Lesson 22: Linear Inequalities, Absolute Value

Linear Inequalities and Interval Notation

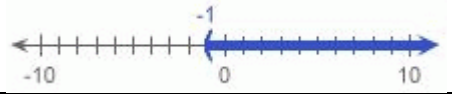
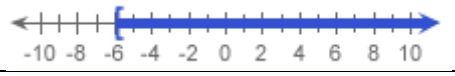
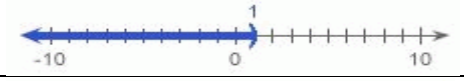
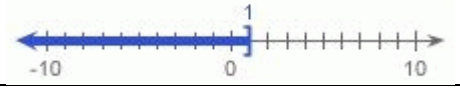
Solving Linear Inequalities in One Variable

When the equals sign in a linear equation is replaced with one of the inequality symbols (<, >, ≤, or ≥) a **linear inequality** is formed.

A major difference between a linear equation and a linear inequality is that the **solution set** of the linear inequality may have an unlimited number of elements.

Graphing and Interval Notation for Strict and Weak Inequalities

There are at least two ways to represent the solution to an inequality: **Graphing** and **interval notation**.

Inequality	Solution Set with Interval Notation	Graph
x > –1	(–1, ∞)	
x ≥ –6	[– 6, ∞)	
x < 1	(– ∞, 1)	
x ≤ 1	(– ∞, 1]	
	Hint: In interval notation, the smallest value must come first.	Hint: When the end value IS included, use the] .

A **strict** inequality uses **<** or **>** and the graph's end point is represented by a (or).
A **weak** inequality uses ≤ or ≥ and the graph's end point is represented by [or].

Consider: $x < 3$

Graph it:

Give the Interval notation:

Consider: $x \geq -4$

Graph it:

Give the Interval notation:

Equivalent and Linear Inequalities

Equivalent inequalities: Inequalities with the same solution set are called equivalent inequalities.

$x < 3$ and $x + 2 < 5$ are equivalent inequalities.

Linear Inequality: A linear inequality in one variable x is any inequality of the form $ax + b < 0$, where a and b are real numbers, with $a \neq 0$. [In place of < one may also use >, ≤, or ≥.]