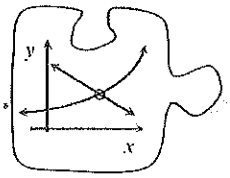
10.3.3 How can I solve the inequality?



Solving Quadratic and Absolute Value Inequalities

The three approaches you have for solving equations can also be used to solve inequalities. While the single-variable inequalities you solve today look different than the ones in Chapter 9, the basic process for solving them is similar. As you solve equations and inequalities in today's lesson, ask yourself these questions:

How can I represent it?

What connections can I make?

10-131. Solve the inequality $2x+7<12$. Represent the solution algebraically and on a number line.

a. What is the boundary point? Is it part of the solution? Why or why not?

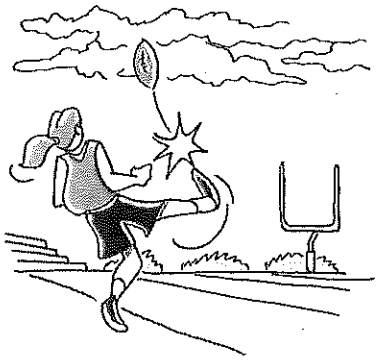
b. In general, how do you find a boundary point? How do you find the solutions of an inequality after you have found the boundary point? Briefly review the process with your team.

10-132. Now consider the inequality $|x-2|>3$.

a. Can you use the process from problem 10-131 to solve this inequality? How is it different from solving $|x-2|=3$? Solve the inequality and represent your solution algebraically and on a number line.

b. How was solving $|x-2|>3$ different from solving $2x+7<12$?

10-133. FOG CITY



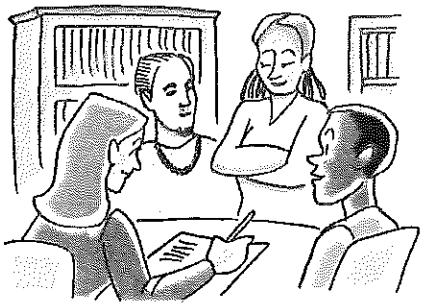
San Francisco is well known for its fog: very thick, low-lying clouds that hide its hills. One foggy day, Penelope was practicing kicking a football on the football field of her school. Once she kicked the football so high that it disappeared into the fog! If the height h of the ball (in feet) could be represented at time t (in seconds) by the equation $h=-16t^2+96t$, and if the fog was 140 feet off the ground, during what times of its flight was the ball not visible? Explain how you got your answer. Represent your solution algebraically and on a number line.

10-134. Solve the inequalities below, if possible, and represent your solution on a number line.

a. $|x+2|>1$ b. $x^2+x-12<0$ c. $|2(x-1)|\geq 0$

d. $9x-4\leq 6-x$ e. $|3x-11|<-2$ f. $(x-2)^2>7$

10-135. PULLING IT TOGETHER



Now that you have the skills necessary to solve many interesting equations and inequalities, work with your team to solve the equation below. (This equation was first introduced in Lesson 10.2.3.) Show your solutions on a number line and be prepared to share your solving process with the class.

$$(\sqrt{|x+5|}-6)^2+4=20$$

10-136. In your Learning Log, explain how you can solve an inequality that has an absolute value. Then make up your own example problem and show how that problem is solved. Title this entry "Solving Inequalities with Absolute Value" and include today's date.

Review & Preview

10-137. Consider the quadratic inequality $x^2+2x+1<4$.

a. Solve for the boundary point(s). How many boundary points are there?

b. Place the boundary point(s) on a number line. How many regions do you need to test?

c. Test each region and determine which one(s) make the inequality true. Identify the solution algebraically and on the number line.