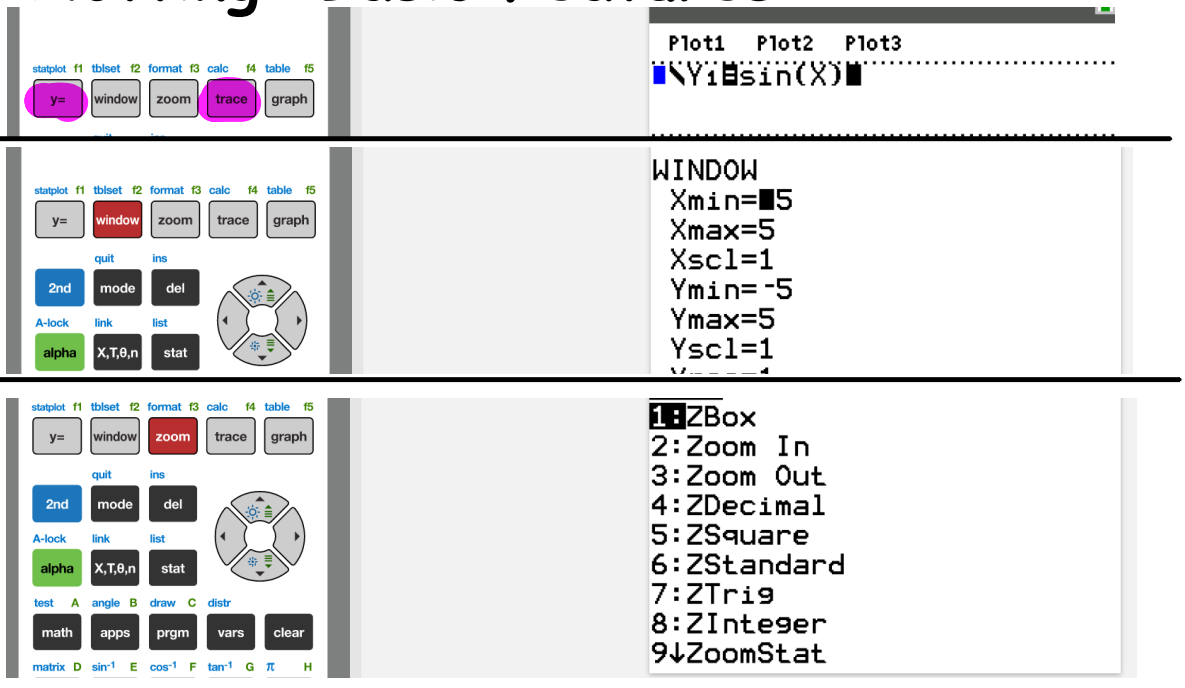
Set the MODE to Degree.



Type on the Home Screen



Plotting: Basic Features



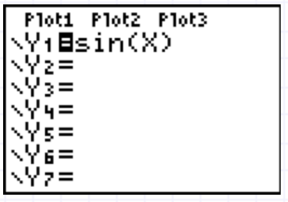
Your turn: Plot the graph of the function y = 100 sin(x) + 80 cos(x).

Change the **window** parameters so that you are able to see at least one period.

Experiment with other Zoom commands

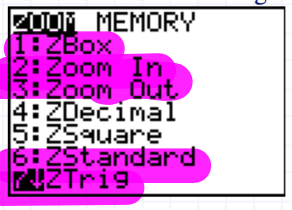
Graph $y = \sin(x)$

Enter the function.



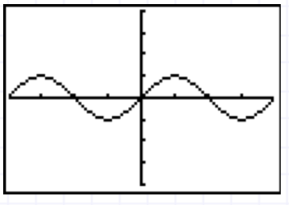
Set the MODE to Radian.

Choose ZOOM #7 ZTrig



Choosing ZOOM #7 ZTrig will set the x interval from $-2\pi \le x \le 2\pi$, set the y interval from $-4 \le y \le 4$, and set the increment at $\pi/2$.

Depending upon your desired graph, you may wish to further adjust these values under WINDOW.

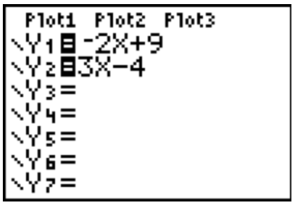


NOTE: If you do a ZOOM #7 ZTrig while in DEGREE mode, the x interval will be set from -352.5° to 352.5°, with the y interval from -4 to 4, and the increment set at 90°.

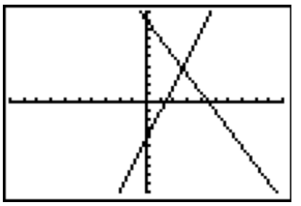
Solving Systems of Equations by Graphing

Solve the system: $y = -2x + 9$ and $y = 3x - 4$

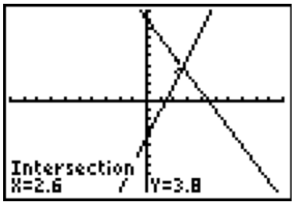
1. Enter the first equation into **Y_1.**
2. Enter the second equation into **Y_2.**
3. Hit **GRAPH.**



4. Use the **INTERSECT** option to find where the two graphs intersect (the answer).
   2nd TRACE (CALC) #5 intersect
   Move spider close to the intersection.
   Hit **ENTER** 3 times.

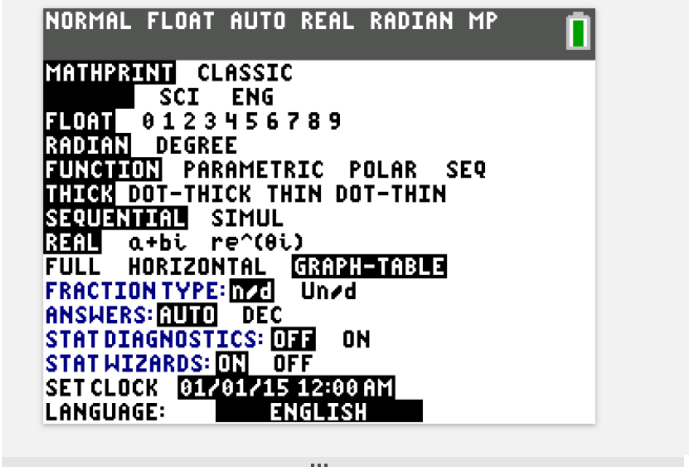


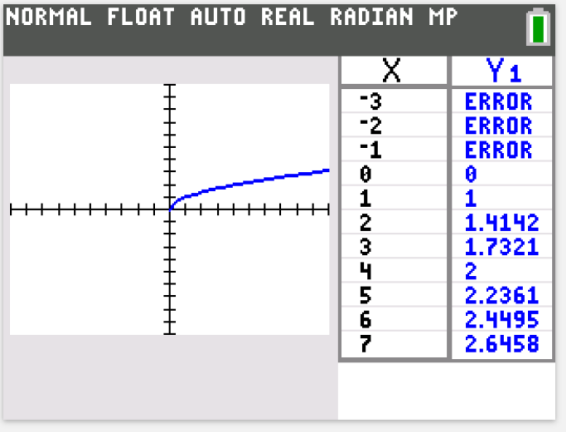
5. Answer: $x = 2.6$ and $y = 3.8$



Graph-Table view

Y1 = x^0.5





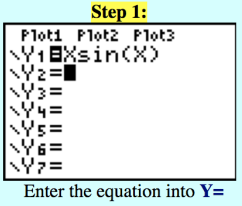
Press **2nd**, then **Graph** to access the table.

Use arrows to navigate.

Max/Min (Graph)

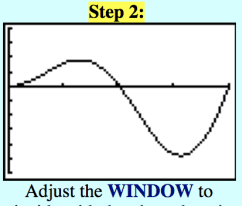
Locate the relative maximum/minimum for the function $f(x) = x\sin x$, where $0 \le x \le 2\pi$.

Step 1:



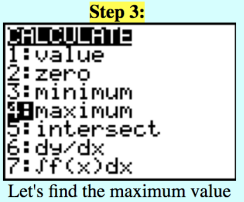
Enter the equation into **Y=**

Step 2:



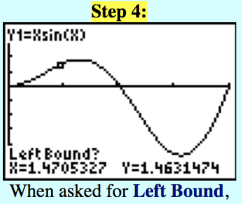
Adjust the **WINDOW** to coincide with the given domain. Hit **GRAPH.** Be sure the graph is viewable in the graphing window. Adjust accordingly.

Step 3:



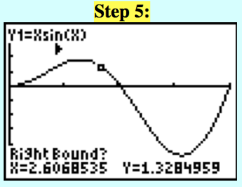
Let's find the maximum value first. Under the **CALC** (**2nd TRACE**) menu, choose **#4 maximum.**
Hit **ENTER**.

Step 4:



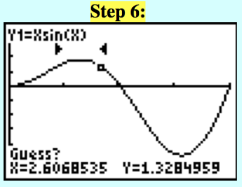
When asked for **Left Bound**, move the cursor (use arrow keys) to the left of the observed maximum location. Hit **ENTER.** You will see a ▶ mark indicating that you have "locked" this position.

Step 5:



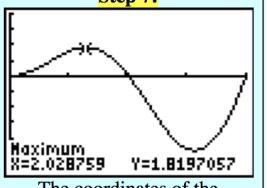
When asked for **Right Bound**, move the cursor (use arrow keys) to the right of the observed maximum location. Hit **ENTER.** You will see a ▶ mark indicating that you have "locked" this position.

Step 6:



When asked for **Guess**, simply hit **ENTER.**

Step 7:



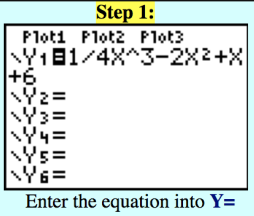
The coordinates of the maximumm value (within your marked boundaries) will appear.

ANSWER:
Max (2.029, 1.920)

Max/Min with Function Notation

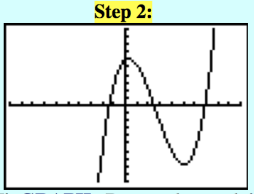
Investigate relative minima/maxima for $y=\frac{1}{4}x^3-2x^2+x+6$.

Step 1:



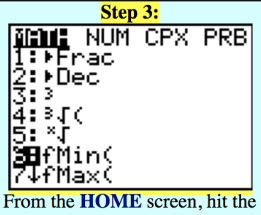
Enter the equation into **Y=**

Step 2:



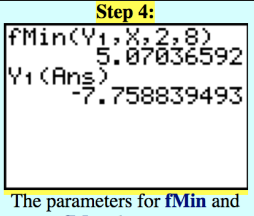
Hit **GRAPH.** Be sure the graph is viewable in the graphing window. Adjust the **WINDOW** if needed.

Step 3:



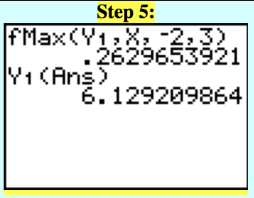
From the **HOME** screen, hit the **MATH** key. Choose either **#6 fMin** or **#7 fMax.** Hit **ENTER**.

Step 4:



The parameters for **fMin** and **fMax** the same:
fMin(*expression, variable, left bound, right bound*)
Be careful: The answer from **fMin** is the ***X*-coordinate where the minimum occurs.** It is not the actual *y*-value minimum. You must then calculate the *y*-value.

Step 5:



Again, remember that the answer from **fMax** is the ***X*-coordinate** where the maximum occurs. You must then calculate the *y*-value.

HINT: To get Y_1**(Ans):**
Y_1**: VARS -> Y-VARS - #1Function**
Ans: 2nd (-) key

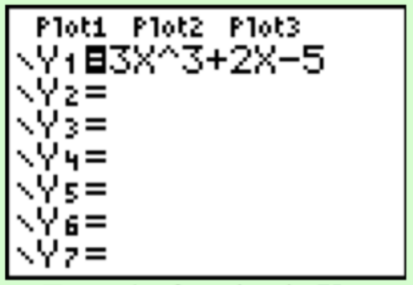
ANSWERS:

Min(5.070, -7.759)

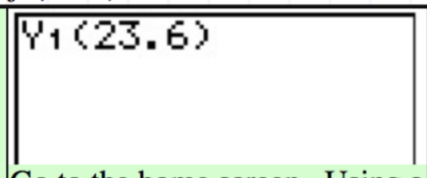
Max(.263, 6.129)

Evaluating with Function notation

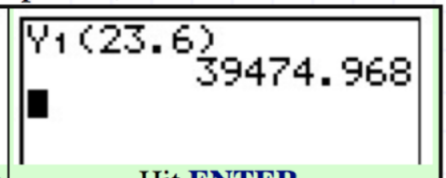
If $f(x) = 3x^3 + 2x - 5$, find $f(23.6)$. Round to 3 decimal places, if needed.



Enter the function in **Y=.**



Go to the home screen. Using a functional notation format, enter **Y1(23.6).** [To get **Y1**, go to **VARS**, arrow right to **Y-VARS**, **#1Function**, **#1Y1.**]

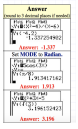


Hit **ENTER.**

Answer: 39,474.968

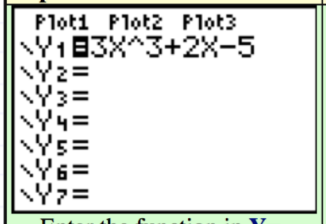
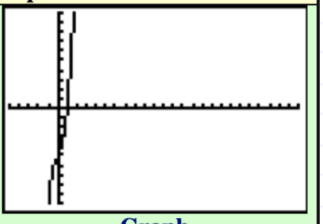
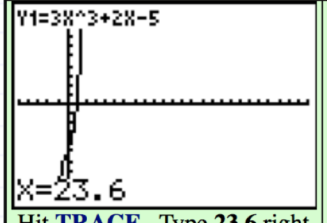
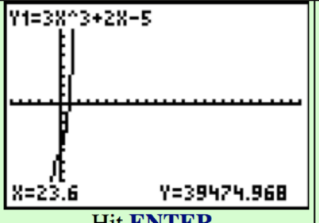
Examples:

	Function:	Evaluate:
1.	$f(x) = \dfrac{x^2 - 4}{x - 6}$	$f(-4.2)$
2.	$f(x) = 5\cos 3\theta$	$f\left(\dfrac{\pi}{8}\right)$
3.	$f(x) = x^2 + 3x - 5$	$f\left(\sqrt{3}\right)$



Evaluating from Graph

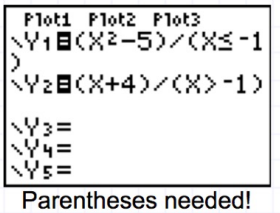
If $f(x) = 3x^3 + 2x - 5$, find $f(23.6)$. Round to 3 decimal places, if needed.

Step 1:	Step 2:	Step 3:
 Enter the function in **Y=**.	 Adjust the **WINDOW** so that the point **23.6** will be shown on the *x*-axis.	 **Graph**
Step 4:	**Step 5:**	**Step 6:**
 Hit **TRACE.** Type **23.6** right on the screen. It will automatically appear at the bottom of the graph.	 Hit **ENTER.** The answer (the *y*-value) will appear.	**Answer:** 39,474.068

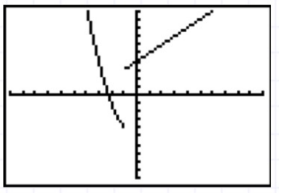
A piece-wise function: Method One

When using this method, enter each SECTION of the function into a **separate Y=** area.

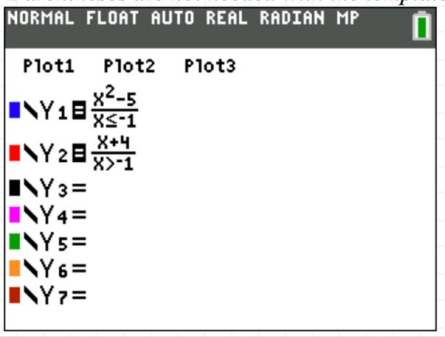
Graph: $f(x) = \begin{cases} x^2 - 5; & x \le -1 \\ x + 4; & x > -1 \end{cases}$

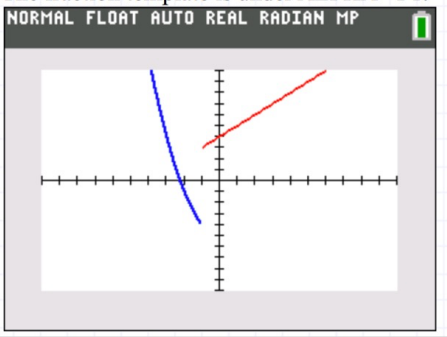


Parentheses needed!



If you use the TI-84+C, you can use the "fraction template" for the "pretty print" display. *Parentheses are not needed with the template*. The fraction template is under ALPHA - F1.

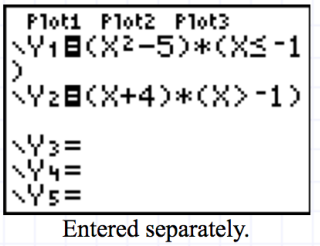




A piece-wise function: Method Two

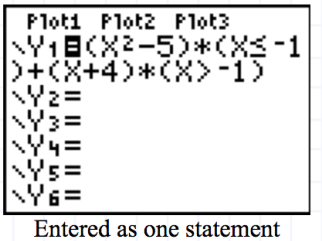
When using this method, enter each SECTION of the function into a **separate Y=** area **OR** enter the ENTIRE function as one statement using + sign to separate the sections.

Graph: $f(x) = \begin{cases} x^2 - 5; & x \le -1 \\ x + 4; & x > -1 \end{cases}$



Entered separately.

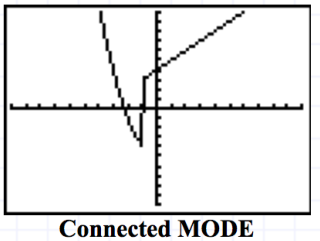
OR

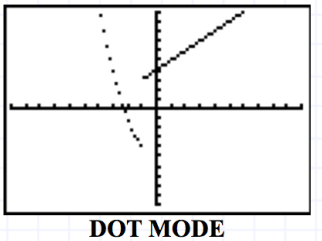


Entered as one statement

The graphs from either of these entries will produce a connected graph.

Unfortunately, DOT MODE is needed with this method to see the actual piecewise functional shape.


Connected MODE


DOT MODE

A step function

Graphing the Greatest Integer Function

The Greatest Integer Function is denoted by $y = [x]$.

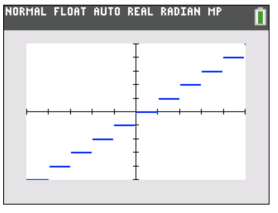
For all real numbers, x, the greatest integer function returns the largest integer less than or equal to x. In essence, it rounds down a real number to the nearest integer.

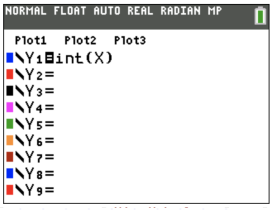
For example: [1] = 1 [1.5] = 1 [3.7] = 3 [4.3] = 4
Beware! [-2] = -2 [-1.6] = -2 [-2.1] = -3 [-5.5] = -6

The command "int" is found under
MATH → NUM #5:int(

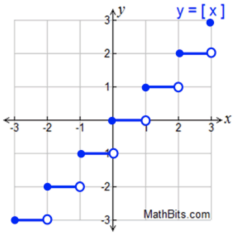
or find in the Catalog.

Calculator Graph





Actual Graph



• If copying the graph from your calculator, be sure to indicate the open and closed circles on the ends of the line segments.

Also, look carefully at the scale locations of the segments is you are transferring the graph onto a sheet of graph paper.

credit: MathBits examples

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