

Solving Linear Inequalities Using a TI-85

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

$$\text{Solve: } 4x + 7 > 2x - 3$$

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.

Graph

F1: Y=

$$Y1 = 4x + 7 - 2x + 3$$

Then graph.

Graph

F5: 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)

More

F1: Math

F3: Root
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 $(-5, \infty)$.

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

Graph

F1: Y=

(Clear functions)

$$Y1 = 4x + 7$$

$$Y2 = 2x - 3$$

Graph

F5: Graph

Change viewing window to see intersection

F2: Range

xmin=-10	ymin=-20
xmax=1	ymax=1
xscl=1	yscl=1

F5: Graph

To find the point of intersection

More

F1: Math

More

F5: Isect

The number 1 for the first equation appears in the upper right hand corner

Enter

The number 2 for the second equation appears in the upper right hand corner

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 $(-5, \infty)$.
