

PITTSGROVE TOWNSHIP SCHOOL DISTRICT



Course Name: Algebra II A/B	Grade Level(s): 10, 11, 12
Department: Math	Credits: 5
BOE Adoption Date: July 2013	Revision Date(s): August 2019

Course Description

This course provides continued work with variables and polynomials, solving exponential, quadratic and rational equations and inequalities, graphing, and introduces the student to radicals, complex numbers, and logarithms. This is a full year, two-part course. The second part of the course students are introduced to basic probability and statistics, as well as, sequences and series and trigonometry. Emphasis is on problem-solving. Class work will include the presentation of course material by the instructor, accompanied by appropriate problem-solving assignments.

The following practices rest on important “processes and proficiencies” with longstanding importance in mathematics education.

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.

Mission Statement

The Pittsgrove Township School District believes in growing all learners to thrive. The district offers an intellectually rigorous, dynamic curriculum aligned to state and national standards coupled with research-based practices in classrooms. The Pittsgrove Township School District strives to highlight critical thinking, problem-solving, intercultural literacy, digital literacy, collaboration, innovation, and a growth mindset as part of the instructional core of learning. The district provides high quality resources to provide young people the knowledge they need to approach the future as leaders and learners.

Curriculum & Instruction Goals

1. To ensure students are college and career ready upon graduation
2. To vertically and horizontally align curriculum PreK-12 to ensure successful transition of students at each grade level
3. To identify individual student strengths and weaknesses utilizing various assessment measures (formative, summative, alternative, etc.) so as to differentiate instruction while meeting the rigor of the applicable content standards
4. To improve student achievement as assessed through multiple measures including, but not limited to, state testing, local assessments, and ongoing progress monitoring

How to Read this Document

This curricular document contains both a *pacing guide* and *curriculum units* . The pacing guide serves to communicate an estimated timeframe as to *when* critical knowledge and skills will be taught throughout the year. The pacing, however, may differ slightly depending upon the unique needs of each learner. The *curriculum units* contain more detailed information as to the content, goals, objectives, instructional strategies, resources, and assessments.

NJ Administrative Code and Statutes Key
<p>^=Amistad Law</p> <p>O=Diversity & Inclusion Law</p> <p><>=Holocaust</p> <p>+=LGBT and Disabilities Law</p> <p>*=AAPI (Asian American and Pacific Islanders)</p> <p>\$=Financial Literacy</p> <p>Use this key to understand where the NJ mandates are being implemented in the K-12 curriculum units.</p>

Pacing Guide

Course Title: Algebra II A/B

Prerequisite(s): Algebra I

Unit Title	Duration/ Month(s)	Related Standards	Learning Goals	Critical Knowledge and Skills
Unit 1: Quadratic Functions & Factoring	September-October Length: 3-4 weeks	Subject Area: Mathematics NJSLS.F.IF.7A NJSLS.A.SSE.3A NJSLS.A.REI.4B NJSLS.N.CN.2 NJSLS.A.REI.4A Mathematical Practices: MP1 MP2 MP3 MP4 MP5 MP6 MP7 MP8	<p>The students will be able to graph quadratic functions written in standard form, vertex form, or intercept form.</p> <p>The students will be able to solve a quadratic equation using a variety of methods and will be able to recognize when the solutions are complex. (The methods include factoring, finding square roots, completing the square, and using the quadratic formula).</p> <p>The students will be able to perform arithmetic operations with complex numbers.</p>	Learning objectives for this Unit: <ul style="list-style-type: none"> ● To graph quadratic functions in standard form, vertex form, and intercept form ● To factor binomials and trinomials, including special quadratic expressions ● To solve quadratic equations by factoring and by finding square roots ● To add, subtract, and multiply complex numbers ● To solve equations and rewrite functions by completing the square ● To solve equations using the quadratic formula ● To determine the type of solutions by using the discriminant
Unit 2: Polynomial	October-	Subject Area:	The students will apply properties of	Learning objectives for this Unit:

<p>Functions</p>	<p>November</p> <p>Length: 3 weeks</p>	<p>Mathematics NJSLS.N.RN.1 NJSLS.F.IF.7C NJSLS.A.APR.1 NJSLS.A.SSE.2 NJSLS.A.APR.2 NJSLS.N.CN.9</p> <p>Mathematical Practices MP1 MP2 MP3 MP4 MP5 MP6 MP7 MP8</p>	<p>exponents as they simplify expressions involving powers.</p> <p>The students will perform arithmetic operations on polynomials and complex numbers.</p> <p>The students will understand the relationship between zeros and factors of polynomials by using the remainder theorem and the fundamental theorem of algebra.</p> <p>The students will be able to identify the zeros of polynomials and use the zeros to construct a rough graph of the function it represents.</p>	<ul style="list-style-type: none"> ● To use properties of exponents ● To classify polynomials ● To write a polynomial function from its zeros ● To divide polynomials using long and synthetic division ● To solve polynomial equations by graphing and factoring ● To solve polynomial equations using the Rational Root Theorem ● To use the Fundamental Theorem of Algebra to find all of the zeros of a polynomial function
<p>Unit 3: Rational Exponents & Radical Functions</p>	<p>November-December</p> <p>Length: 3 weeks</p>	<p>Subject Area: Mathematics NJSLS.N.RN.1 NJSLS.N.RN.2 NJSLS.F.BF.1 NJSLS.F.BF.4 NJSLS.F.IF.7B NJSLS.A.REI.2</p> <p>Mathematical Practices MP1 MP6 MP7</p>	<p>The students will be able to extend the properties of exponents to rational exponents.</p> <p>The students will be able to combine standard function types using arithmetic operations, including composition.</p> <p>The students will know how to determine whether a given function has an inverse that is also a function.</p>	<p>Learning objectives for this Unit:</p> <ul style="list-style-type: none"> ● To simplify and evaluate nth roots ● To apply properties of rational exponents ● To perform function operations and composition ● To determine if a function has an inverse function ● To graph square roots and cube roots ● To solve radical equations

			<p>The students will be able to graph square roots and cube root functions.</p> <p>The students will be able to solve radical and rational equations in one variable, and give examples showing how extraneous solutions may arise.</p>	
<p>Unit 4: Exponential & Logarithmic Functions</p>	<p>December-January</p> <p>Length: 2-3 weeks</p>	<p>Subject Area: Mathematics NJSLS.A.SSE.B.3 NJSLS.F.LE.A.4 NJSLS.F.IF.C.8 NJSLS.F.BF.B.4 NJSLS.F.BF.B.5 NJSLS.F.LE.B.5</p> <p>Mathematical Practices MP4 MP5 MP6 MP7</p>	<p>The students will be able to use the properties of exponents to transform expressions for exponential functions.</p> <p>The students will understand the inverse relationship between exponents and logarithms and use this relationship to solve problems.</p>	<p>Learning objectives for this Unit:</p> <ul style="list-style-type: none"> ● To graph exponential functions ● To solve exponential equations ● To evaluate logarithmic expressions ● To simplify and evaluate expressions using the properties of logarithms ● To solve logarithmic equations using the properties ● To solve exponential equations using common logarithms ● To evaluate logarithmic expressions using the change of base formula
<p>Unit 5: Rational Functions</p>	<p>January-February</p>	<p>Subject Area: Mathematics</p>	<p>The students will write and use models for inverse variation, direct</p>	<p>Learning objectives for this Unit:</p> <ul style="list-style-type: none"> ● Model inverse, direct, and

	Length: 2 weeks	<p>NJSLS.A.APR.D.7 NJSLS.F.IF.7D NJSLS.F.IF.9 NJSLS.A.REI.2</p> <p>Mathematical Practices: MP4 MP5 MP6 MP7</p>	<p>variation, and joint variation.</p> <p>The students will graph rational functions, multiply, divide, add, and subtract rational expressions, and simplify complex fractions.</p> <p>The students will solve rational expressions.</p>	<p>joint variation</p> <ul style="list-style-type: none"> ● Graph rational functions ● Multiply, Divide, Add, and Subtract rational expressions ● Solve rational equations
Unit 6: Data Analysis and Statistics	<p>February-March</p> <p>Length: 2 weeks</p>	<p>Subject Area: Mathematics NJSLS.A.APR.5 NJSLS.S.MD.3 NJSLS.S.ID.4 NJSLS.S.IC.1 NJSLS.S.IC.3</p> <p>Mathematical Practices MP1 MP4 MP5</p>	<p>The students will learn the formula for combinations. They will examine patterns found in Pascal’s triangle and apply these patterns to binomial expansions.</p> <p>The students will extend their understanding of probability distributions and measures of central tendency to the study of normal distributions.</p> <p>The students will study sampling methods for collecting data, how to identify biased samples, and how to calculate margin of error.</p> <p>The students will compare surveys, experiments, and observational studies.</p>	<p>Learning objectives for this Unit:</p> <ul style="list-style-type: none"> ● Find the probability and odds of events ● To find the probability of two independent events ● Find the probability of two dependent events ● Find the probability of mutually exclusive events ● Find the probability of inclusive events ● Use measures of central tendency to represent a set of data ● Find measures of variation for a set of data ● Determine whether a sample is unbiased ● Find margins of sampling error

<p>Unit 7: Sequences and Series</p>	<p>March-April</p> <p>Length: 2-3 weeks</p>	<p>Subject Area: Mathematics NJSLS.A.SSE.B.4 NJSLS.F.BF.A.1 NJSLS.F.BF.A.2</p> <p>Mathematical Practices MP1 MP2 MP8</p>	<p>The students will be able to derive the formula for the sum of a finite geometric series (when the common ratio is not one) and use the formula to solve problems.</p> <p>The students will be able to write arithmetic and geometric sequences both recursively and with and explicit formula, and use them to model situations, and translate between the two forms.</p>	<p>Learning objectives for this Unit:</p> <ul style="list-style-type: none"> ● To identify arithmetic sequences ● To find specified terms of arithmetic sequences ● Find sums of arithmetic series ● Use sigma notation ● To identify geometric sequences ● Find geometric means ● To find specified terms of geometric sequences ● Find sums of geometric series
<p>Unit 8: Trigonometry</p>	<p>April-June</p> <p>Length: 10-11 weeks</p>	<p>Subject Area: Mathematics NJSLS.G.SRT.6 NJSLS.F.TF.1 NJSLS.F.TF.2 NJSLS.F.TF.6 NJSLS.F.SRT.11 NJSLS.F.IF.7E NJSLS.F.TF.5</p> <p>Mathematical Practices MP1 MP2</p>	<p>The students will learn the right triangle definitions of the six trigonometric functions and how to use right triangle trigonometry.</p> <p>The students will use radian measure and evaluate trigonometric functions of any angle.</p> <p>The students will evaluate and use inverse trigonometric functions.</p> <p>The students will learn to apply the law of sines and the law of cosines to solve triangles and applied problems.</p>	<p>Learning objectives for this Unit:</p> <ul style="list-style-type: none"> ● Use trigonometry with right triangles ● Define general angles and use radian measure ● Evaluate trigonometric functions of any angle ● Evaluate inverse trigonometric functions ● Apply the Law of Sines and Law of Cosines ● Graph Sine, Cosine, and Tangent functions, as well as, translate and reflect trigonometric graphs

			The students will graph sine, cosine, and tangent functions, as well as, translations and reflections of the functions.	
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Instructional Unit Map				
Course Title: Algebra II A /B				
Unit Title	Quadratic Functions & Factoring		Start Date:	September-October
			Length of Unit:	3-4 weeks
Content Standards <i>What do we want them to know, understand, & do?</i>	NJSLS.F.IF.7A - Graph linear and quadratic functions and show intercepts, maxima, and minima. NJSLS.A.SSE.3A - Factor a quadratic expression to reveal the zeros of the function it defines. NJSLS.A.REI.4B - Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square,	Learning Goals	The students will be able to graph quadratic functions written in standard form, vertex form, or intercept form. The students will be able to solve a quadratic equation using a variety of methods and will be able to recognize when the solutions are complex. (The methods include factoring, finding square roots, completing the square, and using the quadratic formula). The students will be able to perform arithmetic operations with complex numbers.	

	<p>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.</p> <p>NJSLS.N.CN.2 - Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.</p> <p>NJSLS.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.</p>		
<p>Essential Questions</p>	<ul style="list-style-type: none"> ● <i>What are the different methods which can be used to solve a quadratic equation?</i> ● <i>How are quadratic functions used to model, analyze, and interpret mathematical relationships?</i> ● <i>How are quadratic equations and their graphs used in the real-world?</i> 		

Assessments <i>How will we know they have gained the knowledge & skills?</i>	Formative		Summative		Alternative	
	<ul style="list-style-type: none"> • Warm-ups/exit tickets • Graded homework and classwork assignments • Verbally check for understanding • Class Participation • Teacher observation 		<ul style="list-style-type: none"> • Quizzes • Chapter Test • Real-Life Applications 		<ul style="list-style-type: none"> • Chapter 1 Quadratic Functions Menu Project 	
Unit Pre-Assessment(s) <i>What do they already know?</i>	<ul style="list-style-type: none"> • Warm-Up Chapter 1 Pre-Assessment (Algebra II Textbook) • Teacher-generated warm-up questions 					
Instructional Strategies/Student Activities	<ul style="list-style-type: none"> • Direct Instruction • Note-taking sheet • Guided Practice • Cooperative Learning (group work) • Modeling • Learning Stations • Differential Learning Activities (Ex: Scavenger Hunts, Color-by-Numbers, Mazes, Etc.) 					
Instructional/Assessment Scaffolds <i>(Modifications /Accommodations) – planned for prior to instruction</i>	English Language Learners		Special Education Learners		Struggling Learners	
	<ul style="list-style-type: none"> • Oral Directions (repeat if necessary) • Strategies for Reading Mathematics 		<ul style="list-style-type: none"> • Oral Directions (repeat if necessary) • Preferred Seating 		<ul style="list-style-type: none"> • Manipulatives • Group work • Calculators • Provide examples • Guided practice worksheets with work 	
				Advanced Learners		<ul style="list-style-type: none"> • Tiered classwork assignments • Flexible grouping • Independent

	<ul style="list-style-type: none"> ● Highlight keywords in directions or word problems ● Preferred Seating ● Calculator ● Complete set of notes (if needed) ● Manipulatives ● Test retakes 	<ul style="list-style-type: none"> ● Calculator ● Complete set of notes (if needed) ● Key terms, formulas, equations highlighted ● Manipulatives ● Test retakes ● Extra time ● Modified testing (if needed) 	<p>shown</p> <ul style="list-style-type: none"> ● Test corrections (when needed) ● Small group work with the teacher ● Provide study guides 	<p>study (with teacher guidance when needed)</p>
Differentiated Instructional Methods: <i>(Multiple means for students to access content and multiple modes for student to express understanding)</i>	Access (Resources and/or Process)		Expression (Products and/or Performance)	
	<ul style="list-style-type: none"> ● Note-taking sheet ● Standard-aligned Learning Stations/Activities ● Targeted Lessons based on progress 		<ul style="list-style-type: none"> ● Challenge/application examples 	
Vocabulary <i>Highlight key vocabulary (both Tier II and Tier III words)</i>	<p>Tier II: graph, write, solve, operations, minimum, maximum</p> <p>Tier III: parabola, vertex form, intercept form, standard form of a quadratic function, quadratic equation, root of an equation, zero of a function, square root, complex number, imaginary number, completing the square, quadratic formula, discriminant</p>			

Integration of Technology SAMR	S: Google Classroom Assignments A and M: Desmos.com S, A, and M: Khan Academy S: Graphing Calculator					
Interdisciplinary Connections NJ Student Learning Standards	<p>Technology:</p> <ul style="list-style-type: none"> ● NJSLS.8.2.12.C.5 Create scaled engineering drawings of products both manually and digitally with materials and measurements labeled. <p>ELA:</p> <ul style="list-style-type: none"> ● NJSLS.RL.11-12.4 Determine the meaning of words and phrases as they are used in the text, including figurative and connotative meanings. ● NJSLSA.R1 Read closely to determine what the text says explicitly and to make logical inferences and relevant connections from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text. <p>Career Ready Practices:</p> <ul style="list-style-type: none"> ● CRP1 - Act as a responsible and contributing citizen and employee. ● CRP2 - Apply appropriate academic and technical skills. ● CRP6 - Demonstrate creativity and innovation. 					
21st Century Themes/Skills P21 Framework	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: black; color: white;"> <th style="text-align: center; padding: 5px;">Themes</th> <th style="text-align: center; padding: 5px;">Skills</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;"> <ul style="list-style-type: none"> ● Global Awareness </td> <td style="padding: 5px;"> <ul style="list-style-type: none"> ● Critical Thinking and Problem Solving ● Life and Career Skills </td> </tr> </tbody> </table>		Themes	Skills	<ul style="list-style-type: none"> ● Global Awareness 	<ul style="list-style-type: none"> ● Critical Thinking and Problem Solving ● Life and Career Skills
Themes	Skills					
<ul style="list-style-type: none"> ● Global Awareness 	<ul style="list-style-type: none"> ● Critical Thinking and Problem Solving ● Life and Career Skills 					
Resources/Materials	<p>Resources:</p> <ul style="list-style-type: none"> ● Larson Algebra 2 Textbook (Holt McDougal Common Core Edition) ● Google Classroom ● Teacher-generated worksheet (practice) 					

	<ul style="list-style-type: none"> • Teacher-generated notes • Teacherspayteachers.com (Scavenger Hunt, Maze, Matching Activity, Color-by-Number) • Khan Academy • Desmos.com <p>Materials:</p> <ul style="list-style-type: none"> • Chromebooks • Manipulatives
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Instructional Unit Map			
Course Title: Algebra II A /B			
Unit Title	Polynomial Functions		<p>Start Date: October-November</p> <p>Length of Unit: 3 weeks</p>
Content Standards <i>What do we want them to know, understand, & do?</i>	NJSLS.N.RN.1 - Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to	Learning Goals	<p>The students will apply properties of exponents as they simplify expressions involving powers.</p> <p>The students will perform arithmetic operations on polynomials and complex numbers.</p>

	<p>those values, allowing for a notation for radicals in terms of rational exponents. <i>For example, we define $5^{1/3}$ to be the cube root of 5 because we want $(5^{1/3})^3 = 5(1/3)^3$ to hold, so $(5^{1/3})^3$ must equal 5.</i></p> <p>NJSLS.F.IF.7C - Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.</p> <p>NJSLS.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.</p> <p>NJSLS.A.SSE.2 - Use the structure of an expression to identify ways to rewrite it. <i>For example, see $x^4 - y^4$</i></p>		<p>The students will understand the relationship between zeros and factors of polynomials by using the remainder theorem and the fundamental theorem of algebra.</p> <p>The students will be able to identify the zeros of polynomials and use the zeros to construct a rough graph of the function it represents</p>
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	<p>as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.</p> <p>NJSLS.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 $p(x)$.</p> <p>NJSLS.N.CN.9 - (+) Know the Fundamental Theorem of Algebra; show that it is true for quadratic polynomials.</p>					
Essential Questions	<ul style="list-style-type: none"> ● Explain how to factor a higher order polynomial. Are all polynomials factorable? ● What does the degree (and leading coefficient) of a polynomial tell you about its related polynomial function? ● For a polynomial function, how are factors, roots, and x-intercepts related? ● What are imaginary and complex numbers used for in real-world applications? 					
Assessments	<table border="0" style="width: 100%; text-align: center;"> <tr> <td style="width: 33%;">Formative</td> <td style="width: 33%;">Summative</td> <td style="width: 33%;">Alternative</td> </tr> </table>			Formative	Summative	Alternative
Formative	Summative	Alternative				

<p><i>How will we know they have gained the knowledge & skills?</i></p>	<ul style="list-style-type: none"> ● Warm-ups/exit tickets ● Graded homework and classwork assignments ● Verbally check for understanding ● Class Participation ● Teacher observation 	<ul style="list-style-type: none"> ● Quizzes ● Chapter Test 	<ul style="list-style-type: none"> ● Alternative Chapter 2 Math Journal 	
<p>Unit Pre-Assessment(s) <i>What do they already know?</i></p>	<ul style="list-style-type: none"> ● Warm-Up Chapter 2 Pre-Assessment (Algebra II Textbook) ● Teacher-generated warm-up questions 			
<p>Instructional Strategies/Student Activities</p>	<ul style="list-style-type: none"> ● Introduction to Graphing Polynomial Functions Activity ● Direct Instruction ● Note-taking sheet ● Guided Practice ● Modeling ● Cooperative Learning (group work) ● Differential Learning Activities (Ex: Scavenger Hunts, Stations, etc.) 			
<p>Instructional/Assessment Scaffolds (<i>Modifications /Accommodations</i>) – <i>planned for prior to instruction</i></p>	<p>English Language Learners Special Education Learners Struggling Learners Advanced Learners</p>			
	<ul style="list-style-type: none"> ● Oral Directions (repeat if necessary) ● Strategies for Reading Mathematics ● Graphic organizers for key objectives 	<ul style="list-style-type: none"> ● Oral Directions (repeat if necessary) ● Preferred Seating ● Calculator ● Complete 	<ul style="list-style-type: none"> ● Concrete examples and visuals of different types of graphs ● Group work ● Calculators ● Guided practice worksheets with work shown 	<ul style="list-style-type: none"> ● Flexible grouping ● Independent study to discover real-world examples (with teacher)

	<p>in this unit</p> <ul style="list-style-type: none"> ● One-on-one re-teaching (if needed) ● Calculator ● Complete set of notes (if needed) ● Test retakes 	<p>set of notes (if needed)</p> <ul style="list-style-type: none"> ● Concrete examples and visuals of different types of graphs ● Manipulatives ● Test retakes ● Extra time ● Modified testing (if needed) 	<ul style="list-style-type: none"> ● Test corrections (when needed) ● Small group work with the teacher ● Provide study guides 	<p>guidance when needed)</p>
<p>Differentiated Instructional Methods: <i>(Multiple means for students to access content and multiple modes for student to express understanding)</i></p>	<p>Access (Resources and/or Process)</p> <ul style="list-style-type: none"> ● Note-taking sheet ● Concrete examples of graphs ● Standard-aligned Learning Stations/Activities ● Targeted Lessons based on progress 		<p>Expression (Products and/or Performance)</p> <ul style="list-style-type: none"> ● Real-world applications 	
	<p>Vocabulary <i>Highlight key vocabulary (both Tier II and Tier III words)</i></p> <p>Tier II: graph, write, difference, sum, product, scientific notation, factoring, constant</p> <p>Tier III: polynomial, polynomial function, synthetic substitution, end behavior, like terms, factoring by grouping, quadratic form, polynomial long division, synthetic division, zero of a function, constant term, leading coefficient, irrational conjugates, complex conjugates</p>			

Integration of Technology SAMR	S: Google Classroom Assignments A and M: Desmos.com S, A, and M: Khan Academy	
Interdisciplinary Connections NJ Student Learning Standards	Career Ready Practices: <ul style="list-style-type: none"> ● CRP1 - Act as a responsible and contributing citizen and employee. ● CRP2 - Apply appropriate academic and technical skills. ● CRP11 - Use technology to enhance productivity. ELA: <ul style="list-style-type: none"> ● NJSLSA.R1 Read closely to determine what the text says explicitly and to make logical inferences and relevant connections from it. ● NJSLSA.R4 Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone. ● NJSLS.RL.11-12.4 Determine the meaning of words and phrases as they are used in the text, including figurative and connotative meanings. 	
21st Century Themes/Skills P21 Framework	Themes Skills	
	<ul style="list-style-type: none"> ● Civic Literacy (explore polynomial graphs and how they relate to rollercoaster designs) 	<ul style="list-style-type: none"> ● Critical Thinking and Problem Solving ● Life and Career Skills ● Communication & Collaboration
Resources/Materials	Resources: <ul style="list-style-type: none"> ● Larson Algebra 2 Textbook (Holt McDougal Common Core Edition) ● Google Classroom ● Teacher-generated worksheets and activities (practice, stations, etc.) ● Teacher-generated notes ● Teacherspayteachers.com (Scavenger Hunt) ● Khan Academy 	

	<ul style="list-style-type: none"> • Desmos.com <p>Materials:</p> <ul style="list-style-type: none"> • Chromebooks • Manipulatives • Graphing Calculators
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Instructional Unit Map			
Course Title: Algebra II A /B			
Unit Title	Rational Exponents and Radical Functions		Start Date:
			November-December
			Length of Unit:
			3-4 weeks
<p>Content Standards <i>What do we want them to know, understand, & do?</i></p>	<p>NJSLS.N.RN.1 - Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. <i>For example, we define $5^{1/3}$ to be the cube root of 5 because we want $(5^{1/3})^3 = 5(1/3)^3$ to hold, so $(5^{1/3})^3$ must equal 5.</i></p>	<p>Learning Goals</p>	<p>The students will be able to extend the properties of exponents to rational exponents.</p> <p>The students will be able to combine standard function types using arithmetic operations, including composition.</p> <p>The students will know how to determine whether a given function has an inverse that is also a function.</p> <p>The students will be able to graph square roots and cube root functions.</p> <p>The students will be able to solve radical and rational equations in one variable, and give examples showing how extraneous solutions may arise.</p>

	<p>NJSLS.N.RN.2 - Rewrite expressions involving radicals and rational exponents using the properties of exponents.</p> <p>NJSLS.F.BF.1 - . Write a function that describes a relationship between two quantities.*</p> <p>NJSLS.F.BF.4 - Find inverse functions.</p> <p>NJSLS.F.IF.7B - Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.</p> <p>NJSLS.A.REI.2 - Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.</p>		
<p>Essential Questions</p>	<ul style="list-style-type: none"> ● <i>What is the relationship between nth roots and rational exponents?</i> ● <i>How are the properties of rational exponents related to the properties of integer exponents?</i> ● <i>How are a function and its inverse function related? How can you tell if two functions are inverses of each other?</i> ● <i>How can knowing that the roots and exponents are inverses help in solving radical equations?</i> 		

Assessments <i>How will we know they have gained the knowledge & skills?</i>	Formative		Summative		Alternative			
	<ul style="list-style-type: none"> • Warm-ups/exit tickets • Graded homework and classwork assignments • Group work • Teacher observation 		<ul style="list-style-type: none"> • Quizzes • Chapter Test • Extended Response 		<ul style="list-style-type: none"> • Alternative Chapter 3 Journal 			
Unit Pre-Assessment(s) <i>What do they already know?</i>	<ul style="list-style-type: none"> • Warm-Up Chapter 3 Pre-Assessment (Algebra II Textbook) • Chapter 3 <i>Skills Readiness</i> practice • Key prerequisite vocabulary assessment 							
Instructional Strategies/Student Activities	<ul style="list-style-type: none"> • Direct Instruction • Note-taking sheet • Guided Practice • Cooperative Learning (group work) • Learning Stations • Differential Learning Activities (Ex: Walk-Arounds, Riddles, etc.) 							
Instructional/Assessment Scaffolds <i>(Modifications /Accommodations) – planned for prior to instruction</i>	English Language Learners		Special Education Learners		Struggling Learners		Advanced Learners	
	<ul style="list-style-type: none"> • Oral Directions (repeat if necessary) • Strategies for Reading Mathematics • Underline/highlight key vocabulary and instructions 		<ul style="list-style-type: none"> • Oral Directions (repeat if necessary) • Preferred Seating • Calculator • Complete set of notes 		<ul style="list-style-type: none"> • Group work • Calculators • Guided practice worksheets with work shown • Test corrections (when needed) • Small group work with the teacher 		<ul style="list-style-type: none"> • Flexible grouping to enhance learning • Solving multi-step problems • Tiered activities/assess 	

	<ul style="list-style-type: none"> • Calculator • Complete set of notes (if needed) • Test retakes 	<ul style="list-style-type: none"> • Manipulatives (if needed) • Learning Stations to differentiate between radical operations • Test retakes • Extra time • Modified testing (if needed) 	<ul style="list-style-type: none"> • Provide study guides • Additional time 	ment
Differentiated Instructional Methods: <i>(Multiple means for students to access content and multiple modes for student to express understanding)</i>	Access (Resources and/or Process)		Expression (Products and/or Performance)	
	<ul style="list-style-type: none"> • Guided notes • Provide list of perfect squares and cubes to aid students in simplifying radicals • Demonstrations for key concepts • Provide Khan Academy and other websites with additional examples 		<ul style="list-style-type: none"> • Real-world applications (Compositions of Functions) 	
Vocabulary <i>Highlight key vocabulary (both Tier II and Tier III words)</i>	Tier II: indicate, evaluate, simplify, write Tier III: nth root of a, index of a radical, radicals, power function, composition, inverse relation, inverse function, radical function, parent function, radical equation, extraneous solution			

Integration of Technology SAMR	S: Google Classroom Assignments S, A, and M: Khan Academy					
Interdisciplinary Connections NJ Student Learning Standards	Career Ready Practices: <ul style="list-style-type: none"> ● CRP2 - Apply appropriate academic and technical skills. ELA: <ul style="list-style-type: none"> ● NJSLSA.W4 Produce clear and coherent writing in which the development, organizer, and style are appropriate to task, purpose, and procedure. 					
21st Century Themes/Skills P21 Framework	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: black; color: white;"> <th style="width: 50%; text-align: center;">Themes</th> <th style="width: 50%; text-align: center;">Skills</th> </tr> </thead> <tbody> <tr> <td style="vertical-align: top;"> <ul style="list-style-type: none"> ● Financial Literacy (compositions of real-world applications) </td> <td style="vertical-align: top;"> <ul style="list-style-type: none"> ● Information & Communication Technologies Literacy ● Communication & Collaboration </td> </tr> </tbody> </table>		Themes	Skills	<ul style="list-style-type: none"> ● Financial Literacy (compositions of real-world applications) 	<ul style="list-style-type: none"> ● Information & Communication Technologies Literacy ● Communication & Collaboration
Themes	Skills					
<ul style="list-style-type: none"> ● Financial Literacy (compositions of real-world applications) 	<ul style="list-style-type: none"> ● Information & Communication Technologies Literacy ● Communication & Collaboration 					
Resources/Materials	Resources: <ul style="list-style-type: none"> ● Larson Algebra 2 Textbook (Holt McDougal Common Core Edition) ● Google Classroom ● Teacher-generated worksheets and activities (practice, stations, etc.) ● Teacher-generated notes ● Teacherspayteachers.com (Scavenger Hunt, riddle) ● Khan Academy Materials: <ul style="list-style-type: none"> ● Chromebooks 					

	<ul style="list-style-type: none"> • Manipulatives • Graphing Calculators
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Instructional Unit Map			
Course Title: Algebra II A /B			
Unit Title	Exponential and Logarithmic Functions		Start Date:
			December-January
			Length of Unit:
			3 weeks
Content Standards <i>What do we want them to know, understand, & do?</i>	<p>NJSLS.A.SSE.B.3 - Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.</p> <p>NJSLS.F.LE.A.4 - . Understand the inverse relationship between exponents and logarithms. For exponential models, express as a logarithm the solution to $ab^{ct} = d$ where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology.</p>	Learning Goals	<p>The students will be able to use the properties of exponents to transform expressions for exponential functions.</p> <p>The students will understand the inverse relationship between exponents and logarithms and use this relationship to solve problems.</p>

	<p>NJSLS.F.IF.C.8 - Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.</p> <p>NJSLS.F.BF.B.4 - Find inverse functions.</p> <p>NJSLS.F.BF.B.5 - Use the inverse relationship between exponents and logarithms to solve problems involving logarithms and exponents.</p> <p>NJSLS.F.LE.B.5 - Interpret the parameters in a linear or exponential function in terms of a context.</p>		
Essential Questions	<ul style="list-style-type: none"> • <i>What is the difference between exponential growth and decay?</i> • <i>How are logarithms and exponents related?</i> • <i>How can exponential growth and decay functions be used to model real-world applications?</i> 		
Assessments <i>How will we know they have gained the knowledge & skills?</i>	Formative	Summative	Alternative
	<ul style="list-style-type: none"> • Warm-ups/exit tickets • Graded homework and 	<ul style="list-style-type: none"> • Quizzes • Chapter Test 	<ul style="list-style-type: none"> • CSI: Algebra 2 Exponential & Log

	classwork assignments <ul style="list-style-type: none"> ● Group work ● Teacher observation ● Class participation 		Functions https://www.teacherspayteachers.com/Product/CSI-Algebra-2-Pre-Calc-Unit-6-Exponential-Log-Functions-757315	
Unit Pre-Assessment(s) <i>What do they already know?</i>	<ul style="list-style-type: none"> ● Warm-Up Chapter 4 Pre-Assessment (Algebra II Textbook) 			
Instructional Strategies/Student Activities	<ul style="list-style-type: none"> ● Direct Instruction ● Note-taking sheet ● Guided Practice ● Cooperative Learning (group work) ● Learning Stations ● Differential Learning Activities (Ex: Color-by-Number, Puzzles, CSI, Scavenger Hunt, etc.) 			
Instructional/Assessment Scaffolds (<i>Modifications /Accommodations</i>) – <i>planned for prior to instruction</i>	English Language Learners Special Education Learners Struggling Learners Advanced Learners			
	<ul style="list-style-type: none"> ● Oral Directions (repeat if necessary) ● ELL Lesson Notes ● Simplify language and present directions in bullet-point form ● Calculator ● Shorten 	<ul style="list-style-type: none"> ● Calculator ● Complete set of notes (if needed) ● Provide formula sheet to assist with switching between 	<ul style="list-style-type: none"> ● Group work ● Calculators ● Test corrections (when needed) ● Highlight key terms/phrases in directions ● Provide formula sheet to assist with switching between exponential 	<ul style="list-style-type: none"> ● Tiered activities and assessment

	assignments (if needed) <ul style="list-style-type: none"> • Test retakes 	exponential and logarithmic forms <ul style="list-style-type: none"> • Test retakes/corrections • Extra time • Modified testing (if needed) 	and logarithmic forms <ul style="list-style-type: none"> • Provide Khan Academy videos to use as extra practice 	
Differentiated Instructional Methods: <i>(Multiple means for students to access content and multiple modes for student to express understanding)</i>	Access (Resources and/or Process)		Expression (Products and/or Performance)	
	<ul style="list-style-type: none"> • Learning stations • Read word problems aloud to discuss key words and concepts • Highlight/underline key information in exponential growth/decay problems • Concrete examples • Graphic organizers for key objectives in this unit 		<ul style="list-style-type: none"> • Independent/extension studies on real-world applications of growth and decay • Create test questions and provide answers to be used on assessments 	
Vocabulary <i>Highlight key vocabulary (both Tier II and Tier III words)</i>	Tier II: growth, decay, function, compound interest, domain, range Tier III: exponential function, exponential growth function, exponential decay function, growth factor, decay factor, common logarithm, natural logarithm, asymptote, natural base e, exponential equation, logarithmic equation			

<p>Integration of Technology SAMR</p>	<p>S: Google Classroom Assignments S, A, and M: Khan Academy A and M: Desmos.com</p>
<p>Interdisciplinary Connections NJ Student Learning Standards</p>	<p>Technology:</p> <ul style="list-style-type: none"> ● NJSLS.2.12.B.2 Evaluate ethical considerations regarding the sustainability of environmental resources that are used for the design, creating and maintenance of a chosen product. <p>Career Ready Practices:</p> <ul style="list-style-type: none"> ● CRP1 - Act as a responsible and contributing citizen and employee. ● CRP2 - Apply appropriate academic and technical skills. ● CRP6 - Demonstrate creativity and innovation. ● CRP8 - Utilize critical thinking to make sense of problems and persevere in solving them. ● CRP11 - Use technology to enhance productivity. ● CRP12 - Work productively in teams while using cultural global competence. <p>Financial Literacy:</p> <ul style="list-style-type: none"> ● NJSLS.9.1.12.A.9 Analyze how personal and cultural values impact spending and other financial decisions. ● NJSLS.9.1.12.B.2 Identify age appropriate financial goals. ● NJSLS.9.1.12.B.8 Develop a system for keeping and using financial records. <p>ELA:</p> <ul style="list-style-type: none"> ● NJSLSA.R1 Read closely to determine what the text says explicitly and to make logical inferences and relevant connections from it. ● NJSLSA.R4 Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone. <p>Science:</p>

	<ul style="list-style-type: none"> ● NJSLS-S.HS-LS3-3 Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population. 	
21st Century Themes/Skills P21 Framework	Themes Skills	
	<ul style="list-style-type: none"> ● Financial Literacy ● Environmental Literacy 	<ul style="list-style-type: none"> ● Life and Career Skills ● Communication & Collaboration ● Information Literacy
Resources/Materials	<p>Resources:</p> <ul style="list-style-type: none"> ● Larson Algebra 2 Textbook (Holt McDougal Common Core Edition) ● Google Classroom ● Teacher-generated worksheets and activities (practice, stations, etc.) ● Teacher-generated notes and graphic organizer ● Teacherspayteachers.com (Scavenger Hunt, CSI, Color-by-Number) ● Algebra II Topics by Design ● Desmos.com ● Khan Academy <p>Materials:</p> <ul style="list-style-type: none"> ● Chromebooks ● Graphic organizer ● Graphing Calculators 	

Instructional Unit Map

Course Title: Algebra II A /B

Unit Title	Rational Functions		Start Date:	January-February
			Length of Unit:	2-3 weeks
Content Standards <i>What do we want them to know, understand, & do?</i>	<p>NJSLS.A.APR.D.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.</p> <p>NJSLS.F.IF.7D - Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.</p> <p>NJSLS.F.IF.9 - Compare properties of two functions each represented in a different way (algebraically,</p>	Learning Goals	<p>The students will write and use models for inverse variation, direct variation, and joint variation.</p> <p>The students will graph rational functions, multiply, divide, add, and subtract rational expressions, and simplify complex fractions.</p> <p>The students will solve rational expressions.</p>	

	<p>graphically, numerically in tables, or by verbal descriptions). <i>For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.</i></p> <p>NJSLS.A.REI.2 - Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.</p>						
<p>Essential Questions</p>	<ul style="list-style-type: none"> • <i>How is direct, inverse, and joint variation used in everyday life?</i> • <i>What are the steps in order to add, subtract, multiply, and divide rational expressions? Why do you need to know how to solve a rational equation?</i> 						
<p>Assessments <i>How will we know they have gained the knowledge & skills?</i></p>	<table border="1" style="width: 100%; text-align: center;"> <tr> <th>Formative</th> <th>Summative</th> <th>Alternative</th> </tr> </table>				Formative	Summative	Alternative
Formative	Summative	Alternative					
<ul style="list-style-type: none"> • Warm-ups/exit tickets • Graded homework and classwork assignments • Teacher observation • Class participation • Independent work on real-world variation problems 		<ul style="list-style-type: none"> • Quizzes • Chapter Test 		<ul style="list-style-type: none"> • Unit Menu Activity • Creating real-world variation problems and providing answers to own problem. Have peers answer problems. 			

Unit Pre-Assessment(s) <i>What do they already know?</i>	<ul style="list-style-type: none"> ● Warm-Up Chapter 5 Pre-Assessment (Algebra II Textbook) ● Chapter 5 <i>Skills Readiness</i> practice 			
Instructional Strategies/Student Activities	<ul style="list-style-type: none"> ● Direct Instruction ● Note-taking sheet ● Modeling (applications of variations) ● Guided Practice (applications of variations) ● Cooperative Learning (group work) ● Learning Stations to break down different variations and operations ● Menu Activity 			
Instructional/Assessment Scaffolds (<i>Modifications /Accommodations</i>) – <i>planned for prior to instruction</i>	English Language Learners Special Education Learners Struggling Learners Advanced Learners			
	<ul style="list-style-type: none"> ● Oral Directions (repeat if necessary) ● ELL Lesson Notes ● Calculator ● Test retakes ● Key words underlined to determine the correct operation to use/variation 	<ul style="list-style-type: none"> ● Calculator ● Complete set of notes (if needed) ● Key words underlined to determine the correct operation to use/variation ● Test retakes/corrections 	<ul style="list-style-type: none"> ● Group work ● Calculators ● Key words underlined to determine the correct operation to use/variation ● Test corrections (when needed) 	<ul style="list-style-type: none"> ● Creating real-world variation problems and providing answers to own problem. Have peers answer problems.

		<ul style="list-style-type: none"> • Extra time • Modified testing (if needed) 		
Differentiated Instructional Methods: <i>(Multiple means for students to access content and multiple modes for student to express understanding)</i>	Access (Resources and/or Process)		Expression (Products and/or Performance)	
	<ul style="list-style-type: none"> • Learning stations • Menu Activity • Group work 		<ul style="list-style-type: none"> • Creation of own application problems • Solving peer-created application problems 	
Vocabulary <i>Highlight key vocabulary (both Tier II and Tier III words)</i>	Tier II: decreasing, increasing, variation Tier III: constant of variation, complex fraction, cross multiplying, even function, odd function, inverse variation, joint variation, direct variation, rational function			
Integration of Technology SAMR	S: Google Classroom Assignments S, A, and M: Khan Academy			
Interdisciplinary Connections NJ Student Learning Standards	Career Ready Practices: <ul style="list-style-type: none"> • CRP2 - Apply appropriate academic and technical skills. • CRP6 - Demonstrate creativity and innovation. • CRP8 - Utilize critical thinking to make sense of problems and persevere in solving them. • CRP12 - Work productively in teams while using cultural global competence. 			
21st Century Themes/Skills P21 Framework	Themes		Skills	

	<ul style="list-style-type: none"> ● Environmental Literacy 	<ul style="list-style-type: none"> ● Life and Career Skills ● Communication & Collaboration
Resources/Materials	<p>Resources:</p> <ul style="list-style-type: none"> ● Larson Algebra 2 Textbook (Holt McDougal Common Core Edition) ● Google Classroom ● Teacher-generated worksheets and activities (practice, stations, etc.) ● Teacher-generated notes ● Teacherspayteachers.com (Applications, Gone Fishing (operations), etc.) ● Khan Academy <p>Materials:</p> <ul style="list-style-type: none"> ● Chromebooks ● Smartboard (Gone Fishing) ● Graphing Calculators 	

Instructional Unit Map

Course Title: Algebra II A /B

Unit Title	Data Analysis and Statistics		Start Date:	February-March
			Length of Unit:	2 weeks
Content Standards <i>What do we want them to know, understand, & do?</i>	<p>NJSLS.A.APR.5 - Know and apply the Binomial Theorem for the expansion of $(x + y)^n$ in powers of x and y for a positive integer n, where x and y are any numbers, with coefficients determined for example by Pascal's Triangle.¹</p> <p>NJSLS.S.MD.3 - Develop a probability distribution for a random variable defined for a sample space in which theoretical probabilities can be calculated; find the expected value. <i>For example, find the theoretical probability distribution for the number of correct answers obtained by guessing on all five questions of a multiple-choice test where</i></p>	Learning Goals	<p>The students will learn the formula for combinations. They will examine patterns found in Pascal's triangle and apply these patterns to binomial expansions.</p> <p>The students will extend their understanding of probability distributions and measures of central tendency to the study of normal distributions.</p> <p>The students will study sampling methods for collecting data, how to identify biased samples, and how to calculate margin of error.</p> <p>The students will compare surveys, experiments, and observational studies.</p>	

	<p><i>each question has four choices, and find the expected grade under various grading schemes.</i></p> <p>NJSLS.S.ID.4 - Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.</p> <p>NJSLS.S.IC.1 - Understand statistics as a process for making inferences about population parameters based on a random sample from that population.</p> <p>NJSLS.S.IC.3 - Recognize the purposes of and differences among sample surveys, experiments, and observational studies;</p>		
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	explain how randomization relates to each.		
Essential Questions	<ul style="list-style-type: none"> • <i>How are combinations and the Binomial Theorem used in real-world problems?</i> • <i>How do you construct a binomial distribution? How is a binomial distribution analyzed?</i> • <i>Where are the values in a normal distribution that rarely occur displayed on a normal curve?</i> • <i>How does technology influence and enhance experimental studies?</i> • <i>How does analysis of data inform and influence decisions?</i> 		
Assessments <i>How will we know they have gained the knowledge & skills?</i>	Formative Summative Alternative		
	<ul style="list-style-type: none"> • Warm-ups/exit tickets • Graded homework and classwork assignments • Teacher observation • Class participation 	<ul style="list-style-type: none"> • Quizzes • Chapter Test 	<ul style="list-style-type: none"> • Chapter 6 Alternative Math Journal
Unit Pre-Assessment(s) <i>What do they already know?</i>	<ul style="list-style-type: none"> • Warm-Up Chapter 6 Pre-Assessment (Algebra II Textbook) • Chapter 6 <i>Skills Readiness</i> practice 		
Instructional Strategies/Student Activities	<ul style="list-style-type: none"> • Direct Instruction • Note-taking sheet • Guided Practice (applications) • Cooperative Learning (group work) • Learning Station Review for each section (scavenger hunt, stations) 		
Instructional/Assessment Scaffolds <i>(Modifications /Accommodations) – planned for prior to instruction</i>	English Language Learners	Special Education Learners	Struggling Learners Advanced Learners

	<ul style="list-style-type: none"> • Oral Directions (repeat if necessary) • Pre-teach vocabulary • ELL Lesson Notes • Graphic organizers for key objectives in this unit • Calculator • Test retakes 	<ul style="list-style-type: none"> • Calculator • Complete set of notes (if needed) • Graphic organizers for key objectives in this unit • Highlight key words in application problems • Test retakes/corrections • Extra time • Modified testing (if needed) 	<ul style="list-style-type: none"> • Group work • Graphic organizers for key objectives in this unit • Calculators • Test corrections (when needed) • Highlight key words in application problems 	<ul style="list-style-type: none"> • Creating real-world sample applications and providing answers to own problem. Have peers answer problems. • Chapter 6 Alternative Assessment Multi-Step Problem
Differentiated Instructional Methods: <i>(Multiple means for students to access content and multiple modes for student to express understanding)</i>	Access (Resources and/or Process)		Expression (Products and/or Performance)	
	<ul style="list-style-type: none"> • Learning stations • Highlight key words in directions/application problems • Provide key definitions for each section 	<ul style="list-style-type: none"> • Tiered assessment • Alternative test options 		

	<ul style="list-style-type: none"> ● Provide graphic organizers 	
Vocabulary <i>Highlight key vocabulary (both Tier II and Tier III words)</i>	Tier II: sample, experiment, variable, study Tier III: combination, Pascal’s triangle, binomial theorem, random variable, probability distribution, binomial distribution, symmetric, skewed, normal distribution, normal curve, standard normal distribution, z-score, unbiased sample, biased sample, margin of error, biased questions, observation study, controlled experiment, control group, treatment group, randomized comparative experiment	
Integration of Technology SAMR	S: Google Classroom Assignments S, A, and M: Khan Academy S: Graphing calculator	
Interdisciplinary Connections NJ Student Learning Standards	Career Ready Practices: <ul style="list-style-type: none"> ● CRP2 - Apply appropriate academic and technical skills. ● CRP8 - Utilize critical thinking to make sense of problems and persevere in solving them. ● CRP11 - Use technology to enhance productivity. Career Exploration: <ul style="list-style-type: none"> ● NJSLS.9.3.ST.2 Use technology to acquire, manipulate, analyze and report data. ● NJSLS.9.3.ST-SM.4 Apply critical thinking skills to review information, explain statistical analysis, and to translate, interpret and summarize research and statistical data. 	
21st Century Themes/Skills P21 Framework	Themes Skills	
	<ul style="list-style-type: none"> ● Global Awareness (investigate margins of error for populations of people) 	<ul style="list-style-type: none"> ● Critical Thinking and Problem Solving ● Communication & Collaboration ● Information Literacy

Resources/Materials	<p>Resources:</p> <ul style="list-style-type: none"> ● Larson Algebra 2 Textbook (Holt McDougal Common Core Edition) ● Google Classroom ● Teacher-generated worksheets and activities (practice, stations, scavenger hunt, etc.) ● Teacher-generated notes ● Khan Academy <p>Materials:</p> <ul style="list-style-type: none"> ● Chromebooks ● Graphic organizer ● Graphing Calculators
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Instructional Unit Map			
Course Title: Algebra II A /B			
Unit Title	Sequences and Series		<p>Start Date: March-April</p> <p>Length of Unit: 2-3 weeks</p>
Content Standards <i>What do we want them to know, understand, & do?</i>	NJSLS.A.SSE.B.4 - Derive and/or explain the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems. <i>For example, calculate mortgage payments.</i>	Learning Goals	<p>The students will be able to derive the formula for the sum of a finite geometric series (when the common ratio is not one) and use the formula to solve problems.</p> <p>The students will be able to write arithmetic and geometric sequences both recursively and with and explicit formula, and use them to model situations, and translate between the two forms.</p>

	<ul style="list-style-type: none"> ● Guided Practice ● Cooperative Learning (group work) ● Learning Station Review for each section (scavenger hunt, stations) 			
Instructional/Assessment Scaffolds (<i>Modifications /Accommodations</i>) – planned for prior to instruction	English Language Learners Special Education Learners Struggling Learners Advanced Learners			
	<ul style="list-style-type: none"> ● Oral Directions (repeat if necessary) ● ELL Lesson Notes ● Provide formula sheet ● Highlight key terms in directions ● Calculator ● Test retakes 	<ul style="list-style-type: none"> ● Calculator ● Complete set of notes (if needed) ● Provide formula sheet ● Test retakes/corrections ● Extra time ● Modified testing (if needed) 	<ul style="list-style-type: none"> ● Group work ● Provide formula sheet ● Calculators ● Test corrections (when needed) 	<ul style="list-style-type: none"> ● Chapter 7 Alternative Assessment Multi-Step Problem
Differentiated Instructional Methods: <i>(Multiple means for students to access content and multiple modes for student to express understanding)</i>	Access (Resources and/or Process)		Expression (Products and/or Performance)	
	<ul style="list-style-type: none"> ● Learning stations to differentiate between arithmetic/geometric ● Highlight key words in directions ● Formula sheet 		<ul style="list-style-type: none"> ● Compare and contrast geometric and arithmetic sequences and series 	

Vocabulary <i>Highlight key vocabulary (both Tier II and Tier III words)</i>	Tier II: compare, contrast, sum, difference, ratio Tier III: sequence, series, summation notation, sigma notation, arithmetic sequence, arithmetic series, geometric sequence, geometric series	
Integration of Technology SAMR	S: Google Classroom Assignments S, A, and M: Khan Academy S: Graphing calculator	
Interdisciplinary Connections NJ Student Learning Standards	Technology: <ul style="list-style-type: none"> ● NJSLS.8.1.12.C.1 Develop and innovative solution to a real world problem or issue in collaboration with peers and experts, and present ideas for feedback through social media or in an online community. Career Ready Practices: <ul style="list-style-type: none"> ● CRP2 Apply appropriate academic and technical skills. ● CRP6 Demonstrate creativity and innovation. ● CRP8 Utilize critical thinking to make sense of problems and persevere in solving them. ELA: <ul style="list-style-type: none"> ● NJSLSA.R4 Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone. Career Exploration: <ul style="list-style-type: none"> ● NJSLS.9.3.ST-SM.3 Analyze the impact that science and mathematics has on society. 	
21st Century Themes/Skills P21 Framework	Themes	Skills

	<ul style="list-style-type: none"> Financial, Economic, Business, & Entrepreneurial Literacy 	<ul style="list-style-type: none"> Critical Thinking and Problem Solving Creativity & Innovation
Resources/Materials	<p>Resources:</p> <ul style="list-style-type: none"> Larson Algebra 2 Textbook (Holt McDougal Common Core Edition) Google Classroom Teacher-generated worksheets and activities (practice, stations, etc.) Teacher-generated notes Khan Academy <p>Materials:</p> <ul style="list-style-type: none"> Chromebooks Formula Sheet Graphing Calculators 	

Instructional Unit Map			
Course Title: Algebra II A /B			
	Trigonometric Ratios, Functions, and Graphs	Start Date:	April-June

Unit Title			Length of Unit:
<p>Content Standards <i>What do we want them to know, understand, & do?</i></p>	<p>NJSLS.G.SRT.6 - Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.</p> <p>NJSLS.F.TF.1 - Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.</p> <p>NJSLS.F.TF.2 - Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.</p> <p>NJSLS.F.TF.6 - (+) Understand that restricting a trigonometric function to a domain on</p>	<p>Learning Goals</p>	<p>The students will learn the right triangle definitions of the six trigonometric functions and how to use right triangle trigonometry.</p> <p>The students will use radian measure and evaluate trigonometric functions of any angle.</p> <p>The students will evaluate and use inverse trigonometric functions.</p> <p>The students will learn to apply the law of sines and the law of cosines to solve triangles and applied problems.</p> <p>The students will graph sine, cosine, and tangent functions, as well as, translations and reflections of the functions.</p>

	<p>which it is always increasing or always decreasing allows its inverse to be constructed.</p> <p>NJSLS.F.SRT.11 - (+) Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles (e.g., surveying problems, resultant forces).</p> <p>NJSLS.F.IF.7E - Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.</p> <p>NJSLS.F.TF.5 - . Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.</p>		
Essential Questions	<ul style="list-style-type: none"> • <i>How can I make connections to angles to determine basic trigonometric values?</i> 		

	<ul style="list-style-type: none"> • <i>How can I select and apply trigonometric functions to solve problems in contexts that are related to real-world applications?</i> • <i>What is radian measure and how does it relate to degree measure?</i> • <i>How is graphing trigonometric functions used in the real-world? Why is it important to graph trigonometric functions?</i> 			
Assessments <i>How will we know they have gained the knowledge & skills?</i>	Formative		Summative	Alternative
	<ul style="list-style-type: none"> • Warm-ups/exit tickets • Graded homework and classwork assignments • Teacher observation • Class participation 	<ul style="list-style-type: none"> • Quizzes • Project (test grade) 		<ul style="list-style-type: none"> • Graphing Trigonometric Functions Project
Unit Pre-Assessment(s) <i>What do they already know?</i>	<ul style="list-style-type: none"> • Warm-Up Chapter 9 Pre-Assessment (Algebra II Textbook) • Chapter 9 <i>Skills Readiness</i> practice 			
Instructional Strategies/Student Activities	<ul style="list-style-type: none"> • Direct Instruction • Note-taking sheet • Guided Practice • Cooperative Learning (group work) • Learning Station Review for each section (scavenger hunt, stations) 			
Instructional/Assessment Scaffolds (<i>Modifications /Accommodations</i>) – <i>planned for prior to instruction</i>	English Language Learners	Special Education Learners	Struggling Learners	Advanced Learners
	<ul style="list-style-type: none"> • Oral Directions (repeat if necessary) • ELL Lesson Notes • Provide reference 	<ul style="list-style-type: none"> • Calculator on all assignments • Complete set of notes 	<ul style="list-style-type: none"> • Group work • Provide reference sheets (unit circle, trigonometric definitions, etc.) 	<ul style="list-style-type: none"> • Independent study • Describe/create real-world examples of

	<p>sheets (unit circle, trigonometric definitions, etc.)</p> <ul style="list-style-type: none"> ● Highlight key terms in directions and application problems ● Calculator use on all assignments ● Test retakes 	<p>(if needed)</p> <ul style="list-style-type: none"> ● Provide reference sheets (unit circle, trigonometric definitions, etc.) ● Test retakes/corrections ● Extra time ● Modified testing (if needed) 	<ul style="list-style-type: none"> ● Calculators ● Test corrections (when needed) 	<p>trigonometric functions</p>
<p>Differentiated Instructional Methods: <i>(Multiple means for students to access content and multiple modes for student to express understanding)</i></p>	<p>Access (Resources and/or Process)</p> <ul style="list-style-type: none"> ● Learning stations for each section and chunk information ● Highlight key words in directions ● Provide reference sheets (unit circle, trigonometric definitions, etc.) ● Concrete examples with vocabulary terms highlighted and identified 		<p>Expression (Products and/or Performance)</p> <ul style="list-style-type: none"> ● Compare and contrast trigonometric functions ● Graphing trigonometric project 	
	<p>Vocabulary <i>Highlight key vocabulary (both Tier II and Tier III words)</i></p> <p>Tier II: angle, degree, graph, intercepts, maximum, minimum</p> <p>Tier III: sine, cosine, tangent, cosecant, secant, cotangent, initial side, terminal side, standard position of an angle, coterminal angle, radian, sector, unit circle, reference angle, inverse sine, inverse cosine, inverse tangent,</p>			

	law of sines, law of cosines, amplitude, period
Integration of Technology SAMR	S: Google Classroom Assignments S, A, and M: Khan Academy S: Graphing calculator A and R: Desmos (Students will use desmos graph trigonometric functions. They will have to understand how to translate, reflect, etc. the graphs in order to create a picture of their choosing.)
Interdisciplinary Connections NJ Student Learning Standards	<p>Technology:</p> <ul style="list-style-type: none"> ● NJSLS.8.1.5.A.1 Select and use appropriate digital tools and resources to accomplish a variety of tasks including solving problems. <p>Career Ready Practices:</p> <ul style="list-style-type: none"> ● CRP2 Apply appropriate academic and technical skills. ● CRP11 Use technology to enhance productivity. <p>ELA:</p> <ul style="list-style-type: none"> ● NJSLSA.R4 Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone. <p>Career Exploration:</p> <ul style="list-style-type: none"> ● NJSLS.9.3.ST-SM.1 Apply science and mathematics to provide results, answers and algorithms for engineering and technological activities.
21st Century Themes/Skills P21 Framework	<div style="display: flex; justify-content: space-between;"> Themes Skills </div>

	<ul style="list-style-type: none"> ● Global Awareness 	<ul style="list-style-type: none"> ● Information & Communication Technologies Literacy
Resources/Materials	<p>Resources:</p> <ul style="list-style-type: none"> ● Larson Algebra 2 Textbook (Holt McDougal Common Core Edition) ● Google Classroom ● Teacher-generated worksheets and activities (practice, stations, etc.) ● Teacher-generated notes ● Desmos ● Graphing Trigonometric Functions Project (including rubric) <p>Materials:</p> <ul style="list-style-type: none"> ● Chromebooks ● Formula Sheets ● Graphing Calculators 	