

Quadratic equations and Inequalities

CHAPTER

9

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9.7

Nonlinear Inequalities

Objective

- 1 Solve nonlinear inequalities



Solve nonlinear inequalities

Solve nonlinear inequalities

A **quadratic inequality in one variable** is an inequality that can be written in the form $ax^2 + bx + c < 0$ or $ax^2 + bx + c > 0$, where $a \neq 0$. The symbols \leq and \geq can also be used.

Quadratic inequalities can be solved by algebraic means. However, it is often easier to use a graphical method to solve these inequalities.

The graphical method is used in the example that follows.

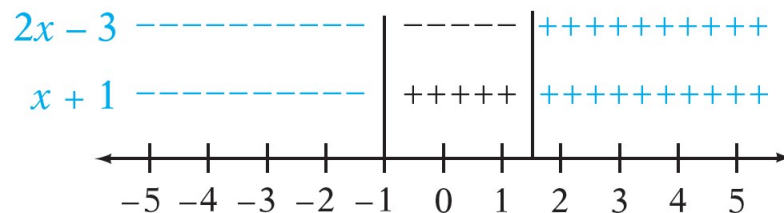
Example 1

Solve and graph the solution set of $2x^2 - x - 3 \geq 0$.
Write the solution set using interval notation.

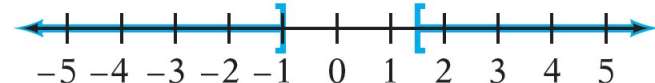
Solution:

$$2x^2 - x - 3 \geq 0$$

$$(2x - 3)(x + 1) \geq 0$$



The solution set is $(-\infty, -1] \cup [\frac{3}{2}, \infty)$.



Solve nonlinear inequalities

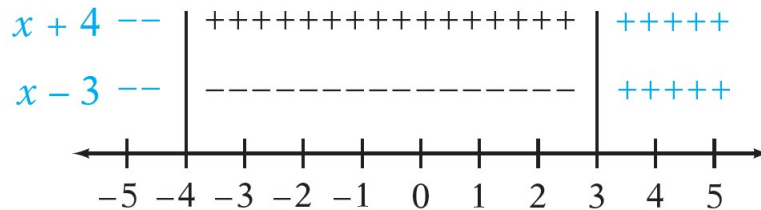
The graphical method can be used to solve rational inequalities.

Example 2

Solve and graph the solution set of $\frac{x + 4}{x - 3} \geq 0$.
Write the solution set using set-builder notation.

Solution:

$$\frac{x + 4}{x - 3} \geq 0$$



The solution set is $\{x|x > 3\} \cup \{x|x \leq -4\}$.

