

Section 2.5 Solving Inequalities Algebraically and Graphically

Course Number

Instructor

Date

Objective: In this lesson you learned how to solve linear inequalities, inequalities involving absolute values, polynomial inequalities, and rational inequalities.

Important Vocabulary

Define each term or concept.

Solutions of an inequality

Graph of an inequality

Linear inequality

Double inequality

Critical numbers

Test intervals

I. Properties of Inequalities (Pages 205–206)

Solving an inequality in the variable x means . . .

What you should learn

How to recognize properties of inequalities

Numbers that are solutions of an inequality are said to

_____ the inequality.

To solve a linear inequality in one variable, use the _____

_____ to isolate the variable.

When both sides of an inequality are multiplied or divided by a negative number, . . .

Two inequalities that have the same solution set are

_____.

Complete the list of Properties of Inequalities given below.

1) Transitive Property: $a < b$ and $b < c \rightarrow$ _____

2) Addition of Inequalities: $a < b$ and $c < d \rightarrow$ _____

3) Addition of a Constant c : $a < b \rightarrow$ _____

4) Multiplication by a Constant c :

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

For $c < 0$, $a < b \rightarrow$ _____

II. Solving a Linear Inequality (Pages 206–207)

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

What you should learn
How to use properties of inequalities to solve linear inequalities

To use a graphing utility to solve the linear inequality

$$7x - 2 < 9x + 8, \dots$$

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

III. Inequalities Involving Absolute Value (Page 208)

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 _____.

The solutions of $|x| > a$ are all values of x that _____

_____.

What you should learn
How to solve inequalities involving absolute values

Example 1: Solve the inequality: $|x + 11| - 4 \leq 0$

The symbol \cup is called a _____ symbol and is used to denote _____.

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

IV. Polynomial Inequalities (Pages 209–211)

Where can polynomials change signs?

What you should learn
How to solve polynomial inequalities

Between two consecutive zeros, a polynomial must be . . .

When the real zeros of a polynomial are put in order, they divide the real number line into . . .

These zeros are the _____ of the inequality, and the resulting open intervals are the _____.

Complete the following steps for determining the intervals on which the values of a polynomial are entirely negative or entirely positive:

1)

2)

3)

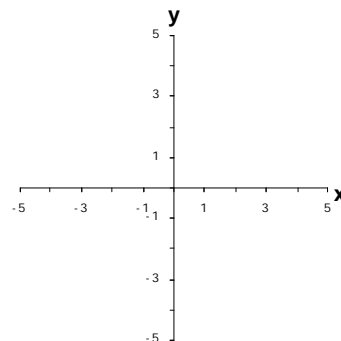
To approximate the solution of the polynomial inequality

$3x^2 + 2x - 5 < 0$ from a graph, . . .

If a polynomial inequality is not given in general form, you should begin the solution process by . . .

Example 3: Solve $x^2 + x - 20 \geq 0$.

Example 4: Use a graph to solve the polynomial inequality $-x^2 - 6x - 9 > 0$.



V. Rational Inequalities (Page 212)

To extend the concepts of critical numbers and test intervals to rational inequalities, use the fact that the value of a rational expression can change sign only at its _____ and its _____. These two types of numbers make up the _____ of a rational inequality.

To solve a rational inequality, . . .

What you should learn
How to solve rational inequalities

Example 5: Solve $\frac{3x+15}{x-2} \leq 0$.

Homework Assignment

Page(s)

Exercises