



Unit Map 2013-2014

Green Brook Township School District

/ **Algebra I Curriculum (D)** / Grade 7 (District Middle Curriculum)

Tuesday, August 27, 2013, 10:04AM

Green Brook Township
Public Schools

Unit: Algebra Basics (Week 1, 3 Weeks) 📅 📄

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 7, 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.

CommonCore: Mathematics, CommonCore: HS: Num/Quantity, Vector & Matrix Quantities

N-VM Perform operations on matrices and use matrices in applications.

- N-VM.6. (+) Use matrices to represent and manipulate data, e.g., to represent payoffs or incidence relationships in a network.
- N-VM.7. (+) Multiply matrices by scalars to produce new matrices, e.g., as when all of the payoffs in a game are doubled.
- N-VM.8. (+) Add, subtract, and multiply matrices of appropriate dimensions.
- N-VM.9. (+) Understand that, unlike multiplication of numbers, matrix multiplication for square matrices is not a commutative operation, but still satisfies the associative and distributive properties.

CommonCore: Mathematics, CommonCore: HS: Algebra, Seeing Structure in Expressions

A-SSE Interpret the structure of expressions.

- A-SSE.1. Interpret expressions that represent a quantity in terms of its context.
 - A-SSE.1a. Interpret parts of an expression, such as terms, factors, and coefficients.
 - A-SSE.1b. Interpret complicated expressions by viewing one or more of their parts as a single entity.
- A-SSE.2. Use the structure of an expression to identify ways to rewrite it.

A-SSE Write expressions in equivalent forms to solve problems.

- A-SSE.3. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.

CommonCore: Mathematics, CommonCore: HS: Algebra, Creating Equations

A-CED Create equations that describe numbers or relationships.

- A-CED.1. Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.

CommonCore: Mathematics, CommonCore: HS: Algebra, Reasoning with Equations & Inequalities

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

- A-REI.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.

Description of Unit

In this unit, students will review concepts from Pre-Algebra and apply them to more difficult problems. Students will translate sentences and problems into algebraic equations, which is the foundation for the remainder of the course. Students will also use the order of operations to simplify numerical and algebraic expressions. The unit will conclude with an introduction to matrices and matrix operations.

Essential Questions

- How do you write equations in order to solve word problems?
- Why do you use absolute value?
- How can algebra be used in real-life situations?

Knowledge

Students will know that:
 1) there are common words and phrases that represent mathematical concepts
 2) the acronym for remembering the order of operations is PEMDAS
 3) the meaning of absolute value is the distance from zero
 4) "like terms" refers to terms with identical variables and exponents
 5) matrices are used to organize numerical data

Skills

Students will be able to:
 a) translate sentences into algebraic equations
 b) use the order of operations, including grouping symbols
 c) simplify expressions involving absolute values
 d) simplify algebraic expressions
 e) perform arithmetic operations with matrices

Assessments

Pre-Assessment

Diagnostic: Written Test

Students will take a pre-assessment to determine the amount of review needed for the first three units in this course.

Daily Formative Assessment

Formative: Other written assessments

Daily formative assessments, such as Do-Now assignments, homework assignments, Tickets-to-Leave, and SmartPal response board practice problems, will provide data for teachers.

Unit Quiz

Formative: Written Test

The unit quiz will include the topics: translating sentences into algebraic equations, solving word problems involving two unknowns, solving word problems using charts, using the order of operations, and simplifying algebraic expressions.

Chapter Test

Summative: Written Test

The chapter test will include the topics: translating sentences into algebraic equations, solving word problems involving two unknowns, solving word problems using charts, using the order of operations, evaluating involving absolute value, simplifying algebraic expressions, solving consecutive integer word problems, and completing arithmetic operations with matrices.

Activities

- Students will complete differentiated practice problems using SmartPal response boards
- Students will complete Visual Brainstorm logic problems

Activities to Differentiate Instruction

- Students will complete matrix arithmetic operation problems that involve multiple operations and use of the order of operations for challenge.
- Students will simplify complex algebraic expressions that require using the order of operations before combining like terms.
- Visual Brainstorm logic problems have cards that are marked by difficulty level. Students will complete problems that are easy, intermediate, or challenging.
- Students will be given problems for SmartPal practice based on individual levels of ability.

Integrated/Cross-Disciplinary Instruction

Resources

- McDougal Littell *Algebra 1* textbook

- When students are translating sentences into algebraic equations, they will be utilizing skills from language arts to relate vocabulary to mathematical symbols and operations.

- McDougal Littell *Algebra: Structure and Method* textbook
- Visual Brainstorm logic problem cards
- SmartPal response boards
- SMART Board

 [McDougal Littell companion website \(Classzone.com\)](#)

 [Smart Exchange](#)

[<< Previous Year](#)

Last Updated: Sunday, August 19, 2012, 12:06AM

© [Rubicon International](#), 2013. All rights reserved

Atlas Version 7.2.6



Unit Map 2013-2014

Green Brook Township School District

/ **Algebra I Curriculum (D)** / Grade 7 (District Middle Curriculum)

Tuesday, August 27, 2013, 10:04AM

Green Brook Township
Public Schools

Unit: Solving Equations (Week 4, 2 Weeks) 📅 📅

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 7, 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.

CommonCore: Mathematics, CommonCore: Grade 8, Expressions & Equations

8.EE Analyze and solve linear equations and pairs of simultaneous linear equations.

- 8.EE.7. Solve linear equations in one variable.
- 8.EE.7a. Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form $x = a$, $a = a$, or $a = b$ results (where a and b are different numbers).
- 8.EE.7b. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.

CommonCore: Mathematics, CommonCore: HS: Algebra, Creating Equations

A-CED Create equations that describe numbers or relationships.

- A-CED.4. Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.

CommonCore: Mathematics, CommonCore: HS: Algebra, Reasoning with Equations & Inequalities

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

- A-REI.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.

A-RE I Solve equations and inequalities in one variable.

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

Description of Unit	Essential Questions
<p>In this unit, students will use the properties of equality to solve two-step and multi-step equations in one variable. They will also use the properties of equality and the distributive property to solve equations with variables on both sides. They will solve equations with integer and rational number coefficients. Students will apply unit skills to solve word problems. They will create charts to solve challenging word problems that include geometry, cost, value, and income.</p>	<ul style="list-style-type: none"> • How are linear equations used to solve real world problems? • How can we construct equations in order to solve real world problems? • When can it be important to rewrite an equation?
Knowledge	Skills
<p>Students will know that:</p> <ol style="list-style-type: none"> 1) the properties of equality, which include addition, subtraction, multiplication, division, and substitution, are used to solve equations 2) charts can be used as an aid when solving word problems 3) formulas can contain multiple variables and can be rewritten in an equivalent form 	<p>Students will be able to:</p> <ol style="list-style-type: none"> a) solve equations in one variable b) solve word problems involving geometry, cost, value, and income c) rewrite equations in two or more variables
<u>Assessments</u>	
<p>Solving Equations Pre-Assessment Diagnostic: Other written assessments Students are given various equations and word problems to solve to assess their prior knowledge of the skills in this chapter.</p> <p>Daily Formative Assessment Formative: Other written assessments Formative assessments, such as Do-Now assignments, homework assignments, Tickets-to-Leave, and SmartPal response board practice problems, will provide daily data for teachers.</p> <p>Solving Equations Quiz</p>	

Summative: Written Test

Topics for this quiz include solving: two-step equations, multi-step equations, equations with variables on both sides, equations with rational number coefficients, and word problems that incorporate geometry concepts.

Solving Equations Test

Summative: Written Test

Topics for this test include solving: two-step equations, multi-step equations, equations with variables on both sides, equations with rational number coefficients, word problems that incorporate geometry concepts, cost, income, and value word problems, and rewriting formulas.

<p>Activities</p>	<p>Activities to Differentiate Instruction</p>
<ul style="list-style-type: none"> • Students will utilize TI-83 Plus graphing calculators to solve linear equations (this will also be a time for students to familiarize themselves with these calculators so that they use them proficiently in future mathematics courses and assessments) • Students will play Equation Bingo in order to review how to solve all types of linear equations • Students will complete differentiated practice problems on SmartPal response boards 	<ul style="list-style-type: none"> • Students will work in pairs when using graphing calculators to assist in finding the various menus and functions. • Equations containing numerous terms and multiple uses of the distributive property will be assigned as challenge problems. • Students will be given problems for SmartPal practice based on individual levels of difficulty.
<p>Integrated/Cross-Disciplinary Instruction</p>	<p>Resources</p>
<ul style="list-style-type: none"> • Students will incorporate technology skills when using the TI-83 Plus graphing calculators. 	<ul style="list-style-type: none"> • McDougal Littell <i>Algebra 1</i> textbook • McDougal Littell <i>Algebra: Structure and Method</i> textbook • TI-83 Plus graphing calculators • blank Bingo board worksheets • SmartPal response boards • SMART Board <p>  McDougal Littell Companion Website (Classzone.com)  Smart Exchange </p>

[<< Previous Year](#)

Last Updated: Monday, August 13, 2012, 9:43PM



Unit Map 2013-2014

Green Brook Township School District

/ **Algebra I Curriculum (D)** / Grade 7 (District Middle Curriculum)

Tuesday, August 27, 2013, 10:05AM

Green Brook Township
Public Schools

Unit: Solving Inequalities (Week 6, 2 Weeks) 📅 📄

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 7, 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.

CommonCore: Mathematics, CommonCore: HS: Algebra, Creating Equations

A-CED Create equations that describe numbers or relationships.

- A-CED.1. Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.
- 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.

CommonCore: Mathematics, CommonCore: HS: Algebra, Reasoning with Equations & Inequalities

A-RE I Solve equations and inequalities in one variable.

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

Description of Unit

In this unit, students will write, solve, and graph two-step and multi-step inequalities using addition, subtractions, multiplication, and division. They will learn to reverse an

Essential Questions

- Why are inequalities important to use in representing real world situations?

inequality sign when multiplying or dividing by a negative number. Students will solve and graph compound inequalities. Finally, they will solve and graph absolute value inequalities. This will require them to recognize that certain problems require "and answers" and some require "or answers". This is dependent upon the inequality sign in the original problem. Overall, students will recognize that solving one variable inequalities uses the same steps as solving one variable equations, however they contain infinite solutions as opposed to only one solution.

- How are inequalities used to solve real world problems?
- How does mathematics help to model and explain our world?
- How have your thought processes and techniques to solving problems changed?

Knowledge	Skills
<p>Students will know that:</p> <ol style="list-style-type: none"> 1) the properties of inequalities are used when solving one variable inequalities 2) compound inequalities can consist of "and problems" and "or problems" 3) absolute value equations contain two solutions 4) absolute value inequality problems with greater than signs are "or problems" and those with less than signs are "and problems" 	<p>Students will be able to:</p> <ol style="list-style-type: none"> a) solve and graph two-step and multi-step inequalities b) solve and graph compound inequalities c) solve absolute value equations d) solve and graph absolute value inequalities

Assessments

Inequalities Pre-Assessment

Diagnostic: Other written assessments

Students are given various inequalities and word problems to solve in order to assess their prior knowledge in this chapter. They learned how to solve one-step inequalities in Pre-Algebra and this will determine if students remember the basic steps for solving these problems.

Daily Formative Assessment

Formative: Other written assessments

Formative assessments, such as Do-Now assignments, homework assignments, Tickets-to-Leave, and SmartPal response board practice problems, will provide daily data for teachers.

Problem-Solving Workshop

Formative: Other oral assessments

Students will work in pairs to complete challenging word problems that require problem-solving strategies. Each pair of students will be assigned a particular problem and will present their solution to the class.

<p>Inequalities Quest Summative: Written Test Topics will include: solving two-step, multi-step, compound, and absolute value inequalities and solving absolute value equations</p>	
<p>Activities</p> <ul style="list-style-type: none"> Students will complete differentiated practice problems on SmartPal response boards. 	<p>Activities to Differentiate Instruction</p> <ul style="list-style-type: none"> Students will use the acronym "G.O.L.A." to assist in remembering that absolute value inequality problems with greater than signs are "or problems" and those with less than signs are "and problems". Students will discover how to recognize if an absolute value inequality problem has no solution or infinitely many solutions without graphing. Students will be given problems for SmartPal practice based on individual levels of difficulty.
<p>Integrated/Cross-Disciplinary Instruction</p> <ul style="list-style-type: none"> Students will utilize science and 21st Century Skills curricula when completing word problems involving science and financial planning formulas. 	<p>Resources</p> <ul style="list-style-type: none"> McDougal Littell <i>Algebra 1</i> textbook McDougal Littell <i>Algebra: Structure and Method</i> textbook SmartPal response boards SMART Board <p>  McDougal Littell Companion Website (Classzone.com)  Smart Exchange </p>

[<< Previous Year](#)

Last Updated: Monday, August 20, 2012, 11:08AM



Unit Map 2013-2014

Green Brook Township School District

/ **Algebra I Curriculum (D)** / Grade 7 (District Middle Curriculum)

Tuesday, August 27, 2013, 10:12AM

Green Brook Township
Public Schools

Unit: Graphing Linear Equations and Inequalities (Week 8, 3 Weeks)  

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 7, 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.

CommonCore: Mathematics, CommonCore: Grade 8, Functions

8.F Define, evaluate, and compare functions.

- 8.F.1. Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.
- 8.F.3. Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear.

8.F Use functions to model relationships between quantities.

- 8.F.5. Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.

CommonCore: Mathematics, CommonCore: HS: Algebra, Reasoning with Equations & Inequalities

A-RE I Represent and solve equations and inequalities graphically.

- A-REI.10. Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).

- 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.

CommonCore: Mathematics, CommonCore: HS: Functions, Interpreting Functions

F-IF Understand the concept of a function and use function notation.

- F-IF.1. Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x . The graph of f is the graph of the equation $y = f(x)$.
- F-IF.2. Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.

F-IF Analyze functions using different representations.

- F-IF.7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
- F-IF.8. Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.
- F-IF.9. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).

Description of Unit	Essential Questions
<p>In this unit, students will become acquainted with the coordinate plane. They will graph linear equations and inequalities in both slope-intercept and standard form. These foundational skills will be utilized in subsequent units. Students will be able to calculate slope, x-intercepts, and y-intercepts. Students will also be introduced to functions and their notation.</p>	<ul style="list-style-type: none"> • How can one recognize linear relationships? • How does one know which method to use when graphing linear equations? • Where are linear inequalities used in real-world situations? • How does mathematics help in explaining our world?
Knowledge	Skills
<p>Students will know that:</p> <ol style="list-style-type: none"> 1) the Cartesian plane (coordinate plane) is comprised of a x-axis and y-axis 2) the intercepts of a graph are the locations where a line crosses the axes 3) slope measures the steepness of a function 	<p>Students will be able to:</p> <ol style="list-style-type: none"> a) plot points and graph linear equations using tables b) calculate x and y-intercepts c) calculate slope d) graph linear equations in slope-intercept and standard form e) graph linear inequalities in slope-intercept and standard form

- 4) slope-intercept form is $y=mx+b$ and standard form is $ax+by=c$
- 5) linear inequalities and absolute value equations are comprised of lines
- 6) functions are relations in which every input has exactly one output
- 7) direct variation is an equation of the form $y=kx$
- 8) the graph of absolute value functions is in the shape of a "V"

- f) identify functions and evaluate functions for given input values
- g) identify direct variation and find the constant of variation
- h) graph absolute value functions

Assessments

Graphing Pre-Assessment

Diagnostic: Other written assessments

Students will be assessed on their prior knowledge of the coordinate plane and how to graph linear equations.

Daily Formative Assessment

Formative: Other written assessments

Formative assessments, such as Do-Now assignments, homework assignments, Tickets-to-Leave, and SmartPal response board practice problems, will provide daily data for teachers.

Graphing Quiz

Formative: Written Test

Topics will include: calculating slope, finding missing coordinates that produce given slopes, graphing linear equations in slope-intercept and standard form, calculating x and y-intercepts, and determining if lines are parallel or perpendicular.

Graphing Test

Summative: Written Test

Topics will include: calculating x and y-intercepts, calculating slope, finding missing coordinates that produce given slopes, graphing linear equations in slope-intercept and standard form, determining if lines are parallel or perpendicular, graphing linear inequalities, identifying direct variation, identifying and evaluating functions, and graphing absolute value functions.

Carnival Time Project

Summative: Technology Project

Students are given a scenario in which they are planning a school carnival. They will graph and interpret their data from linear equations that they will create.

 [Carnival Time Project](#)

Activities

Activities to Differentiate Instruction

- Students will utilize TI-83 Plus graphing calculators in order to graph linear equations and inequalities.
- Students will complete Slope Picture activity where students will draw a picture on a coordinate plane that only consists of straight line segments and will calculate the slope of each segment
- Students will complete differentiated practice problems on SmartPal response boards.
- Students will create scatter plot of student standing height versus kneeling height to demonstrate direct variation.

- Students will graph non-linear functions in the graphing calculator and will compare and contrast its their characteristics to those of linear functions.
- Students will be required to have at least 15 segments with at least 6 unique slopes.
- Students will be given problems for SmartPal practice based on individual levels of difficulty.

Integrated/Cross-Disciplinary Instruction	Resources
<ul style="list-style-type: none"> • Students will incorporate technology skills when using the TI-83 Plus graphing calculators. 	<ul style="list-style-type: none"> • McDougal Littell <i>Algebra 1</i> textbook • McDougal Littell <i>Algebra: Structure and Method</i> textbook • TI-83 Plus graphing calculators • SmartPal response boards • SMART Board <p>  McDougal Littell Companion Website (Classzone.com)  Smart Exchange </p>

[<< Previous Year](#)

Last Updated: Monday, August 20, 2012, 11:09AM

© [Rubicon International](#), 2013. All rights reserved

Atlas Version 7.2.6



Unit Map 2013-2014

Green Brook Township School District

/ **Algebra I Curriculum (D)** / Grade 7 (District Middle Curriculum)

Tuesday, August 27, 2013, 10:12AM



Unit: Writing Linear Equations (Week 11, 2 Weeks)

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 7, 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.

CommonCore: Mathematics, CommonCore: HS: Algebra, Creating Equations

A-CED Create equations that describe numbers or relationships.

- A-CED.1. Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.
- A-CED.2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

Description of Unit

In this unit, students will write the equations of lines in slope-intercept and standard form. Students will be able to write equations whether they are given the slope and y-intercept, the slope and a point, or only two points. Also, they will write equations and use their graphs in order to solve real-world problems. Then they will write and find equations of lines parallel or perpendicular to a given line. Finally, they will make

Essential Questions

- How are patterns of change related to the behavior of functions?
- How can patterns, relations, and functions be used as tools to best describe and help explain real-life situations?
- How can knowing the equation of a line help in decision-making?

scatter plots of real-world data and use a line of fit to model and interpret the data. They will perform linear regression to find the best-fitting line for data, and make predictions using the graph and the equation.

Knowledge

Students will know that:

- 1) slope-intercept form of a line is $y = mx + b$
- 2) point-slope form of a line is $y - y_1 = m(x - x_1)$
- 3) standard form of a line is $Ax + By = C$
- 4) parallel lines have the same slope and perpendicular lines have negative reciprocal slopes
- 5) linear regression is the process of finding the line of best fit to model a set of data

Skills

Students will be able to:

- a) write equations in slope-intercept form
- b) write equations in point-slope form
- c) write equations in standard form
- d) write equations of parallel or perpendicular lines
- e) find a best-fitting line for a scatter plot and use it to make predictions

Assessments

Writing Equations from Graphs Pre-Assessment

Diagnostic: Other written assessments

Students will be given a pre-assessment to measure prior knowledge and student understanding of how to write equations when given a graph of a linear function.

Writing Equations Quiz

Formative: Written Test

Topics will include: writing equations in slope-intercept, point-slope, and standard forms when given either a graph, the slope and a point on the line, or two points on the line, graphing lines in point-slope form, and writing equations when given word problems.

Writing Equations Test

Summative: Written Test

Topics will include: writing equations in slope-intercept, point-slope, and standard forms when given either a graph, table, the slope and a point on the line, or two points on the line, graphing lines in point-slope form, writing equations when given word problems, creating scatter plots and equations of lines of best fit, and using graphing calculators to write equations from data and make predictions .

Real-Life Linear Relationship Project

Summative: Other written assessments

Students will identify a real-life linear relationship and will collect data to present a scatter plot and line of best fit. They will utilize graphing calculators as a tool to verify their best-fitting line's equation and the existence of a linear relationship. Students will analyze their results and present it in a written explanation.

Daily Formative Assessment

Formative: Other written assessments

Formative assessments, such as Do-Now assignments, homework assignments, Tickets-to-Leave, and SmartPal response board practice problems, will provide daily data for teachers.

 Real-Life Linear Relationship Project

<p>Activities</p> <ul style="list-style-type: none"> • Students will complete differentiated practice problems on SmartPal response boards • Students will utilize graphing calculators when making scatter plots and finding lines of best fit. • Students will complete "Bull's Eye worksheet" to measure student understanding of the connections between slope-intercept form, standard form, and x-intercepts. • Students will complete problem-solving workshops in order to become familiar with writing short-constructed and extended responses for Algebra 1 questions. <p> <u>Bullseye Worksheet</u></p>	<p>Activities to Differentiate Instruction</p> <ul style="list-style-type: none"> • Students will be given problems for SmartPal practice based on individual levels of difficulty. • Students will be given problems that will result in equations that have slopes and y-intercepts that are fractions. • Students will collect ten pieces of data for the Real-Life Linear Relationship Project and will make predictions using their data.
<p>Integrated/Cross-Disciplinary Instruction</p> <ul style="list-style-type: none"> • Students will use science, sports, and geography data when constructing scatter plots and finding lines of best fit. 	<p>Resources</p> <ul style="list-style-type: none"> • McDougal Littell <i>Algebra 1</i> textbook • McDougal Littell <i>Algebra: Structure and Method</i> textbook • TI-83 Plus graphing calculators • SmartPal response boards • SMART Board <p> McDougal Littell Companion Website (Classzone.com)</p> <p> Smart Exchange</p>

<< [Previous Year](#)

Last Updated: Monday, August 20, 2012, 11:18AM



Unit Map 2013-2014

Green Brook Township School District

/ **Algebra I Curriculum (D)** / Grade 7 (District Middle Curriculum)

Tuesday, August 27, 2013, 10:12AM

Green Brook Township
Public Schools

Unit: Systems of Equations (Week 13, 3 Weeks)  

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 7, 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.

CommonCore: Mathematics, CommonCore: Grade 8, Expressions & Equations

8.EE Analyze and solve linear equations and pairs of simultaneous linear equations.

- 8.EE.8. Analyze and solve pairs of simultaneous linear equations.
- 8.EE.8a. Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.
- 8.EE.8b. Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. For example, $3x + 2y = 5$ and $3x + 2y = 6$ have no solution because $3x + 2y$ cannot simultaneously be 5 and 6.
- 8.EE.8c. Solve real-world and mathematical problems leading to two linear equations in two variables. For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.

CommonCore: Mathematics, CommonCore: HS: Algebra, Creating Equations

A-CED Create equations that describe numbers or relationships.

- A-CED.2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

- 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.

CommonCore: Mathematics, CommonCore: HS: Algebra, Reasoning with Equations & Inequalities

A-RE I Solve systems of equations.

- A-REI.5. Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.
- A-REI.6. Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.

A-RE I Represent and solve equations and inequalities graphically.

- A-REI.11. Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.
- 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.

Description of Unit	Essential Questions
<p>In this unit, students will apply the skills that they have learned in order to solve real-life problems. They will use the concepts of graphing, substitution, opposite integers, and integer operations in this unit. Students will begin with solving systems by graphing, which utilizes the concepts that they learned in the Graphing Linear Equations and Inequalities Unit. Then students will solve systems by using substitution. After working with these methods and seeing their setbacks, students will learn to solve systems using linear combinations. They will apply their knowledge of linear systems and writing equations to solve real-life problems. Finally, students will solve systems of linear inequalities.</p>	<ul style="list-style-type: none"> • How can one model a real-life situation using a system of equations? • How can one construct equations in order to solve a real-world problem? • How does algebra assist in decision making in real-life situations?
Knowledge	Skills
<p>Students will know that: 1) solution sets consist of coordinate points</p>	<p>Students will be able to: a) solve systems by graphing b) solve systems by substitution</p>

2) the substitution method is useful when a coefficient equals one or negative one
 3) the elimination method is useful when all coefficients are not equal to one
 4) wind and current problems can be solved by constructing a linear system
 5) systems of inequalities contain an infinite number of solutions

c) solve systems by elimination
 d) solve real-life situations using systems
 e) solve systems of linear inequalities

Assessments

Systems of Equations Pre-Assessment

Diagnostic: Other written assessments

Students will be assessed on their prior knowledge of solving systems of equations, particularly focusing on solving by graphing, a concept learned in Pre-Algebra.

Daily Formative Assessment

Formative: Other written assessments

Formative assessments, such as Do-Now assignments, homework assignments, Tickets-to-Leave, and SmartPal response board practice problems, will provide daily data for teachers.

Systems of Equations Quiz

Formative: Written Test

Topics will include: solving systems by graphing, substitution, and elimination, including those that are special cases, and solving word problems using systems

Systems of Equations Test

Summative: Written Test

Topics will include: solving systems by graphing, substitution, and elimination, including those that are special cases, solving word problems using systems, solving wind and water current word problems, and solving systems of linear inequalities.

Systems of three variables is an optional topic that may be included if it was used in differentiation.

Systems of Equations Unit Project

Summative: Other written assessments

Students will work in pairs or groups to create a story that contains a word problem. They will construct a poster that contains the story and shows the solution to the problem using all three methods for solving linear systems. After all posters have been turned in, the solutions will be temporarily covered so that the remaining students can complete a "walking tour" of all the posters.

 [Systems of Equations Unit Project](#)

<p>Activities</p> <ul style="list-style-type: none"> • Students will complete differentiated practice problems on SmartPal response boards. • Students will utilize graphing calculators in order to solve linear systems by graphing that could not be solved by hand using standard 10 x 10 coordinate graphs. • Students will complete Word Problem Box Activity in which they will solve a word problem by writing a system of equations and using all three methods to solve it. • Students will complete the Penny Problem Activity in which students will be given a set of pennies, create a linear system, and solve it in order to find how many pennies in their set are from before 1982 and how many are from after 1982. <p> Penny Problem Activity</p> <p> Word Problem Box</p>	<p>Activities to Differentiate Instruction</p> <ul style="list-style-type: none"> • Students will be given problems for SmartPal practice based on individual levels of difficulty. • Students will be given systems of equations that contain decimal or fraction coefficients. • Students will create their own word problem for the Word Problem Box Activity. • Students will apply their knowledge of elimination to solve systems in three variables.
<p>Integrated/Cross-Disciplinary Instruction</p> <ul style="list-style-type: none"> • Students will use science knowledge when operating triple beam balances and using facts of the chemical composition of pennies in order to build a linear system. • Student will use language arts knowledge when creating the story for their word problem for the Systems of Equations Unit Project. 	<p>Resources</p> <ul style="list-style-type: none"> • McDougal Littell <i>Algebra 1</i> textbook • McDougal Littell <i>Algebra: Structure and Method</i> textbook • TI-83 Plus graphing calculators • SmartPal response boards • Graph paper • Pennies • Triple beam balances • Poster paper • SMART Board <p> McDougal Littell Companion Website (Classzone.com)</p> <p> Smart Exchange</p>

[<< Previous Year](#)

Last Updated: Monday, August 20, 2012, 11:19AM



Unit Map 2013-2014

Green Brook Township School District

/ **Algebra I Curriculum (D)** / Grade 7 (District Middle Curriculum)

Tuesday, August 27, 2013, 10:13AM

Green Brook Township
Public Schools

Unit: Exponents and Exponential Functions (Week 16, 4 Weeks)  

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 7, 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.

CommonCore: Mathematics, CommonCore: HS: Algebra, Seeing Structure in Expressions

A-SSE Interpret the structure of expressions.

- A-SSE.1a. Interpret parts of an expression, such as terms, factors, and coefficients.
- A-SSE.1b. Interpret complicated expressions by viewing one or more of their parts as a single entity.
- A-SSE.2. Use the structure of an expression to identify ways to rewrite it.

A-SSE Write expressions in equivalent forms to solve problems.

- A-SSE.3. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.
- A-SSE.3c. Use the properties of exponents to transform expressions for exponential functions.

CommonCore: Mathematics, CommonCore: HS: Algebra, Arithmetic with Polynomials & Rational Functions

A-APR Perform arithmetic operations on polynomials.

- A-APR.1. Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.

CommonCore: Mathematics, CommonCore: HS: Functions, Linear, Quadratic, and Exponential Models

F-LE Construct and compare linear and exponential models and solve problems.

- F-LE.1. Distinguish between situations that can be modeled with linear functions and with exponential functions.
- F-LE.1a. Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.
- F-LE.1c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.
- F-LE.2. Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).

F-LE Interpret expressions for functions in terms of the situation they model.

- F-LE.5. Interpret the parameters in a linear or exponential function in terms of a context.

Description of Unit

In this unit, students will become familiar with the laws of exponents and how to apply them to real-world situations. It will focus on expressions containing exponents and on graphing exponential functions. Students will learn the properties of exponents while working with positive exponents and then will extend the properties to zero and negative exponents. They will learn to write numbers in scientific notation using positive, negative and zero exponents. With an understanding of exponents, students will examine exponential functions (non-linear equations). Students will graph exponential functions on graphing calculators and will interpret the results while solving real-world problems.

Essential Questions

- How can exponents be used to model real-life situations?
- How would one use zero and negative exponents in everyday situations?
- How are uniform motion problems used in the real-world?
- How can scientific notation be useful in math and science?

Knowledge

Students will know that:

- 1) the laws of exponents are used when multiplying, dividing, and finding powers of expressions containing exponents
- 2) any number to the zero power is equal to one
- 3) any expression to a negative power is equal to the reciprocal to the expression to the positive power
- 4) one form of the distance formula is $d = rt$
- 5) scientific notation is used to write very large and very small numbers

Skills

Students will be able to:

- a) simplify sums, products, quotients, and powers involving exponents
- b) simplify and convert between negative and positive exponents
- c) solve uniform motion problems
- d) convert between standard and scientific notation and utilize exponent rules when multiplying and dividing with exponents

6) exponential growth and decay functions are non-linear functions in which quantities either increase or decrease by the same percent over equal time periods

e) identify and graph exponential growth and decay functions

Assessments

Exponents Pre-Assessment

Diagnostic: Other written assessments

Students will be measured on their prior knowledge of the laws of exponents and how to simplify expressions containing exponents.

Daily Formative Assessment

Formative: Other written assessments

Formative assessments, such as Do-Now assignments, homework assignments, Tickets-to-Leave, and SmartPal response board practice problems, will provide daily data for teachers.

Exponents Quiz

Formative: Written Test

Topics will include: adding, subtracting, multiplying, dividing, and finding powers of expressions involving positive, negative, and zero exponents and multiplying binomials

Exponents and Exponential Functions Test

Summative: Written Test

Topics will include: adding, subtracting, multiplying, dividing, and finding powers of expressions involving positive, negative, and zero exponents, multiplying binomials, solving uniform motion problems, and identifying, sketching, and writing equations of exponential functions.

Algebra 1 Midterm Exam

Formative: Written Test

Students will take a cumulative exam that consists of all material that has been covered through this unit. This assessment is to prepare students for the comprehensive final exam that they will take at the conclusion of this course.

Activities

- Students will complete differentiated practice problems on SmartPal response boards
- Students will complete Modeling an Exponential Growth Function (Activity Generator: Algebra 1: Section 8.5) to illustrate an example of a non-linear function.

Activities to Differentiate Instruction

- Students will be given problems for SmartPal practice based on individual levels of difficulty.
- Students will be given problems in which they will have to utilize all of the laws of exponents in order to simplify an expression.

Integrated/Cross-Disciplinary Instruction	Resources
<ul style="list-style-type: none"> • Students will use social studies curriculum when solving exponential growth and decay problems that involve population growth. • Students will use science curriculum when solving exponential growth and decay problems that involve bacteria growth. 	<ul style="list-style-type: none"> • McDougal Littell <i>Algebra 1</i> textbook • McDougal Littell <i>Algebra: Structure and Method</i> textbook • SmartPal response boards • Pennies • Graph paper • SMART Board <p>  McDougal Littell Companion Website (Classzone.com)  Smart Exchange </p>

[<< Previous Year](#)

Last Updated: Monday, August 20, 2012, 11:23AM

© [Rubicon International](#), 2013. All rights reserved

Atlas Version 7.2.6



Unit Map 2013-2014

Green Brook Township School District

/ **Algebra I Curriculum (D)** / Grade 7 (District Middle Curriculum)

Tuesday, August 27, 2013, 11:46AM

Green Brook Township
Public Schools

Unit: Factoring Polynomials (Week 20, 3 Weeks)

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 7, 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.

CommonCore: Mathematics, CommonCore: HS: Algebra, Seeing Structure in Expressions

A-SSE Interpret the structure of expressions.

- A-SSE.2. Use the structure of an expression to identify ways to rewrite it.

A-SSE Write expressions in equivalent forms to solve problems.

- A-SSE.3. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.
- A-SSE.3a. Factor a quadratic expression to reveal the zeros of the function it defines.

Description of Unit

In this unit, students will learn various methods for factoring polynomials. This unit is extremely important for subsequent topics in the course, such as rational expressions and solving quadratic functions. It will begin with students learning how to factor out a greatest common factor

Essential Questions

- How do we know which factoring method(s) to use for each problem?
- How is solving a quadratic equation by factoring similar to solving a linear equation?

from a polynomial. Then they will learn how to factor polynomials in which the leading coefficient is equal to one. Then they will learn how to factor trinomials where the leading coefficient is not equal to one by both guess and check and the "AC method" which integrates factoring by grouping. Students will explore special case polynomials and how to factor four term polynomials through factoring by grouping. Throughout the unit, students will learn how to solve quadratic equations by factoring and how to apply this skill in order to solve real-world problems.

- How can factoring polynomials assist in solving real-world problems?

Knowledge	Skills
<p>Students will know that:</p> <ol style="list-style-type: none"> 1) a factoring chart can be used when deciding which method to use for factoring 2) the first step to factoring polynomials is to factor out the greatest common factor, if necessary 3) the AC method and guess and check are two methods for factoring ax^2+bx+c 4) prime polynomials cannot be factored 5) physics problems involving falling objects use the vertical motion model 	<p>Students will be able to:</p> <ol style="list-style-type: none"> a) factor trinomials b) recognize and factor difference of squares and perfect square trinomials c) factor by grouping d) solve quadratic equations by factoring e) solve word problems involving area and physics concepts
<p><u>Assessments</u></p> <p>Factoring Pre-Assessment Diagnostic: Other written assessments Students will be given factoring problems in order to measure prior understanding of this concept.</p> <p>Factoring Quiz Formative: Written Test Topics will include: factoring out the greatest common factor, factoring when the leading coefficient equals one, "AC method", and solving quadratic equations by factoring.</p> <p>Factoring Test Summative: Written Test Topics will include: factoring out the greatest common factor, factoring when the leading coefficient equals one, "AC" method, factoring special cases, factoring by grouping, factoring completely, solving quadratic equations by factoring, and solving word problems by factoring.</p>	

<p>Daily Formative Assessment Formative: Other written assessments Formative assessments, such as Do-Now assignments, homework assignments, Tickets-to-Leave, and SmartPal response board practice problems, will provide daily data for teachers.</p>	
<p>Activities</p> <ul style="list-style-type: none"> • Students will complete differentiated practice problems on SmartPal response boards. • Students will utilize graphing calculators in order to see visual representations of quadratics and higher degree functions and understand why many of these functions have more than one solution. 	<p>Activities to Differentiate Instruction</p> <ul style="list-style-type: none"> • Students will be given problems for SmartPal practice based on individual levels of difficulty. • Students will be given worksheets with guided steps when learning how to factor polynomials in which the leading coefficients are not equal to one. • Students will be given polynomials that require at least two methods of factoring.
<p>Integrated/Cross-Disciplinary Instruction</p> <ul style="list-style-type: none"> • Students will utilize science curriculum when using physics formulas to write and solve equations using the vertical motion model. 	<p>Resources</p> <ul style="list-style-type: none"> • McDougal Littell <i>Algebra 1</i> textbook • McDougal Littell <i>Algebra: Structure and Method</i> textbook • SmartPal response boards • TI-83 Plus graphing calculators • SMART Board <p> McDougal Littell Companion Website (Classzone.com)</p> <p> Smart Exchange</p>

[<< Previous Year](#)

Last Updated: Monday, August 20, 2012, 6:57PM



Unit Map 2013-2014

Green Brook Township School District

/ **Algebra I Curriculum (D)** / Grade 7 (District Middle Curriculum)

Tuesday, August 27, 2013, 11:46AM

Green Brook Township
Public Schools

Unit: Radicals (Week 23, 3 Weeks)  

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 7, 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.

CommonCore: Mathematics, CommonCore: Grade 8, The Number System

8.NS Know that there are numbers that are not rational, and approximate them by rational numbers.

- 8.NS.1. Understand informally that every number has a decimal expansion; the rational numbers are those with decimal expansions that terminate in 0s or eventually repeat. Know that other numbers are called irrational.
- 8.NS.2. Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions

CommonCore: Mathematics, CommonCore: HS: Algebra, Seeing Structure in Expressions

A-SSE Interpret the structure of expressions.

- A-SSE.2. Use the structure of an expression to identify ways to rewrite it.

CommonCore: Mathematics, CommonCore: HS: Algebra, Reasoning with Equations & Inequalities

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

- A-REI.2. Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.

Description of Unit	Essential Questions
<p>In this unit, students will study how to complete arithmetic operations involving radicals. The unit will begin with students reviewing examples of rational and irrational numbers. Then they will learn how to add, subtract, multiply, and divide radicals. Students will solve radical equations and use this knowledge to solve real-life applications. These applications involve the distance formula, midpoint formula, and physics applications.</p>	<ul style="list-style-type: none"> • Where are radical expressions used in the real world? • How are the rules for radicals similar to other known rules in algebra? • How does mathematics help us model and explain our world?
Knowledge	Skills
<p>Students will know that:</p> <ol style="list-style-type: none"> 1) irrational numbers are numbers that cannot be written as fractions 2) a conjugate is a binomial in which the operation sign has been changed to its opposite 3) the Pythagorean Theorem is $a^2 + b^2 = c^2$ 4) the Distance and Midpoint Formulas are $(x_2 - x_1)^2 + (y_2 - y_1)^2$ and $((x_1 + x_2)/ 2, (y_1 + y_2)/2)$ 5) problem-solving techniques are utilized when solving real-world problems 	<p>Students will be able to:</p> <ol style="list-style-type: none"> a) simplify radicals b) add and subtract radicals c) multiply and divide radicals d) solve equations containing radicals e) use the Pythagorean Theorem to find missing sides of right triangles and prove that triangles are right f) find the distance and midpoint between two coordinate points
Assessments	
<p>Radicals Pre-Assessment Diagnostic: Other written assessments Students will be given questions to measure their prior knowledge on evaluating radicals containing perfect squares and using the Pythagorean Theorem.</p> <p>Daily Formative Assessment Formative: Other written assessments Formative assessments, such as Do-Now assignments, homework assignments, Tickets-to-Leave, and SmartPal response board practice problems, will provide daily data for teachers.</p> <p>Radicals Quiz Formative: Written Test</p>	

Topics will include: identifying rational and irrational numbers, simplifying, adding, subtracting, multiplying, and dividing radicals.

Radicals Test

Summative: Written Test

Topics will include: identifying rational and irrational numbers, simplifying radicals, adding and subtracting radicals, multiplying and dividing radicals, solving radical equations, finding missing sides of right triangles, using the Pythagorean Theorem to prove triangles are right, and finding the distance and midpoint between two coordinates.

Activities

- Students will complete differentiated practice problems on SmartPal response boards.
- Students will complete a problem-solving workshop in which they will use their skill of solving radical equations in order to solve word problems.
- Students will complete Pythagorean Theorem Stations, in which they will solve real-life application problems using the theorem.

-  [Problem-Solving with Radicals](#)
-  [Distance Formula Picture Directions](#)
-  [Distance Formula Picture Graph and Rubric](#)

Activities to Differentiate Instruction

- Students will be given problems for SmartPal practice based on individual levels of difficulty.
- Students will be given problems that will involve using the order of operations to simplify radical expressions that have multiple steps.
- Students will investigate Pythagorean triples and how they can assist in solving problems that contain large numbers and the Pythagorean Theorem when no calculators are available.
- Students will be provided with challenge problems to complete at the Pythagorean Theorem Stations.

Integrated/Cross-Disciplinary Instruction

- Students will solve problems containing physics formulas while completing the problem-solving workshop.

Resources

- McDougal Littell *Algebra 1* textbook
- McDougal Littell *Algebra: Structure and Method* textbook
- SmartPal response boards
- Graph paper
- SMART Board

-  [McDougal Littell Companion Website \(Classzone.com\)](#)
-  [Smart Exchange](#)



Unit Map 2013-2014

Green Brook Township School District

/ **Algebra I Curriculum (D)** / Grade 7 (District Middle Curriculum)

Tuesday, August 27, 2013, 11:47AM

Green Brook Township
Public Schools

Unit: Quadratic Equations (Week 26, 3 Weeks) 📅 📄

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 7, 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.

CommonCore: Mathematics, CommonCore: HS: Algebra, Seeing Structure in Expressions

A-SSE Write expressions in equivalent forms to solve problems.

- A-SSE.3b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.

CommonCore: Mathematics, CommonCore: HS: Algebra, Reasoning with Equations & Inequalities

A-RE I Solve equations and inequalities in one variable.

- A-REI.4. Solve quadratic equations in one variable.
- A-REI.4a. Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x - p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form.
- A-REI.4b. Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b .

A-RE I Represent and solve equations and inequalities graphically.

- A-REI.10. Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).

CommonCore: Mathematics, CommonCore: HS: Functions, Interpreting Functions

F-IF Analyze functions using different representations.

- F-IF.7a. Graph linear and quadratic functions and show intercepts, maxima, and minima.

CommonCore: Mathematics, CommonCore: HS: Functions, Linear, Quadratic, and Exponential Models

F-LE Construct and compare linear and exponential models and solve problems.

- F-LE.1b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.
- F-LE.3. Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.

Description of Unit

In this unit, students will learn to define quadratic functions and to recognize quadratic equations and graphs, especially when compared with other mathematical equations and graphs. They will graph quadratic functions and discover that the x-intercepts of the graph are also the solutions to its equation. Students will solve quadratic equations by using square roots, by completing the square, and by using the quadratic formula. They will discover that quadratic equations can have zero, one, or two solutions and that the graph of an equation and the value of the discriminant can indicate the number of solutions to an equation. After learning all of the methods to solve quadratic equations, the students will be able to identify which method would be optimal to use when asked to solve a particular equation. The unit will conclude with the study of applications of quadratic functions and parabolas.

Essential Questions

- How does one know which method to use when solving a quadratic equation?
- How does the discriminant of a quadratic function relate to its graph?
- How are quadratic equations and their graphs useful in solving real-life problems?

Knowledge

Students will know that:
 1) the vertex and the axis of symmetry are needed when graphing parabolas
 2) the discriminant can be used to find the number of solutions for a quadratic equation

Skills

Students will be able to:
 a) graph quadratic functions and use the graphs to solve the equations
 b) solve quadratics using square roots
 c) solve quadratics by completing the square

3) inverse operations can be used to solve quadratic equations when the linear term is missing
 4) completing the square is used when the quadratic coefficient equals one and the linear term is even
 5) the quadratic formula can be used to solve all quadratic equations

d) solve quadratics by using the quadratic formula
 e) apply the quadratic solution methods to real-world problems

Assessments

Quadratics Pre-Assessment

Diagnostic: Other written assessments

Students will be assessed on their prior knowledge on solving quadratic equations.

Daily Formative Assessment

Formative: Other written assessments

Formative assessments, such as Do-Now assignments, homework assignments, Tickets-to-Leave, and SmartPal response board practice problems, will provide daily data for teachers.

Quadratics Quiz

Formative: Written Test

Topics will include: graphing parabolas, solving by graphing, solving by taking square roots, solving by completing the square, and solving by using a graphing calculator.

Quadratics Test

Summative: Written Test

Topics will include: graphing parabolas, solving by graphing, solving by taking square roots, solving by completing the square, solving using the quadratic formula, finding the number of solutions by using the discriminant, identifying functions as either linear, exponential, or quadratic, and solving word problems that utilize quadratic equations.

Rocket Quandary Project

Summative: Other oral assessments

Students will be given a scenario about two students who launch rockets for their school NASA Club. They will be given unique equations for their project and will answer questions regarding them. They will solve for information, such as how high the rockets went, the meaning of the equations' constants, and how long each rocket stayed in the air. Students will present their answers using the presentation format of their choice, such as Microsoft PowerPoint or Glogster.

Activities

- Students will complete differentiated practice problems on SmartPal response boards.

Activities to Differentiate Instruction

- Students will be given problems for SmartPal practice based on individual levels of difficulty.

- Students will utilize graphing calculators to graph parabolas and solve quadratic equations by graphing when the solutions cannot be found by graphing using pencil and paper.
- Students will complete Quadratic Box Activity in which they will solve an assigned quadratic equation using each of the methods that has been studied in the course. They will explain the method that they preferred for their particular equation.
- Students will complete real-life applications problems that will require them to utilize the graphing calculator and problem-solving techniques.

- Students will be given quadratic equations that contain coefficients and constants that are decimals and fractions.
- Students will create their own equation for the Quadratics Box Activity.

 [Quadratic Box Activity](#)

 [Quadratics Problem-Solving](#)

Integrated/Cross-Disciplinary Instruction	Resources
<ul style="list-style-type: none"> • Students will be using physics formulas, such as the vertical motion model, when solving real-life application word problems. 	<ul style="list-style-type: none"> • McDougal Littell Algebra 1 textbook • McDougal Littell Algebra: Structure and Method textbook • SmartPal response boards • SMART Board • Graph paper • TI-83 Plus graphing calculators • Scissors • Tape <p> McDougal Littell companion website (Classzone.com)</p> <p> Smart Exchange</p>

[<< Previous Year](#)

Last Updated: Monday, August 20, 2012, 9:43PM



Unit Map 2013-2014

Green Brook Township School District

/ **Algebra I Curriculum (D)** / Grade 7 (District Middle Curriculum)

Tuesday, August 27, 2013, 11:48AM

Green Brook Township
Public Schools

Unit: NJASK Review (Week 29, 3 Weeks) 📅 📌

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 7, 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.

CommonCore: Mathematics, CommonCore: Grade 7, Ratios & Proportional Relationships

7.RP Analyze proportional relationships and use them to solve real-world and mathematical problems.

- 7.RP.1. Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.
- 7.RP.2. Recognize and represent proportional relationships between quantities.
- 7.RP.2a. Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.
- 7.RP.2b. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
- 7.RP.2c. Represent proportional relationships by equations.
- 7.RP.2d. Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points $(0, 0)$ and $(1, r)$ where r is the unit rate.
- 7.RP.3. Use proportional relationships to solve multistep ratio and percent problems.

CommonCore: Mathematics, CommonCore: Grade 7, The Number System

7.NS Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.

- 7.NS.3. Solve real-world and mathematical problems involving the four operations with rational numbers.

CommonCore: Mathematics, CommonCore: Grade 7, Expressions & Equations

7.EE Use properties of operations to generate equivalent expressions.

- 7.EE.1. Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
- 7.EE.2. Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related.

7.EE Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

- 7.EE.3. Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.
- 7.EE.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.
- 7.EE.4a. Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p , q , and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach.
- 7.EE.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.

CommonCore: Mathematics, CommonCore: Grade 7, Geometry

7.G Draw, construct, and describe geometrical figures and describe the relationships between them.

- 7.G.1. Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.
- 7.G.2. Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.
- 7.G.3. Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.

7.G Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.

- 7.G.4. Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.
- 7.G.5. Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.
- 7.G.6. Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.

CommonCore: Mathematics, CommonCore: Grade 7, Statistics & Probability

7.SP Use random sampling to draw inferences about a population.

- 7.SP.1. Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.
- 7.SP.2. Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions.

7.SP Draw informal comparative inferences about two populations.

- 7.SP.3. Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability.
- 7.SP.4. Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations.

7.SP Investigate chance processes and develop, use, and evaluate probability models.

- 7.SP.5. Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.
- 7.SP.6. Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability.
- 7.SP.7. Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.
- 7.SP.7a. Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events.
- 7.SP.7b. Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process.
- 7.SP.8. Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.
- 7.SP.8a. Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.
- 7.SP.8b. Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., "rolling double sixes"), identify the outcomes in the sample space which compose the event.
- 7.SP.8c. Design and use a simulation to generate frequencies for compound events.

Description of Unit

During this unit, students will review concepts from previous courses that will be assessed on the NJASK. Because these

Essential Questions

- Where does one use the various geometric concepts in real-life situations?

students are in an advanced math class, they have learned these topics, but will need to refresh their skills. They will revisit the concepts of probability, including independent and dependent events, the counting principle, permutations, and combinations. They will also study geometric concepts, such as angle relationships, congruency, polygons, area, surface area, and volume. Students will learn test strategies and will practice with multiple-choice, short-answer, and open-ended questions.

- How does one know when to use the counting principle, permutations, or combinations when counting outcomes?
- How does mathematics help to model and explain our world?

Knowledge	Skills
<p>Students will know that:</p> <ol style="list-style-type: none"> 1) percent is a ratio of parts per 100 and can be calculated by using a proportion or an equation 2) the number of outcomes in a situation with constraints can be calculated by using the appropriate method, the Counting Principle, permutations, or combinations 3) independent probability is used when the occurrence of the first event does not affect the probability of the second event 4) dependent probability is used when the first event affects the second event 5) missing angles can be found by using the properties of angle relationships, such as complementary, supplementary, vertical, corresponding, alternate interior, and alternate exterior angles 6) transformations include translations, reflections, rotations, and dilations 7) area calculates the space inside a two-dimensional figure 8) surface area is the sum of the exterior area of a three-dimensional solid 9) volume calculates the space inside a three-dimensional figure 10) fractals are geometric figures that have self-similar patterns 	<p>Students will be able to:</p> <ol style="list-style-type: none"> a) solve problems involving percents b) calculate possible outcomes for given situations c) calculate simple probability d) calculate probability of independent and dependent events e) recognize angle relationships and use their properties in order to find missing angles f) complete transformations of geometric figures on the coordinate plane g) calculate area, surface area, and volume h) recognize fractals and calculate networks
<p><u>Assessments</u></p>	
<p>Pre-Assessment Diagnostic: Other written assessments</p>	

Students will be given an NJASK practice test that contains various topics. It will be used to guide instruction for this unit. Because students have studied these topics in Pre-Algebra and in the beginning of Algebra 1, there may be topics that will not need to be reviewed while others may require more time and practice.

Daily Formative Assessment

Formative: Other written assessments

Formative assessments, such as Do-Now assignments, homework assignments, Tickets-to-Leave, and SmartPal response board practice problems, will provide daily data for teachers.

Percents, Probability, and Data Analysis Test

Summative: Written Test

Topics will include: basic percents, discounts, markups, tax, percent of change, basic probability, independent and dependent probability, the Counting Principle, permutations, combinations, and interpreting and constructing bar graphs, histograms, line graphs, stem-and-leaf plots, box-and-whisker plots, scatter plots, and circle graphs.

Geometry Test

Summative: Written Test

Topics will include: angle relationships, properties of polygons, interior and exterior angles of polygons, area and perimeter of polygons and circles, surface area and volume of three-dimensional solids, scale figures and transformations.

Activities	Activities to Differentiate Instruction
<ul style="list-style-type: none"> • Students will complete differentiated practice problems on SmartPal response boards. • Students will play Percents Kooshball Game on the Smart Board. This can be done individually or in teams. • Students will complete Cereal Box Challenge. This activity is an application of using surface area and volume computations. • Students will complete Go Fish! activity in which students use experimental probability to make predictions. • Students will be placed in groups, assigned a review topic, and create a poster with a summary and examples. Then they will complete a "Walking Tour" in which they will complete a review worksheet by using the information on their classmates' posters. 	<ul style="list-style-type: none"> • Students will be given problems for SmartPal practice based on individual levels of difficulty. • Students will be given problems that contain multiple transformations. • Students will develop the formulas for transformations by utilizing the patterns in their answers so that they can solve these problems without the use of a coordinate plane. • Students will create a scale for their sketch for the Cereal Box Challenge. Then they will draw a proportional sketch of the cereal box according to the scale.

 [Percent Kooshball Game](#)

 [Cereal Box Challenge](#)

 [Go Fish Activity](#)

Integrated/Cross-Disciplinary Instruction	Resources
<ul style="list-style-type: none"> • Students will utilize financial literacy skills from 21st Century Skills curriculum when completing percent problems that involve simple and compound interest. • Students will utilize language arts literacy skills when constructing open-ended responses. • Students will utilize visual arts skills when designing their cereal box in the Cereal Box Challenge. 	<ul style="list-style-type: none"> • McDougal Littell and Prentice Hall <i>Pre-Algebra</i> resources • SmartPal response boards • Graph paper • SMART Board • Kooshball • Rulers • Goldfish and Pretzel Goldfish crackers • Paper bags • Cups • Plates • Poster paper • Markers <p> McDougal Littell Companion Website (Classzone.com)</p> <p> Smart Exchange</p>

[<< Previous Year](#)

Last Updated: Monday, August 20, 2012, 10:13PM

© [Rubicon International](#) 2013. All rights reserved

Atlas Version 7.2.6



Unit Map 2013-2014

Green Brook Township School District

/ **Algebra I Curriculum (D)** / Grade 7 (District Middle Curriculum)

Tuesday, August 27, 2013, 11:48AM

Green Brook Township
Public Schools

Unit: Rational Expressions and Equations (Week 32, 4 Weeks)  

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 7, 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.

CommonCore: Mathematics, CommonCore: HS: Algebra, Seeing Structure in Expressions

A-SSE Interpret the structure of expressions.

- A-SSE.1b. Interpret complicated expressions by viewing one or more of their parts as a single entity.

A-SSE Write expressions in equivalent forms to solve problems.

- A-SSE.3. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.

CommonCore: Mathematics, CommonCore: HS: Algebra, Arithmetic with Polynomials & Rational Functions

A-APR Perform arithmetic operations on polynomials.

- A-APR.1. Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.

A-APR Rewrite rational expressions.

- A-APR.6. Rewrite simple rational expressions in different forms; write $\frac{a(x)}{b(x)}$ in the form $q(x) + \frac{r(x)}{b(x)}$, where $a(x)$, $b(x)$, $q(x)$, and $r(x)$ are polynomials with the degree of $r(x)$ less than the degree of $b(x)$, using inspection, long division, or, for the more complicated examples, a computer algebra system.
- A-APR.7. (+) Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions.

CommonCore: Mathematics, CommonCore: HS: Algebra, Reasoning with Equations & Inequalities

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

- A-REI.2. Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.

Description of Unit

In this unit, students will study how to compute basic operations for rational expressions. Students will learn polynomial long division. After working with this extensive process, students will realize the need for an easier process, which will lead to the introduction of simplifying rational expressions. This process of cancelling out factors will be reinforced as students learn how to multiply, divide, add, and subtract algebraic fractions. Students will simplify complex fractions and will relate the process of clearing the denominators to that which they have used with fractions throughout the course. The unit will conclude with students solving rational equations and checking their answers for extraneous solutions.

Essential Questions

- Why is it important to find excluded values for rational expressions?
- How are the rules for fraction operations and factoring related to rational expressions?
- How can previous mathematical strategies be applied in solving more complex problems?

Knowledge

Students will know that:

- 1) polynomial long division can be used to simplify polynomials that are prime
- 2) inverse factors are polynomials with opposite coefficients
- 3) excluded values are numbers that cause rationals to have a denominator of zero
- 4) simplest form of a rational expression is when a rational has no common factors

Skills

Students will be able to:

- a) divide polynomials
- b) simplify algebraic fractions and complex fractions
- c) multiply and divide algebraic fractions
- d) add and subtract algebraic fractions
- e) solve rational equations

<p>5) clearing the denominator is a process needed to solve rational equations 6) extraneous solutions are answers that occur when solving a problem. but which are not valid solutions</p>	
<p>Assessments</p> <p>Rationals Pre-Assessment Diagnostic: Other written assessments Students will be assessed on their prior knowledge of fraction operations, factoring, and simplifying algebraic fractions.</p> <p>Daily Formative Assessment Formative: Other written assessments Formative assessments, such as Do-Now assignments, homework assignments, Tickets-to-Leave, and SmartPal response board practice problems, will provide daily data for teachers.</p> <p>Rationals Quiz Formative: Written Test Topics will include: polynomial long division, simplifying rationals, finding excluded values, multiplying rationals, dividing rationals, and adding and subtracting rationals with like denominators.</p> <p>Rationals Test Summative: Written Test Topics will include: polynomial long division, simplifying rationals, finding excluded values, multiplying rationals, dividing rationals, adding and subtracting rationals with unlike denominators, simplifying complex fractions, and solving rational equations.</p>	
<p>Activities</p> <ul style="list-style-type: none"> • Students will complete differentiated practice problems on SmartPal response boards. • Students will complete Simplifying Rationals investigation from <i>McDougal Littell</i> Chapter 12 resource book to develop their understanding of the process of simplifying algebraic fractions and their knowledge that a binomial factor of a polynomial is a single entity. • Students will use a graphing calculator to discover the connection between a rational expression's excluded value and its graphical representation. 	<p>Activities to Differentiate Instruction</p> <ul style="list-style-type: none"> • Students will be given problems for SmartPal practice based on individual levels of difficulty. • Students will relate polynomial long division to numerical long division to assist in learning the algorithm. • Students will be given polynomials that contain numerous factors. • Students will be given complex fractions in which the denominators require factoring in order to find the least common denominator.

Integrated/Cross-Disciplinary Instruction	Resources
<ul style="list-style-type: none"> • Students will utilize 21st Century Skills curriculum when using problem-solving methods to complete word problems involving a variety of topics, such as financial planning and population density. 	<ul style="list-style-type: none"> • McDougal Littell <i>Algebra 1</i> textbook and resources • McDougal Littell <i>Algebra: Structure and Method</i> textbook • SmartPal response boards • Graph paper • SMART Board • Binomial index cards (see Simplifying Rationals investigation in <i>McDougal Littell</i> Chapter 12 resource book) • TI-83 Plus graphing calculators <p>  McDougal Littell Companion Website (Classzone.com)  Smart Exchange </p>

[<< Previous Year](#)

Last Updated: Monday, August 20, 2012, 10:26PM

© [Rubicon International](#), 2013. All rights reserved

Atlas Version 7.2.6



Unit Map 2013-2014

Green Brook Township School District

/ **Algebra I Curriculum (D)** / Grade 7 (District Middle Curriculum)

Tuesday, August 27, 2013, 11:48AM

Green Brook Township
Public Schools

Unit: Final Exam Review and Algebra Applications (Week 36, 4 Weeks) 📅 📄

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 7, 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.

CommonCore: Mathematics, CommonCore: HS: Algebra, Seeing Structure in Expressions

A-SSE Interpret the structure of expressions.

- A-SSE.1. Interpret expressions that represent a quantity in terms of its context.
- A-SSE.1a. Interpret parts of an expression, such as terms, factors, and coefficients.
- A-SSE.1b. Interpret complicated expressions by viewing one or more of their parts as a single entity.
- A-SSE.2. Use the structure of an expression to identify ways to rewrite it.

A-SSE Write expressions in equivalent forms to solve problems.

- A-SSE.3. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.
- A-SSE.3a. Factor a quadratic expression to reveal the zeros of the function it defines.
- A-SSE.3b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.
- A-SSE.3c. Use the properties of exponents to transform expressions for exponential functions.

CommonCore: Mathematics, CommonCore: HS: Algebra, Arithmetic with Polynomials & Rational Functions

A-APR Perform arithmetic operations on polynomials.

- A-APR.1. Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.

A-APR Rewrite rational expressions.

- A-APR.6. Rewrite simple rational expressions in different forms; write $\frac{a(x)}{b(x)}$ in the form $q(x) + \frac{r(x)}{b(x)}$, where $a(x)$, $b(x)$, $q(x)$, and $r(x)$ are polynomials with the degree of $r(x)$ less than the degree of $b(x)$, using inspection, long division, or, for the more complicated examples, a computer algebra system.
- A-APR.7. (+) Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions.

CommonCore: Mathematics, CommonCore: HS: Algebra, Creating Equations

A-CED Create equations that describe numbers or relationships.

- A-CED.1. Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.
- A-CED.2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
- 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-CED.4. Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.

CommonCore: Mathematics, CommonCore: HS: Algebra, Reasoning with Equations & Inequalities

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

- A-REI.2. Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.

A-RE I Solve equations and inequalities in one variable.

- A-REI.3. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.
- A-REI.4. Solve quadratic equations in one variable.
- A-REI.4a. Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x - p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form.
- A-REI.4b. Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b .

A-RE I Solve systems of equations.

- A-REI.5. Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.
- A-REI.6. Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.

A-RE I Represent and solve equations and inequalities graphically.

- A-REI.10. Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).
- A-REI.11. Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.
- 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.

CommonCore: Mathematics, CommonCore: HS: Functions, Interpreting Functions

F-IF Analyze functions using different representations.

- F-IF.7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
- F-IF.7a. Graph linear and quadratic functions and show intercepts, maxima, and minima.
- F-IF.8. Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.

CommonCore: Mathematics, CommonCore: HS: Functions, Building Functions

F-BF Build a function that models a relationship between two quantities.

- F-BF.1. Write a function that describes a relationship between two quantities.

Description of Unit

In this unit, students will prepare for their final exam as well as apply the algebraic skills that they have learned to problem-solving situations. Students will be given various review materials and will learn test-taking strategies for algebra tests. Students will review how to use charts to aid in writing equations. They will apply this problem-solving method to mixture and work word problems.

Essential Questions

- How does finding common denominators in fractions useful in multiple topics in algebra?
- How does algebra assist in making decisions?
- How is algebra used in the real-world?

Knowledge	Skills
<p>Students will know that:</p> <ol style="list-style-type: none"> 1) there are three forms of linear equations 2) graphing, substitution, and elimination are methods for solving systems of equations 3) factoring methods include special case polynomials, "AC method", and factoring by grouping 4) radicals are simplified when there are no perfect square factors under the radical and no fractions contained in the radical 5) factoring, taking square roots, completing the square, and the quadratic formula are methods for solving quadratic equations 6) rational expressions can contain restrictions and rational equations may contain extraneous solutions 7) the percent of acid times the amount of substance equals the amount of acid 8) the work formula ($\text{rate} * \text{time} = \text{work}$) is used to estimate the time of a job's completion 	<p>Students will be able to:</p> <ol style="list-style-type: none"> a) write linear equations and solve systems of equations b) factor polynomials c) simplify radical expressions and solve radical equations d) solve quadratic equations e) simplify rational expressions and solve rational equations f) solve word problems involving mixtures g) solve word problems involving the work formula
<p><u>Assessments</u></p>	
<p>Pre-Assessment Diagnostic: Other written assessments Students will take a pre-assessment to assist in planning for the topics that will be reviewed during this unit. Results of this pre-assessment, as well as student input, will guide the teacher in judging the time needed for each topic.</p> <p>Daily Formative Assessment Formative: Other written assessments Formative assessments, such as Do-Now assignments, homework assignments, Tickets-to-Leave, and SmartPal response board practice problems, will provide daily data for teachers.</p> <p>Algebra I Final Exam Summative: Written Test Students will take the Algebra I Final Exam for this level course provided by the Mathematics Department of Watchung Hills Regional High School. This test will cover all units in the curriculum. Students must receive a qualifying score in order to move on to the next course, Geometry Honors.</p> <p>M&M Mixture Project Summative: Other written assessments</p>	

Students will work in groups of two to four people for this project. They will begin by completing practice problems involving M&M mixtures. Then they will create their own M&M mixture problem and will display it on a poster with an empty chart. After all groups have completed their posters, students will complete a "Walking Tour" and solve to complete the data charts on their classmates' posters.

 [M&M Mixture Project](#)

 [M&M Mixture Project Walking Tour Worksheet](#)

<p>Activities</p> <ul style="list-style-type: none"> • Students will complete differentiated practice problems on SmartPal response boards. • Students will work in review centers to complete a review and practice problems cooperatively with their classmates. • Students will present summaries and presentations of examples for assigned topics to the class. 	<p>Activities to Differentiate Instruction</p> <ul style="list-style-type: none"> • Students will be given problems for SmartPal practice based on individual levels of difficulty. • Students will be given the opportunity to select the topics on which they would like more practice when working in review centers. • Students will be assigned to create and solve mixture problems that contain three items.
<p>Integrated/Cross-Disciplinary Instruction</p> <ul style="list-style-type: none"> • Students will use science formulas when solving mixture and work problems. Some mixture problems will contain chemistry word problems. • Students will use language arts literacy skills when translating parts of a word problem into algebraic expressions so that they can create an equation. 	<p>Resources</p> <ul style="list-style-type: none"> • McDougal Littell Algebra 1 textbook • McDougal Littell Algebra: Structure and Method textbook • TI-83 Plus graphing calculators • SmartPal response boards • Graph paper • Poster paper • SMART Board • Markers • Computers (optional) <p> McDougal Littell Companion Website (Classzone.com)</p> <p> Smart Exchange</p>

[<< Previous Year](#)

Last Updated: Friday, September 21, 2012, 4:10PM

© [Rubicon International](#) 2013. All rights reserved

Atlas Version 7.2.6

