

# **Glen Ridge Public Schools –Mathematics Curriculum**



**Course Title:** Algebra I

**Subject:** Mathematics

**Grade Level:** 9<sup>th</sup>

**Duration:** Full Year

**Prerequisite:** Algebra I Concepts 8<sup>th</sup> Grade or Advanced Algebra 8<sup>th</sup> Grade

**Elective or Required:** Required

## **Mathematics Mission Statement**

Mathematics is an integral part of our lives. Students must be actively involved in their mathematics education through the use of modeling and demonstrating the ability to persevere through problem solving. The mathematics curricula will emphasize critical thinking skills through a balance of logic and reasoning, attention to precision by utilizing patterns and structure, and bridging these ideas to cross-curricular learning. Students will be engaged and challenged in a student-centered learning environment that is developmentally appropriate and will communicate mathematical ideas, both in a verbal and written form. Through effectively applying hands-on manipulatives, basic computation skills and the use of technical writing to justify their processes, students will critique the work of themselves and others.

**Course Description:** Algebra is a basic course for all college preparatory mathematics courses. Instructional emphasis will be placed on modeling real-life situations with expressions, equations, inequalities and systems of equations, and inequalities. After we cover the basics, students will learn what a function is. We will take a closer look at three different types of functions: linear, quadratic, and exponential. Students will spend most of the third marking period studying quadratics. Students will learn how to graph and solve quadratics using various methods. In addition, students will explore functions as they represent real-world phenomena in the form of tables, equations and graphs through the use of technology.

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**Date Submitted:** Summer 2017

# Algebra I

## I Solving Equations and Inequalities

**Approximate # Of Weeks: 2**

### **Essential Questions:**

- How do you solve equations?
- How do you solve proportions?
- How do you solve inequalities?
- How can you use equations to solve real world applications?
- How do you write compound inequalities?
- How are “and” compound inequalities different than “or” compound inequalities?
- How do you solve compound inequalities?
- How can you check a solution to an equation by hand?
- How can you check a solution to an equation on the calculator?
- How do you solve literal equations?
- How do you generate a table on the calculator for literal equations?
- How do you solve absolute value equations?
- How do you solve absolute value inequalities?
- How do you solve absolute value equations and inequalities on the graphing calculator?

### **Upon completion of this unit students will be able to:**

- Solve multi-step equations.
- Solve multi-step inequalities.
- Solve compound inequalities.
- Use equations, inequalities, and compound inequalities to solve real world applications.
- Solve literal equations.
- Solve absolute value equations and inequalities.
- Generate tables on the graphing calculators for literal equations\

### **NJ Student Learning Standards:**

- A.CED.1, 2, 4
- A.REI.1, 3
- A.SSE.1
- N.Q.1-3

### **Interdisciplinary Standards (njcccs.org)**

- Standard 5.1 – Science Practices
- Standard 8.1 -- Computer and Information Literacy
- Standard 8.2 – Technology Education
- Standard 9.1 – 21st - Century Life & Career Skills
- Standard 9.3 – Career Awareness, Exploration, and Preparation

**Activities – include 21<sup>st</sup> Century Technologies:**

- TI-Calculator Activity – solving equations by graphing (Holt and McDougal)
- Equation Puzzle (Big Ideas)
- Solving Simple Equations Activities (Big Ideas)
- Solving Multi-Step Equations Activities (Big Ideas)
- Solving Equations with Variables on Both Sides Activities (Big Ideas)
- Smart notebook lessons
- Online quizzes from textbook website
- Online videos from textbook website
- Class lecture and discussion in class and on google classroom
- Khan Academy
- Youtube videos

**Enrichment Activities:**

- Study Guide and Intervention
- Skills Practice
- Word Problem Practice
- Practice
- Mathbits activities

**Methods of Assessments/Evaluation:**

- Thumbs up/down
- Think-pair-share
- Dry erase response
- Find the mistake
- Kahoot
- Homework
- Graded classwork
- Partner activities
- Google Classroom exit ticket/question
- Chapter Test
- Individual problem assessment during lesson
- Graphing calculator check
- Self-Assessment (4-3-2-1)
- Open-ended question
- Skyward quizzes

**Resources/Including Online Resources**

- Online Textbook Information: [connected.my.hrw.com](http://connected.my.hrw.com)
- Google Classroom
- Various Youtube channels
- TI-83/84 Graphing Calculator
- Big Ideas Algebra Textbook by Holt McDougal

### Prerequisite Learning Goals Self-Assessment Chart

Learning Level	Objectives	Assessment
1	<ul style="list-style-type: none"> <li>• None</li> </ul>	<b>4 I can teach others</b> <b>3 I can pass an assessment</b> <b>2 I need more practice</b> <b>1 I don't understand</b>
2	<ul style="list-style-type: none"> <li>• Solve one step equations</li> <li>• Solve inequalities that do not require multiplication by a negative</li> </ul>	
3	<ul style="list-style-type: none"> <li>• Solve multi-step equations</li> <li>• Solve multi-step inequalities</li> <li>• Solve compound inequalities</li> <li>• Solve absolute value equations and inequalities by hand</li> <li>• Solve literal equations</li> </ul>	
4	<ul style="list-style-type: none"> <li>• Use equations, inequalities, and compound inequalities to solve real world applications</li> <li>• Solve equations, inequalities, and compound inequalities that contain fractions</li> <li>• Solve absolute value equations and inequalities by hand and on the graphing calculator</li> <li>• Use the calculator to generate a table of values for any variable of a literal equation</li> </ul>	

## II Functions

**Approximate # Of Weeks: 3**

**Essential Questions:**

- What makes a relation a function?
- How can you tell if a relation is a function by looking at a graph?
- How can you tell if a relation is a function by mapping?
- How can you model real-world situations using a function?
- How can you find the domain and range of a function?
- How can you decide whether the domain of a function is discrete or continuous?

**Upon completion of this unit students will be able to:**

- Match simple graphs with situations
- Determine if a relation is a function by mapping and looking at its graph
- Graph a function
- Graph a function when a domain is given
- Find the domain and range of relations and functions
- Use a function notation to evaluate functions
- Create and interpret scatter plots by hand and on the graphing calculator
- Extend an arithmetic sequence
- Find a given term of an arithmetic sequence

**NJ Student Learning Standards:**

- A.APR.1
- A.CED.1-3
- A.REI.10

- A.SSE.1
- N.Q.1, 2
- F.BF.1, 2
- F.IF.1, 2, 4-7
- F.LE.2
- S.ID.6

### **Interdisciplinary Standards (njcccs.org)**

- Standard 5.1 – Science Practices
- Standard 8.1 -- Computer and Information Literacy
- Standard 8.2 – Technology Education
- Standard 9.1 – 21st - Century Life & Career Skills
- Standard 9.3 – Career Awareness, Exploration, and Preparation

### **Activities – include 21<sup>st</sup> Century Technologies:**

- SmartBoard powerpoint presentations
- Lecture and class discussion
- Vertical-Line Test Activity (Holt McDougal)
- Modeling Activity – variable relationships (Holt McDougal)
- TI-Calculator Activity – Connect Function Rules, Tables, and Graphs
- TI-Calculator Activity – Interpret Scatter Plots and Trend Lines
- The Domain and Range of a Function Activities 1 – 3 (Big Ideas)
- Finding Linear Patterns Activities 1 – 2 (Big Ideas)
- Matching Function with their Graphs (Big Ideas)
- Evaluating a Function Activity (Big Ideas)
- Comparing Graphs of Functions Activity (Big Ideas)
- Using a Pattern in Science to Predict Activity (Big Ideas)
- Writing a Story Activity (Big Ideas)
- Review Game Writing Linear Functions – Domain and Range (Big Ideas)
- Online quizzes from textbook website
- Online videos from textbook website

### **Enrichment Activities:**

- Study Guide and Intervention
- Skills Practice
- Word Problem Practice
- Practice
- Mathbits activities

### **Methods of Assessments/Evaluation:**

- Thumbs up/down
- Think-pair-share
- Dry erase response
- Find the mistake
- Kahoot
- Homework
- Graded classwork
- Partner activities

- Google Classroom exit ticket/question
- Chapter Test
- Individual problem assessment during lesson
- Graphing calculator check
- Self-Assessment (4-3-2-1)
- Open-ended question
- Skyward quizzes

**Resources/Including Online Resources**

- Online Textbook Information: [connected.mcgraw-hill.com](http://connected.mcgraw-hill.com)
- Google Classroom
- Various Youtube channels
- TI-83/84 Graphing Calculator
- Big Ideas Algebra Textbook by Holt McDougal

**Prerequisite Learning Goals Self-Assessment Chart**

Learning Level	Objectives	Assessment 4 I can teach others 3 I can pass an assessment 2 I need more practice 1 I don't understand
1	<ul style="list-style-type: none"> <li>● None</li> </ul>	
2	<ul style="list-style-type: none"> <li>● Graph a function</li> <li>● Recognize an arithmetic sequence</li> <li>● Determine whether a relation is a function by using the vertical line test</li> </ul>	
3	<ul style="list-style-type: none"> <li>● Graph a function with a specific domain</li> <li>● Determine whether a relation is a function by mapping</li> <li>● Make a scatterplot by hand</li> <li>● Make predictions for a scatterplot</li> <li>● Determine the domain and range by looking at a graph</li> </ul>	
4	<ul style="list-style-type: none"> <li>● Make a scatterplot by hand and on the graphing calculator</li> <li>● Determine the domain and range of a function when an equation is given</li> <li>● Find a given term of an arithmetic sequence</li> </ul>	

**III Linear Functions**

**Approximate # Of Weeks: 4**

**Essential Questions:**

- How do you find the rate of change or slope?
- How can you find the slope of a linear equation?
- How does the slope affect the graph of a linear function?
- How does the y-intercept affect the graph of a linear function?
- How do you graph a linear function in slope-intercept form?
- How do you graph a linear function that isn't in slope-intercept form?
- How do you write an equation for a function given a table or graph?
- How do you write the equation of a line when the slope and the y-intercept is given?

- How do you write the equation of a line when the slope and a point is given?
- How do you write the equation of a line when two points are given?
- When do we use slope-intercept form and when do we use point-slope form of a line?
- How can you use graphs and equations to compare functions?
- How do you use a graphing calculator to perform linear regression?
- How do you model real world situations using linear functions?

**Upon completion of this unit students will be able to:**

- Identify linear relations and functions.
- Write linear equations in all three forms: slope-intercept, point-slope, and standard
- Find rate of change using a graph, the algebraic formula, the linear equation, or by looking at a table of values
- Determine the slope of a line
- Write an equation of a line given the slope and a point on the line using point-slope form and slope-intercept form
- Write an equation of a line parallel or perpendicular to a given line.
- Use scatter plots and make predictions
- Model data using lines of regression.
- Use transformations to estimate graphs of various linear functions.
- Describe transformations of functions.
- Graph linear inequalities.

**NJ Student Learning Standards:**

- A.CED.1-3
- A.REI.10-11
- F.BF.1, 3-4
- F.IF.1, 2, 4-7
- F.LE.1, 2, 5
- G.GPE.5
- N.Q.1, 2
- S.ID.6-9

**Interdisciplinary Standards (njcccs.org)**

- Standard 5.1 – Science Practices
- Standard 8.1 -- Computer and Information Literacy
- Standard 8.2 – Technology Education
- Standard 9.1 – 21st - Century Life & Career Skills
- Standard 9.3 – Career Awareness, Exploration, and Preparation

**Activities – include 21<sup>st</sup> Century Technologies:**

- SmartBoard powerpoint presentations
- Lecture and class discussion
- Word Problem Practice – Relations and Functions
- Word Problem Practice – Linear Relations and Functions
- Word Problem Practice – Rate of Change and Slope
- Word Problem Practice – Writing Linear Equations
- Word Problem Practice – Scatter Plots and Lines of Regression
- Word Problem Practice – Graphing Linear and Absolute Value Inequalities

- Enrichment – Median-Fit Lines • Enrichment – Limits
- TI-Calculator Activity – Graphing Linear Functions
- TI-Calculator Activity – Exploring Linear Functions
- TI-Calculator Activity – Graphing Linear Inequalities
- TI-Calculator Activity – Graphing Absolute Value Inequalities
- Online quizzes from textbook website
- Online videos from textbook website

**Enrichment Activities:**

- Study Guide and Intervention
- Skills Practice
- Word Problem Practice
- Practice
- Mathbits activities

**Methods of Assessments/Evaluation:**

- Thumbs up/down
- Think-pair-share
- Dry erase response
- Find the mistake
- Kahoot
- Homework
- Graded classwork
- Partner activities
- Google Classroom exit ticket/question
- Chapter Test
- Individual problem assessment during lesson
- Graphing calculator check
- Self-Assessment (4-3-2-1)
- Open-ended question
- Skyward quizzes

**Resources/Including Online Resources**

- Online Textbook Information: [connected.mcgraw-hill.com](http://connected.mcgraw-hill.com)
- Google Classroom
- Various Youtube channels
- TI-83/84 Graphing Calculator
- Big Ideas Algebra Textbook by Holt McDougal



### Prerequisite Learning Goals Self-Assessment Chart

Learning Level	Objectives	Assessment
1	<ul style="list-style-type: none"> <li>• Identify a linear function by looking at it's graph</li> <li>• Identify the slope of a line when a linear equation is in slope-intercept form</li> </ul>	<b>4 I can teach others</b> <b>3 I can pass an assessment</b> <b>2 I need more practice</b> <b>1 I don't understand</b>
2	<ul style="list-style-type: none"> <li>• Write the equation of a line when the slope and y-intercept or given</li> <li>• Find the slope of a line when two points are given</li> </ul>	
3	<ul style="list-style-type: none"> <li>• Write the equation of a line when two points are given</li> <li>• Write the equation of a line in any form</li> <li>• Write the equations of lines that parallel to a given line</li> <li>• Find the slope of a line by looking at the equation, graph, or table of a value</li> <li>• Graph linear inequalities</li> </ul>	
4	<ul style="list-style-type: none"> <li>• Model real world situations using linear functions</li> <li>• Write the equations of lines that perpendicular to a given line</li> <li>• Make a scatterplot by hand and on the graphing calculator to make predictions for a given set of data</li> </ul>	

## IV Systems of Equations and Inequalities

**Approximate # Of Weeks: 5**

**Essential Questions:**

- How do you find the solution of a system of linear equations by graphing?
- How do you use substitution to solve a system of linear equations?
- How do you solve a system of linear equations by elimination?
- How do you solve a system of linear inequalities?
- How can you use systems of linear equations or inequalities to model and solve real world situations?
- How many solutions can a system of linear equations have?

**Upon completion of this unit students will be able to:**

- Identify solutions of systems of linear equations in two variables
- Solve systems of linear equations in two variables by graphing by hand and on the graphing calculator
- Solve systems of linear equations in two variables by substitution
- Solve systems of linear equations in two variables by elimination
- Choose an appropriate method for solving systems of linear equations
- Solve special systems of linear equations in two variables
- Graph and solve linear inequalities in two variables
- Graph and solve systems of linear inequalities in two variables
- Write the system of linear inequalities in two variables when a graph is given
- Solve a system of linear inequalities in two variables on the graphing calculator
- Solve real life application using a system of linear equation or inequality in two variables.

**NJ Student Learning Standards:**

- CC.9-12. A.SSE.1
- CC.9-12. A.CED.2
- CC.9-12. F.IF.4-6, 9

**Interdisciplinary Standards (njcccs.org)**

- Standard 5.1 – Science Practices
- Standard 8.1 -- Computer and Information Literacy
- Standard 8.2 – Technology Education
- Standard 9.1 – 21st - Century Life & Career Skills
- Standard 9.3 – Career Awareness, Exploration, and Preparation

**Activities – include 21<sup>st</sup> Century Technologies:**

- SmartBoard powerpoint presentations
- Lecture and class discussion and on google classroom
- TI-Calculator Activity – solve system of linear inequalities activity (Holt McDougal)
- Solving Systems of Linear Equations and by Graphing Activities (Big Ideas)
- Solving Systems of Linear Equations by Substitution Activities (Big Ideas)
- Solving Systems of Linear Equations by Elimination Activities (Big Ideas)
- Solving Special Systems of Linear Equations Activities (Big Ideas)
- System of Linear Inequalities Activities (Big Ideas)
- Graphing Linear Inequalities in Two Variables Activities (Big Ideas)
- Battle-Ship Systems Review Game (Big Ideas)
- Online quizzes from textbook website
- Online videos from textbook website

**Enrichment Activities:**

- Study Guide and Intervention
- Skills Practice
- Word Problem Practice
- Practice
- Mathbits activities

**Methods of Assessments/Evaluation:**

- Thumbs up/down
- Think-pair-share
- Dry erase response
- Find the mistake
- Kahoot
- Homework
- Graded classwork
- Partner activities
- Google Classroom exit ticket/question
- Chapter Test
- Individual problem assessment during lesson
- Graphing calculator check
- Self-Assessment (4-3-2-1)
- Open-ended question
- Skyward quizzes

### Resources/Including Online Resources

- Online Textbook Information: [connected.mcgraw-hill.com](http://connected.mcgraw-hill.com)
- Google Classroom
- Various Youtube channels
- TI-83/84 Graphing Calculator
- Big Ideas Algebra Textbook by Holt McDougal

### Prerequisite Learning Goals Self-Assessment Chart

Learning Level	Objectives	Assessment 4 I can teach others 3 I can pass an assessment 2 I need more practice 1 I don't understand
1	<ul style="list-style-type: none"><li>• Find the solution of a linear system of equations in two variables when a graph is given</li></ul>	
2	<ul style="list-style-type: none"><li>• Find the solution of a linear system of equations in two variables when using the graphical method</li><li>• Find the solution of a linear system of equation in two variables using the substitution method when both equations are in slope-intercept form</li></ul>	
3	<ul style="list-style-type: none"><li>• Find the solution of a linear system of equations in two variables using elimination and substitution</li><li>• Find the solution of a linear system of equations in two variables on a graphing calculator</li><li>• Find the solution to special linear systems of equations and inequalities in two variables</li><li>• Write the system of linear inequalities in two variables when a graph is given</li></ul>	
4	<ul style="list-style-type: none"><li>• Choose the most efficient method to solving any system of equations in two variables</li><li>• Use systems of linear equations in two variables to solve real world applications</li><li>• Use systems of linear inequalities in two variables to solve real world applications</li></ul>	

## V Polynomials

### Approximate # Of Weeks: 4

#### Essential Questions:

- How can you tell if an expression is a polynomial?
- How do you classify a polynomial by the degree and number of terms?
- How do you use the properties of integer exponents?
- How can you perform operations with polynomials?
- How can you use the distributive property to multiply binomials?
- What are the patterns in the special products of when multiplying polynomials?

#### Upon completion of this unit students will be able to:

- Evaluate polynomial expressions using function notation
- Simplify and evaluate expressions containing zero and integer exponents
- Evaluate and simplify expressions containing rational exponents
- Classify polynomials and write polynomials in standard form
- Add and subtract polynomials

- Multiply polynomials using the distributive property
- Find special products of binomials

**NJ Student Learning Standards:**

- A.CED.2, 3
- A.REI.3, 5, 6, 11, 12
- N.Q.1, 2

**Interdisciplinary Standards (njcccs.org)**

- Standard 5.1 – Science Practices
- Standard 8.1 -- Computer and Information Literacy
- Standard 8.2 – Technology Education
- Standard 9.1 – 21st - Century Life & Career Skills
- Standard 9.3 – Career Awareness, Exploration, and Preparation

**Activities – include 21<sup>st</sup> Century Technologies:**

- SmartBoard powerpoint presentations
- Lecture and class discussion
- Group Multiplying Monomials Activity – students create either a monomial, binomial, trinomial, or a quadric polynomial then break into groups and multiply each pair of polynomials in their group (Holt and McDougal – Lesson Alternative Assessment)
- Properties of Exponents Activities (Big Ideas)
- Adding and Subtracting Polynomials Activities (Big Ideas)
- Multiplying Polynomials Activities (Big Ideas)
- Special Products of Polynomials Activities (Big Ideas)
- Online quizzes from textbook website
- Online videos from textbook website

**Enrichment Activities:**

- Study Guide and Intervention
- Skills Practice
- Word Problem Practice
- Practice
- Mathbits activities

**Methods of Assessments/Evaluation:**

- Thumbs up/down
- Think-pair-share
- Dry erase response
- Find the mistake
- Kahoot
- Homework
- Graded classwork
- Partner activities
- Google Classroom exit ticket/question
- Chapter Test
- Individual problem assessment during lesson
- Graphing calculator check
- Self-Assessment (4-3-2-1)

- Open-ended question
- Skyward quizzes

**Resources/Including Online Resources**

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- Google Classroom
- Various Youtube channels
- TI-83/84 Graphing Calculator
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**Prerequisite Learning Goals Self-Assessment Chart**

Learning Level	Objectives	Assessment 4 I can teach others 3 I can pass an assessment 2 I need more practice 1 I don't understand
1	<ul style="list-style-type: none"> <li>• Add polynomials</li> <li>• Write polynomials in standard form</li> </ul>	
2	<ul style="list-style-type: none"> <li>• Identify whether an expression is a polynomial or not</li> <li>• Evaluate polynomials using function notation</li> <li>• Classify polynomials by degree and terms</li> <li>• Subtract polynomials</li> </ul>	
3	<ul style="list-style-type: none"> <li>• Multiply polynomials</li> <li>• Use integer properties to simplify exponents</li> </ul>	
4	<ul style="list-style-type: none"> <li>• Use shortcuts for special products of binomials</li> <li>• Evaluate and simplify expressions containing rational exponents</li> </ul>	

**VI Factoring**

**Approximate # Of Weeks: 5**

**Essential Questions:**

- What is the 1<sup>st</sup> step when factoring?
- Why do you factor out the GCF 1<sup>st</sup> when factoring?
- How do you factor quadratic trinomials?
- What is the shortcut when factoring quadratic trinomials when a = 1?
- What is the common binomial theorem?
- How can you use common factors to write a polynomial in factored form?
- How do you know when you are done factoring a polynomial?
- How can you recognize and factor special products?

**Upon completion of this unit students will be able to:**

- Find the GCF of polynomials
- Factor by grouping
- Factor quadratic trinomials when a = 1
- Factor quadratic trinomials when a doesn't = 1
- Factor perfect-square trinomials

- Factor the difference of two squares
- Choose an appropriate method for factoring a polynomial
- Combine methods for factoring a polynomial

**NJ Student Learning Standards:**

- A.SSE.2
- A.APR.3

**Interdisciplinary Standards (njcccs.org)**

- Standard 5.1 – Science Practices
- Standard 6.3 – Active Citizenship in the 21<sup>st</sup> Century
- Standard 8.1 – Computer and Information Literacy
- Standard 8.2 – Technology Education
- Standard 9.1 – 21st - Century Life & Career Skills

**Activities – include 21<sup>st</sup> Century Technologies:**

- SmartBoard powerpoint presentations
- Lecture and class discussion
- TI-Calculator Activity – use a graph to factor polynomials (Holt McDougal)
- Factoring  $x^2 + bx + c$  Activities (Big Ideas)
- Factoring  $ax^2 + bx + c$  Activities (Big Ideas)
- Online quizzes from textbook website
- Online videos from textbook website

**Enrichment Activities:**

- Study Guide and Intervention
- Skills Practice
- Word Problem Practice
- Practice
- Mathbits activities

**Methods of Assessments/Evaluation:**

- Thumbs up/down
- Think-pair-share
- Dry erase response
- Find the mistake
- Kahoot
- Homework
- Graded classwork
- Partner activities
- Google Classroom exit ticket/question
- Chapter Test
- Individual problem assessment during lesson
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- Self-Assessment (4-3-2-1)
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- Skyward quizzes

### Resources/Including Online Resources

- Online Textbook Information: [connected.mcgraw-hill.com](http://connected.mcgraw-hill.com)
- Google Classroom
- Various Youtube channels
- TI-83/84 Graphing Calculator
- Big Ideas Algebra Textbook by Holt McDougal

### Prerequisite Learning Goals Self-Assessment Chart

Learning Level	Objectives	Assessment
		4 I can teach others 3 I can pass an assessment 2 I need more practice 1 I don't understand
1	<ul style="list-style-type: none"><li>• Factor out the GCF</li></ul>	
2	<ul style="list-style-type: none"><li>• Factor quadratic trinomials when <math>a = 1</math></li></ul>	
3	<ul style="list-style-type: none"><li>• Factoring all types of quadratic trinomials</li><li>• Factoring using the difference of two squares</li></ul>	
4	<ul style="list-style-type: none"><li>• Choosing the most efficient method to factor a polynomial</li><li>• Solve real world problem using factoring</li></ul>	

## VII Quadratics

**Approximate # Of Weeks: 5**

### Essential Questions:

- How can you graph a quadratic function?
- How do you graph a function in vertex form?
- How can you solve a quadratic equation by graphing by hand?
- How can you solve a quadratic equation by graphing on the graphing calculator?
- How can you solve a quadratic equation by factoring?
- How can you solve a quadratic equation using square roots?
- How can you solve a quadratic equation using completing the square?
- How can you solve a quadratic equation using the quadratic formula?
- How can you model a real-world situation using a quadratic function?
- How can you use the discriminant to determine the number of solutions of a quadratic equation?
- How do you solve quadratic equations using the quadratic formula?

### Upon completion of this unit students will be able to:

- Identify quadratic functions and determine whether they have a minimum or maximum
- Graph a quadratic function and identify: the vertex, the axis of symmetry, and the zeros of the graph
- Graph a quadratic function in standard form
- Graph and transform quadratic functions when in standard and vertex form

- Solve quadratic equations by graphing
- Solve quadratic equations by factoring
- Solve quadratic equations by completing the square
- Solve quadratic equations by using the Quadratic Formula
- Determine the number of solutions of a quadratic equation by using the discriminant

**NJ Student Learning Standards:**

- A.APR.3
- A.CED.1-3
- A.REI.1, 4, 7, 10, 11
- A.SSE.3
- F.IF.2, 4, 5, 7-9
- F.BF.1, 3
- N.Q.1, 2
- S.ID.6

**Interdisciplinary Standards ([njcccs.org](http://njcccs.org))**

- Standard 5.1 – Science Practices
- Standard 6.3 – Active Citizenship in the 21<sup>st</sup> Century
- Standard 8.1 – Computer and Information Literacy
- Standard 8.2 – Technology Education
- Standard 9.1 – 21<sup>st</sup> - Century Life & Career Skills

**Activities – include 21<sup>st</sup> Century Technologies:**

- SmartBoard powerpoint presentations
- Lecture and class discussion
- PowerPoint Presentations (Holt McDougal)
- Selected online games and activities (see appendix)
- Exploring Activity – axis of symmetry using graphing (Holt McDougal)
- TI-Calculator Activity– The Family of Quadratic Functions (Holt McDougal)
- TI-Calculator Activity– Explore Roots, Zeros, and x-Intercepts (Holt McDougal)
- Solving Quadratic Equations by Graphing Activities (Big Ideas)
- Solving Quadratic Equations Using Square Roots Activities (Big Ideas)
- Solving Quadratic Equations by Completing the Square Activities (Big Ideas)
- Solving Quadratic Equations by Using the Quadratic Formula Activities (Big Ideas)
- Online quizzes from textbook website
- Online videos from textbook website

**Enrichment Activities:**

- Study Guide and Intervention
- Skills Practice
- Word Problem Practice
- Practice
- Mathbits activities

**Methods of Assessments/Evaluation:**



- Thumbs up/down
- Think-pair-share
- Dry erase response
- Find the mistake
- Kahoot
- Homework
- Graded classwork
- Partner activities
- Google Classroom exit ticket/question
- Chapter Test
- Individual problem assessment during lesson
- Graphing calculator check
- Self-Assessment (4-3-2-1)
- Open-ended question
- Skyward quizzes

**Resources/Including Online Resources**

- Online Textbook Information: [connected.mcgraw-hill.com](http://connected.mcgraw-hill.com)
- Google Classroom
- Various Youtube channels
- TI-83/84 Graphing Calculator
- Big Ideas Algebra Textbook by Holt McDougal

**Prerequisite Learning Goals Self-Assessment Chart**

Learning Level	Objectives	Assessment 4 I can teach others 3 I can pass an assessment 2 I need more practice 1 I don't understand
1	<ul style="list-style-type: none"> <li>● Identify the zeros of a quadratic function when the graph is given</li> </ul>	
2	<ul style="list-style-type: none"> <li>● Graph a quadratic function</li> <li>● Solve a quadratic function by factoring</li> </ul>	
3	<ul style="list-style-type: none"> <li>● Solve a quadratic equation by: graphing, factoring, square roots, and the quadratic formula</li> </ul>	
4	<ul style="list-style-type: none"> <li>● Solve a quadratic equation by completing the square</li> <li>● Solve real world applications with quadratic functions</li> </ul>	

**VIII Exponential Functions**

**Approximate # of Weeks: 4**

**Essential Questions:**

- How can you tell if an equation is an exponential function?
- How can you tell if a function is exponential by looking at its table?
- How do you write, graph, and interpret exponential growth and decay functions?
- How does the graph of  $f(x) = ab^x$  change when a and b are changed?
- How can you solve problems modeled by equations involving variable exponents?

- How can you recognize, describe, and compare linear, exponential, and quadratic functions?

**Common Core Standards:**

- A.CED.1, 2
- A.REI.11
- F.BF.1-3
- F.IF.1-7, 9
- F.LE.1-3, 5, 6

**Upon completion of this unit students will be able to:**

- Find the  $n$ th term of a geometric sequence
- Evaluate exponential functions
- Identify and graph exponential functions
- Solve problems involving exponential growth and decay
- Compare linear, quadratic, and exponential models
- Given a set of data, decide which type of function models the data and write an equation to describe the functions
- Identify linear and nonlinear rates of change
- Compare rates of change
- Compare functions in different representations
- Estimate and compare rates of change

**Interdisciplinary Standards (njcccs.org)**

- Standard 5.1 – Science Practices
- Standard 6.1 – U.S. History: America in the World
- Standard 6.3 – Active Citizenship in the 21<sup>st</sup> Century
- Standard 8.1 – Computer and Information Literacy
- Standard 8.2 – Technology Education
- Standard 9.1 – 21<sup>st</sup> - Century Life & Career Skills

**Activities – include 21<sup>st</sup> Century Technologies:**

- SmartBoard powerpoint presentations
- Lecture and class discussion
- PowerPoint Presentations (Holt McDougal)
- Comparing Linear, Exponential, and Quadratic Function Activities (Big Ideas)
- Exponential Functions Activities (Big Ideas)
- Exponential Growth Activities (Big Ideas)
- Exponential Decay Activities (Big Ideas)
- Simplifying Square Roots Activities (Big Ideas)
- Online quizzes from textbook website
- Online videos from textbook website

**Enrichment Activities:**

- Study Guide and Intervention
- Skills Practice
- Word Problem Practice
- Practice
- Mathbits activities

**Methods of Assessments/Evaluation:**

- Thumbs up/down
- Think-pair-share
- Dry erase response
- Find the mistake
- Kahoot
- Homework
- Graded classwork
- Partner activities
- Google Classroom exit ticket/question
- Chapter Test
- Individual problem assessment during lesson
- Graphing calculator check
- Self-Assessment (4-3-2-1)
- Open-ended question
- Skyward quizzes

**Resources/Including Online Resources**

- Online Textbook Information: [connected.mcgraw-hill.com](http://connected.mcgraw-hill.com)
- Google Classroom
- Various Youtube channels
- TI-83/84 Graphing Calculator
- Big Ideas Algebra Textbook by Holt McDougal

**Prerequisite Learning Goals Self-Assessment Chart**

Learning Level	Objectives	Assessment
		4 I can teach others 3 I can pass an assessment 2 I need more practice 1 I don't understand
1	<ul style="list-style-type: none"> <li>• Identify an exponential function by looking at an equation</li> </ul>	
2	<ul style="list-style-type: none"> <li>• Evaluate exponential functions</li> <li>• Graph exponential functions</li> </ul>	
3	<ul style="list-style-type: none"> <li>• Find the domain and range of exponential functions</li> <li>• Find the rate of change of linear and non-linear functions</li> </ul>	
4	<ul style="list-style-type: none"> <li>• Solve real world applications using exponential functions</li> <li>• Compare linear, quadratic, and exponential functions</li> </ul>	

**IX – Real Numbers****Approximate # of Weeks: 3****Essential Questions:**

- What is the difference between rational and irrational numbers?
- How do you simplify radicals?
- How do you simplify radical expressions using operations?

**Common Core Standards:**

- N.RN.3
- N.Q.1-3

**Upon completion of this unit students will be able to:**

- Simplify radical expressions
- Simplify radical expressions using operations
- Classify real numbers
- Classifying rational and irrational numbers

**Interdisciplinary Standards (njcccs.org)**

- Standard 5.1 – Science Practices
- Standard 6.1 – U.S. History: America in the World
- Standard 6.3 – Active Citizenship in the 21<sup>st</sup> Century
- Standard 8.1 – Computer and Information Literacy
- Standard 8.2 – Technology Education
- Standard 9.1 – 21<sup>st</sup> - Century Life & Career Skills

**Activities – include 21<sup>st</sup> Century Technologies:**

- SmartBoard powerpoint presentations
- Lecture and class discussion
- PowerPoint Presentations (Holt McDougal)
- Selected online games and activities (see appendix)
- Verifying Rationals and Irrationals (mathbits)
- Online quizzes from textbook website
- Online videos from textbook website

**Enrichment Activities:**

- Study Guide and Intervention
- Skills Practice
- Word Problem Practice
- Practice
- Mathbits activities

**Methods of Assessments/Evaluation:**

- Thumbs up/down
- Think-pair-share
- Dry erase response
- Find the mistake
- Kahoot
- Homework
- Graded classwork
- Partner activities
- Google Classroom exit ticket/question
- Chapter Test
- Individual problem assessment during lesson
- Graphing calculator check
- Self-Assessment (4-3-2-1)
- Open-ended question
- Skyward quizzes

**Resources/Including Online Resources**

- Online Textbook Information: [connected.mcgraw-hill.com](http://connected.mcgraw-hill.com)
- Google Classroom
- Various Youtube channels
- TI-83/84 Graphing Calculator
- Big Ideas Algebra Textbook by Holt McDougal

**Prerequisite Learning Goals Self-Assessment Chart**

Learning Level	Objectives	Assessment
		4 I can teach others 3 I can pass an assessment 2 I need more practice 1 I don't understand
1	<ul style="list-style-type: none"><li>• None</li></ul>	
2	<ul style="list-style-type: none"><li>• Classify real numbers (with the exception of rational/irrational)</li></ul>	
3	<ul style="list-style-type: none"><li>• Classify rational and irrational numbers</li><li>• Simplify square roots</li></ul>	
4	<ul style="list-style-type: none"><li>• Simplify radicals expressions using radical operations</li></ul>	

**X Data Analysis and Probability**

**Approximate # of Weeks: 4**

**Essential Questions:**

- What statistics can you use to characterize and compare the center and spread of data sets?
- Which statistics are most affected by outliers?
- How can you estimate statistics from data displayed in a histogram?
- How can you compare data sets using box plots?
- How can categorical data be organized and analyzed?
- How do you find the experimental probability of an event?
- How do you find the probability of a compound event?
- How can you use simulations to estimate probabilities?
- What is the difference between independent and dependent events?
- How can you display data in a way that helps you make decisions?

**Common Core Standards:**

- S.CP.1-4, 7
- S.IC.1
- S.ID.1-3, 5

**Upon completion of this unit students will be able to:**

- Use data presented in bar graphs and circle graphs to solve equations
- Organize data in tables and graphs
- Choose a table or graph to display data
- Create stem-and-leaf plots

- Describe the central tendency of a data set
- Create and interpret box-and-whisker plots
- Create dot-plots
- Use a dot plot to describe the shape of a data distribution
- Recognize misleading graphs
- Recognize misleading statistics
- Examine different sampling methods and sources of bias
- Use a number cube to simulate a probability experiment
- Determine the experimental probability of an event
- Use experimental probability to make predictions
- Use a graphing calculator to find experimental probabilities by generating random numbers
- Determine the theoretical probability of an event
- Find the probability of independent events
- Find the probability of dependent events
- Find the probability of compound events

#### **Interdisciplinary Standards (njcccs.org)**

- Standard 5.1 – Science Practices
- Standard 6.1 – U.S. History: America in the World
- Standard 6.3 – Active Citizenship in the 21<sup>st</sup> Century
- Standard 8.1 – Computer and Information Literacy
- Standard 8.2 – Technology Education
- Standard 9.1 – 21st - Century Life & Career Skills

#### **Activities – include 21<sup>st</sup> Century Technologies:**

- SmartBoard powerpoint presentations
- Lecture and class discussion
- PowerPoint Presentations (Holt McDougal)
- Selected online games and activities (see appendix)
- TI-Calculator Activity – use random numbers to find experimental probability (Holt McDougal)
- Exploring Activity – use dice rolls to determine compound events (Holt McDougal)
- Measures of Central Tendency Activities (Big Ideas)
- Box-and-Whisker Activities (Big Ideas)

#### **Enrichment Activities:**

- Study Guide and Intervention
- Skills Practice
- Word Problem Practice
- Practice
- Mathbits activities

#### **Methods of Assessments/Evaluation:**

- Thumbs up/down
- Think-pair-share
- Dry erase response
- Find the mistake
- Kahoot

- Homework
- Graded classwork
- Partner activities
- Google Classroom exit ticket/question
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**Prerequisite Learning Goals Self-Assessment Chart**

Learning Level	Objectives	Assessment 4 I can teach others 3 I can pass an assessment 2 I need more practice 1 I don't understand
1	<ul style="list-style-type: none"> <li>● None</li> </ul>	
2	<ul style="list-style-type: none"> <li>● Identify graphs that are misleading</li> <li>● Identify misleading stats</li> <li>● Create stem and leaf plots</li> </ul>	
3	<ul style="list-style-type: none"> <li>● Describe the central tendency of a data set</li> <li>● Find the probability of independent events</li> <li>● Find the probability of dependent events</li> </ul>	
4	<ul style="list-style-type: none"> <li>● Find the probability of compound events</li> </ul>	