Section 1.5 Solving Inequalities

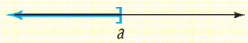
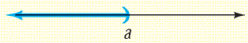
Make sure you use _____ _____ when writing out your solutions dealing w/inequalities

A(n) _____ _____ is denoted by $[a, b]$, or $a \leq x \leq b$

A(n) _____ _____ is denoted by (a, b), or $a < x < b$

The _____-_____ , or _____-_____ intervals are $(a, b]$ for $a < x \leq b$ and $[a, b)$ for $a \leq x < b$

$[a, \infty)$	consists of all real numbers x for which $x \geq a$
(a, ∞)	consists of all real numbers x for which $x > a$
$(-\infty, a]$	consists of all real numbers x for which $x \leq a$
$(-\infty, a)$	consists of all real numbers x for which $x < a$
$(-\infty, \infty)$	consists of all real numbers x

Interval	Inequality	Graph
The open interval (a, b)	$a < x < b$	
The closed interval $[a, b]$	$a \leq x \leq b$	
The half-open interval $[a, b)$	$a \leq x < b$	
The half-open interval $(a, b]$	$a < x \leq b$	
The interval $[a, \infty)$	$x \geq a$	
The interval (a, ∞)	$x > a$	
The interval $(-\infty, a]$	$x \leq a$	
The interval $(-\infty, a)$	$x < a$	
The interval $(-\infty, \infty)$	All real numbers	

Properties of Inequalities

Nonnegative Property: for any real number a, $a^2 \geq 0$

Addition Property: for any real number a, b, and c

If $a < b$, then $a + c$ $\quad$ $b + c$

If $a > b$, then $a + c$ $\quad$ $b + c$

Multiplying an Inequality by a Positive Number

Express as an inequality the result of multiplying each side of the inequality by: 3 < 5 by 2 then try 3 < 5 by – 2.

Reciprocal Property for Inequalities:

If $a > 0$, then $\frac{1}{a} > 0$ $\quad$ if $\frac{1}{a} > 0$, then $a > 0$

If $a < 0$, then $\frac{1}{a} < 0$ $\quad$ if $\frac{1}{a} < 0$, then $a < 0$

Solving Inequalities

Procedures that leave the <u>inequality symbol</u> **unchanged**:

1. Simplify _____ sides of the inequality by combining _____ _____ and eliminating the _____

Example: Replace $(x + 2) + 6 > 2x + 5(x + 1)$

by

2. _____ or _____ the same expression on _____ _____ of the inequality

Example: Replace $3x - 5 < 4$

by

3. _____ or _____ both sides of the inequality by the _____ **positive** expression

Example: Replace $4x > 16$

By

Procedures that **change** <u>the inequality symbol</u>:

1. _____ the two sides of the inequality

Example: Replace $3 < x$ by

2. _____ or _____ both sides by the _____ **negative** expression

Example: Replace $-2 > 6$, by

Solve the inequality: $4x+3<2x-1$ and graph

Solving a Combined Inequality

Solve the inequality: $1\le\frac{5-2x}{3}\le 3$ and graph

Using the Reciprocal Property to Solve an Inequality

Solve the inequality: $(3x+6)^{-1}>0$ and graph

Creating Equivalent Inequalities

If $-3<x<2$, find a and b so that $a<3x+2<b$.

In electricity, Ohm's law states that $E = IR$, where E is the voltage (in volts). I is the current (in amperes), and R is the resistance (in ohms). An air-conditioning unit is rated at a resistance of 10 ohms. If the voltage varies from 110 to 120 volts, inclusive, what corresponding range of current will the air conditioner draw?