Solving Linear Inequalities Using a TI-83+

Before you begin, clear all previously saved variables and functions, set the graph mode and viewing window.

Solve: $4x + 7 > 2x - 3$

Algebraically:

$4x + 7 > 2x - 3$
$2x > -10$
$x > -5$
$(-5, \infty)$

There are two ways to solve a linear inequality graphically: Using Root and Using Intersection

Graphically: Using Zero (Root)

Rewrite the inequality with 0 on one side.
$4x + 7 - 2x + 3 > 0$

Let Y1 equal the left side of the inequality.
Y=
$Y1 = 4x + 7 - 2x + 3$

Then graph.
Graph

The solution set for **> inequalities** is the set of all x-values for which the graph is **above** the x-axis.

The solution set for **< inequalities** is the set of all x-values for which the graph is **below** the x-axis.

Find the x-intercept (zero)
2nd Calc
2:Zero
Left Bound?: Use the left or right arrow to move the cursor to the left of the intercept.

Enter
Right Bound?: Use the right arrow to move the cursor to the right of the intercept
Enter
Guess?: Move the cursor close to the x-intercept.
Enter

The coordinates of the x-intercept are given at the bottom of the screen: (-5, 0)

The graph is above the x-axis for x values greater than -5.

The solution is (-5, ∞)**.**

(This is the other method.)

Graphically: Using Intersection

Let Y1 be the left side of the inequality and Y2 the right side of the inequality.

The inequality will either be Y1<Y2 or Y1>Y2. Graph Y1 and Y2 on the same screen.

If Y1<Y2 determine on what interval Y1 is **below** Y2.

If Y1>Y2 determine on what interval Y1 is **above** Y2.

Solve: $4x + 7 > 2x - 3$

> **Y=**
> (Clear functions)
>
> $Y1 = 4x + 7$
> $Y2 = 2x - 3$
>
> **Graph**
>
> Change viewing window to see the point of intersection.
> **Window**
>
> xmin=-10   ymin=-20
> xmax=1   ymax=1
> xscl=1   yscl=1
>
> **Graph**

To find the point of intersection
       2nd Calc
       5:Intersect
       First Curve?

The first equation appears in the upper left corner
Enter
Second Curve?
The second equation appears in the upper left corner
Enter
Guess? Move cursor close to the point of intersection
Enter

The calculator shows the intersection is at (-5, -13).

Y1 is above Y2 to the right of the point of intersection. Therefore, $4x + 7 > 2x - 3$
for values of x in the interval (-5, ∞).