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Graphing Calculator Investigation**Quadratic Inequalities and the Test Menu***(Use with Lesson 6-7.)*

The inequality symbols, called *relational operators*, in the **TEST** menu can be used to display the solution of a quadratic inequality. Another method that can be used to find the solution set of a quadratic inequality is to graph each side of an inequality separately. Examine the graphs and use the **intersect** function to determine the range of values for which the inequality is true.

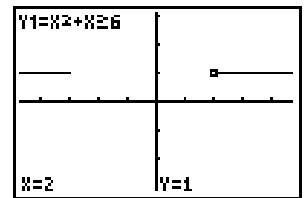
Example 1 Solve $x^2 + x \geq 6$.

Place the calculator in Dot mode. Enter the inequality into **Y1**. Then trace the graph and describe the solution as an inequality.

Keystrokes: $\boxed{Y=}$ $\boxed{X,T,\theta,n}$ $\boxed{x^2}$ $\boxed{+}$ $\boxed{X,T,\theta,n}$ $\boxed{2nd}$ $\boxed{[TEST]}$ $\boxed{4}$ $\boxed{6}$ \boxed{ZOOM} $\boxed{4}$.

Use **TRACE** to determine the endpoints of the segments.

These values are used to express the solution of the inequality, $\{x \mid x \leq -3 \text{ or } x \geq 2\}$.

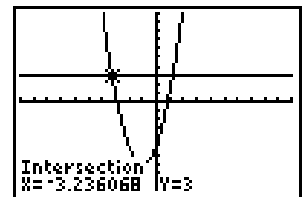


$[-4.7, 4.7]$ scl:1 by $[-3.1, 3.1]$ scl:1

Example 2 Solve $2x^2 + 4x - 5 \leq 3$.

Place the left side of the inequality in **Y1** and the right side in **Y2**. Determine the points of intersection. Use the intersection points to express the solution set of the inequality. Be sure to set the calculator to **Connected** mode.

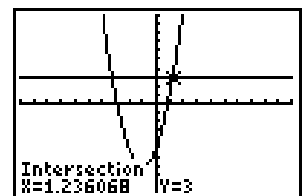
Keystrokes: $\boxed{Y=}$ $\boxed{2}$ $\boxed{X,T,\theta,n}$ $\boxed{x^2}$ $\boxed{+}$ $\boxed{4}$ $\boxed{X,T,\theta,n}$ $\boxed{-}$ $\boxed{5}$ \boxed{ENTER} $\boxed{3}$ \boxed{ENTER} \boxed{ZOOM} $\boxed{6}$.



$[-10, 10]$ scl:1 by $[-10, 10]$ scl:1

Press $\boxed{2nd}$ $\boxed{[CALC]}$ $\boxed{5}$ and use the $\boxed{\blacktriangleleft}$ key to move the cursor to the left of the first intersection point. Press \boxed{ENTER} . Then move the cursor to the right of the intersection point and press \boxed{ENTER} . One of the values used in the solution set is displayed. Repeat the procedure on the other intersection point.

The solution is $\{x \mid -3.24 \leq x \leq 1.24\}$.



$[-10, 10]$ scl:1 by $[-10, 10]$ scl:1

Exercises

Solve each inequality.

1. $-x^2 - 10x - 21 < 0$

2. $x^2 - 9 < 0$

3. $x^2 + 10x + 25 \leq 0$

4. $x^2 + 3x \leq 28$

5. $2x^2 + x \geq 3$

6. $4x^2 + 12x + 9 > 0$

7. $23 > -x^2 + 10x$

8. $x^2 - 4x - 13 \leq 0$

9. $(x + 1)(x - 3) > 0$