

04 Solving Inequalities

Content Area: **Mathematics**
Course(s):
Time Period: **Week1**
Length: **5 Weeks**
Status: **Published**

Stage 1: Desired Results

Unit Overview/ Rationale

Inequalities can be solved by reasoning about the properties of inequality. Many, but not all of the properties of equality hold true for inequalities (ie: inequality symbols are reversed when multiplying or dividing both sides of an inequality by a negative number) Solutions to an inequality can be written in many forms.

Standards & Indicators

CommonCore: Mathematics, CommonCore: Grade 8, Mathematical Practice

The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.

- 1. Make sense of problems and persevere in solving them.
- 2. Reason abstractly and quantitatively.
- 3. Construct viable arguments and critique the reasoning of others.
- 4. Model with mathematics.
- 5. Use appropriate tools strategically.
- 6. Attend to precision.
- 7. Look for and make use of structure.
- 8. Look for and express regularity in repeated reasoning.

MA.6.6.EE.B.5

Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or

	inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.
MA.9-12.A-REI.B.3	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.
MA.7.7.EE	Expressions and Equations
MA.7.7.EE.B.4b	Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p , q , and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem.
MA.6.6.EE.B.8	Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many solutions; represent solutions of such inequalities on number line diagrams.
MA.6.6.EE	Expressions and Equations
MA.9-12.A-CED.A	Create equations that describe numbers or relationships
MA.9-12.A-CED.A.1	Create equations and inequalities in one variable and use them to solve problems.
MA.9-12.A-CED.A.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.
MA.9-12.A-REI	Reasoning with Equations and Inequalities
MA.7.7.EE.B.4	Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.

Big Ideas - Students will understand that...

-Graphs and equations and inequalities are alternative (and often equivalent) ways for depicting and analyzing patterns of change.

-Functional relationships can be expressed in real contexts, graphs, algebraic equations and inequalities, tables, and words; each representation of a given function is simply a different way of expressing the same idea.

-The value of a particular representation depends on its purpose.

Essential Questions - What provocative questions will foster inquiry and transfer of learning

-How can we use mathematical models to construct meaning for inequality situations?

-How can patterns, relations, and functions be used as tools to best describe and help explain real-life inequality situations?

Content - Students will know...

Key concepts:

inequality, compound inequality, absolute value equations, absolute value inequalities, set-notation, element of a set, complement of a set, interval notation

Skills - Students will be able to...

-Solve and graph one-step and multi-step inequalities

-Solve and graph compound inequalities

-Write inequalities and compound inequalities based on given information

-Use set notation to write solutions to an inequality

-Model naturally occurring phenomenon linear inequalities and absolute value in one variable

-Solve and graph absolute value equations in one variable

Stage 2: Assessment Evidence

Assessment

Stage 3: Learning Plan

Learning Activities

Suggested Activities:

Students solve one-step and two-step linear inequalities, graph inequalities, and write inequalities from a given scenario. □ Included will be dividing by a negative value to reverse the inequality symbol.

Formative Assessment:

Teacher observation of student work in small-group and independent practice.

□

Closure/Exit Slip: □ Students will be asked to create an inequality which will have a reversed inequality symbol when solved. □ Students will trade with a partner to solve and graph the inequality.

□

Example:

Solve the inequality $7 - 2x > 15$ and graph the solution on a number line.

Sample Solution:

$$7 - 2x > 15$$

$$-2x > 8$$

$$x < -4$$

Suggested Activities:

Students solve and graph multi-step inequalities. □ Students will analyze problems and write multi-step inequalities based on the information given. □ They will also determine when it is appropriate to use inequalities and when it is appropriate to use equations to model a situation.

Formative Assessment:

Teacher observation of student work in small-group and independent practice.

Closure/Exit Slip: □ Students will be asked to solve a multi-step inequality.

Example:

□ Solve the inequality $-2x + 9 < -2(x - 3)$

Sample Solution:

$$-2x + 9 < -2(x - 3)$$

$$-2x + 9 < -2x + 6$$

$$9 < 6$$

No solution because 9 is not less than 6.

Suggested Activities:

Students write solutions in set notation and interval notation.

Formative assessment: □

Teacher observation of student work in small-group and independent practice.

Closure/Exit Slip: □ Students will be asked to write solutions of an inequality in set notation.

Example:

□ If N is the set of even numbers that are less than or equal to 12, write N in set notation. □

□

Suggested Activities:

Students will use Venn Diagrams to answer questions about a group in order to understand the difference between statements with *and*, and statements with *or*. □ Class may form a survey question that has 2 distinct categories, which will allow for some overlap (example: □ students taking art class and students taking music class). □ Teacher generated exercises distinguishing between *and* statements and *or* statements

Class may also create a human number line representing values on a number line based on a real situation.

□

intervals. □ (For example: □ a basketball must be inflated to a pressure of 8 psi with an absolute error of 0.5 psi.) □

□

Formative Assessment:

Teacher observation of student work in small-group and independent practice.

□

Sample Assessment Questions: □

Solve equations in the following forms:

$|ax + b| = c$, $a|x + b| = c$, $|ax| + b = c$, $|ax + b| + b2 = c$

Resources

Prentice Hall

Unit 3 - Solving Inequalities