Secaucus Board of Education
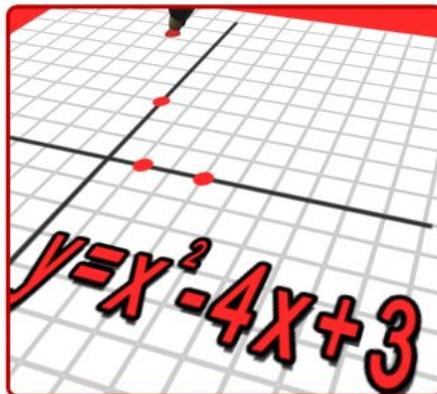
Algebra II Trigonometry

Course Codes: 3101, 3310, 3320, 3330 & 6343

Mathematics Department

District Equity Statement

   The Board of Education directs that all students enrolled in the schools of this district shall be afforded equal educational opportunities in strict accordance with the law. No students shall be denied access to or benefit from any educational program or activity or from a co-curricular or athletic activity on the basis of the student's race, color, creed, religion, national origin, ancestry, age, marital status, affectional or sexual orientation, gender, gender identity or expression, socioeconomic status, or disability. The Board directs the Superintendent to allocate faculty, administrators, support staff members, curriculum materials, and instructional equipment supplies among and between the schools and classes of this district in a manner that ensures equivalency of educational opportunity throughout this district. The school district's curricula in the following areas will eliminate discrimination, promote mutual acceptance and respect among students, and enable students to interact effectively with others, regardless of race, color, creed, religion, national origin, ancestry, age, marital status, affectional or sexual orientation, gender, gender identity or expression, socioeconomic status, or disability:

1.   School climate/learning environment

2.   Courses of study, including Physical Education

3.   Instructional materials and strategies

4.   Library materials

5.   Software and audio-visual materials

6.   Guidance and counseling

7.   Extra-curricular programs and activities

8.   Testing and other assessments.

Excerpt from Secaucus Board of Education, Policy 5750, Edited September 2016.

Course Description

This course introduces students to key concepts and theories that provide a foundation for further study in mathematics (College Algebra, Pre-Calculus, Calculus, and beyond) and increases students' mathematics literacy, problem solving, and critical thinking skills. The problem solving and critical thinking skills that students learn in Algebra II are valuable tools that can be taken to and applied in other disciplines. This course builds on algebraic and geometric concepts. It develops advanced algebra skills such as functions, advanced polynomials, imaginary and complex numbers, quadratics, exponential functions and includes the study of trigonometric functions. It also introduces matrices and their properties. The content of this course is also important for students' success on both the SATS, ACTs and college mathematics entrance exams.

Primary Interdisciplinary Connections

Science

Finance

Economics

Business

Entrepreneurial Literacy

Potential Course Modifications (ELLs, Special Education, Gifted and Talented)

The teacher will determine, with the assistance of guidance counselors, teacher assistant/aides, educational specialists and/or special education teachers, what modifications will be made for his/her students. Such examples of modifications can include, but not be limited to:

- Extended time as needed
- Modification of tests and quizzes
- Preferential seating
- Alternative/Formative assessment (projects)
- Effective teacher questioning (ranging from simple recall to higher order critical thinking questions)
- Supplemental materials
- Cooperative learning
- Teacher tutoring
- Peer tutoring
- Differentiated Instruction

Unit 1: Overview of Functions	The unit covers properties and operations of functions. The unit starts out by reviewing function basics including relations, functions, function notation, domain, range, and continuity. It then has students performing operations with functions, constructing and simplifying composite functions, and being introduced to inverse functions. The unit compares features of multiple parent functions as well.
Timing:	3 Weeks
Standards:	*NJSLS for Mathematics:* F.IF.1, F.IF.2, F.IF.4, F.IF.5, F.BF.1, F.BF.4, Standards for MP 1-8 *NJSLS for Technology:* 8.1.12.A.3, 8.1.12.A.4, 8.1.12.C.1 *NJSLS 21st Century Life and Careers:* CRP1, CRP2, CRP4, CRP8, CRP11, CRP12

Essential Questions:	Objectives:	Activities, Investigation, and Student Experiences:

● How can knowing and being able to interpret the properties of functions help us predict and interpret data?
● What are some different kinds of functions and what sorts of real world situations can they model?
● Why is the idea of "inverse" so important in mathematics?
	● Students will be able to identify the properties of functions such as domain, range, and continuity.
	● Students will be able to evaluate functions using function notation.
	● Students will be able to perform operations with functions.
		● Interactive Whiteboard Presentations
		  ○ Visual Representations of Concepts
		  ○ Modeling of Examples
		● Cooperative Group Investigations and Hands-on Activities
		● Graphing Calculator Demonstrations and Using the Graphing Calculator to Solve Problems

• Students will be able to combine functions and create composite functions. • Students will be able to find and identify inverse functions. • Students will be able to identify the x- and y-intercepts, maxima, minima, and end behavior of different functions. • Students will be able to differentiate between odd and even functions. • Student will be able to identify different lines of symmetry for functions.	• Partner collaboration or individual work (depending on the topic and assignment.) • Solving Real World Problems -- • Domain and Range Matching Activity

Assessments:	Materials:	Resources:
• Do Nows • Student Participation • Oral Questioning • Exit Cards • ActivExpression Device Results • Homework Assignments • Classwork • Projects • Unit Quizzes • Unit Test	• Interactive Whiteboard • Document Camera • ActivExpression Devices • Whiteboards • Dry Erase Markers • Erasers • Colored Pencils • Activity Sheets • Graph Paper • TI-84+ Graphing Calculator • TI-84 Smartview Software	• NJCTL Presentations / Teacher Created Interactive Whiteboard Presentations • Texas Instruments Activity Central Website • Illuminations Website • Mathematics Assessment Project Website • IXL Algebra II Practice Website • Department Created Assessments

Unit 2: Linear and Absolute Value Functions	This unit covers the properties and solutions of linear and absolute value functions. Part 1 of the unit focuses on linear equations and inequalities. It reviews rate of change and further develops solving and graphing the equations and inequalities that can be applied to real-world problems. It then expands to solving and interpreting systems of linear equations and inequalities. Part 2 then moves on to absolute value functions and their different key aspects such as domain, range, intercepts, end behavior, etc. The unit also compares functions using different transformations
Timing:	4 Weeks
Standards:	*NJSLS for Mathematics:* A.CED.A.1, A.CED.A.2, A.CED.A.3, A.REI.C.6, A.REI.D.10, A.REI.D.11, A.REI.D.12, F.IF.B.6, F.IF.B.7, F.IF.C.7, Standards for MP 1-8 *NJSLS for Technology:* 8.1.12.A.3, 8.1.12.A.4, 8.1.12.C.1 *NJSLS 21st Century Life and Careers:* CRP1, CRP2, CRP4, CRP8, CRP11, CRP12

Essential Questions:	Objectives:	Activities, Investigation, and Student Experiences:
- What is the general equation of a linear function? - How is solving an inequality similar to solving an equation? - How do you represent the solutions to an inequality	- Students will be able to understand how to calculate the rate at which things change. - Students will be able to write the equation of a line in its three different forms.	- Interactive Whiteboard Presentations - Visual Representations of Concepts - Modeling of Examples - Cooperative Group Investigations and Hands-on Activities - Graphing Calculator

in interval notation?
- Why is it possible to have no solution or infinitely many solutions to an equation or an inequality?
- How would you describe the solution of a system of linear equations and inequalities?
- How do you determine the best method to solve a system of linear equations?
- How can you use a system of linear equations or inequalities to model a real-world situation?
- Why is the shape of an absolute value function different from the shape of a linear function when graphed?
- How do you graph an absolute value function using transformations?

- Students will be able to solve real-world problems using linear functions.
- Students will be able to solve systems of linear equations.
- Students will be able to solve real-world problems by constructing and solving a system of linear equations.
- Students will be able to write and solve inequalities in one variable.
- Students will be able to write the solutions to inequalities using interval notation.
- Students will be able to graph linear inequalities in two variables.
- Students will be able to graph and solve systems of linear inequalities.
- Students will be able to solve and graph absolute value equations.
- Students will be able to evaluate absolute value expressions.
- Students will be able to solve real-world problems by writing & solving absolute value equations.
- Students will be able to solve and graph absolute value inequalities.
- Students will be able to solve real-world problems by writing & solving absolute value inequalities.
- Students will be able to identify key aspects of absolute value functions,

Demonstrations and Using the Graphing Calculator to Solve Problems
- Partner collaboration or individual work (depending on the topic and assignment.)
- Solving Real World Problems

- Roller Coaster Lab
- Investigations of Transformations with Absolute Value Functions Lab

	such as domain, range, intercepts, end behavior, etc. ● Students will be able to describe transformations of functions. ● Students will be able to graph functions using transformations.	
Assessments:	**Materials:**	**Resources:**
● Do Nows ● Student Participation ● Oral Questioning ● Exit Cards ● ActivExpression Device Results ● Homework Assignments ● Classwork ● Projects ● Unit Quizzes ● Unit Test	● Interactive Whiteboard ● Document Camera ● ActivExpression Devices ● Whiteboards ● Dry Erase Markers ● Erasers ● Colored Pencils ● Activity Sheets ● Graph Paper ● TI-84+ Graphing Calculator ● TI-84 Smartview Software	● NJCTL Presentations / Teacher Created Interactive Whiteboard Presentations ● Texas Instruments Activity Central Website ● Illuminations Website ● Mathematics Assessment Project Website ● IXL Algebra II Practice Website ● Department Created Assessments

Unit 3: Quadratics Equations and Complex Numbers	The unit covers quadratic equations. Students learn to solve quadratic equations through factoring, square roots, completing the square, and the quadratic formula. Students are introduced to imaginary and complex numbers. They learn to perform arithmetic operations, graph, and solve quadratic equations with imaginary and complex solutions.
Timing:	4 Weeks
Standards:	*NJSLS for Mathematics:* A.SSE.2, A.SSE.3, A.CED.1, A.REI.4, Standards for MP 1-8 *NJSLS for Technology:* 8.1.12.A.3, 8.1.12.A.4, 8.1.12.C.1 *NJSLS 21st Century Life and Careers:* CRP1, CRP2, CRP4, CRP8, CRP11, CRP12

Essential Questions:	Objectives:	Activities, Investigation, and Student Experiences:
- What are the advantages of a quadratic function in vertex form? In standard form? - How do you analyze and graph quadratic functions in both standard and vertex forms? - How is any quadratic function related to the parent quadratic function? - How are the real solutions of a quadratic equation related to the graph of the related quadratic function?	- Students will be able to solve quadratic equations algebraically (factoring, square roots, completing the square, and using the quadratic formula). - Students will be able to state the number and nature of the roots of a quadratic using the discriminant. - Students will be able to apply the techniques for finding zeros of a quadratic to real-world problems. - Students will be able to simplify square roots that have imaginary	- Interactive Whiteboard Presentations - Visual Representations of Concepts - Modeling of Examples - Cooperative Group Investigations and Hands-on Activities - Graphing Calculator Demonstrations and Using the Graphing Calculator to Solve Problems - Partner collaboration or individual work (depending on the topic and

• How can we find the position of an object at a given time, including when it hits the ground? • How are quadratic functions used to model, analyze and interpret mathematical relationships? • How do you represent and operate using complex numbers? • How can we find the position of an object at a given time, including when it hits the ground?	solutions. Students will be able to perform operations with imaginary and complex numbers. • Students will be able to graph imaginary and complex numbers in a complex plane. • Students will be able to calculate the absolute value of complex numbers. • Students will be able to solve quadratic equations with complex solutions.	assignment.) • Solving Real World Problems -- • Polynomials Discovery Lab • Exploration of the Values of Terms in a Polynomial Lab • Quadratics Graphing Calculator Activities
Assessments:	**Materials:**	**Resources:**
• Do Nows • Student Participation • Oral Questioning • Exit Cards • ActivExpression Device Results • Homework Assignments • Classwork • Projects • Unit Quizzes • Unit Test	• Interactive Whiteboard • Document Camera • ActivExpression Devices • Whiteboards • Dry Erase Markers • Erasers • Colored Pencils • Activity Sheets • Graph Paper • TI-84+ Graphing Calculator • TI-84 Smartview Software • TI-84 Activity Files • Excel Software / Google Sheets • Laptops with Internet Connection	• NJCTL Presentations / Teacher Created Interactive Whiteboard Presentations • Texas Instruments Activity Central Website • Illuminations Website • Mathematics Assessment Project Website • IXL Algebra II Practice Website • Department Created Assessments

Unit 4: Polynomial Functions	The unit begins with reviewing rules of exponents, adding, subtracting, and multiplying polynomials. Dividing polynomials and the Remainder Theorem are emphasized. Students will be asked to analyze polynomial functions and find the zeros both algebraically, in tables, and graphically. Students will also be asked to write polynomial functions from the given zeros.
Timing:	3 Weeks
Standards:	*NJSLS for Mathematics:* N.CN.1, N.CN.8, A.APR.1-6, A.SSE.2, A.SSE.3, A.REI.11, F.IF.4, F.IF.7, Standards for MP 1-8 *NJSLS for Technology:* 8.1.12.A.3, 8.1.12.A.4, 8.1.12.C.1 *NJSLS 21st Century Life and Careers:* CRP1, CRP2, CRP4, CRP8, CRP11, CRP12

Essential Questions:	**Objectives:**	**Activities, Investigation, and Student Experiences:**
- How are polynomial functions used to understand/represent the Universe we live in? - How are all the different representations of a polynomial function related? - How are factors, zeros and x-intercepts related for a	- Students will be able to combine polynomial functions using operations of addition, subtraction, multiplication, and division and will be fluent in factoring all types of polynomials. - Students will know and be able to apply the Remainder Theorem.	- Interactive Whiteboard Presentations - Visual Representations of Concepts - Modeling of Examples - Cooperative Group Investigations and Hands-on Activities - Graphing Calculator Demonstrations and Using the

polynomial function? ● Does knowing the zeros of a function give you enough information to sketch it?	● Students will be to describe characteristics of polynomials given equations, tables, and graphs. ● Students will be able to find the zeros of a polynomial, both real and imaginary. Students will be able to write polynomials from its given zeros.	Graphing Calculator to Solve Problems ● Partner collaboration or individual work (depending on the topic and assignment.) ● Solving Real World Problems --- ● Polynomials Graphing Calculator Activities ● Polynomial Puzzler Activity ● Building Connections Activity
Assessments:	**Materials:**	**Resources:**
● Do Nows ● Student Participation ● Oral Questioning ● Exit Cards ● ActivExpression Device Results ● Homework Assignments ● Classwork ● Projects ● Unit Quizzes ● Unit Test	● Interactive Whiteboard ● Document Camera ● ActivExpression Devices ● Whiteboards ● Dry Erase Markers ● Erasers ● Colored Pencils ● Activity Sheets ● Graph Paper ● Rulers ● TI-84+ Graphing Calculator ● TI-84 Smartview Software	● NJCTL Presentations / Teacher Created Interactive Whiteboard Presentations ● Texas Instruments Activity Central Website ● Illuminations Website ● Mathematics Assessment Project Website ● IXL Algebra II Practice Website ● Department Created Assessments

Unit 5: Rational Expressions and Equations	The unit covers what a rational expression is and how to simplify it. The unit covers adding, subtracting, multiplying, and dividing rational equations. Solving rational equations, variation and graphing of rational equations will also be covered.
Timing:	2 Weeks
Standards:	*NJSLS for Mathematics:* A.APR.6, A.APR.7, A.REI.1, A.REI.1, F.IF.7, Standards for MP 1-8 *NJSLS for Technology:* 8.1.12.A.3, 8.1.12.A.4, 8.1.12.C.1 *NJSLS 21st Century Life and Careers:* CRP1, CRP2, CRP4, CRP8, CRP11, CRP12

Essential Questions:	Objectives:	Activities, Investigation, and Student Experiences:

● How are rational functions and their graphs similar to linear functions?
● How are they different?
	● Students will be able to simplify rational expressions.
	● Students will be able to add, subtract, multiply, and divide rational expressions
	● Students will be able to solve variation problems.
	● Students will be able to graph rational equations, identify asymptotes and removable discontinuities.
	● Students will be able to solve rational equations and identify solutions as feasible or extraneous.
		● Interactive Whiteboard Presentations
		  ○ Visual Representations of Concepts
		  ○ Modeling of Examples
		● Cooperative Group Investigations and Hands-on Activities
		● Graphing Calculator Demonstrations and Using the Graphing Calculator to Solve Problems
		● Partner collaboration or individual work (depending on the topic and assignment.)

		● Solving Real World Problems -- ● [Rational Expressions Graphing Calculator Activities](#)
Assessments:	**Materials:**	**Resources:**
● Do Nows ● Student Participation ● Oral Questioning ● Exit Cards ● ActivExpression Device Results ● Homework Assignments ● Classwork ● Projects ● Unit Quizzes ● Unit Test	● Interactive Whiteboard ● Document Camera ● ActivExpression Devices ● Whiteboards ● Dry Erase Markers ● Erasers ● Colored Pencils ● Activity Sheets ● Graph Paper ● TI-84+ Graphing Calculator ● TI-84 Smartview Software	● [NJCTL](#) Presentations / Teacher Created Interactive Whiteboard Presentations ● [Texas Instruments Activity Central](#) Website ● [Illuminations](#) Website ● [Mathematics Assessment Project](#) Website ● IXL [Algebra II Practice](#) Website ● Department Created Assessments

Unit 6: Radical Equations	The unit covers roots, radicals, complex numbers, notation, operations with, graphing and solving equations. Students learn to convert between rational exponents and radical form, write roots in simplest terms, and perform operations with roots. Students will be introduced to the imaginary number i and perform operations with it. The graphing of square roots will be done and students will graph more complicated radical functions	
Timing:	3 Weeks	
Standards:	*NJSLS for Mathematics:* N.RN.1, N.RN.2, N.CN.1, N.CN.2, A.REI.12, A.SSE.12,F.IF.7, F.BF.1, FB.F.3, Standards for MP 1-8 *NJSLS for Technology:* 8.1.12.A.3, 8.1.12.A.4, 8.1.12.C.1 *NJSLS 21st Century Life and Careers:* CRP1, CRP2, CRP4, CRP8, CRP11, CRP12	
Essential Questions:	**Objectives:**	**Activities, Investigation, and Student Experiences:**

• How can knowing that roots and exponents are inverses, help in solving radical equations?
• How are radical functions used to understand/represent the Universe we live in?
• How can something that "doesn't exist" affect our world?
• How can we make sense of
	• Students will be able to graph square roots and describe the transformation of the parent function.
	• Students will be able to simplify radicals and radical expressions.
	• Students will be able to simplify radicals with an index other than 2.
	• Students will be able to convert rational exponents to and from radical form.
		• Interactive Whiteboard Presentations
		  ○ Visual Representations of Concepts
		  ○ Modeling of Examples
		• Cooperative Group Investigations and Hands-on Activities
		• Graphing Calculator Demonstrations and Using the Graphing Calculator to Solve Problems

exponents that are not integers?	● Students will be able to solve radical equations and identify extraneous answers. ● Students will be able to simplify complex radical expressions using i.	● Partner collaboration or individual work (depending on the topic and assignment.) ● Solving Real World Problems --- ● Powers, Roots and Radical Functions Graphing Calculator Activities
Assessments:	**Materials:**	**Resources:**
● Do Nows ● Student Participation ● Oral Questioning ● Exit Cards ● ActivExpression Device Results ● Homework Assignments ● Classwork ● Projects ● Unit Quizzes ● Unit Test	● Interactive Whiteboard ● Document Camera ● ActivExpression Devices ● Whiteboards ● Dry Erase Markers ● Erasers ● Colored Pencils ● Activity Sheets ● Graph Paper ● TI-84+ Graphing Calculator ● TI-84 Smartview Software	● NJCTL Presentations / Teacher Created Interactive Whiteboard Presentations ● Texas Instruments Activity Central Website ● Illuminations Website ● Mathematics Assessment Project Website ● IXL Algebra II Practice Website ● Department Created Assessments

Unit 7: Linear, Exponential and Logarithmic Functions	The unit covers linear functions, exponential functions, logarithmic functions, properties of logs, solving logarithmic equations, the number e and the natural log, and growth and decay. Students will learn to write equations in slope-intercept, standard and point-slope forms to represent linear functions, and to convert from one form to another. They will learn to graph linear and exponential functions and to recognize characteristics of these graphs. They will be able to differentiate between linear and exponential relationships. Students will learn to convert between exponential and logarithmic equations, and use the relationship and properties of logarithms to evaluate and simplify expressions and to solve equations. Students will learn to convert logs to base 10 to solve and evaluate using a graphing calculator. They will learn about the number, e, and the natural log, ln, and how to use them to solve real-world exponential growth and decay problems.	
Timing:	3 Weeks	
Standards:	*NJSLS for Mathematics:* A.CED.A.1, A.CED.A.2, A.REI.D.10, F.IF.B.5, F.IF.B.6, F.IF.C.7.E, F.BF.1, F.BF.5, F.LE.A.1-5, Standards for MP 1-8 *NJSLS for Technology:* 8.1.12.A.3, 8.1.12.A.4, 8.1.12.C.1 *NJSLS 21st Century Life and Careers:* CRP1, CRP2, CRP4, CRP8, CRP11, CRP12	
Essential Questions:	**Objectives:**	**Activities, Investigation, and Student Experiences:**
● How can we characterize and compare the rates of change in linear function	● Students will be able to graph and identify characteristics of graphs of linear functions.	● Interactive Whiteboard Presentations ○ Visual Representations of

and exponential functions? ● Why does the graph of an exponential function have its shape? How is it possible to get closer and closer to something and never touch it? ● Why is the idea of "inverse" important in mathematics?	● Students will be able to write equations of linear functions in slope-intercept, standard, and point-slope forms. ● Students will be able to graph and identify characteristics of graphs of exponential functions. ● Students will be able to convert from exponential to logarithmic forms and use both forms to solve problems. ● Students will be able to use properties of logarithms to solve equations. Students will be able to solve real-world problems involving exponential growth and decay	Concepts ○ Modeling of Examples ● Cooperative Group Investigations and Hands-on Activities ● Graphing Calculator Demonstrations and Using the Graphing Calculator to Solve Problems ● Partner collaboration or individual work (depending on the topic and assignment.) ● Solving Real World Problems --- ● Logarithms and Exponentials Graphing Calculator Activities
Assessments:	**Materials:**	**Resources:**
● Do Nows ● Student Participation ● Oral Questioning ● Exit Cards ● ActivExpression Device Results ● Homework Assignments ● Classwork ● Projects ● Unit Quizzes ● Unit Test	● Interactive Whiteboard ● Document Camera ● ActivExpression Devices ● Whiteboards ● Dry Erase Markers ● Erasers ● Colored Pencils ● Activity Sheets ● Graph Paper ● TI-84+ Graphing Calculator ● TI-84 Smartview Software	● NJCTL Presentations / Teacher Created Interactive Whiteboard Presentations ● Texas Instruments Activity Central Website ● Illuminations Website ● Mathematics Assessment Project Website ● IXL Algebra II Practice Website ● Department Created Assessments

Unit 8: Sequences and Series	The unit examines arithmetic and geometric sequences and series. Formulas for these and the sum of an infinite series will be covered. Lear
Timing:	2 Weeks
Standards:	*NJSLS for Mathematics:* A.SSE.4, F.BF.2, Standards for MP 1-8 *NJSLS for Technology:* 8.1.12.A.3, 8.1.12.A.4, 8.1.12.C.1 *NJSLS 21st Century Life and Careers:* CRP1, CRP2, CRP4, CRP8, CRP11, CRP12

Essential Questions:	Objectives:	Activities, Investigation, and Student Experiences:
- What is the difference between geometric and arithmetic sequences? - What is the difference between a recursive and explicit formula?	- Students will be able to identify the common difference in an arithmetic sequence. - Students will be able to identify the common ratio in a geometric sequence. - Students will be able to find the value missing term(s) in arithmetic and geometric sequences.. - Students will be able to identify special sequences, including Fibonacci Sequences.	- Interactive Whiteboard Presentations - Visual Representations of Concepts - Modeling of Examples - Cooperative Group Investigations and Hands-on Activities - Graphing Calculator Demonstrations and Using the Graphing Calculator to Solve Problems - Partner collaboration or individual work (depending on the topic and assignment.)

			● Solving Real World Problems

			● [Fundamental Counting Principle](Lab) Lab
			● [Sampling and Experiments](Lab) Lab

Assessments:	Materials:	Resources:
- Do Nows - Student Participation - Oral Questioning - Exit Cards - ActivExpression Device Results - Homework Assignments - Classwork - Projects - Unit Quizzes - Unit Test	- Interactive Whiteboard - Document Camera - ActivExpression Devices - Whiteboards - Dry Erase Markers - Erasers - Colored Pencils - Activity Sheets - Graph Paper - TI-84+ Graphing Calculator - TI-84 Smartview Software	- NJCTL Presentations / Teacher Created Interactive Whiteboard Presentations - Texas Instruments Activity Central Website - Illuminations Website - Mathematics Assessment Project Website - IXL Algebra II Practice Website - Department Created Assessments

Unit 9: Trigonometry	The unit reviews the solving of triangles using trig ratios. Students learned about the unit circle and graphing trig functions. Trig identities are used to prove statements are true and to solve equations.
Timing:	3 Weeks
Standards:	*NJSLS for Mathematics:* G.SRT.C.6-8, G.SRT.D.10, G.SRT.D.11, F.TF.A.1-3, F.TF.B.5, F.TF.C.8, G.SRT.D.10, G.SRT.D.1, Standards for MP 1-8 *NJSLS for Technology:* 8.1.12.A.3, 8.1.12.A.4, 8.1.12.C.1 *NJSLS 21st Century Life and Careers:* CRP1, CRP2, CRP4, CRP8, CRP11, CRP12

Essential Questions:	Objectives:	Activities, Investigation, and Student Experiences:
- What is the relationship between the sides and angles of a triangle? - What special relationships exist in the sides and angles of equilateral and isosceles right triangles? - What does it mean to extend trigonometry of the right triangle to angles of any measure?	- Students will be able to solve right triangles using trig functions and inverse trig functions. - Students will be able to apply the laws of sine and cosine to solve non-right triangles. - Students will be able to convert radians to degrees and degrees to radians. - Students will be able to calculate the length of an arc intercepted by a	- Interactive Whiteboard Presentations - Visual Representations of Concepts - Modeling of Examples - Cooperative Group Investigations and Hands-on Activities - Graphing Calculator Demonstrations and Using the Graphing Calculator to Solve Problems - Partner collaboration or individual work (depending on the topic and

<table>
<tr><td></td><td>central angle and the area of the associated sector.
● Students will be able to use the unit circle to find the value of trig functions of any angle.
● Students will be able to graph trig functions.
● Students will be able to prove trig equations by applying Pythagorean identities.</td><td>assignment.)
● Solving Real World Problems

● Trigonometric Functions Graphing Calculator Activities</td></tr>
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Assessments:	Materials:	Resources:
● Do Nows ● Student Participation ● Oral Questioning ● Exit Cards ● ActivExpression Device Results ● Homework Assignments ● Classwork ● Projects ● Unit Quizzes ● Unit Test	● Interactive Whiteboard ● Document Camera ● ActivExpression Devices ● Whiteboards ● Dry Erase Markers ● Erasers ● Colored Pencils ● Activity Sheets ● Graph Paper ● TI-84+ Graphing Calculator ● TI-84 Smartview Software	● NJCTL Presentations / Teacher Created Interactive Whiteboard Presentations ● Texas Instruments Activity Central Website ● Illuminations Website ● Mathematics Assessment Project Website ● IXL Algebra II Practice Website ● Department Created Assessments

Unit 10: Probability and Statistics	This unit introduces fundamental set vocabulary and builds upon prior knowledge of probability. The unit first applies this knowledge to independence and conditional probability and then introduces concepts of central tendency, standard deviation, and normal distribution. Two-way tables, sampling, and experiments are then explored and created to extend theory into practice.	
Timing:	3.5 Weeks	
Standards:	*NJSLS for Mathematics:* N.Q.1-3, S.ID.1-9, S.IC.1-6, S.CP.1-9, S.MD.1-7, Standards for MP 1-8 *NJSLS for Technology:* 8.1.12.A.3, 8.1.12.A.4, 8.1.12.C.1 *NJSLS 21st Century Life and Careers:* CRP1, CRP2, CRP4, CRP8, CRP11, CRP12	
Essential Questions:	**Objectives:**	**Activities, Investigation, and Student Experiences:**

• How can we predict the likelihood of an event occurring?
• How can information be examined and interpreted to our advantage?
• How can I evaluate data in real-life situations to help me make decisions?
	• Students will be able to use characteristics of problems, including unions, intersections and complement, to describe events with appropriate set notation and Venn Diagrams.
	• Students will be able to verify that two events are independent or dependent and calculate the conditional probability of the events.
	• Students will be able to translate their results using everyday language.
		• Interactive Whiteboard Presentations
		  ○ Visual Representations of Concepts
		  ○ Modeling of Examples
		• Cooperative Group Investigations and Hands-on Activities
		• Graphing Calculator Demonstrations and Using the Graphing Calculator to Solve Problems
		• Partner collaboration or individual

	- Students will review mean, median, mode, range, and outliers. - Students will be able to calculate Interquartile Range and Standard Deviation of two or more data sets. - Students will be able to calculate the standard deviation of a data set and analyze a normal distribution. - Students will be able to recognize trends with and interpret different association of data in a two-way frequency table. - Students will be able to recognize appropriate uses and models for statistics, justify their results using data or experimentation, and calculate a margin error for sets of information.	work (depending on the topic and assignment.) ● Solving Real World Problems --- ● [Probability](#) Graphing Calculator Activities
Assessments:	**Materials:**	**Resources:**
- Do Nows - Student Participation - Oral Questioning - Exit Cards - ActivExpression Device Results - Homework Assignments - Classwork - Projects - Unit Quizzes - Unit Test	- Interactive Whiteboard - Document Camera - ActivExpression Devices - Whiteboards - Dry Erase Markers - Erasers - Colored Pencils - Activity Sheets - Graph Paper - TI-84+ Graphing Calculator - TI-84 Smartview Software	[NJCTL](#) Presentations / Teacher Created Interactive Whiteboard Presentations [Texas Instruments Activity Central](#) Website [Illuminations](#) Website [Mathematics Assessment Project](#) Website - IXL [Algebra II Practice](#) Website - Department Created Assessments

Unit 11: Conics	The unit extends the formulas for midpoint and distance to the conic sections. Students will work with the equations for circles, parabolas, ellipse, and hyperbola in standard and general form. Students will learn the characteristics of the different conics and be able to graph them.	
Timing:	2.5 Weeks	
Standards:	*NJSLS for Mathematics:* G.GPE.1-4, Standards for MP 1-8 *NJSLS for Technology:* 8.1.12.A.3, 8.1.12.A.4, 8.1.12.C.1 *NJSLS 21st Century Life and Careers:* CRP1, CRP2, CRP4, CRP8, CRP11, CRP12	
Essential Questions:	**Objectives:**	**Activities, Investigation, and Student Experiences:**

● How are the conic sections related to the equation for distance?
● What are the similarities and differences between the four types of curves known as conic sections?
● What is a conic section and how is it developed?
● What is the intersection of a cone and a plane parallel to a line along the side of a
	● Students will be able to graph circles, parabolas, ellipse, and hyperbola.
	● Students will be able to identify a conic section from its equation.
	● Students will be able to rewrite the general form of a conic to its standard form.
		● Interactive Whiteboard Presentations
		  ○ Visual Representations of Concepts
		  ○ Modeling of Examples
		● Cooperative Group Investigations and Hands-on Activities
		● Graphing Calculator Demonstrations and Using the Graphing Calculator to Solve Problems
		● Partner collaboration or individual

cone?
- What mathematical theorems and postulates are used in finding the equations of conic sections?
- What is meant by a locus of points, and how is it used in determining an equation of a conic section?

work (depending on the topic and assignment.)
- Solving Real World Problems

- Cutting Conics Activity
- Conic Section Explorer
- Human Conics Activity

Assessments:	Materials:	Resources:
- Do Nows - Student Participation - Oral Questioning - Exit Cards - ActivExpression Device Results - Homework Assignments - Classwork - Projects - Unit Quizzes - Unit Test	- Interactive Whiteboard - Document Camera - ActivExpression Devices - Whiteboards - Dry Erase Markers - Erasers - Colored Pencils - Activity Sheets - Graph Paper - TI-84+ Graphing Calculator - TI-84 Smartview Software - Laptops with Internet connections - Double-napped cone model - Sidewalk Chalk - Rope - Right Angle Measures - Compasses	- NJCTL Presentations / Teacher Created Interactive Whiteboard Presentations - Texas Instruments Activity Central Website - Illuminations Website - Mathematics Assessment Project Website - IXL Algebra II Practice Website - Department Created Assessments