Cliffside Park Public Schools

Department: **Mathematics**	Course Title **Algebra 2**
Textbook(s): *Algebra ii – Prentice Hall Mathematics*	

Date:	**Unit 1, September 4 - 28**	**Unit 2, October 1 – November 3**
Essential Question(s):	• What are the different characteristics of the different types of numbers? • How does one solve an equation with one variable? • What additional skills are needed to solve inequalities? • What additional skills are needed to solve absolute value equations and inequalities?	• What is the difference between a relation and a function? • What are the different ways to represent a linear function? • What are the properties and graphs of different types of functions? • How does one graph two-variable inequalities?
Content	Tools of Algebra: • Properties of Real Numbers • Evaluating Algebraic Expressions and Formulas • Solving Algebraic Equations • Solving Inequalities • Absolute Value Equations and Inequalities	Functions, Equations and Graphs • Relations and Functions • Linear Equations • "Direct Variation" Functions • Absolute Value Functions and Graphs • Vertical and Horizontal Translations of functions • Two-variable Inequalities
Skills:	• Differentiate the different type of numbers (integer, rational, etc.) • Solve more difficult equations and inequalities with one variable; this includes having variables on both sides of the equation, terms with fractions and/or parenthesis, and compound inequalities • Solve absolute value equations and Inequalities with one variable • Know when an equation has "no solution" or when the solution is "all real numbers" • Translate word problems into the correct algebraic equation or expression or inequality	• Know the difference between a relation and a function. • Know the different ways to represent a linear function (slope-intercept, point-slope, and Standard Form), and how to go from one representation to a second one • List the properties of different types of functions, including "direct variation", "linear", "absolute value", and two-variable inequalities • Graph the different types of functions, including linear, absolute value, and an inequality with two variables
Standards/Benchmarks	**A.APR.1,6,7, A.CED.1, A.SSE.1.a**	**A.CED.2, A.REI.3,12, F.IF.1,2,7,7a,b,8, F.BF.3, F.LE.2,5, N.Q.1**

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Assessments/Resources	• Tests/Notebooks • Homework • Classroom Participation	• Tests/Notebooks • Homework • Classroom Participation

Cliffside Park Public Schools

Department:	Course Title
Mathematics	**Algebra II - A**

Textbook(s): *Algebra ii – Prentice Hall Mathematics*	
Date:	**Unit 3, November 4 – December 5**	**Unit 2, December 6 – December 22**

Essential Question(s):	• What are the different methods of solving two or three equations with two or three variables? • What is linear programming, and what are its practical uses? • How does one solve two inequalities with two variables?	• What is a matrix, and how can it be used to store dat? • How matrix addition, subtraction, multiplication, and scalar multiplication done? • How can matrices be used to represent geometric transformations?
Content	Linear Systems of Equations and Inequalities: • Solving systems of linear equations by graphing (two variables) • Solving systems of linear equations algebraically (two variables) • Solving and graphing systems of inequalities (two variables) • Linear Programming (Optional) • Graphs in Three Dimensions (Optional) • Solving three equations with three unknowns	The Basics of Matrices • Organizing data into matrices • Reading data from matrices • Adding and Subtracting Matrices • Scalar Multiplication of Matrices • Matrix Multiplication • Geometric Transformations with Matrices
Skills:	• Know the different methods for solving two equations with two variables: Elimination, Substitution, and Graphing • Know when a system of equations has "no solution", or the answer is "all real numbers". • Solve three equations with three unknowns • Solve systems of inequalities by graphing • Know how to do Linear Programming problems, with constraints, using the "Vertex Principle of Linear Programming"	• Organize data into matrices • Read and correctly interpret data in matrices • Know how to add, subtract, and multiply matrices. • Solve equations which include matrices • Know how matrices can be used to perform geometric transformations: Translations, Dilations, Reflections, and Rotations
Standards/Benchmarks	**A.APR.1,2,3,4,6, A.CED.2,3, A.REI.6,7, F.IF.4,5, N.CN.8,9**	**A.REI.8, N.VM.6,7,8,9,10**

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Assessments/Resources	- Tests/Notebooks - Homework - Classroom Participation	- Tests/Notebooks - Homework - Classroom Participation

BOE Approved 4/15

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Department: **Mathematics**	Course Title **Algebra II - A**
Textbook(s): *Algebra ii – Prentice Hall Mathematics*	
Date:	**Unit 5, January 5 – January 24**	**Unit 6, January 25 – February 12**

	Unit 5, January 5 – January 24	Unit 6, January 25 – February 12
Essential Question(s):	• How are the determinants of 2x2 or 3x3 matrices calculate? • How are the inverses of 2x2 and 3x3 matrices calculated? • What are the different ways to solve systems of equations using matrices and their properties?	• What is a quadratic equation? • What is a parabola, and what are its properties? • How can one factor an equation in the form: $ax^2 + bx + c$? • How can factoring be used to solve a quadratic equation?
Content	Advanced Lessons with Matrices: • 2x2 Matrices: Their inverses and determinants • 3x3 Matrices: Their inverses and determinants • Graphs in Three-Dimensions (Optional) • Inverse Matrices and Systems of Equations • Augmented Matrices and Systems of Equations (Optional)	The Basics of Quadratic Equations and Functions • Modeling data with Quadratic Functions • Properties of Parabolas • Translating parabolas into Vertex Form • Factoring Quadratic Equations
Skills:	• Calculate the determinants of 2x2 and 3x3 matrices • Calculate the inverses of 2x2 and 3x3 matrices • Solve systems of equations using different techniques involving matrices: Inverse Matrices, Augmented matrices, and Cramer's Rule	• Know what a quadratic function is • Know how to graph a parabola by calculating its vertex, minimum or maximum, and line of symmetry • Know how to factor quadratics in the form: $x^2 + bx + c$. • Know how to factor quadratics in the form: $ax^2 + bx + c$, with $a \neq 1$. • Know the "Difference of Perfect Squares" and "Perfect Squares" formulas • Know how to solve a quadratic equation by factoring
Standards/Benchmarks	**A.REI.6,9, N.VM.10,12**	**A.REI.7, G.GPE.1,2,3,4, N.Q.1**

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Assessments/Resources	- Tests/Notebooks - Homework - Classroom Participation	- Tests/Notebooks - Homework - Classroom Participation

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Department: **Mathematics**	Course Title **Algebra II - A**
Textbook(s): *Algebra ii – Prentice Hall Mathematics*	

Date:	**Unit 7, February 13 – March 6**	**Unit 8, March 7 – March 24**
Essential Question(s):	• Does the student have enough skills to successfully answer multiple choice standardized test (HSPA) problems? • Does the student know shortcuts and other ways to make it easier to solve standardized test (HSPA) multiple-choice questions? • What is necessary to answer a standardized test (HSPA) open-ended question fully and completely?	• What are the different methods for solving a quadratic equation? • What is an imaginary number? • How do you solve quadratic equations when the answer involves the square root of a negative number? • How can you use the discriminant of a quadratic equation to determine the number and type (rational, irrational, imaginary) of solutions?
Content	A quick review of the main four content areas on the HSPA: • Number and Numerical Operations • Geometry and Measurement • Patterns and Algebra • Data Analysis, Probability, and Discrete Mathematics	More Advanced Topics With Quadratic Equations and Functions • Complex Numbers (Optional) • Completing the Square • The Quadratic Formula
Skills:	• Know more about the content areas necessary to pass the HSPA exam: Number and Numerical Operations, Geometry and Measurement, Patterns and Algebra, and Data Analysis, Probability, and Discrete Mathematics • Improve on the skills necessary to answer standardized test multiple choice questions more accurately • Improve on the skills necessary to answer standardized test open-ended questions fully and completely	• Solve a quadratic equation by factoring • Solve a quadratic equation by completing the square • Solve a quadratic equation using the "Quadratic Formula" • Know the definition of the imaginary number, *I*, and how to use it when solving quadratic equations • Take square roots of negative numbers

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Standards/Benchmarks	A.CED.1,4, A.REI.3,4.b, 6,7, A.SSE.1.a,3.a,c, F.IF.5,6, FLE.1.b, G.CO.1,2,3,4,5,6,7,8,9,10,11,12, G.GMD.1,2,3, G.MG.1,2, G.GPE.4,7, G.MG.1,3, G.GPE.5,7, G.SRT.4,5,8 N.Q.1 N.RN.1,2,3, S.CP.1,2,3,4,5,6,7,8,9, S.ID.1,2,6.c,7, S.SRT.1.a,b,2,3,	A.CED.1, A.REI.4,4a,b, F.BF.3, F.IF.1,2,4,7,7a, N.CN.1.2.3.4.5.6.7.8
Assessments/Resources		- Tests/Notebooks - Homework - Classroom Participation

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Department:	**Mathematics**	Course Title:	**Algebra II - A**

Textbook(s): *Algebra ii – Prentice Hall Mathematics*	

Date:	**Unit 9, March 25 – April 21**	**Unit 10, April 22 – May 20**
Essential Question(s):	- What are the methods for calculating the zeroes of a polynomial equation? - How can one determine the number of zeroes in any polynomial, and weather the solutions are real or imaginary? - How can the Fundamental Theorem of Algebra be used to expand polynomials in the form: $(x + y)^n$, n = any integer	- How does one simplify, add, subtract, multiply and divide radical expressions? - What do rational exponents mean? - How does one solve an equation with radicals in them? - How does one add, subtract, multiply, and divide functions, and calculate their inverses? - What is a compound function?
Content	Polynomials and Polynomial Functions - Polynomial Functions - Polynomials and Linear Functions - Dividing Polynomials - Solving Polynomial Equations - Theorems about Roots of Polynomial Functions - The Fundamental Theorem of Algebra - Permutations and Combinations (Optional) - The Binomial Theorem (Optional)	Radical Functions and Rational Exponents - Roots and Radical Expressions - Multiplying and Dividing Radical Expressions - Binomial Radical Expressions - Rational Exponents - Solving Radical Equations - Function Operations - Inverse Relations and Functions - Graphing Radical Functions (Optional)
Skills:	- Solve polynomial equations, using methods which include factoring, the "Fundamental Theorem of Algebra", the "Rational Root" Theorem, and the "Irrational Root" Theorem. - Divide polynomials using long division and Synthetic Division - Loosely graph polynomials based on their zeroes - Calculate a polynomial in Standard Form given its zeroes - Expand polynomials of the form $(x + y)^n$ using both Pascal's Triangle (or "$_nC_r$") and the Binomial Theorem	- Simplify terms and expressions with radicals in them. - Add, subtract, multiply, divide, and graph radical expressions, including the idea of rationalizing the denominator - Know what a rational exponent is, and what it means. This includes both fractional exponents and negative exponents - Add, subtract, multiply, divide, and simplify expressions with terms that contain rational exponents - Solve equations which contain radical terms - Add, subtract, multiply, and divide functions, including an understanding of composite functions - Calculate the inverse of a function or relation

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Standards/Benchmarks	**A.APR.1,2,3,4,6, F.FIF.4,5, N.CN.8,9**	**A.REI.2, F.BIF.1,4, F.IF.5,7b,c, N.RN.1,2**
Assessments/Resources	• Tests/Notebooks • Homework • Classroom Participation	• Tests/Notebooks • Homework • Classroom Participation

Cliffside Park Public Schools

Department:	**Mathematics**	Course Title:	**Algebra II - A**

Textbook(s): *Algebra ii – Prentice Hall Mathematics*	

Date:	**Unit 11, May 21 – June 11**	
Essential Question(s):	• What is a rational and an exponential function, and how can they be used to model real-life situations? • What are the graphs and properties of rational and exponential functions? • How does one solve rational equations and exponential equations? • How does one add, subtract, and simplify rational expressions?	
Content	Exponential and Rational Functions • Exploring Exponential Models • Properties of Exponential Functions • Exponential Equations • Rational Functions and Their Graphs • Rational Expressions • Adding and Subtracting Rational Expressions • Solving Radical Expressions	
Skills:	• Know the properties of an exponential function, including the decay or growth factor, and the idea of an "asymptote". • Graph both exponential functions and rational functions, with the correct calculation of any vertical or horizontal asymptotes • Solve both exponential equations and rational equations • Simplify, add, and subtract rational expressions	
Standards/Benchmarks	**A.APR.7, A.CED.1, A.REI.2, F.BF.1,4, F.IF.4,5,7, N.RN.1,2**	

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Assessments/Resources	• Tests/Notebooks • Homework • Classroom Participation	

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Differentiation/Accommodations/Modifications			
Gifted and Talented	**English Language Learners**	**Students with Disabilities**	**Students at Risk of Failure**
(content, process, product and learning environment)	**Modifications for Classroom**	*(appropriate accommodations, instructional adaptations, and/or modifications as determined by the IEP or 504 team)*	**Modifications for Classroom** Pair visual prompts with verbal presentations
Extension Activities	Assign a peer helper in the class setting		
Conduct research and provide presentation of cultural topics.	Use Smartphone as dictionary	**Modifications for Classroom** Pair visual prompts with verbal presentations	Ask students to restate information, directions, and assignments.
Design surveys to generate and analyze data to be used in discussion.	Use Dictionary		
	Use materials in native language, if available	Ask students to restate information, directions, and assignments.	Repetition and and practice
Debate topics of interest / cultural importance.			Model skills / techniques to be mastered.
	Modifications for Homework/Assignments	Repetition and and practice	
Authentic listening and reading sources that provide data and support for speaking and writing prompts.	Modified Assignments	Model skills / techniques to be mastered.	Extended time to complete class work
	Native Language Translation (peer, online assistive technology, translation device, bilingual dictionary)		Provide copy of classnotes
Exploration of art and/or artists to understand society and history.		Extended time to complete class work	
	Extended time for assignment completion as needed	Provide copy of class notes	Preferential seating to be mutually determined by the student and teacher
Anchor Activities	Highlight key vocabulary		
Use of Higher Level Questioning Techniques	Use graphic organizers	Preferential seating to be mutually determined by the student and teacher	Student may request to use a computer to complete assignments.

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Provide assessments at a higher level of thinking	**Modifications for Assessments**		
	Extended time on classroom tests and quizzes.	Student may request to use a computer to complete assignments.	Establish expectations for correct spelling on assignments.
	Student may take/complete tests in an alternate setting as needed.		
		Establish expectations for correct spelling on assignments.	Extra textbooks for home.
	Restate, reread, and clarify directions/questions		
		Extra textbooks for home.	
	Use dictionary or approved electronic device		Student may request books on tape / CD / digital media, as available and appropriate.
		Student may request books on tape / CD / digital media, as available and appropriate.	
			Assign a peer helper in the class setting
		Assign a peer helper in the class setting	
			Provide oral reminders and check student work during independent work time
		Provide oral reminders and check student work during independent work time	
			Assist student with long and short term planning of assignments
		Assist student with long and short term planning of assignments	
			Encourage student to proofread assignments and tests
		Encourage student to proofread assignments and tests	
			Provide regular parent/ school

			communication
		Provide regular parent/ school communication	Teachers will check/sign student agenda daily
		Teachers will check/sign student agenda daily	Student requires use of other assistive technology device
		Student requires use of other assistive technology device	
		Modifications for Homework and Assignments Extended time to complete assignments.	
		Student requires more complex assignments to be broken up and explained in smaller units, with work to be submitted in phases.	**Modifications for Homework and Assignments** Extended time to complete assignments.
			Student requires more complex assignments to be broken up and explained in smaller units, with work to be submitted in phases.
		Provide the student with clearly stated (written) expectations and grading criteria for assignments.	Provide the student with clearly stated (written) expectations and grading criteria for assignments.
			Implement RAFT activities as they

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		Modifications for Assessments	pertain to the types / modes of communication (role, audience, format, and topic).
		Extended time on classroom tests and quizzes.	**Modifications for Assessments** Extended time on classroom tests and quizzes.
		Student may take/complete tests in an alternate setting as needed.	Student may take/complete tests in an alternate setting as needed.
		Restate, reread, and clarify directions/questions	Restate, reread, and clarify directions/questions
		Distribute study guide for classroom tests.	Distribute study guide for classroom tests.
		Establish procedures for accommodations / modifications for assessments	Establish procedures for accommodations / modifications for assessments.