

You can solve quadratic inequalities using graphs, tables, and algebraic methods. Indeed, the most effective way may be a combination of methods.

1 ACTIVITY

To find which of $x^2 - 12$ or $3x + 6$ is greater, enter the two functions as Y_1 and Y_2 in your graphing calculator, you could use the TABLE option to compare the two functions for various values of x , as shown below.

Plot1	Plot2	Plot3
Y1 = $X^2 - 12$		
Y2 = $3X + 6$		
Y3 =		
Y4 =		
Y5 =		
Y6 =		
Y7 =		

TABLE SETUP	
TblStart	= -10
ΔTbl	= 5
Indpnt	: AUTO ASK
Depend	: AUTO ASK

X	Y1	Y2
-10	88	-24
-5	13	-9
0	-12	6
5	13	21
10	88	36
15	213	51
20	388	66

X = -10

- For which values of x in the table is $x^2 - 12 > 3x + 6$?
- For which values of x in the table is $x^2 - 12 < 3x + 6$?
- Does this table tell you all values of x for which $x^2 - 12 < 3x + 6$? Explain.
- In the TBLSET (TABLE SETUP) menu, change TblStart to -9 and ΔTbl to 3 . Display the table again. Does the table with this setup give you more information? Why?

You can compare functions more efficiently by making one side of the inequality 0.

- Show that $x^2 - 12 < 3x + 6$ is equivalent to $x^2 - 3x - 18 < 0$.
- Enter $x^2 - 3x - 18$ as Y_3 in your graphing calculator. Place the cursor on the = sign after Y_1 and press **ENTER**. This operation turns off the display of the equation Y_1 . Turn off Y_2 as well, and then display the table. You will see the screen shown at the right. For which values of x in the table is $x^2 - 3x - 18 < 0$?

X	Y3
-9	90
-6	36
-3	0
0	-18
3	-18
6	0
9	36

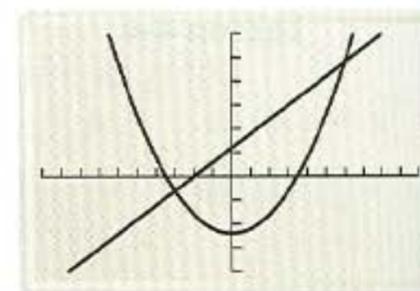
X = 9

2 ACTIVITY

For a visual model, look at the same inequalities graphically. Turn off Y_3 and turn on Y_1 and Y_2 . Begin by graphing the two functions in the original inequality as shown in the screens below.

Plot1	Plot2	Plot3
Y1 = $X^2 - 12$		
Y2 = $3X + 6$		
Y3 = $X^2 - 3X - 18$		
Y4 =		
Y5 =		
Y6 =		
Y7 =		

WINDOW	
Xmin	= -10
Xmax	= 10
Xscl	= 1
Ymin	= -20
Ymax	= 30
Yscl	= 5
Xres	= 1



- Which graph represents the function $f(x) = x^2 - 12$? Which graph represents $f(x) = 3x + 6$? How can you tell?

