



Unit Map 2013-2014

Green Brook Township School District

/ **Algebra B Curriculum (D)** / Grade 8 (District Middle Curriculum)

Monday, August 26, 2013, 3:21PM

Green Brook Township
Public Schools

Unit: Algebra B Fundamentals (Week 1, 4 Weeks) 📅 📄

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 8, Mathematical Practice

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

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

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.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: 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.

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.
- 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 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-RE I Solve systems of equations.

- 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.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.

<p>Description of Unit</p>	<p>Essential Questions</p>
<p>In this unit, students will review and build upon concepts learned in Algebra A, as these are essential before moving into the Algebra B curriculum. Students will begin by taking a pre-assessment on topics learned in Algebra A, including solving multi-step equations, writing and graphing equations of lines, solving linear inequalities, and solving systems of equations. The results of the pre-assessment will be used to guide the topics and time spent on the review process.</p>	<ol style="list-style-type: none"> 1. What makes an algebraic algorithm both effective and efficient? 2. How can change be represented mathematically?
<p>Knowledge</p>	<p>Skills</p>
<p>Students will know that:</p> <ol style="list-style-type: none"> 1. a linear equation can have one solution, no solution, or infinite solutions. 2. linear inequalities have an infinite number of solutions. 3. absolute value equations have two solutions. 4. there are three forms for writing equations of lines: slope-intercept, point-slope, and standard form. 5. systems of equations can be solved by graphing, substitution, and elimination. 	<p>Students will be able to:</p> <ol style="list-style-type: none"> A. solve multi-step equations with one, infinite, or no solutions. B. solve a formula for a specific variable. C. solve simple and compound linear inequalities. D. solve absolute value equations. E. graph linear equations. F. write equations of lines in slope-intercept, point-slope, and standard form. G. solve systems of equations using graphing, substitution, and elimination. H. graph linear inequalities in two variables.
<p>Assessments</p>	
<p>Pre-Test Diagnostic: Written Test Students will take a pre-assessment on key concepts learned in Algebra A.</p>	

Daily Warm-Up Problems

Diagnostic: Other written assessments

Students will complete daily warm-up problems to assess readiness.

Communicator Practice

Diagnostic: Other written assessments

Students will solve practice problems on communicators to receive immediate feedback.

Ticket to Leave Problems

Formative: Other written assessments

Students will complete one or two problems to assess knowledge and skills learned during the class period.

Quiz

Formative: Written Test

Students will take a quiz on topics needing review as determined by the pre-test.

Unit Test

Summative: Written Test

Students will take a test on all material covered in the unit.

Activities	Activities to Differentiate Instruction
<p><u>Worksheet Races</u> Students will work in small groups to solve problems. They will check their answers with the teacher. The goal is to complete all problems accurately and as quickly as possible.</p> <p><u>Math Stations</u> Students will work cooperatively to solve problems from different units.</p> <p> <u>Systems Review Activity</u></p> <p> <u>Absolute Value Equations Review</u></p>	<p>Mixed-ability grouping Interactive Smart Board activities Multi-Step Problem Solving Math stations Cooperative learning Study guides (teacher and student completed) Modify tests and homework as needed Modified grading rubrics Graphic organizers Communicator response boards Extended response questions Challenge and enrichment homework and worksheets Optional weekly challenge problems</p>
Integrated/Cross-Disciplinary Instruction	Resources

	<p>McDougal Littell Algebra 1 textbook and resource materials Website: www.classzone.com (see link)</p> <p>Kuta Software</p> <p>Algebra with Pizzazz</p> <p>Punchline Algebra</p> <p>Smart Exchange Website (see link)</p> <p>American Diploma Project Algebra 1 End-of-Course Exam Workbook</p> <p>NJ Ask Review Workbook Grade 8</p> <p> McDougal Littel website</p> <p> Smart Exchange Website</p>
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Unit Map 2013-2014

Green Brook Township School District

/ **Algebra B Curriculum (D)** / Grade 8 (District Middle Curriculum)

Monday, August 26, 2013, 3:21PM

Green Brook Township
Public Schools

Unit: Exponents and Exponential Functions (Week 5, 4 Weeks) 📅 📄

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 8, Mathematical Practice

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

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

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

8.EE Work with radicals and integer exponents.

- 8.EE.4. Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology.

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.
- A-SSE.4. Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems.

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.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.

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	Essential Questions
<p>In this unit on exponents and exponential functions, students will learn and use the properties of exponents involving products and quotients. They learn how to apply the following properties: product of powers, power of a power, power of a product, quotient of powers, and power of a quotient property. Students will also use zero and negative exponents. They will read, write, and compute numbers in scientific notation and compute compound interest. Students will extend their knowledge of exponents to graphing and writing rules for exponential functions. They will also apply this knowledge to identify, graph, and write geometric sequences.</p>	<ol style="list-style-type: none"> 1. How can mathematical models be used to describe physical relationships? 2. How can patterns, relations, and functions be used to best describe and explain real-life situations? 3. How are patterns of change related to behavior of functions? 4. How do graphs of linear functions differ from exponential functions?
Knowledge	Skills
<p>Students will know that:</p> <ol style="list-style-type: none"> 1. properties of exponents can be used to simplify exponential expressions. 	<p>Students will be able to:</p> <ol style="list-style-type: none"> A. use properties of exponents involving products. B. use the properties of exponents quotients.

2. any number raised to a power of zero equals one.
3. exponential functions are non-linear.
4. scientific notation is an abbreviated way of writing very large and very small numbers.
5. fractals are geometric figures that have self-similar patterns
6. compounding of interest can be modeled by exponential growth.
7. a geometric sequence has a common ratio.

- C. recognize and draw the next stage in a fractal.
- D. use zero and negative exponents.
- D. read and write numbers in scientific notation.
- F. calculate compound interest.
- G. write and graph exponential growth functions.
- H. write and graph exponential decay functions.
- I. recognize the difference in structure of a linear and exponential function.
- J. identify, write, and graph geometric sequences.

Assessments

Daily Warm-up Problems

Diagnostic: Other written assessments

Students will complete daily warm-up problems to assess readiness.

Communicator Practice

Diagnostic: Other written assessments

Students will complete one or two problems to assess knowledge and skills learned during the class period.

Exponents Quiz

Formative: Written Test

Students will use properties of exponents to solve problems with positive, negative, and zero exponents. They will also write numbers in scientific notation and calculate compound interest.

Unit Test

Summative: Written Test

Students will take a test on all material covered in the unit.

Activities

Products and Powers

Students will use patterns to derive the product of powers and power of a power properties.

Investigating Quotients and Powers

Students will use patterns to derive the quotient of powers property.

Zero and Negative Exponents

Activities to Differentiate Instruction

- Mixed-ability grouping
- Interactive Smart Board activities
- Multi-Step Problem Solving
- Math stations
- Cooperative learning
- Study guides (teacher and student completed)
- Modify tests and homework as needed
- Modified grading rubrics
- Graphic organizers
- Communicator response boards

Students will learn how to evaluate zero and negative exponents by using number patterns.

Scientific Notation and Technology

Students will use a graphing calculator to solve problems involving scientific notation.

Exploring Pluto

Students will use their knowledge of standard and scientific notation to answer questions about Pluto and our solar system.

Modeling an Exponential Growth Function Activity

Students will write and analyze an exponential growth function from an experiment of tossing pennies. They will compare it to a linear function.

Investigating Exponential Models Activity

Students will model an exponential decay function using scissors and pieces of string.

Creating Geometric Sequences Activity

Students will model a geometric pattern and sequence using triangles.

Relate Geometric Sequences to Exponential Functions

Students will identify, graph, and write geometric sequences.

Enrichment Project: Cooling Hot Water

Students will analyze the cooling factor of hot water and graph and interpret the results.

Extended response questions

Challenge and enrichment homework, worksheets and enrichment project

Optional weekly challenge problems

Integrated/Cross-Disciplinary Instruction

Resources

McDougal Littell Algebra 1 textbook and resource materials
Website: www.classzone.com (see link)

Kuta Software

Algebra with Pizzazz

[Punchline Algebra](#)

[Smart Exchange Website](#) (see link)

[Grade 8 Ask Math](#)

[American Diploma Project Algebra 1 End-of-Course Exam](#)

 www.classzone.com

 exchange.smarttech.com/

 [The Power of Algebra: Using Positive Exponents Video](#)

 [Fractals Video](#)

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Unit Map 2013-2014

Green Brook Township School District

/ **Algebra B Curriculum (D)** / **Grade 8 (District Middle Curriculum)**

Monday, August 26, 2013, 3:22PM

Green Brook Township
Public Schools

Unit: Polynomials and Factoring (Week 9, 5 Weeks) 📅 📧

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 8, Mathematical Practice

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

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

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 identify, classify, add, subtract and multiply polynomials. To find products, they will use the distributive property and patterns (including the FOIL model (first, outer, inner, last), the square of a binomial pattern and the sum and difference patterns). Students will write

Essential Questions

1. How do we know which factoring method(s) to use to solve a problem?
2. How can factoring polynomials assist in solving real-world problems?

polynomials to describe and solve real-world problems, and solve polynomial equations. Students will factor polynomials and use factoring to solve equations, to find the zeros of functions, and the roots of equations. They will factor polynomials completely using a variety of techniques. Students will compare polynomial functions with linear and exponential functions.

Knowledge	Skills
<p>Students will know that:</p> <ol style="list-style-type: none"> 1. a polynomial is a monomial or sum of monomials. 2. polynomials can be multiplied using a vertical or horizontal model. 3. the FOIL pattern (first, outer, inner, last) can be used to multiply two binomials. 4. the first step to factoring polynomials is to factor out the greatest common factor (if necessary). 5. the AC method, crisscross method, and guess and check method can be used to factor polynomials in the form ax^2+bx+c. 6. polynomials that are prime cannot be factored. 7. polynomial equations can be solved by using the zero-product property. 	<p>Students will be able to:</p> <ol style="list-style-type: none"> a. identify polynomials by type and degree. b. add and subtract polynomials. c. multiply polynomials. d. use special product patterns to multiply polynomials. e. solve polynomial equations in factored form. f. factor trinomials with a leading coefficient of 1. g. factor trinomials with a leading coefficient greater than 1 or negative. h. factor special products. i. factor polynomials by grouping. j. factor polynomials completely. k. use polynomials to find perimeter, area and dimensions of 2 dimensional figures. l. compare polynomial functions with linear and exponential functions.

Assessments

Daily Warm-up Problems

Diagnostic: Other written assessments

Students will complete daily warm-up problems to assess readiness.

Communicator Practice

Diagnostic: Other written assessments

Students will solve practice problems on communicators to receive immediate feedback.

Ticket to Leave Problems

Formative: Other written assessments

Students will complete one or two problems to assess knowledge and skills learned during the class period.

Polynomials Quiz

Formative: Written Test

Topics will include adding, subtracting, and multiplying polynomials, and solving polynomial equations in factored form.

Factoring Quiz

Formative: Written Test

Topics will include factoring trinomials by using different methods.

Unit Test

Summative: Written Test

Unit Test will include all topics covered in the unit.

Activities	Activities to Differentiate Instruction
<p><u>Graph Polynomial Functions</u> Students will graph polynomial functions using paper and pencil and the graphing calculator.</p> <p><u>Real-Life Problem Solving using Polynomials: Cutting the Lawn</u></p> <p><u>Investigation: Solving Factored Equations</u></p> <p><u>Factoring Puzzle</u></p> <p><u>Key Vocabulary Crossword Puzzle</u></p> <p><u>Pythagoras Enrichment Activity</u></p> <p><u>Manufacturing Enrichment Project</u></p> <p> <u>Classifying Polynomials Activity</u></p> <p> <u>Pre-Factoring Puzzles</u></p>	<p>Mixed-ability grouping</p> <p>Interactive Smart Board activities</p> <p>Multi-Step Problem Solving</p> <p>Math stations</p> <p>Cooperative learning</p> <p>Study guides (teacher and student completed)</p> <p>Modify tests and homework as needed</p> <p>Modified grading rubrics</p> <p>Graphic organizers (Factoring Methods Chart)</p> <p>Communicator response boards</p> <p>Extended response questions</p> <p>Challenge and enrichment homework, worksheets, and enrichment activity and project</p> <p>Optional weekly challenge problems</p>
Integrated/Cross-Disciplinary Instruction	Resources
	<p><u>McDougal Littell Algebra 1</u> textbook and resource materials Website: www.classzone.com (see link)</p> <p><u>Kuta Software</u></p>

[Algebra with Pizzazz](#)

[Punchline Algebra](#)

[Smart Exchange](#) Website (see link)

[Grade 8 Ask Math](#)

[American Diploma Project Algebra 1 End-of-Course Exam Workbook](#)

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Unit Map 2013-2014

Green Brook Township School District

/ **Algebra B Curriculum (D)** / Grade 8 (District Middle Curriculum)

Monday, August 26, 2013, 3:22PM

Green Brook Township
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Unit: Quadratic Equations and Functions (Week 14, 5 Weeks) 📅 📌

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 8, Mathematical Practice

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

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

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

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

- 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.

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.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.8a. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.
- F-IF.9. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).

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

F-BF Build new functions from existing functions.

- F-BF.3. Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

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	Essential Questions
<p>In this unit, students graph quadratic functions and compare them to the parent graph ($y = x^2$). They find the axis of symmetry, the vertex, and minimum or maximum values. They solve quadratic equations by factoring, graphing, using square roots, completing the square, and using the quadratic formula. Students use the discriminant to determine the number and type of solutions of a quadratic equation. They will use quadratic equations to solve vertical motion problems. Finally, students determine whether a linear, exponential, or quadratic function best models a set of data.</p>	<ol style="list-style-type: none"> 1. How do linear, exponential, and quadratic models differ from each other? 2. How can mathematical models be used to describe physical relationships? 3. How can quadratic equations be used to solve real-world problems?

Knowledge	Skills
<p>Students will know that:</p> <ol style="list-style-type: none"> 1. the most basic quadratic function is called the parent quadratic function. 2. every quadratic function has a U-shaped graph called a parabola. 3. the lowest or highest point on a parabola is the vertex. 4. the line that passes through the vertex and divides the parabola into 2 symmetric parts is called the axis of symmetry. 5. quadratic functions have either a minimum or maximum value. 6. the sign of the leading coefficient of a quadratic function determines whether it opens up or down. 7. quadratic functions can be solved by graphing, finding square roots, completing the square, using the quadratic formula, and factoring. 8. the discriminant is used to determine the number of solutions of a quadratic equation. 	<p>Students will be able to:</p> <ol style="list-style-type: none"> a. graph simple and general quadratic functions. b. solve quadratic equations by graphing. c. solve a quadratic equation by finding square roots. d. solve quadratic equations by completing the square. e. solve quadratic equations by using the quadratic formula. f. solve quadratic equations by factoring. g. use quadratic equations to solve vertical motion problems. h. use the value of the discriminant. i. compare linear, exponential, and quadratic models.
<p><u>Assessments</u></p>	
<p>Daily Warm-Up Problems Diagnostic: Other written assessments Students will complete daily warm-up problems to assess readiness.</p> <p>Communicator Practice Diagnostic: Other written assessments Students will solve practice problems on communicators to receive immediate feedback.</p> <p>Ticket to Leave Problems Formative: Other visual assessments Students will complete one or two problems to assess knowledge and skills learning during the class period.</p> <p>Graphing Quadratic Functions Quiz Formative: Written Test Students will solve quadratic equations by graphing.</p>	

Solving Quadratic Equations Quiz

Formative: Written Test

Quiz will include solving quadratic equations by factoring, taking square roots, completing the square, and the quadratic formula.

Unit Test

Summative: Written Test

Test will include all topics covered in the unit.

Activities	Activities to Differentiate Instruction
<p><u>Graphing Investigation</u> Students will graph quadratic functions by hand and by using the graphing calculator.</p> <p><u>Find a Minimum or Maximum Value of a Graph</u> Students will use the graphing calculator to find the minimum or maximum value of a quadratic function.</p> <p><u>Enrichment Project: How Warm is it in Your City?</u> Students will compare the normal daily mean temperature of a city where they live to the coldest city in the United States. This project will incorporate technology.</p> <p> <u>Vertical Motion Investigation and Problem Solving Activity</u></p>	<p>Mixed-ability grouping Interactive Smart Board activities Multi-Step Problem Solving Math stations Cooperative learning Study guides (teacher and student completed) Modify tests and homework as needed Modified grading rubrics Graphic organizers Communicator response boards Extended response questions Challenge and enrichment homework assignments, worksheets, and project Optional weekly challenge problems</p>
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[NJ Ask Review Workbook Grade 8](#)

[American Diploma Project Algebra 1 End-of-Course Exam Workbook](#)

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Green Brook Township
Public Schools

Unit: Radical Equations and Expressions (Week 19, 4 Weeks) 📅 📄

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 8, Mathematical Practice

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- 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: Grade 8, Geometry

8.G Understand and apply the Pythagorean Theorem.

- 8.G.6. Explain a proof of the Pythagorean Theorem and its converse.
- 8.G.7. Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.
- 8.G.8. Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.

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 use properties to simplify radical expressions, including rationalizing the denominator. They add, subtract, and multiply radicals. Students solve radical equations, including those with extraneous solutions. They apply the Pythagorean Theorem and its converse to find missing lengths and to determine whether triangles are right triangles. They apply the distance and midpoint formulas between two points to find missing coordinates. Students will graph square root functions and compare them with linear and non-linear functions.</p>	<ol style="list-style-type: none"> 1. How are radical expressions used in the real world? 2. How do geometric relationships help to solve problems and/or make sense of phenomena? 3. How can geometric/algebraic relationships best be represented and verified?
Knowledge	Skills
<p>Students will know that:</p> <ol style="list-style-type: none"> 1. the number or expression inside a radical symbol is the radicand. 2. a radicand cannot be negative under the real numbers. 3. a conjugate is a binomial in which the operational sign has been changed to its opposite. 4. the product of two conjugates does not contain a radical. 5. radical equations can have extraneous solutions. 6. the Pythagorean Theorem states the relationship among the lengths of the sides of right triangles. 7. the distance formula can be used to find the distance between two points on the coordinate plane. 8. the midpoint formula can be used to find the midpoint of a line on the coordinate plane. 9. the graph of a square root function is non-linear. 	<p>Students will be able to:</p> <ol style="list-style-type: none"> a. simplify radical expressions. b. solve radical equations. c. apply the Pythagorean Theorem and its converse. d. use the distance and midpoint formulas. e. graph square root functions and compare them with linear and non-linear functions.

Assessments

Daily Warm-Up Problems

Diagnostic: Other written assessments

Students will complete daily warm-up problems to assess readiness.

Communicator Practice

Diagnostic: Other written assessments

Students will solve practice problems on communicators to receive immediate feedback.

Ticket to Leave Problems

Formative: Other written assessments

Students will complete one or two problems to assess knowledge and skills learned during the class period.

Radicals Quiz

Formative: Written Test

Students will take a quiz on simplifying radical expressions (including those involving multiplying by the conjugate to rationalize the denominator) and solving radical equations.

Unit Test

Summative: Written Test

Students will take a test on all topics covered in the unit.

Activities

Properties of Radicals Activity

Students will use patterns to simplify products and quotients of square roots. They will check their answers using a calculator.

Exploring Solutions to Radical Equations

Students will explore the relationship between the distance an object drops and the reaction time needed to catch the object. They will check their answers using a calculator.

Graph Square Root Functions

Students will graph square root functions by hand and with the graphing calculator.

Pythagorean Theorem Investigation

Distance on the Coordinate Plane Investigation

Activities to Differentiate Instruction

- Mixed-ability grouping
- Interactive Smart Board activities
- Multi-Step Problem Solving
- Math stations
- Cooperative learning
- Study guides (teacher and student completed)
- Modify tests and homework as needed
- Modified grading rubrics
- Graphic organizers
- Communicator response boards
- Extended response questions
- Challenge and enrichment homework assignments, worksheets, and enrichment project
- Optional weekly challenge problems

Students will create a puzzle using the distance and midpoint formula.

Enrichment Project: [Puzzling Distances](#)

-  [Radical Equations Activity](#)
-  [Finding Midpoint and Distance](#)

Integrated/Cross-Disciplinary Instruction	Resources
	<p>McDougal Littell Algebra 1 textbook and resource materials Website: www.classzone.com (see link)</p> <p>Kuta Software</p> <p>Algebra with Pizzazz</p> <p>Punchline Algebra</p> <p>Smart Exchange Website (see link)</p> <p>Grade 8 Ask Math</p> <p>American Diploma Project Algebra 1 End-of-Course Exam Workbook</p> <p> www.classzone.com</p> <p> http://exchange.smarttech.com/#tab=0</p>

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Unit Map 2013-2014

Green Brook Township School District

/ **Algebra B Curriculum (D)** / Grade 8 (District Middle Curriculum)

Monday, August 26, 2013, 3:23PM

Green Brook Township
Public Schools

Unit: Probability and Data Analysis (Week 23, 4 Weeks) 📅 📌

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 8, Mathematical Practice

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

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

CommonCore: Mathematics, CommonCore: Grade 8, Statistics & Probability

8.SP Investigate patterns of association in bivariate data.

- 8.SP.1. Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.
- 8.SP.2. Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line.
- 8.SP.3. Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept.
- 8.SP.4. Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables.

CommonCore: Mathematics, CommonCore: HS: Stats/Prob, Interpreting Categorical & Quantitative Data

S-ID Summarize, represent, and interpret data on a single count or measurement variable

- S-ID.1. Represent data with plots on the real number line (dot plots, histograms, and box plots).
- S-ID.2. Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.
- S-ID.3. Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).

S-ID Summarize, represent, and interpret data on two categorical and quantitative variables

- S-ID.5. Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal and conditional relative frequencies). Recognize possible associations and trends in the data.
- S-ID.6. Represent data on two quantitative variables on a scatter plot and describe how the variables are related.
- S-ID.6a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models.
- S-ID.6b. Informally assess the fit of a model function by plotting and analyzing residuals.
- S-ID.6c. Fit a linear function for scatter plots that suggest a linear association.

CommonCore: Mathematics, CommonCore: HS: Stats/Prob, Making Inferences & Justifying Conclusions

S-IC Understand and evaluate random processes underlying statistical experiments

- S-IC.1. Understand that statistics is a process for making inferences about population parameters based on a random sample from that population.

S-IC Make inferences and justify conclusions from sample surveys, experiments and observational studies

- S-IC.4. Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling.

CommonCore: Mathematics, CommonCore: HS: Stats/Prob, Conditional Probability & the Rules of Probability

S-CP Understand independence and conditional probability and use them to interpret data

- S-CP.2. Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.
- S-CP.5. Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations.

S-CP Use the rules of probability to compute probabilities of compound events in a uniform probability model

- S-CP.6. Find the conditional probability of A given B as the fraction of B's outcomes that also belong to A and interpret the answer in terms of the model. Apply the Addition Rule, $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$, and interpret the answer in terms of the model.
- S-CP.7. Apply the Addition Rule, $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$, and interpret the answer in terms of the model.

- S-CP.9. (+) Use permutations and combinations to compute probabilities of compound events and solve problems.

CommonCore: Mathematics, CommonCore: HS: Stats/Prob, Using Probability to Make Decisions

S-MD Use probability to evaluate outcomes of decisions

- S-MD.6. (+)Use probabilities to make fair decisions
- S-MD.7.(+) Analyze decisions and strategies using probability concepts

Description of Unit

In this unit, students use sample spaces to calculate probabilities and odds. They identify and use the number of permutations or combinations in a set of objects to calculate the probability of an event. They find probability of simple and compound events by determining if the events are mutually exclusive or overlapping, or whether the events are dependent or independent. They will be able to identify populations and different methods of sampling. Students compare measures of central tendency; the mean, median, mode; and compare measures of dispersion by using the range. They will analyze and display data in histograms, line graphs, frequency tables, stem-and-leaf plots, bar graphs, circle graphs, and box-and-whisker plots. Students will make scatter plots of data and use a line of fit to model and interpret the data using paper and pencil and technology.

Essential Questions

1. How can mathematical models be used to clarify mathematical relationships?
2. How can mathematical models be used to describe physical relationships?
3. How can you determine which type of display to use with a set of data?

Knowledge

Students will know that:

1. probabilities can be independent or dependent.
2. events can be mutually exclusive or overlapping.
3. the numbers representing odds in favor and odds against are reciprocals.

Skills

Students will be able to:

- a. find sample spaces and probabilities.
- b. find the odds in favor and the odds against an event happening.
- c. find probabilities using permutations and combinations.

- 4. a permutation is an arrangement of objects in which order is important.
- 5. a combination is a selection of objects in which order is *not* important.
- 6. a biased sample has a population that is over- or under-represented.
- 6. measures of central tendency and dispersion are used to describe a set of data.
- 7. different data displays are used to represent different types of data.

- d. find probabilities of compound events.
- e. identify populations and sample methods.
- f. compare measures of central tendency and dispersion.
- g. make and interpret the following: stem-and-leaf plots, box-and-whisker plots, frequency tables, histograms, line graphs, bar graphs, and circle graphs.
- h. make and interpret scatter plots and write equations to model the data.
- i. make predictions using best-fitting lines.

Assessments

Daily Warm-Up Problems

Diagnostic: Other written assessments

Students will solve one or two problems from the previous lesson to assess readiness.

Communicator Practice

Diagnostic: Other written assessments

Students will solve practice problems on communicators to receive immediate feedback.

Ticket to Leave Problems

Formative: Other written assessments

Students will complete one or two problems to assess knowledge and skills learned from the lesson.

Probability and Sampling Quiz

Formative: Written Test

Students will take a quiz on calculating and interpreting probabilities, permutations, and combinations and sampling methods and populations.

Unit Test

Summative: Written Test

Students will take a test on all topics covered in the unit.

Activities

Finding Probabilities of Compound Events

Students will use Venn diagrams to find probabilities.

Activities to Differentiate Instruction

Mixed-ability grouping

Interactive Smart Board activities

Investigating Algebra Activity: Combinations

Measures of Central Tendency Project

Students will use measures of central tendency and dispersion to analyze student collected data on a topic of their choice. They will calculate the measures using paper and pencil and the graphing calculator. They will also create data displays best suited to represent the data.

Voting Rights Activity

Students will analyze information about female voters.

Enrichment Project: Snack Time

Students will use data analysis and probability to determine whether or not to install vending machines at the school.

- Multi-Step Problem Solving
- Math stations
- Cooperative learning
- Study guides (teacher and student completed)
- Modify tests and homework as needed
- Modified grading rubrics
- Graphic organizers
- Communicator response boards
- Extended response questions
- Challenge and enrichment homework, worksheets and enrichment project
- Optional weekly challenge problems

Integrated/Cross-Disciplinary Instruction	Resources
<p>Students will use skills learned in language arts when answering extended response questions.</p>	<p><u>McDougal Littell Algebra 1</u> textbook and resource materials Website: www.classzone.com (see link)</p> <p><u>Kuta Software</u></p> <p><u>Algebra with Pizzazz</u></p> <p><u>Punchline Algebra</u></p> <p><u>Smart Exchange Website</u> (see link)</p> <p><u>Grade 8 Ask Math</u></p> <p><u>American Diploma Project Algebra 1 End-of-Course Exam</u></p> <p><u>Discovering Math: Advanced: Statistics and Data Analysis: Part 01</u> <u>A Segment of: Discovering Math: Advanced: Statistics and Data Analysis: Part 01</u> Video (see link)</p>

Discovering Math: Advanced: Statistics and Data Analysis: Part 02

Video (see link)

 [Classzone Website](#)

 [Smart Exchange Website](#)

 <http://player.discoveryeducation.com/index.cfm?guidAssetId=7E84C036-8265-4618-8247-E1E5F89BA6BF&blnFromSearch=1&productcode=US>

<http://player.discoveryeducation.com/index.cfm?guidAssetId=ACD298DC-8CD7-4F6E-BD85-88958BF8F4EA&blnFromSearch=1&productcode=US>

 <http://player.discoveryeducation.com/index.cfm?guidAssetId=ACD298DC-8CD7-4F6E-BD85-88958BF8F4EA&blnFromSearch=1&productcode=US>

<http://player.discoveryeducation.com/index.cfm?guidAssetId=ACD298DC-8CD7-4F6E-BD85-88958BF8F4EA&blnFromSearch=1&productcode=US>

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Unit Map 2013-2014

Green Brook Township School District

/ **Algebra B Curriculum (D)** / **Grade 8 (District Middle Curriculum)**

Monday, August 26, 2013, 3:24PM

Green Brook Township
Public Schools

Unit: Geometry (Week 27, 4 Weeks) 📅 📄

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 7, Geometry

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

- 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 8, Mathematical Practice

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

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

CommonCore: Mathematics, CommonCore: Grade 8, Geometry

8.G Understand congruence and similarity using physical models, transparencies, or geometry software.

- 8.G.1. Verify experimentally the properties of rotations, reflections, and translations:

- 8.G.1a. Lines are taken to lines, and line segments to line segments of the same length.
- 8.G.1b. Angles are taken to angles of the same measure.
- 8.G.1c. Parallel lines are taken to parallel lines.
- 8.G.2. Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.
- 8.G.3. Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.
- 8.G.4. Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.
- 8.G.5. Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles.

8.G Understand and apply the Pythagorean Theorem.

- 8.G.6. Explain a proof of the Pythagorean Theorem and its converse.
- 8.G.7. Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.
- 8.G.8. Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.

8.G Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.

- 8.G.9. Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.

Description of Unit

In this unit, students will classify regular polygons and know their properties. They will name corresponding and congruent parts of similar polygons. Students will identify angles that are formed when parallel lines are cut by a transversal. They will use facts about supplementary, complementary, vertical, and adjacent angles to write and solve equations for unknown angles in a figure. Students will know and apply the formulas for finding areas of two-dimensional figures, and will use these formulas to help find areas of irregular figures. They will also know and apply formulas for finding volumes and surface areas of three-dimensional space figures. Students will study transformations in the coordinate plane including rotations, reflections, translations, and dilations. The unit will conclude with solving problems by applying the Pythagorean Theorem

Essential Questions

1. How can algebra be used to solve problems in geometry?
2. When is it important to have precise measurements instead of an approximations?
3. How can geometric relationships help to solve problems and/or make sense of phenomena?

Knowledge	Skills
<p>Students will know that:</p> <ol style="list-style-type: none"> regular polygons can be classified based on their sides and angles. similar figures have corresponding sides and angles. missing angles can be found by using the properties of angle relationships such as complementary, supplementary, vertical, corresponding, alternate interior, and alternate exterior angles transformations include translations, reflections, rotations, and dilations area calculates the space inside a two-dimensional figure, surface area is the sum of the exterior area of a three-dimensional solid, and volume calculate the space inside a three-dimensional figure 	<p>Students will be able to:</p> <ol style="list-style-type: none"> classifying regular polygons, lines, and angles identify supplementary, complementary, and vertical angles recognize angle relationships and use their properties to find missing angles identify special angles given parallel lines cut by a transversal find the sum of interior and exterior angles measures in a polygon classify and identify three-dimensional figures. complete transformations of geometric figures on the coordinate plane identify rotational symmetry calculate area of parallelograms, triangles, trapezoids, circles, and irregular figures calculate the perimeter of regular and irregular figures. calculate circumference of circles calculate volume of prisms, cylinders, spheres, pyramids, and cones calculate surface area of rectangular prisms, cylinders, and spheres. measure objects using metric and customary units.
<u>Assessments</u>	
<p>Daily Do Now Problems Diagnostic: Other written assessments Students will complete daily Do Now problems to assess readiness.</p> <p>Tickets to Leave Formative: Other written assessments One or two problems will be used to determine whether students mastered material taught during the lesson.</p> <p>Communicator Practice Diagnostic: Other written assessments Students will solve practice problems on communicators to receive immediate feedback.</p>	

Angles Quiz

Formative: Written Test

Students will take a quiz to demonstrate understanding of angle relationships and interior angles of polygons.

Transformations Quiz

Formative: Written Test

Students will take a quiz to demonstrate understanding of translations, reflections, rotations, and dilations.

Geometry Test

Summative: Written Test

Topics will include: angle relationships, polygons, transformations, area, surface area, volume, and measurement.

Activities	Activities to Differentiate Instruction
<p>See links for activities</p> <ul style="list-style-type: none">  Transformations Investigation  volume surface area kooshball.notebook  Pythagorean theorem.notebook  Angles transversal G8.notebook  Area of Shaded Regions G8.notebook 	<ul style="list-style-type: none"> Mixed-ability grouping Interactive Smart Board activities Multi-Step Problem Solving Math stations Cooperative learning Study guides (teacher and student completed) Modify tests and homework as needed Modified grading rubrics Graphic organizers Communicator response boards Extended response questions Challenge and enrichment homework and worksheets Optional weekly challenge problems
Integrated/Cross-Disciplinary Instruction	Resources
<p>Students will use writing skills when answering extended response questions.</p>	<ul style="list-style-type: none"> McDougal-Littell Algebra 1 textbook and resource materials website: www.classzone.com Kuta Software Bridge to Algebra Smart Exchange resources website: www.exchange.smarttech.com

[NJ Ask Review Workbook Grade 8](#)

 exchange.smarttech.com/

 www.classzone.com

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Unit Map 2013-2014

Green Brook Township School District

/ **Algebra B Curriculum (D)** / **Grade 8 (District Middle Curriculum)**

Monday, August 26, 2013, 3:24PM

Green Brook Township
Public Schools

Unit: Rational Expressions and Equations (Week 31, 6 Weeks)  

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 8, Mathematical Practice

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

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

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 Understand the relationship between zeros and factors of polynomials.

- A-APR.2. Know and apply the Remainder Theorem: For a polynomial $p(x)$ and a number a , the remainder on division by $x - a$ is $p(a)$, so $p(a) = 0$ if and only if $(x - a)$ is a factor of $p(x)$.

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	Essential Questions
<p>In this unit, students divide polynomials by monomials and binomials; these will include problems with and without remainders. Students will simplify rational expressions and state any excluded values. They will also simplify complex fractions. Students will add, subtract, multiply, and divide rational expressions and then use these operations to solve rational equations.</p>	<ol style="list-style-type: none"> 1. How can previous mathematical strategies be applied in solving more complex problems? 2. How and when can rational functions be used?
Knowledge	Skills
<p>Students will know that:</p> <ol style="list-style-type: none"> 1. long division must be used when dividing a polynomial by a binomial. 2. answers to long division problems may have remainders. 3. a rational expression can be written as a ratio of two polynomials where the denominator is not zero. 4. an excluded value is a number that makes a rational expression undefined. 5. a complex fraction is a fraction that contains a fraction in the numerator, denominator, or both. 6. a rational equation contains one or more rational expressions. 	<p>Students will be able to:</p> <ol style="list-style-type: none"> a. divide polynomials by monomials and binomials. b. simplify rational expressions. c. add, subtract, multiply, and divide rational expressions. d. simplify complex fractions. e. solve rational equations.

Assessments

Daily Warm-Up Problems

Diagnostic: Other written assessments

Students will complete daily warm-up problems to assess readiness.

Communicator Practice

Diagnostic: Other written assessments

Students will solve practice problems on communicators to receive immediate feedback.

Ticket to Leave Problems

Formative: Other written assessments

Students will complete one or two problems to assess knowledge and skills learning during the class period.

Simplify Rational Expressions Quiz

Formative: Written Test

Students will take a quiz on polynomial long division, simplifying, multiplying, and dividing rational expressions.

Complex Fractions/Rational Expressions Quiz

Formative: Written Test

Students will take a quiz on simplifying complex fractions and adding and subtracting rational expressions.

Unit Test

Summative: Written Test

Students will take a test on all topics covered in the unit.

Activities

Dividing Polynomials Using Algebra Tiles Activity

Exploring Complex Fractions Investigation

Solving Linear Equations Using Fractions Investigation

Chapter Review Game/Activity

Challenge Problems: Swimming Pool Application and Medical Expertise Problems

Activities to Differentiate Instruction

Mixed-ability grouping
 Interactive Smart Board activities
 Multi-Step Problem Solving
 Math stations
 Cooperative learning
 Study guides (teacher and student completed)
 Modify tests and homework as needed
 Modified grading rubrics
 Graphic organizers
 Communicator response boards
 Extended response questions

Enrichment Project: How Far Can You See?

Students will derive a rational function that models the near point of the eye.

Challenge and enrichment homework assignments, worksheets, and enrichment project
Optional weekly challenge problems

 Polynomial Long Division

Integrated/Cross-Disciplinary Instruction	Resources
	<p><u>McDougal Littell Algebra 1</u> textbook and resource materials Website: www.classzone.com (see link)</p> <p><u>Kuta Software</u></p> <p><u>Algebra with Pizzazz</u></p> <p><u>Punchline Algebra</u></p> <p><u>Smart Exchange Website</u> (see link)</p> <p> www.classzone.com</p> <p> http://exchange.smarttech.com/#tab=0</p>

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Unit Map 2013-2014

Green Brook Township School District

/ **Algebra B Curriculum (D)** / Grade 8 (District Middle Curriculum)

Monday, August 26, 2013, 3:25PM

Green Brook Township
Public Schools

Unit: Final Exam Review (Week 37, 3 Weeks) 📅 📌

New Jersey Core Curriculum Standards

CommonCore: Mathematics, CommonCore: Grade 8, Mathematical Practice

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

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

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 review for the Algebra 1A Final Exam. Review for the exam will include guided and independent practice. Students will participate in other review activities such as games and stations.

Essential Questions

1. How does algebra assist in making decisions?
2. How is algebra used in real-world applications?

Knowledge	Skills
<p>Students will know that:</p> <p>A. equations can be solved by using properties of equality.</p> <p>B. linear equations have three forms (slope-intercept, point-slope, and standard).</p> <p>C. systems of equations can be solved using graphing, substitution, and elimination methods.</p> <p>D. polynomials can be factored using different methods.</p> <p>E. quadratic equations can be solved using the following methods: factoring, taking square roots, completing the square, and the quadratic formula.</p> <p>F. radicals are simplified when there are no perfect square factors under the radical and no fractions contained in the radical.</p> <p>G. rational expressions can contain restrictions and rational equations may contain extraneous solutions.</p>	<p>Students will be able to:</p> <ol style="list-style-type: none"> 1. solve linear equations. 2. write linear equations. 3. solve systems of equations. 4. factor polynomials. 5. simplify radical expressions and solve radical equations. 6. solve quadratic equations. 7. simplify rational expressions and solve rational equations.
<p><u>Assessments</u></p>	
<p>Pre-Assessment</p> <p>Diagnostic: Other written assessments</p> <p>Students will take a pre-assessment in order to plan 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 Warm-Up Problems</p> <p>Diagnostic: Other written assessments</p> <p>Students will complete daily warm-up problems on different review topics.</p> <p>Communicator Practice</p> <p>Diagnostic: Other written assessments</p> <p>Students will solve practice problems on communicators to receive immediate feedback.</p> <p>Ticket to Leave Problems</p> <p>Formative: Other written assessments</p> <p>Students will complete one or two problems to assess knowledge and skills learned during the class period.</p> <p>Algebra IA Final Exam</p>	

Summative: Written Test

Students will take the Algebra IA Final Exam provided by Watchung Hills Regional High School. This test will cover all material in this course. Students must receive a qualifying score in order to move on to the next course.

 [M&M Mixture Project](#)

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

<p>Activities</p>	<p>Activities to Differentiate Instruction</p>
<p><u>Worksheet Races</u> Students will complete practice problems in groups.</p> <p><u>Math Stations</u> Students will work in different review stations to cooperatively practice problems.</p> <p><u>Student-Led Lessons</u> Students will work cooperatively to present a review topic to the class.</p>	<p>Mixed-ability grouping Interactive Smart Board activities Multi-Step Problem Solving Math stations Cooperative learning Study guides (teacher and student completed) Modify homework as needed Graphic organizers Communicator response boards Extended response questions Challenge and enrichment homework and worksheets Optional weekly challenge problems</p>
<p>Integrated/Cross-Disciplinary Instruction</p>	<p>Resources</p>
	<p><u>McDougal Littell Algebra 1</u> textbook and resource materials Website: www.classzone.com (see link)</p> <p>Review materials provided by Watchung Hills Regional High School</p> <p><u>Kuta Software</u></p> <p><u>Algebra with Pizzazz</u></p> <p><u>Punchline Algebra</u></p> <p><u>Smart Exchange</u> Website (see link)</p>

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

[<< Previous Year](#)

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