

Parent Newsletter

Chapter 3: Solving Linear Inequalities

Standards

Common Core:

A.CED.1: Create equations and inequalities in one variable and use them to solve problems.

A.CED.3: Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context.

A.REI.3: Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

A.REI.12: Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.

Key Terms

An *inequality* is a mathematical sentence that compares expressions.

A *solution of an inequality* is a value that makes the inequality true.

The set of all solutions of an inequality is called the *solution set*.

The *graph of an inequality* shows all of the solutions of the inequality on a number line.

A *compound inequality* is an inequality formed by joining two inequalities with the word “and” or the word “or.”

An *absolute value inequality* is an inequality that contains an absolute value expression.

A *linear inequality in two variables* x and y can be written as
 $ax + by < c$ $ax + by \leq c$ $ax + by > c$ $ax + by \geq c$
 where a , b , and c are real numbers.

The *graph of a linear inequality* in two variables shows all the solutions of the inequality in a coordinate plane.

A *solution of a linear inequality* in two variables is an ordered pair (x, y) that makes the inequality true.

The boundary line divides the coordinate plane into two *half-planes*.

Students will...

Write and graph inequalities.

Write and solve inequalities using addition or subtraction.

Solve inequalities using multiplication or division.

Write and solve multi-step inequalities.

Solve real-life problems.

Graph linear inequalities in two variables.

Key Ideas

Addition Property of Inequality

If you add the same number to each side of an inequality, the inequality remains true.

Subtraction Property of Inequality

If you subtract the same number from each side of an inequality, the inequality remains true.

Multiplication and Division Properties of Inequality (Case 1)

If you multiply or divide each side of an inequality by the same *positive* number, the inequality remains true.



Key Ideas

Multiplication and Division Properties of Inequality (Case 2)

If you multiply or divide each side of an inequality by the same *negative* number, the direction of the inequality symbol must be reversed for the inequality to remain true.

Solving Absolute Value Inequalities

To solve $|ax + b| < c$ for $c > 0$, solve the compound inequality $ax + b > -c$ and $ax + b < c$.

To solve $|ax + b| > c$ for $c > 0$, solve the compound inequality $ax + b < -c$ or $ax + b > c$.

Graphing a Linear Inequality in Two Variables

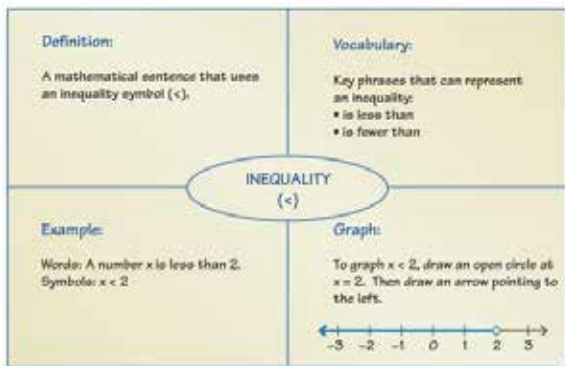
Step 1: Graph the boundary line for the inequality. Use a dashed line for $<$ or $>$. Use a solid line for \leq or \geq .

Step 2: Test a point that is not on the boundary line to determine if it is a solution of the inequality.

Step 3: If the test point is a solution, shade the half-plane that contains the point. If the test point is *not* a solution, shade the half-plane that does *not* contain the point.

Reference Tools

A **Four Square** can be used to organize information about a topic. Students write the topic in the “bubble” in the middle of the four square. Then students write concepts related to the topic in the four squares surrounding the bubble.



Essential Questions

How can you use an inequality to describe a real-life statement?

How can you use addition or subtraction to solve an inequality?

How can you use multiplication or division to solve an inequality?

How can you use an inequality to describe the area and perimeter of a composite figure?

How can you use a coordinate plane to solve problems involving linear inequalities?

Quick Review

Solving inequalities is similar to solving equations. Whatever you do to one side of the inequality, you must do to the other side of the inequality.

When you multiply or divide each side of an inequality by the same *negative* number, the direction of the inequality symbol must be reversed for the inequality to remain true.

To graph a linear inequality in two variables, graph the boundary line, test a point, and shade the appropriate half-plane.

What's the Point?

The ability to understand and use inequalities is very useful in real life. Designers use inequalities to calculate the electrical needs of a home.

The STEM Videos available online show ways to use mathematics in real-life situations.

The Chapter 3: Designing for Electricity STEM Video is available online at www.bigideasmath.com.

