Course Number

Instructor

Date

Section 1.7 Linear Inequalities in One Variable

Objective: In this lesson you learned how to solve linear inequalities and inequalities involving absolute value.

Important Vocabulary Define each term or concept.

Solution of an inequality A value of the variable for which the inequality true.

Graph of an inequality The set of all points on the real number line that represent the solution set of an inequality.

Linear inequality in one variable An inequality in one variable (usually x) that can be written in the form $ax + b < 0$ or $ax + b > 0$,where a and b are real numbers with $a \neq 0$.

Double inequality An inequality that represents two inequalities.

What you should learn
How to represent solutions of linear inequalities in one variable

I. Introduction to Inequalities (Page 144)

Solving an inequality in the variable x means . . . finding all the values of x for which the inequality is true.

Such values are solutions and are said to satisfy the inequality.

Example 1: (a) Write the inequality as an interval and state whether it is bounded or unbounded: $x \leq -16$.
(b) Decide whether the interval [4, 12) is bounded or unbounded and then write it as an inequality.

(a) $(-\infty, -16]$, unbounded
(b) bounded, $4 \leq x < 12$

II. Properties of Inequalities (Page 145)

To solve a linear inequality in one variable, use the properties of inequalities to isolate the variable.

When each side of an inequality is multiplied or divided by a negative number, . . . the direction of the inequality symbol must be reversed.

Two inequalities that have the same solution set are

_____equivalent_____.

Complete the list of Properties of Inequalities given below.

1) Transitive Property: $a < b$ and $b < c \rightarrow$ _____$a < c$_____
2) Addition of Inequalities: $a < b$ and $c < d \rightarrow$ _____$a + c < b + d$_____
3) Addition of a Constant c: $a < b \rightarrow$ _____$a + c < b + c$_____
4) Multiplication by a Constant c:

   For $c > 0$, $a < b \rightarrow$ _____$ac < bc$_____

   For $c < 0$, $a < b \rightarrow$ _____$ac > bc$_____

III. Solving a Linear Inequality in One Variable (Pages 146–147)

What you should learn
How to solve linear inequalities in one variable

Describe the steps that would be necessary to solve the linear inequality $7x - 2 < 9x + 8$.

Add 2 to each side. Subtract $9x$ from each side, and combine like terms. Divide each side by -2 and reverse the inequality. Write the solution set as an interval.

The two inequalities $-10 < 3x$ and $14 \geq 3x$ can be rewritten as the double inequality _____$-10 < 3x \leq 14$_____.

IV. Inequalities Involving Absolute Value (Page 148)

What you should learn
How to solve inequalities involving absolute values

Let x be a variable or an algebraic expression and let a be a real number such that $a \geq 0$. The solutions of $|x| < a$ are all values of x that _____lie between $-a$ and a_____. The solutions of $|x| > a$ are all values of x that _____are less than $-a$ or greater than a_____.

Example 2: Solve the inequality: $|x + 11| - 4 \leq 0$

[– 15, – 7]

The symbol $\cup$ is called a ___union___ symbol and is used to denote ___the combining of two sets___.

Example 3: Write the following solution set using interval notation: $x > 8$ or $x < 2$

$(-\infty, 2) \cup (8, \infty)$

V. Applications of Linear Inequalities (Page 149)

What you should learn
How to use inequalities to model and solve real-life problems

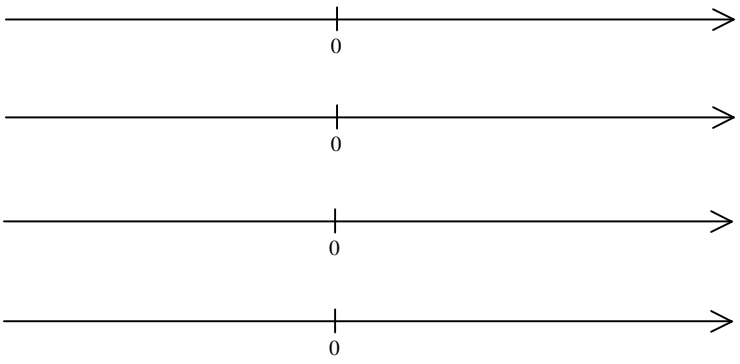
Describe a real-life situation that involves a linear inequality.

Answers will vary.

Describe a real-life problem that could be solved using an absolute value inequality.

Answers will vary.

Additional notes



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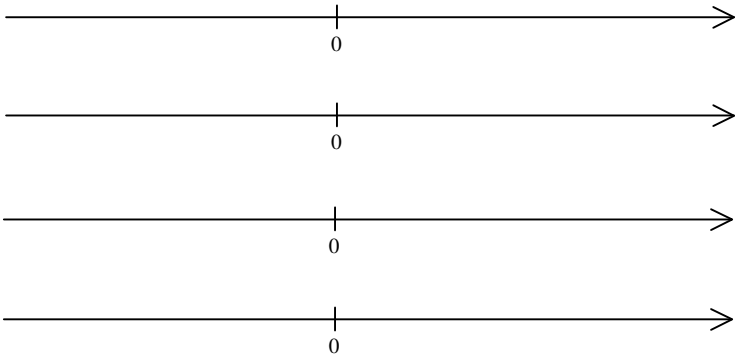

Homework Assignment

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