

02-Solving Linear Equations & Inequalities

Content Area: **Math**
Course(s):
Time Period: **Full Year**
Length: **5 weeks (18-20 blocks)**
Status: **Published**

General Overview, Course Description or Course Philosophy

In this unit, students will build on the knowledge of algebraic equations learned in pre-algebra to solve more complex one-variable equations and inequalities. Students will understand how to maintain equivalence when solving an equation or inequality and will be able to justify each step when solving. Students will learn how to apply these ideas to equations/inequalities with rational coefficients, compound inequalities, and absolute value equations and inequalities.

OBJECTIVES, ESSENTIAL QUESTIONS, ENDURING UNDERSTANDINGS

Students will understand that:

- Rules of arithmetic and algebra can be used together with equivalence to transform equations/inequalities to determine solutions
- Equations and graphs are alternative and often equivalent ways for depicting and analyzing patterns of change
- A formula is an equation which expresses a relationship in a precise form

Essential Questions:

- Can equations that appear to be different be equivalent?
- How is solving an equation similar to solving an inequality? How is it different?
- What does it mean if an equation has all real solutions?
- Construct a viable argument to justify each step of solving an equation.
- How is graphing the solution set to an inequality beneficial?

CONTENT AREA STANDARDS

A.APR

A. Perform arithmetic operations on polynomials

B. Understand the relationship between zeros and factors of polynomials

C. Use polynomial identities to solve problems

D. Rewrite rational expressions

A.CED

A. Create equations that describe numbers or relationships

A.REI

A. Understand solving equations as a process of reasoning and explain the reasoning

B. Solve equations and inequalities in one variable

C. Solve systems of equations

D. Represent and solve equations and inequalities graphically

A.SSE

A. Interpret the structure of expressions

B. Write expressions in equivalent forms to solve problems

HS Functions

F.BF

A. Build a function that models a relationship between two quantities

B. Build new functions from existing functions

F.IF

A. Understand the concept of a function and use function notation

B. Interpret functions that arise in applications in terms of the context

C. Analyze functions using different representations

MA.K-12.1	Make sense of problems and persevere in solving them.
MA.A-SSE.A.1	Interpret expressions that represent a quantity in terms of its context.
MA.K-12.2	Reason abstractly and quantitatively.
MA.A-SSE.A.1a	Interpret parts of an expression, such as terms, factors, and coefficients.
MA.K-12.3	Construct viable arguments and critique the reasoning of others.
MA.A-SSE.A.1b	Interpret complicated expressions by viewing one or more of their parts as a single entity.
MA.K-12.4	Model with mathematics.

MA.N-Q.A.1	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
MA.K-12.6	Attend to precision.
MA.N-Q.A.2	Define appropriate quantities for the purpose of descriptive modeling.
MA.N-Q.A.3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
MA.K-12.7	Look for and make use of structure.
MA.K-12.8	Look for and express regularity in repeated reasoning.
MA.A-CED.A.1	Create equations and inequalities in one variable and use them to solve problems.
MA.A-CED.A.4	Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.
MA.A-REI.A.1	Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.
MA.A-REI.B.3	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

RELATED STANDARDS (Technology, 21st Century Life & Careers, ELA Companion Standards are Required)

LA.K-12.NJSLSA.R7	Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.
CS.K-12.3.a	Identify complex, interdisciplinary, real-world problems that can be solved computationally.
CS.K-12.3.b	Decompose complex real-world problems into manageable sub-problems that could integrate existing solutions or procedures.
CS.K-12.3.c	Evaluate whether it is appropriate and feasible to solve a problem computationally.
CS.K-12.5.b	Create a computational artifact for practical intent, personal expression, or to address a societal issue.
TECH.K-12.P.5	Utilize critical thinking to make sense of problems and persevere in solving them.

STUDENT LEARNING TARGETS

Declarative Knowledge

Students will understand that:

- Number properties can be applied to algebraic equations/inequalities to maintain equivalence
- Rules of identity and inverse can be used to transform algebraic equations/inequalities
- Order of operations helps determine the order in which an equation needs to be solved
- Like terms can be combined over addition/subtraction
- Absolute value of a number is its distance from zero on a number line, which means it is always non-

negative

- Interval notation can be used to express solutions to inequalities

Procedural Knowledge

Students will be able to:

- Identify and combine like terms
- Solve equations and inequalities with one variable using multiple transformations
- Determine if an equation has one, infinitely many, or no solutions
- Apply inverse operations to rearrange literal equations and formulas
- Solve literal equations for an indicated variable
- Apply dimensional analysis to convert between units
- Solve simple and compound inequalities
- Create graphs of the solution sets of simple and compound inequalities
- Utilize interval notation to describe solution sets
- Solve, graph, and analyze key characteristics of absolute value equations and inequalities
- Create and solve equations/inequalities to represent real-life applications (perimeter, coin, age, distance, consecutive numbers, etc.)

EVIDENCE OF LEARNING

Benchmark Assessments

- Benchmark Assessments conducted three times per year, using Pear Assessment (Standards Based Assessments)

Alternate Assessments

- Portfolios
- Verbal Assessment (instead of written)

- Multiple choice
- Modified Rubrics
- Performance Based Assessments

Formative Assessments

- Class Discussion/Exit Cards
- Homework/practice problems (assigned from textbook or various web resources, such as Khan Academy, Albert, Quizizz, or Desmos)

Summative Assessments

- Lesson quizzes
- Teacher-generated unit test
- Performance tasks

RESOURCES (Instructional, Supplemental, Intervention Materials)

Core Instructional Resources

- *Pearson Algebra 1: Common Core*, Chapters 2 & 3

Supplemental Instructional Resources

- [Illustrative Math Tasks](#)
- [Arlington Algebra Project \(Linear Expressions, Equations, and Inequalities\)](#)

INTERDISCIPLINARY CONNECTIONS

Students can write equations or inequalities to model real-world situations that arise in a variety of contexts. For example, students can apply equations to represent and solve for unknown quantities in a variety of contexts and inequalities to analyze constraints (i.e. monetary or supply constraints when completing a project).

ACCOMMODATIONS & MODIFICATIONS FOR SUBGROUPS

See link to Accommodations & Modifications document in course folder.