Algebra 1A , Unit 2 , Linear Inequalities

Content Area: Math
Course(s): Algebra 1
Time Period: NovDec
Length: 25-30 Days
Status: Published

Title Section

Department of Curriculum and Instruction

Belleville Public Schools
Curriculum Guide

Algebra 1A
Unit 2  Linear Inequalities

Belleville Board of Education
102 Passaic Avenue
Belleville, NJ 07109
Unit Overview
This unit is about solving and graphing inequalities and compound inequalities.

The students should learn how to solve inequalities using different methods, graph their solution sets on number line, identify and solve compound inequalities.

Enduring Understanding
The solution to an inequality is a set, not just a single solution.

Make sense of problems and persevere in solving them.

Reason abstractly and quantitatively.

Model with mathematics.

Attend to precision.

Look for and make use of structure.

Look for and express regularity in repeated reasoning.
Essential Questions

- How do you represent relationships between quantities that are not equal?
- How do you justify the solution to a linear inequality?
- Can inequalities that appear to be different be equivalent?
- How can you solve inequalities?
- How to distinguish between types of inequalities: unions and intersection?
- What are real-life applications of inequalities?

Exit Skills

By the end of Unit 2 Students Should be able to:

- Write, graph, and identify solutions of inequalities.
- Solve inequalities using addition or subtraction.
- Solve inequalities using multiplication or division.
- Solve multi-step inequalities involving the distributive property.
- To solve inequalities with coefficients represented by letters.
- Graph linear inequalities on the coordinate plane.
- Identify compound statements connected by the word and/or.
- Solve compound inequalities containing the word and/or and graph their solution set.
- Model real world problems using inequalities.

New Jersey Student Learning Standards (NJSLS)
MA.A-REI.B Solve equations and inequalities in one variable
MA.A-REI.B.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.
MA.K-12.3 Construct viable arguments and critique the reasoning of others.
MA.K-12.4 Model with mathematics.
MA.K-12.5 Use appropriate tools strategically.
MA.K-12.6 Attend to precision.
MA.A-CED.A.1 Create equations and inequalities in one variable and use them to solve problems.
MA.K-12.1 Make sense of problems and persevere in solving them.

Interdisciplinary Connections

9-12.HS-PS1-3.3 Planning and carrying out investigations in 9-12 builds on K-8 experiences and progresses to include investigations that provide evidence for and test conceptual, mathematical, physical, and empirical models.
9-12.HS-PS1-4.2.1 Develop a model based on evidence to illustrate the relationships between systems or between components of a system.
9-12.HS-PS2-4.5 Mathematical and computational thinking at the 9–12 level builds on K–8 and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.
LA.W.9-10.1 Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
9.3.12.FN.1 Utilize mathematical concepts, skills and problem solving to obtain necessary information for decision making in the finance industry.
LA.L.9-10.1 Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.

Learning Objectives

Students will be able to:

- Represent relationship algebraically and evaluate them using properties.
- Interpret real-word examples into linear inequalities.
- Solve one-step inequalities in one variable using different operations.
- Solve multi-step inequalities and justify each step using properties.
- Solve inequalities with the variables on both sides by using like terms and the distributive property.
- Identify inequalities that are unions and intersections by analyzing the signs of inequalities.
- Graph solution sets on the number line using number theory.
- Solve inequalities by graphing.
- Investigate the graphs of inequalities by using a graphing calculator.
- Analyze the difference between the words phrases "at least" and "the most" and be able to use their symbols in inequalities.
- Model real-world situations using inequalities.
- Investigate and extend classroom activities into self research and long term projects.

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**Suggested Activities & Best Practices**

Videos on Solving Inequalities:

https://mathtv.com/topic/algebra/35

https://www.youtube.com/watch?v=oElmCg5fcWU
AI Assessment and Learning System:

https://www.aleks.com/

Mindset:

https://www.youtube.com/watch?v=3icoSeGqOtY


Teaching Strategies for Improving Algebra Knowledge in Middle and High School Students:


Coaching Corner:

https://sites.google.com/belleville.k12.nj.us/thecoachingcorner/home
Algebra Tools - Functions:

https://www.state.nj.us/education/aps/cccs/math/NJISTFunctions.pdf

Algebra Tools - Algebra:

https://www.state.nj.us/education/aps/cccs/math/NJISTAgebra.pdf

Misc Mathematics materials:

http://www.mathnstuff.com/

Algebra Kahoots:

https://kahoot.com/explore/collections/math-kahoot-algebra/
**Assessment Evidence - Checking for Understanding (CFU)**

McGraw Hill:

Solving inequalities (Summative):

https://connected.mcgraw-hill.com/c2j/resourceLibrary.do?bookId=DFRTR2RBH9YT25W7OSMM6J3XM1&libraryId=DZDJJ7M7F3O5CNLMT8JK7ZQ4L4

EAssessment test generator (Summative):

https://assess.k12.mhedu.com/Instructor/TestGenerator.aspx

Edulastic Formative assessments (Formative):

Solving and graphing multi-step inequalities:

https://app.edulastic.com/#renderResource/close/NzA1ODgzNTgy

Solving and graphing compound inequalities:

https://app.edulastic.com/#renderResource/close/NzExODQ3MzU4

Benchmark 1 - Common Assessment on Oncourse (Benchmark)

"Do Now/Exit Ticket" Activity (Formative)

- Admit Tickets
- Anticipation Guide
- Common Benchmarks
- Compare & Contrast
- Create a Multimedia Poster
- DBQ's
- Define
- Describe
- Evaluate
• Evaluation rubrics
• Exit Tickets
• Explaining
• Fist- to-Five or Thumb-Ometer
• Illustration
• Journals
• KWL Chart
• Learning Center Activities
• Multimedia Reports
• Newspaper Headline
• Outline
• Question Stems
• Quickwrite
• Quizzes
• Red Light, Green Light
• Self- assessments
• Socratic Seminar
• Study Guide
• Surveys
• Teacher Observation Checklist
• Think, Pair, Share
• Think, Write, Pair, Share
• Top 10 List
• Unit review/Test prep
• Unit tests
• Web-Based Assessments
• Written Reports

**Primary Resources & Materials**
Glencoe McGraw-Hill Algebra 1 2014

Glencoe McGraw-Hill Algebra 1 2010

Practice Glencoe Algebra 1

Study Guide Glencoe Algebra 1
Ancillary Resources

ALEKS

The Glencoe Personal Tutor Plus

The Glencoe Personal Tutor Plus(Spanish)

Technology Infusion

Create and assign exit tickets using Edulastic
{ https://app.edulastic.com/#renderResource/close/Mjk0MjE2ODUwOA%3D%3D } or Google forms

Use graphing calculator to model problems

Technology that may be infused into this unit to enhance learning

- Youtube
- Khan academy
- Google Classroom
- GSuite
- Kutasoftware
- Edulastic
- PodCasts
- Skype
- Twitter
- Ted Talks
- QR Barcode Generator
- Calculator/Graphing calculator
- Flipgrid
- Peardeck
- Nearpod
- McGraw-Hill Education
- Desmos.com
- Geogebra.org
Alignment to 21st Century Skills & Technology


Mastery and infusion of 21st Century Skills & Technology and their Alignment to the core content areas is essential to student learning. The core content areas include:

- English Language Arts;
- Mathematics;
- Science and Scientific Inquiry (Next Generation);
- Social Studies and Economics;
- Technology;
- Visual and Performing Arts.

TECH.8.1.12.F.CS1  Identify and define authentic problems and significant questions for investigation.
CRP.K-12.CRP2  Apply appropriate academic and technical skills.
CRP.K-12.CRP4  Communicate clearly and effectively and with reason.
CAEP.9.2.12.C.2  Modify Personalized Student Learning Plans to support declared career goals.
CRP.K-12.CRP11  Use technology to enhance productivity.
CRP.K-12.CRP8  Utilize critical thinking to make sense of problems and persevere in solving them.
CRP.K-12.CRP7  Employ valid and reliable research strategies.
TECH.8.1.12.A.3  Collaborate in online courses, learning communities, social networks or virtual worlds to discuss a resolution to a problem or issue.
21st Century Skills/Interdisciplinary Themes

- Communication and Collaboration
- Creativity and Innovation
- Critical thinking and Problem Solving
- ICT (Information, Communications and Technology) Literacy
- Information Literacy
- Life and Career Skills
- Media Literacy

21st Century Skills

- Civic Literacy
- Environmental Literacy
- Financial, Economic, Business and Entrepreneurial Literacy
- Global Awareness
- Health Literacy

Differentiation

Glencoe -McGrawHill Resources:

- Teaching with Manipulatives: Algebra Tiles
- Algebra Labs
- Math Triumphs
- Algebra 1 Study Notebook

TI-84 Calculator Activities

McGraw Hill Graphing Calculator lessons on inequalities:
Algebra Tiles:
Use of algebra tiles to model solving inequalities (McGraw Hill Alg 1 textbook pages 291)

Vocabulary of inequalities:
https://connected.mcgraw-hill.com/media/repository/protected_content/COMPOUND/50000579/76/84/index.html?mghCourseID=DFRTR2RBH9YT25W7OSMM6J3XM1

Differentiations:
- Small group instruction
- Small group assignments
- Extra time to complete assignments
- Pairing oral instruction with visuals
- Repeat directions
- Use manipulatives
- Center-based instruction
- Token economy
- Study guides
- Teacher reads assessments allowed
- Scheduled breaks
- Rephrase written directions
- Multisensory approaches
- Additional time
- Preview vocabulary
- Preview content & concepts
- Story guides
- Behavior management plan
- Highlight text
- Student(s) work with assigned partner
- Visual presentation
- Assistive technology
- Auditory presentations
- Large print edition
- Dictation to scribe
- Small group setting

Hi-Prep Differentiations:
- Alternative formative and summative assessments
- Choice boards
- Games and tournaments
- Group investigations
- Guided Reading
- Independent research and projects
- Interest groups
- Learning contracts
- Leveled rubrics
- Literature circles
- Multiple intelligence options
- Multiple texts
- Personal agendas
- Project-based learning
- Problem-based learning
- Stations/centers
- Think-Tac-Toes
- Tiered activities/assignments
- Tiered products
- Varying organizers for instructions

**Lo-Prep Differentiations**

- Choice of books or activities
- Cubing activities
- Exploration by interest
- Flexible grouping
- Goal setting with students
- Jigsaw
- Mini workshops to re-teach or extend skills
- Open-ended activities
- Think-Pair-Share
- Reading buddies
- Varied journal prompts
- Varied supplemental materials

**Special Education Learning (IEP's & 504's)**

Graphing calculator (Ti-84)

The Glencoe-McGrawHill Personal Tutor

Glencoe-McGrawHill Resources:

• printed copy of board work/notes provided
• additional time for skill mastery
• assistive technology
• behavior management plan
• Center-Based Instruction
• check work frequently for understanding
• computer or electronic device utilizes
• extended time on tests/ quizzes
• have student repeat directions to check for understanding
• highlighted text visual presentation
• modified assignment format
• modified test content
• modified test format
• modified test length
• multiple test sessions
• multi-sensory presentation
• preferential seating
• preview of content, concepts, and vocabulary
• Provide modifications as dictated in the student's IEP/504 plan
• reduced/shortened reading assignments
• Reduced/shortened written assignments
• secure attention before giving instruction/directions
• shortened assignments
• student working with an assigned partner
• teacher initiated weekly assignment sheet
• Use open book, study guides, test prototypes
English Language Learning (ELL)
The Glencoe Personal Tutor(Spanish):

Solve and graph an Intersection

Solve and graph a Union

Teaching Algebra with Manipulatives

- teaching key aspects of a topic. Eliminate nonessential information
- using videos, illustrations, pictures, and drawings to explain or clarify
- allowing products (projects, timelines, demonstrations, models, drawings, dioramas, poster boards, charts, graphs, slide shows, videos, etc.) to demonstrate student’s learning;
- allowing students to correct errors (looking for understanding)
- allowing the use of note cards or open-book during testing
- decreasing the amount of work presented or required
- having peers take notes or providing a copy of the teacher’s notes
- modifying tests to reflect selected objectives
- providing study guides
- reducing or omitting lengthy outside reading assignments
- reducing the number of answer choices on a multiple choice test
- tutoring by peers
- using computer word processing spell check and grammar check features
- using true/false, matching, or fill in the blank tests in lieu of essay tests

At Risk
Graphing calculator(TI-84)

Graphing Inequalities p.323 textbook

Glencoe -McGrawHill Resources:

Teaching Algebra with Manipulatives, McGrawHill Resource - (digital version accessible)

- Compound inequalities
- Reading Compound sentences

Math Triumphs

Algebra 1 Study Notebook
• allowing students to correct errors (looking for understanding)
• teaching key aspects of a topic. Eliminate nonessential information
• allowing products (projects, timelines, demonstrations, models, drawings, dioramas, poster boards, charts, graphs, slide shows, videos, etc.) to demonstrate student’s learning
• allowing students to select from given choices
• allowing the use of note cards or open-book during testing
• collaborating (general education teacher and specialist) to modify vocabulary, omit or modify items to reflect objectives for the student, eliminate sections of the test, and determine how the grade will be determined prior to giving the test.
• decreasing the amount of work presented or required
• having peers take notes or providing a copy of the teacher’s notes
• marking students’ correct and acceptable work, not the mistakes
• modifying tests to reflect selected objectives
• providing study guides
• reducing or omitting lengthy outside reading assignments
• reducing the number of answer choices on a multiple choice test
• tutoring by peers
• using authentic assessments with real-life problem-solving
• using true/false, matching, or fill in the blank tests in lieu of essay tests
• using videos, illustrations, pictures, and drawings to explain or clarify

Talented and Gifted Learning (T&G)
Glencoe Enrichment Activities

Glencoe Chapter Projects

Math Forum: Problems of the Week, Sample Lesson, Reasoning and Making Sense Task Library

Enrichment: Solving Compound Inequalities (5-4)

• Above grade level placement option for qualified students
• Advanced problem-solving
• Allow students to work at a faster pace
• Cluster grouping
• Complete activities aligned with above grade level text using Benchmark results
• Create a blog or social media page about their unit
• Create a plan to solve an issue presented in the class or in a text
• Debate issues with research to support arguments
• Flexible skill grouping within a class or across grade level for rigor
• Higher order, critical & creative thinking skills, and discovery
• Multi-disciplinary unit and/or project
• Teacher-selected instructional strategies that are focused to provide challenge, engagement, and growth opportunities
• Utilize exploratory connections to higher-grade concepts
• Utilize project-based learning for greater depth of knowledge

**Sample Lesson**

**Unit Name: Linear Equations**

**NJSLS:**

MA.9-12.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.9-12.A-REI.B.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

**Statement of Objective:** After reviewing the Do Now and HW the learner will solve equations with one variable by combining like terms and using the distributive property to show whether there is one, none, or infinitiely many solutions

**Learning Activity:**


Distribute graphic organizer with steps to Solving multi-step equations (Suggested Activities & Best Practices)

Ask questions to discern understanding of distributive property, combining like terms, and inverse operations.....first? next? ... How can we check our answer? - Model with Algebra tiles or digital tiles

**Model Problems on Smart TV:**

Powerpoint([https://connected.mcgraw-hill.com/e2j/resourceLibrary.do?facet=GROUP%7cN&facet=TAG%7cBBW9KBBEFF7MXHDNLPLD2YQZSE&bookId=DFRTR2RBH9YT25W7OSMM6J3XM1&libraryId=Z6G2OY1GBWQ6VGC0F13O5Z16LO&mode=BROWSE](https://connected.mcgraw-hill.com/e2j/resourceLibrary.do?facet=GROUP%7cN&facet=TAG%7cBBW9KBBEFF7MXHDNLPLD2YQZSE&bookId=DFRTR2RBH9YT25W7OSMM6J3XM1&libraryId=Z6G2OY1GBWQ6VGC0F13O5Z16LO&mode=BROWSE))
Discuss no solutions to an equation? infinitely many solutions to an equation?

Practice with their partner/group - think/pair/share

Have students go to board or post to show and explain their work and answer


Differentiation/Modifications: Cooperative groups, peer partners, Algebra tiles, Teacher's step by step notes, read aloud, graphic organizers, worked examples, videos, digital tutorials McGraw-Hill Personal Tutor Plus, Calculator, shorten homework assignments

Interdisciplinary Connection: Number Theory, Financing.


Integration of Technology: SmartTV, Peardeck, Google Slides, Powerpoint, Edulastic, McGraw-Hill digital Resources, Calculator.