

Chapter 2 / Example 20

Solving absolute value function inequalities

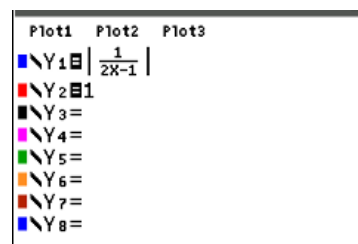
Solve $\left| \frac{1}{2x-1} \right| < 1$ graphically.

Press $[F1]$ $[Y=]$ to display the equation entry screen.

Type $\left| \frac{1}{2x-1} \right|$ and press $[ENTER]$ to enter the first equation as Y_1 .

To enter the absolute value function press $[MATH]$ \blacktriangleright NUM 1:abs(and use the fraction template by pressing $[ALPHA]$ $[F1]$ 1:n/d

Type 1 and press $[ENTER]$ to enter the second equation as Y_2 .



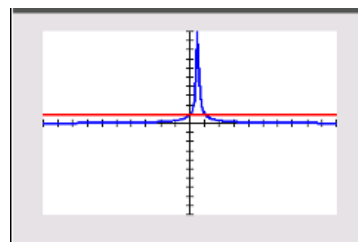
Press $[F5]$ $[GRAPH]$ to display the graph screen

The GDC now displays both graphs:

$$Y_1 = \left| \frac{1}{2x-1} \right|$$

$$Y_2 = 1$$

The default axes are $-10 \leq x \leq 10$ and $-10 \leq y \leq 10$.

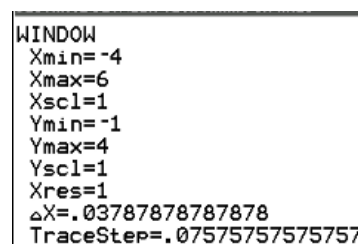


To see both intersections better, change the window settings

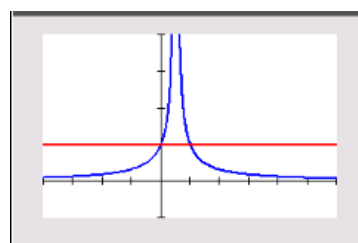
Press $[F2]$ $[WINDOW]$ $[FORMAT]$

Set the axes to show $-4 \leq x \leq 6$ and $-1 \leq y \leq 4$ with scales of 1.

Press $[F5]$ $[GRAPH]$ when you have finished.



The GDC displays the graphs in a suitable window.



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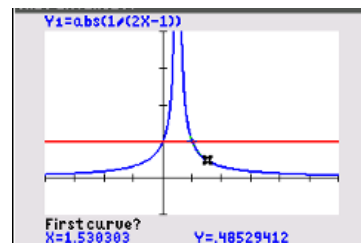
Solving absolute value function inequalities

Press **2nd** **f4** **[calc]** 5:intersect

To find the intersection you need to choose the two lines that intersect.

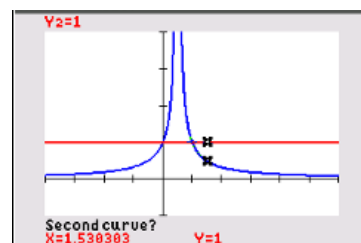
The GDC shows a cross on the curve and 'First curve?'.

Press **enter**.



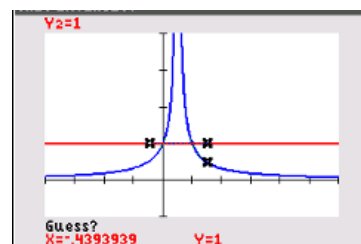
The GDC shows a cross on the line and 'Second curve?'.

Press **enter**.

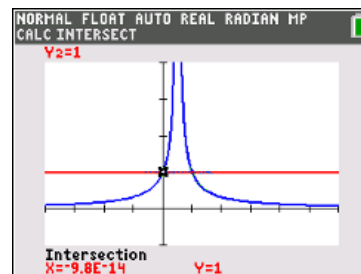


The GDC requires an initial guess for the position of the intersection. Choose a point close to the first intersection by moving the cursor with the **◀** **▶** keys.

Press **enter**.



The GDC displays the first intersection at (0,1).



Repeat for the second intersection.

The GDC an intersection at (1,1).

The solutions is $x > 1$; $x < 0$.

