Name _____ Class _____ Date _____

1-5 Reteaching

Solving Inequalities

As with an equation, the solutions of an inequality are numbers that make it true. The procedure for solving a linear inequality is much like the one for solving linear equations. To isolate the variable on one side of the inequality, perform the same algebraic operation on each side of the inequality symbol.

The **Addition and Subtraction Properties of Inequality** state that adding or subtracting the same number from both sides of the inequality does not change the inequality.

If $a < b$, then $a + c < b + c$.

If $a < b$, then $a - c < b - c$.

The **Multiplication and Division Properties of Inequality** state that multiplying or dividing both sides of the inequality by the same *positive* number does not change the inequality.

If $a < b$ and $c > 0$, then $ac < bc$.

If $a < b$ and $c > 0$, then $\frac{a}{c} < \frac{b}{c}$.

Problem

What is the solution of $3(x + 2) - 5 \leq 21 - x$? Graph the solution.

Justify each line in the solution by naming one of the properties of inequalities.

$3x + 6 - 5 \leq 21 - x$	Distributive Property
$3x + 1 \leq 21 - x$	Simplify.
$4x + 1 \leq 21$	Addition Property of Inequality
$4x \leq 20$	Subtraction Property of Inequality
$x \leq 5$	Division Property of Inequality

To graph the solution, locate the boundary point. Plot a point at $x = 5$. Because the inequality is "*less than or equal to*," the boundary point is part of the solution set. Therefore, use a closed dot to graph the boundary point. Shade the number line to the left of the boundary point because the inequality is "*less than*."

Graph the solution on a number line.

Exercises

Solve each inequality. Graph the solution.

1. $2x + 4(x - 2) > 4$ **$x > 2$**

2. $4 - (2x - 4) \geq 5 - (4x + 3)$ **$x \geq -3$**

Name _____ Class _____ Date _____

1-5 Reteaching (continued)

Solving Inequalities

The procedure for solving an inequality is similar to the procedure for solving an equation but with one important exception.

The Multiplication and Division Properties of Equality also state that, when you multiply or divide each side of an inequality by a negative number, you must reverse the inequality symbol.

If $a < b$ and $c < 0$, then $ac > bc$.

If $a < b$ and $c < 0$, then $\frac{a}{c} > \frac{b}{c}$.

Problem

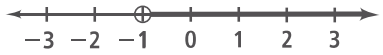
What is the solution of $2x - 3(x - 1) < x + 5$? Graph the solution.

Justify each line in the solution by naming one of the properties of inequalities.

$2x - 3(x - 1) < x + 5$	
$2x - 3x + 3 < x + 5$	Distributive Property
$-x + 3 < x + 5$	Simplify.
$-2x < 2$	Subtraction Property of Inequality
$x > -1$	Division Property of Inequality

The direction of the inequality changed in the last step because we divided both sides of the inequality by a negative number.

Graph the solution on a number line.



Exercises

Solve each inequality.

3. $x - 1 \leq -4(-2 - x)$ $x \geq -3$

4. $7 - 7(x - 7) > -4 + 5x$ $x < 5$

5. $7(x + 4) - 13 \geq 12 + 13(3 + x)$ $x \leq -6$

6. $4x - 1 < 6x - 5$ $x > 2$