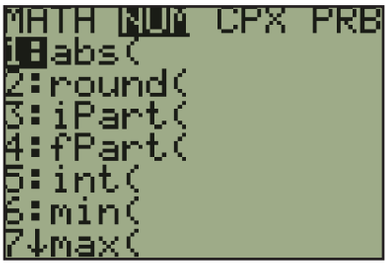
Calculator Guide

TI-83/84 Skills
Lesson 6.1: Graphing Absolute Value Functions

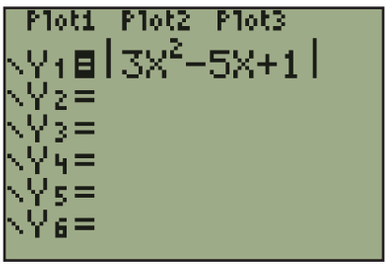
1. Graph $y = |3x^2 - 5x + 1|$

- Press [Y=]
- Use the **abs(** command to designate an absolute value.



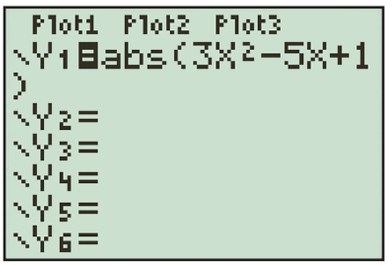
- Press [MATH]
- Press the right arrow key to get to the NUM menu
- select 1: abs(

On newer operating systems, the absolute value symbols are shown**.**

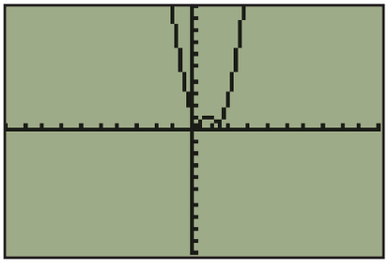


- Enter $3x^2 - 5x + 1$ between the absolute value symbols.

On older operating systems, abs(…) is shown.



- Enter $3x^2 - 5x + 1$ inside the parentheses.

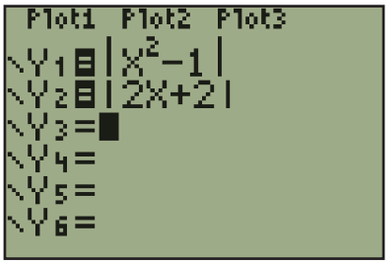


- Press [GRAPH]
- Adjust the window if necessary.

Lesson 6.2: Solving Absolute Value Equations Graphically

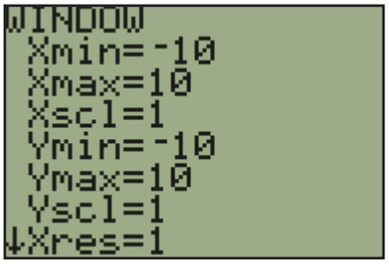
1. Solve the equation $|x^2 - 1| = |2x + 2|$.

Begin by entering the corresponding functions into Y1 and Y2.



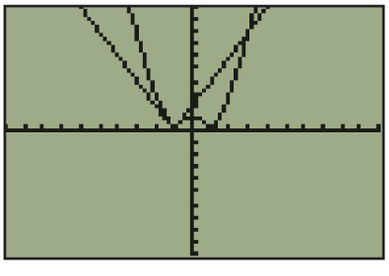
- Press [Y=]
- Enter $|x^2 - 1|$ into Y1 and $|2x + 2|$ into Y2.

Next, set the domain and range of the graph.



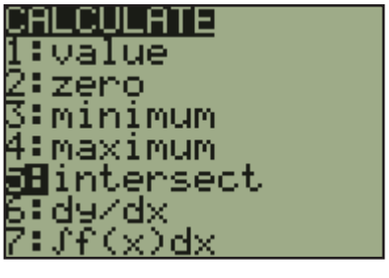
- Press [WINDOW]
- Set the Xmin, Xmax, Ymin, and Ymax to appropriate values. Sometimes it will take a bit of guessing and testing to get an appropriate window.

Now, view the graph.

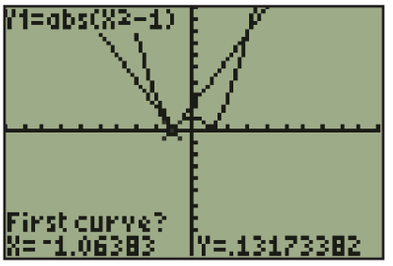


- Press[GRAPH]
- This window shows both points of intersection, so the window setting is appropriate.

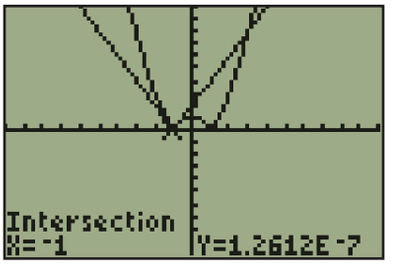
Determine where the two functions intersect.



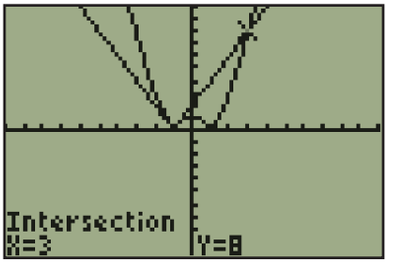
- Press [2nd], [Trace]
- Select 5: intersect



- The calculator will ask for the first curve. Use the up and down arrows to switch between functions. Select one of the curves of interest, and move the cursor so it is near the intersection of interest, and press [ENTER].
- The calculator will ask for a second curve. Select the other curve of interest, move the cursor so it is near the intersection of interest, and press [ENTER].
- The calculator will ask for a guess. Move the cursor so it is near the intersection of interest, and press [ENTER].



- The first intersection occurs at (–1, 0). The y-value of 1.261 2×10^{-7} is a rounding error by the calculator, and highlights a limitation of the program.



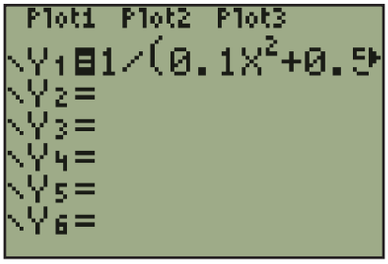
- Repeat the process, but move your guess near the second intersection.
- The second intersection occurs at (3, 8).

The solutions to the system are (–1, 0) and (3, 8).

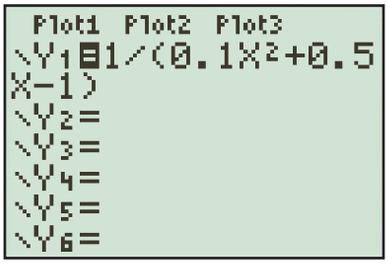
Lesson 6.3: Graphing Reciprocal Functions

1. Graph the function $y = \dfrac{1}{0.1x^2 + 0.5x - 1}$

Begin by entering the function into Y1. Make sure to put parentheses around the expression in the denominator.

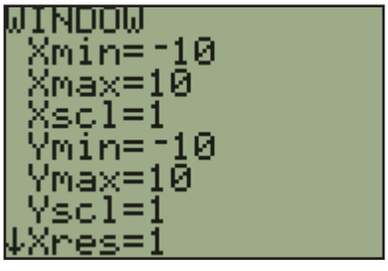


- Press [Y=]
- Enter $1/(0.1x^2 + 0.5x - 1)$
- Newer operating systems only show part of the function



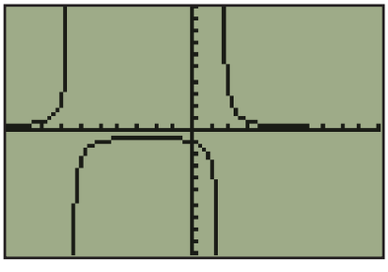
- Older operating systems show the function across multiple lines.

Next, set the domain and range of the graph.



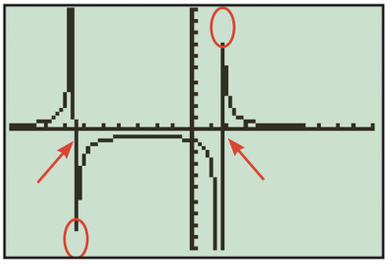
- Press [WINDOW]
- Set the Xmin, Xmax, Ymin, and Ymax to appropriate values. Sometimes it will take a bit of guessing and testing to get an appropriate window.

Now, view the graph.



- Press[GRAPH]

On older operating systems, there may appear to be missing or extra parts of the function. The user needs to interpret the calculator's output properly by imagining the extra parts are there and removing the unnecessary parts.



- The ovals show missing areas. The x-values are too close together for the calculator to recognize that the function continues here.

The lines indicated by the arrows are **not** asymptotes, although they often appear in the same location as asymptotes. Here, the calculator is trying to connect the points from left to right. In the first instance, the calculator sees the points (x, large number) and (x+ a little, large negative number), and uses a nearly vertical line to connect the two.

When interpreting or sketching a graph from this information, you will need to imagine the missing parts of the function are present, and the extra "vertical" lines are not.

Graphing Standards for Students

- Plot a minimum of three ordered pairs for linear functions; two points determine a line and the third is your check point.
- Plot an appropriate number of ordered pairs to ensure that the shape of non-linear functions can be determined.
- Label the x- and y-axes.
- Include an appropriate scale on the axes.
- Title the graph, where necessary.
- Define the line or curve with equation/function beside or near it.
- Apply arrows on the ends of function, where necessary.
- Plot and label the x- and y-intercepts, if applicable.
- Label the vertex, if applicable.
- Include asymptotes, open circles for points of discontinuity, and end points, where applicable.
- When a graph is to be sketched, the shape of the graph is determined by important features such as asymptotes, maximum and minimum points, intercepts, etc. on an appropriate scale. All important features must be labelled.