

Chapter 2 / Example 20

Solving absolute value function inequalities

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

Open a new document and add a Graphs page.

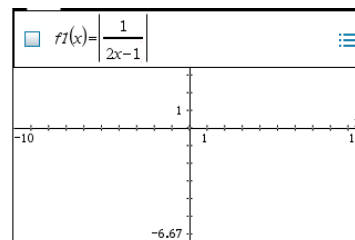
The entry line is displayed at the top of the work area.

The default graph type is function, so 'f1(x)= ' is displayed.

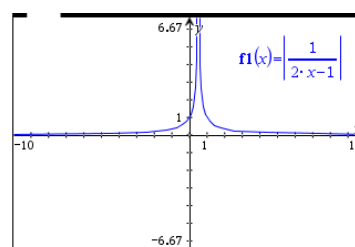
The default axes are $-10 \leq x \leq 10$ and $-6.67 \leq y \leq 6.67$.

Type $\left| \frac{1}{2x-1} \right|$ and press **enter**.

Enter the absolute value function press **|** and select **|** with the trackpad and use the fraction template **ctrl** **÷** ($\frac{\square}{\square}$).

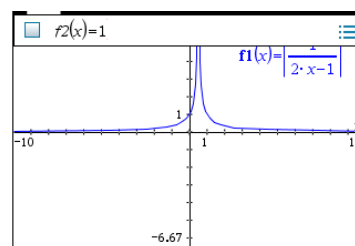


The GDC displays the graph $f1(x) = \left| \frac{1}{2x-1} \right|$ with the default axes.



Press **tab** to display the entry line again. This time 'f2(x)= ' is displayed.

Type 1 and press **enter**.

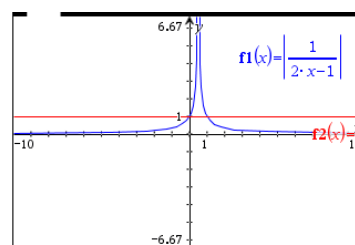


The GDC now displays both graphs:

$$f1(x) = \left| \frac{1}{2x-1} \right|$$

$$f2(x) = 1$$

with the default axes.



Chapter 2 / Example 20

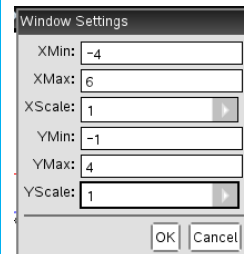
Solving absolute value function inequalities

To see both intersections better, change the window settings

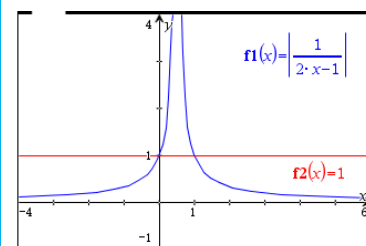
Press **menu** 4:Window/Zoom | 1:Window Settings...

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

Press **enter** when you have finished.



The GDC displays the graphs in a suitable window.

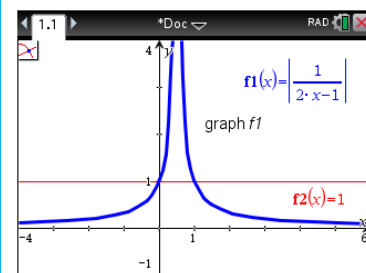


There are two ways to find intersection points. The first is to use **menu** 6:Analyse Graph | 4:Intersection. When there is more than one point, however, the following method is quicker.

Press **menu** 8:Geometry | 1:Points & Lines | 3: Intersection Point(s)

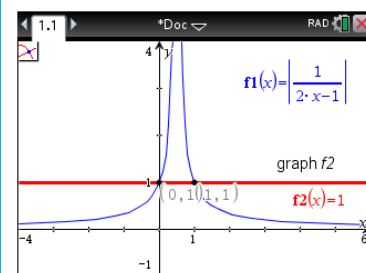
To find the points use the touchpad to highlight the first graph. You will see 'graph f1' displayed.

Click the touchpad.



Use the touchpad to highlight the straight line. You will see 'graph f2' displayed.

Click the touchpad.



The GDC now displays the coordinates of both points of intersection.

The points of intersection are $(0, 1)$ and $(1, 1)$.

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

