

NJ-CCSS AREA: MATHEMATICS

North Brunswick Township Public Schools

HONORS MATH ANALYSIS

Acknowledgements

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Date: New _____

Revision May 2012

Board Adoption _____

Due to the nature of this course, both the NJ Common Core State Standards for Mathematics and the New Jersey Core Curriculum Content Standards can be applied.

New Jersey - Common Core State Standards for Mathematics

Unit P: Prerequisites

Grade: 10-11

Date: May 2012

NJ-CCSS Domain Essential Questions		NJ-CCSS Cluster.Standard Standards for Mathematical Practice		
<p>4.1.12A.1,2 (4.2.12C.1; 4.3.12B.1; 4.5B1,4; 4.5C1,6; 4.5E1; 4.5F4) N-CN The Complex Number System</p> <p>G-CO Congruence</p> <ul style="list-style-type: none"> How do mathematical ideas interconnect and build on one another to produce a coherent whole? 		<p>N-CN.6 Represent complex numbers and their operations on the complex plane. Calculate the distance between numbers in the complex plane as the modulus of the difference, and the midpoint of a segment as the average of the numbers at its endpoints.</p> <p>G-CO.1 Experiment with transformations in the plane. Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment based on the undefined notions of point, line, distance along a line and distance around a circular arc.</p> <p>SMP.1 Make sense of problems and persevere in solving them SMP.3 Construct viable arguments and critique the reasoning of others. SMP.5 Use appropriate tools strategically. SMP.6 Attend to precision SMP.7 Look for and make use of structure</p>		
Skills/Objectives SWBAT...	Instructional Strategies Activities/ Materials /Technology Interdisciplinary Connections Cultural Diversity	Modifications ESL / Special Education Academic Support/G&T Differentiated Instruction	Assessments Formative Summative Benchmarks	Pacing
<p>Obj P.1 Classify real numbers, apply basic properties of algebra, convert between decimals and fractions, write inequalities, and work with exponents and scientific notation. Use interval notation for bounded/unbounded inequalities.</p> <p>Obj P.2 To graph points, find distance and midpoints on a number line, and in a coordinate plane, and write standard-form equations of circles.</p>	<p>Summer assignment</p> <p><u>Materials/Technology/Resources:</u> Graphing Calculator <u>Precalculus</u>, Addison Wesley, 2007</p> <p><u>Interdisciplinary Connections:</u> Physics, Statistics, Economics</p>	<ul style="list-style-type: none"> Extended time Assignment modification Group investigations Mnemonics Color coding Highlighting/and underlining Simulations Pair-share Small group instruction Pair-share 	<p><u>Formative:</u></p> <ul style="list-style-type: none"> In class practice problems Board work Do Now prompts Class work Homework Problem solving activities Think and Discuss Open-ended questions Exit prompts 	0 days

NJ-CCSS Domain Essential Questions		NJ-CCSS Cluster.Standard Standards for Mathematical Practice		
<p>A-REI Reasoning with Equations and Inequalities</p> <p>A-CED Creating Equations</p> <p>F-IF Interpreting Functions</p> <ul style="list-style-type: none"> • How can we model mathematical situations ? • How are patterns of change related to the behavior of functions? • What makes an algebraic algorithm both effective and efficient? 		<p>A-REI.10 Represent and solve equations and inequalities graphically. Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).</p> <p>A-REI.11 Represent and solve equations and inequalities graphically. Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately. Include cases where $f(x)$ and/or $g(x)$ are linear and exponential.</p> <p>A-REI.12 Represent and solve equations and inequalities graphically. Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes</p> <p>A-CED.2 Create equations that describe numbers or relationships. Create equations in two or more variables to represent relationships between quantities, graph equations on coordinate axes with labels and scales</p> <p>F-IF.7b Analyze functions using different representations. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. Graph square root, cube root, and piecewise defined functions, including step functions and absolute value functions</p> <p>SMP.1 Make sense of problems and persevere in solving them</p> <p>SMP.2 Reason abstractly and quantitatively</p> <p>SMP.4 Model with mathematics.</p> <p>SMP.5 Use appropriate tools strategically.</p> <p>SMP.7 Look for and make use of structure</p>		
Skills/Objectives	Instructional Strategies	Modifications	Assessments	Pacing
SWBAT...	Activities/ Materials /Technology Interdisciplinary Connections Cultural Diversity	ESL / Special Education Academic Support/G&T Differentiated Instruction	Formative Summative Benchmarks	
<p>Obj P.3 To solve linear equations and inequalities in one variable.</p> <p>Obj P.4 To use concepts of slope and y-intercept to graph and write linear equations in two variables.</p> <p>Obj P.5 To solve equations involving quadratic, absolute value, and fractional expressions by finding x-intercepts or intersections on graphs, by using algebraic techniques, or by numerical techniques.</p>	Summer assignment	<ul style="list-style-type: none"> • Extended time • Assignment modification • Group investigations • Mnemonics • Color coding • Highlighting/and underlining • Simulations • Pair-share 	<ul style="list-style-type: none"> • Formative: • In class practice problems • Board work • Do Now prompts • Class work • Homework activities • Problem solving • Think and Discuss • Open-ended questions • Exit prompts 	0 days

NJ-CCSS Domain Essential Questions		NJ-CCSS Cluster.Standard Standards for Mathematical Practice		
<p>N-CN The Complex Number System</p> <ul style="list-style-type: none"> How does the complex number system differ from the real number system? 		<p>N-CN.1 Perform arithmetic operations with complex numbers. Know there is a complex number i such that $i^2 = -1$, and every complex number has the form $a + bi$ with a and b real.</p> <p>N-CN.2 Perform arithmetic operations with complex numbers. Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.</p> <p>N-CN.3 Perform arithmetic operations with complex numbers. Find the conjugate of a complex number; use conjugates to find moduli and quotients of complex numbers.</p> <p>N-CN.4 Represent complex numbers and their operations on the complex plane. Represent complex numbers on the complex plane in rectangular and polar form (including real and imaginary numbers), and explain why the rectangular and polar forms of a given complex number represent the same number.</p> <p>N-CN.5 Represent complex numbers and their operations on the complex plane. Represent addition, subtraction, multiplication, and conjugation of complex numbers geometrically on the complex plane; use properties of this representation for computation.</p> <p>N-CN.7 Use complex numbers in polynomial identities and equations. Solve quadratic equations with real coefficients that have complex solutions.</p> <p>SMP.3 Construct viable arguments and critique the reasoning of others. SMP.5 Use appropriate tools strategically. SMP.6 Attend to precision SMP.7 Look for and make use of structure SMP.8 Look for and express regularity in repeated reasoning</p>		
Skills/Objectives	Instructional Strategies	Modifications	Assessments	Pacing
SWBAT...	Activities/ Materials /Technology Interdisciplinary Connections Cultural Diversity	ESL / Special Education Academic Support/G&T Differentiated Instruction	Formative Summative Benchmarks	
Obj. P.6 To add, subtract, multiply and divide complex numbers; find complex zeros of quadratic functions.	Review of summer assignment	<ul style="list-style-type: none"> Extended time Assignment modification Group investigations Mnemonics Color coding Highlighting/and underlining Simulations Pair-share 	<p>Formative:</p> <ul style="list-style-type: none"> In class practice problems Board work Do Now prompts Class work Homework Problem solving activities Think and Discuss Open-ended questions Exit prompts 	0 days

NJ-CCSS Domain Essential Questions		NJ-CCSS Cluster.Standard Standards for Mathematical Practice		
<p>A-REI Reasoning with Equations and Inequalities</p> <p>F-BF Building Functions</p> <ul style="list-style-type: none"> • What makes an algebraic algorithm both effective and efficient? • How are patterns of change related to the behavior of functions? 		<p>A-REI.11 Represent and solve equations and inequalities graphically. Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, radical, absolute value, and exponential functions</p> <p>F-BF.1.b Build a function that models a relationship between two quantities. Write a function that describes a relationship between two quantities. Combine standard function types using arithmetic operations.</p> <p>F-BF.1.c Build a function that models a relationship between two quantities. Write a function that describes a relationship between two quantities. Compose functions.</p> <p>SMP.1 Make sense of problems and persevere in solving them</p> <p>SMP.2 Reason abstractly and quantitatively</p> <p>SMP.4 Model with mathematics.</p> <p>SMP.5 Use appropriate tools strategically.</p> <p>SMP.7 Look for and make use of structure</p> <p>SMP.8 Look for and express regularity in repeated reasoning</p>		
Skills/Objectives SWBAT...	Instructional Strategies Activities/ Materials /Technology Interdisciplinary Connections Cultural Diversity	Modifications ESL / Special Education Academic Support/G&T Differentiated Instruction	Assessments Formative Summative Benchmarks	Pacing
<p>Obj. P.7 To be able to solve inequalities involving absolute value, quadratic polynomials, and expressions involving fractions</p> <p>Obj 1.4 Add, subtract, multiply, divide, and compose functions.</p>	<p>Review of summer assignment</p>	<ul style="list-style-type: none"> • Extended time • Assignment modification • Group investigations • Mnemonics • Color coding • Highlighting/and underlining • Simulations • Pair-share 	<p>Formative:</p> <ul style="list-style-type: none"> • In class practice problems • Board work • Do Now prompts • Class work • Homework • Problem solving activities • Think and Discuss • Open-ended questions • Exit prompts • Study Island assignments <p>Performance Assessment - Benchmark: TEST</p>	<p>0 days</p>

NJ-CCSS Domain Essential Questions		NJ-CCSS Cluster.Standard Standards for Mathematical Practice		
<p>G-SRT Similarity, Right Triangles, and Trigonometry</p> <ul style="list-style-type: none"> How are transformations expressed algebraically? 		<p>G-SRT.1b Understand similarity in terms of similarity transformations. Verify experimentally the properties of dilations given by a center and a scale factor. The dilation of a line segment is longer or shorter in the ratio given by the scale factor.</p> <p>G-SRT.2 Understand similarity in terms of similarity transformations. Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.</p> <p>SMP.2 Reason abstractly and quantitatively SMP.3 Construct viable arguments and critique the reasoning of others.. SMP.5 Use appropriate tools strategically. SMP.6 Attend to precision SMP.7 Look for and make use of structure</p>		
Skills/Objectives SWBAT...	Instructional Strategies Activities/ Materials /Technology Interdisciplinary Connections Cultural Diversity	Modifications ESL / Special Education Academic Support/G&T Differentiated Instruction	Assessments Formative Summative Benchmarks	Pacing
<p>Obj. 1.6 Algebraically and graphically represent translations, reflections, stretches, and shrinks of a function.</p>	<p>Review of summer assignment</p>	<ul style="list-style-type: none"> Extended time Assignment modification Group investigations KWL strategies Mnemonics Color coding Highlighting/and underlining Simulations Pair-share 	<p>Formative:</p> <ul style="list-style-type: none"> Board work Class work <p>Performance Assessment - Benchmark:</p> <ul style="list-style-type: none"> TEST 	<p>3 days</p>
NJ-CCSS Domain Essential Questions		NJ-CCSS Cluster.Standard Standards for Mathematical Practice		
<p>A-REI Reasoning with Equations and Inequalities</p> <p>F-IF Interpreting Functions</p>		<p>A-REI.2 Understand solving equations as a process of reasoning and explain the reasoning. Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise</p> <p>F-IF.7c Analyze functions using different representations. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. Graph</p>		

<ul style="list-style-type: none"> • How can we use mathematical models to describe physical relationships? • How are patterns of change related to the behavior of functions? 	<p>polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.</p> <p>F-BF.1.c Build a function that models a relationship between two quantities. Write a function that describes a relationship between two quantities. Compose functions</p> <p>F-BF.4b Build new functions from existing functions. Find inverse functions. Verify by composition that one function is the inverse of another.</p> <p>F-BF.4c Build new functions from existing functions. Find inverse functions. Read values of an inverse function from a graph or a table, given that the function has an inverse.</p> <p>F-BF.4d Build new functions from existing functions. Find inverse functions. Produce an invertible function from a non-invertible function by restricting the domain.</p> <p>SMP.1 Make sense of problems and persevere in solving them</p> <p>SMP.2 Reason abstractly and quantitatively</p> <p>SMP.4 Model with mathematics.</p> <p>SMP.5 Use appropriate tools strategically.</p> <p>SMP.7 Look for and make use of structure</p>				
Skills/Objectives SWBAT...	Instructional Strategies Activities/ Materials /Technology Interdisciplinary Connections Cultural Diversity		Modifications ESL / Special Education Academic Support/G&T Differentiated Instruction	Assessments Formative Summative Benchmarks	Pacing
<p>Obj 1.1 Use numerical, algebraic, and graphical models to solve problems and translate from one model to another.</p> <p>Obj 1.2 Represent functions numerically, algebraically, and graphically, determine the domain and range for functions, analyze function characteristics such as extreme values, symmetry, asymptotes, and end behavior.</p> <p>Obj 1.3 Recognize graphs of twelve basic functions; recognize the domain of the twelve functions and combine the functions to create new functions.</p> <p>Obj 1.5 Define functions and</p>	<ul style="list-style-type: none"> • Definitions, examples and notes • Overhead grapher demonstrations • Graphing Calculator Instruction finding hidden behavior, windows • Comparison of graphing and algebraic techniques • Major concepts worksheet <ul style="list-style-type: none"> • Definitions, examples and notes • Notes and examples of domain and range • Overhead grapher demonstrations on: domain, range, discontinuity, continuity, increasing and decreasing functions, minimums and maximums, asymptotes <ul style="list-style-type: none"> • Definitions, examples and notes • Graphing functions parametrically • Grapher demonstration of parametrics • When 2 trains pass each other worksheet (parametric simulation) • Graph piecewise functions without a calculator • Graph functions and their inverses, find inverse algebraically • Find an inverse function by restricting domain 		<ul style="list-style-type: none"> • Extended time • Assignment modification • Group investigations • Mnemonics • Color coding • Highlighting/and underlining • Simulations • Pair-share 	<p>Formative:</p> <ul style="list-style-type: none"> • In class practice problems • Board work • Do Now prompts • Class work • Homework • Problem solving activities • Think and Discuss • Open-ended questions • Exit prompts • Study Island assignments <p>Summative:</p> <ul style="list-style-type: none"> • Mini Quiz 1.1, 1.2 <p>Summative:</p> <ul style="list-style-type: none"> • Quiz 1.3-1.5 	<p>2 days</p> <p>2 days</p> <p>3 days</p>

<p>relations parametrically and find inverses of functions and relations.</p> <p>Obj 1.7 Identify appropriate basic functions with which to model real-world problems and be able to produce specific functions to model data.</p>	<ul style="list-style-type: none"> • Definitions, examples and notes • Grapher demonstration 			<p>3 days</p>
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Unit 2: Polynomial, Power, and Rational Functions

Grade: 10-11

Date: May 2012

NJ-CCSS Domain Essential Questions		NJ-CCSS Cluster.Standard Standards for Mathematical Practice		
<p>F-IF Interpreting Functions</p> <ul style="list-style-type: none"> • How are patterns of change related to the behavior of functions? • What are the 3 interrelated families of functions? • How can these 3 families be used in the social, behavioral, and natural sciences? • How do you find the real and complex solutions of polynomials and inequalities? 		<p>F-IF.7b Analyze functions using different representations. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.</p> <p>F-IF.8a Analyze functions using different representations. Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.</p> <p>SMP.1 Make sense of problems and persevere in solving them SMP.2 Reason abstractly and quantitatively SMP.3 Construct viable arguments and critique the reasoning of others. SMP.4 Model with mathematics. SMP.7 Look for and make use of structure SMP.8 Look for and express regularity in repeated reasoning.</p>		
Skills/Objectives SWBAT...	Instructional Strategies Activities/ Materials /Technology Interdisciplinary Connections Cultural Diversity	Modifications ESL / Special Education Academic Support/G&T Differentiated Instruction	Assessments Formative Summative Benchmarks	Pacing
<p>Obj 2.1 Recognize and graph linear and quadratic functions, and use these functions to model situations and solve problems.</p> <p>Obj. 2.2 Sketch power functions in the form of $f(x) = kx^a$, where k and a are rational numbers.</p> <p>Obj 2.3 Graph polynomial functions, predict their end behavior, and find their real zeros using a grapher or an algebraic method.</p>	<ul style="list-style-type: none"> • Definitions, examples and notes • Graphing calculator review of windows • Scatterplot instruction on the grapher • Descriptions of parabolas • Vertical Free-Fall Motion problems • Review of all properties of a function • Example of describing end behavior using limit notation • Introduction of multiplicity of zeros • Problem solving: designing a box <p>Materials/Technology/Resources: Precalculus Pearson 2007</p> <p>Interdisciplinary Connections: Physics, Economics, Statistics</p>	<ul style="list-style-type: none"> • Extended time • Assignment modification • Group investigations • Mnemonics • Color coding • Highlighting/and underlining • Simulations • Pair-share Small group instruction • Pair-share 	<p>Formative:</p> <ul style="list-style-type: none"> • In class practice problems • Board work • Do Now prompts • Homework • Problem solving activities • Think and Discuss • Open-ended questions • Exit prompts <p>Summative:</p> <ul style="list-style-type: none"> • Mini quiz • Quiz 	7 days

NJ-CCSS Domain Essential Questions		NJ-CCSS Cluster.Standard Standards for Mathematical Practice		
<p>A-APR Arithmetic with Polynomials and Rational Expressions</p> <p>N-CN The Complex Number System</p> <p>F-IF Interpreting Functions</p> <p>A-REI Reasoning with Equations and Inequalities</p> <ul style="list-style-type: none"> • How can you determine the number and types of complex roots of a polynomial? • How can you determine the range within which the complex numbers lie? • How do you find the limits of a rational function? • How do you determine the end behavior of a rational function? • How do you solve a rational equation in one variable? • How do you know if a solution is real or extraneous? • How do you determine if a solution is the solution to a real world problem? 		<p>A-APR.7 Rewrite rational expressions. 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>N-CN.8 Use complex numbers in polynomial identities and equations. Extend polynomial identities to the complex numbers. <i>For example, rewrite $x^2 + 4$ as $(x + 2i)(x - 2i)$.</i></p> <p>(+) N-CN.9 Use complex numbers in polynomial identities and equations. Know the Fundamental Theorem of Algebra; show that it is true for quadratic polynomials.</p> <p>F-IF.7c Analyze functions using different representations. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.</p> <p>A-REI.2 Understand solving equations as a process of reasoning and explain the reasoning. Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise</p> <p>SMP.2 Reason abstractly and quantitatively SMP.3 Construct viable arguments and critique the reasoning of others. SMP.4 Model with mathematics. SMP.5 Use appropriate tools strategically. SMP.6 Attend to precision SMP.7 Look for and make use of structure</p>		
Skills/Objectives	Instructional Strategies Activities/ Materials /Technology Interdisciplinary Connections Cultural Diversity	Modifications ESL / Special Education Academic Support/G&T Differentiated Instruction	Assessments Formative Summative Benchmarks	Pacing
SWBAT...				
<p>Obj 2.4 Divide polynomials using long and synthetic division; apply remainder theorem, factor theorem Rational Zero Theorem; and find upper and lower bounds for zeros of polynomials.</p> <p>Obj 2.5 Factor polynomials with real coefficients using factors with complex coefficients.</p>	<ul style="list-style-type: none"> • Definitions, examples and notes • Applying the remainder and factor theorems • Applying DeCartes rule • Compare/contrast long division and synthetic division – what situations to use each • Using “bag of tricks” to determine the zeros of a polynomial and be able to write it in factored form • Review complex numbers • Calculator substitution 	<ul style="list-style-type: none"> • Extended time • Assignment modification • Group investigations • Mnemonics • Color coding • Highlighting/and underlining • Simulations • Pair-share 	<p>Formative:</p> <ul style="list-style-type: none"> • In class practice problems • Board work • Do Now prompts • Class work • Homework • Problem solving activities • Think and Discuss • Open-ended questions • Exit prompts 	<p>3 days</p> <p>3 days</p>

<p><u>Obj 2.6</u> Describe graphs of rational functions, identify horizontal and vertical asymptotes, and predict end behavior of rational functions</p> <p><u>Obj 2.7</u> Solve equations involving fractions using both algebraic and graphical techniques; identify extraneous solutions.</p> <p><u>Obj 2.8</u> Solve inequalities involving polynomials and rational functions by using both algebraic and graphical techniques.</p>	<ul style="list-style-type: none">• Definitions, examples and notes• Review Reciprocal Function• Find domain, all asymptotes, x & y intercepts, limits of a function• Practice graphing without calculator• Analyze the graph of a rational function <ul style="list-style-type: none">• Definitions, examples and notes• Comparison of graphing and algebraic solutions, extraneous roots• Perimeter and volume word problems• Introduce sign charts to determine the solution of an inequality		<p><u>Summative:</u></p> <ul style="list-style-type: none">• Mini Quiz	<p>3 days</p> <p>5 days</p>
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Unit 3: Exponential, Logistic, and Logarithmic Functions

Grade: 10-11

Date: May 2012

NJ-CCSS Domain Essential Questions		NJ-CCSS Cluster.Standard Standards for Mathematical Practice		
<p>N-RN The Real Number System</p> <p>F-IF Interpreting Functions</p> <p>F-BF Building Functions</p> <ul style="list-style-type: none"> • How can we use mathematical models to describe physical relationships? • How can we model a pattern of growth or decay? • What is the relationship between exponents and logarithms? • Why are base 10 and base e so important to logarithms? 		<p>N-RN.1 Extend the properties of exponents to rational exponents. Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those value, allowing for notation for radicals in terms of rational exponents.</p> <p>N-RN.2 Extend the properties of exponents to rational exponents. Rewrite expressions involving radicals and rational exponents using the properties of exponents.</p> <p>F-IF.7e Analyze functions using different representations. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.</p> <p>F-BF.5 Build new functions from existing functions. Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents.</p> <p>SMP.1 Make sense of problems and persevere in solving them SMP.2 Reason abstractly and quantitatively SMP.4 Model with mathematics. SMP.5 Use appropriate tools strategically. SMP.6 Attend to precision SMP.7 Look for and make use of structure</p>		
Skills/Objectives SWBAT...	Instructional Strategies Activities/ Materials /Technology Interdisciplinary Connections Cultural Diversity	Modifications ESL / Special Education Academic Support/G&T Differentiated Instruction	Assessments Formative Summative Benchmarks	Pacing
<p>Obj. 3.1 Evaluate exponential expressions and identify and graph exponential and logistic functions</p> <p>Obj. 3.2 Use exponential growth, decay and regression to model real-life problems</p>	<ul style="list-style-type: none"> • Definitions, examples and notes • Comparison of growth and decay functions, algebraic and graphs • Review base e • Develop properties of function, exponential and logistic • Translate graphs • Examples and notes • Develop properties with numerical examples • Expand relationships of properties • Change of base • Solving equations • Use regression to model data • Comparison of regression models and application with scatterplots 	<ul style="list-style-type: none"> • Extended time • Assignment modification • Group investigations • Mnemonics • Color coding • Highlighting/and underlining • Simulations • Pair-share 	<p>Formative:</p> <ul style="list-style-type: none"> • In class practice problems • Board work • Do Now prompts • Class work • Homework • Problem solving activities 	12 days

<p>Obj. 3.3 Convert equations between logarithmic form and exponential form, evaluate common and natural logarithms, and graph common and natural logarithmic functions</p> <p>Obj. 3.4 Apply the properties of logarithms to evaluate expressions and graph functions, and be able to re-express data</p> <p>Obj. 3.5 Apply the properties of logarithms to solve exponential and logarithmic equations algebraically and solve application problems using these equations</p> <p>Obj. 3.6 Use exponential functions and equations to solve business and finance applications related to compound interest and annuities.</p>	<ul style="list-style-type: none"> • Develop properties with numerical examples • Expand relationships of properties • Change of base • Solving equations • Use regression to model data • Comparison of regression models and application with scatterplots • Comparison of various interest formulas <p><u>Materials/Technology/Resources:</u> Graphing Calculator <u>Precalculus</u>, Addison Wesley, 2007</p> <p><u>Interdisciplinary Connections:</u> Statistics, Biology, Social Sciences, Chemistry, Business</p>		<ul style="list-style-type: none"> • Think and Discuss • Open-ended questions • Exit prompts <p><u>Summative:</u></p> <ul style="list-style-type: none"> • Mini-quiz <p><u>Performance Assessment</u> -</p> <ul style="list-style-type: none"> • Chapter Test <p><u>Benchmark:</u></p> <ul style="list-style-type: none"> • Chapter Test 	
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Unit 9: Discrete Mathematics

Grade: 10-11

Date: May 2012

NJ-CCSS Domain Essential Questions		NJ-CCSS Cluster.Standard Standards for Mathematical Practice		
<p>S-MD Using Probability to Make Decisions</p> <ul style="list-style-type: none"> • How can you determine the difference between combinations and permutations? • How can you decide what counting strategy will work best in a particular situation? 		<p>S-MD-1 Calculate expected values and use them to solve problems. Define a random variable for a quantity of interest by assigning a numerical value to each event in a sample space; graph the corresponding probability distribution using the same graphical displays as for data distributions.</p> <p>SMP.1 Make sense of problems and persevere in solving them SMP.2 Reason abstractly and quantitatively SMP.3 Construct viable arguments and critique the reasoning of others. SMP.6 Attend to precision SMP.7 Look for and make use of structure</p>		
Skills/Objectives SWBAT...	Instructional Strategies Activities/ Materials /Technology Interdisciplinary Connections Cultural Diversity	Modifications ESL / Special Education Academic Support/G&T Differentiated Instruction	Assessments Formative Summative Benchmarks	Pacing
<p>Obj 9.1 Use the multiplication principle of counting, permutations, or combinations to count the number of ways that a task can be done</p>	<ul style="list-style-type: none"> • Definitions, examples and notes • Applying counting principle • Extra practice problems/worksheets • Use of the calculator • Developing difference in use of combinations and permutations <p><u>Materials/Technology/Resources:</u> Graphing Calculators Precalculus, Addison Wesley, 2007</p> <p><u>Interdisciplinary Connections:</u> Business, Social Sciences, Statistics</p>	<ul style="list-style-type: none"> • Extended time • Assignment modification • Group investigations • Mnemonics • Color coding • Highlighting/and underlining • Simulations • Pair-share 	<p><u>Formative:</u></p> <ul style="list-style-type: none"> • In class practice problems • Board work • Do Now prompts • Class work • Homework • Problem solving activities • Think and Discuss • Open-ended questions • Exit prompts • Study Island assignments <p><u>S Summative:</u></p> <ul style="list-style-type: none"> • Mini-quiz • Quiz 	3 days

NJ-CCSS Domain Essential Questions		NJ-CCSS Cluster.Standard Standards for Mathematical Practice		
<p>A-APR Arithmetic with Polynomials and Rational Expressions</p> <ul style="list-style-type: none"> How can you expand powers of binomials without using repeated applications of the distributive property? How can we use Pascal's triangle to expand powers of binomials? 		<p>A-APR.5 Use polynomial identities to solve problems. 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</p> <p>SMP.2 Reason abstractly and quantitatively SMP.3 Construct viable arguments and critique the reasoning of others. SMP.5 Use appropriate tools strategically. SMP.6 Attend to precision SMP.7 Look for and make use of structure SMP.8 Look for and express regularity in repeated reasoning.</p>		
Skills/Objectives SWBAT...	Instructional Strategies Activities/ Materials /Technology Interdisciplinary Connections Cultural Diversity	Modifications ESL / Special Education Academic Support/G&T Differentiated Instruction	Assessments Formative Summative Benchmarks	Pacing
<p>Obj 9.2 Expand a power of a binomial using the binomial theorem or Pascal's triangle. Find the coefficient of a given term of a binomial expansion.</p>	<ul style="list-style-type: none"> Definitions, examples and notes Extending Pascal's triangle Comparing Pascal's triangle to Using nCr to expand a Binomial Applying the Binomial Theorem to expand binomials <p>Materials/Technology/Resources: Graphing Calculators Supplementary Worksheets</p>	<ul style="list-style-type: none"> Extended time Assignment modification Group investigations Mnemonics Color coding Highlighting/and underlining Simulations Pair-share 	<p>Formative:</p> <ul style="list-style-type: none"> In class practice problems Board work Do Now prompts Class work Homework Problem solving activities Think and Discuss Open-ended questions <p>Summative:</p> <ul style="list-style-type: none"> Mini-quiz Quiz 	2 days

NJ-CCSS Domain Essential Questions		NJ-CCSS Cluster.Standard Standards for Mathematical Practice		
<p>S-CP Conditional Probability and the Rules of Probability</p> <p>S-MD Using Probability to Make Decisions</p> <ul style="list-style-type: none"> How can experimental and theoretical probabilities be used to make predictions or draw conclusions? 		<p>S-CP.1 Understand independence and conditional probability and use them to interpret data. Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events (“or,” “and,” “not”)</p> <p>S-MD.2 Calculate expected values and use them to solve problems. Calculate the expected value of a random variable; interpret it as the mean of the probability distribution.</p> <p>S-MD.3 Calculate expected values and use them to solve problems. Develop a probability distribution for a random variable defined for a sample space in which theoretical probabilities can be calculated; find the expected value.</p> <p>S-MD.4 Calculate expected values and use them to solve problems. Develop a probability distribution for a random variable defined for a sample space in which probabilities are assigned empirically; find the expected value.</p> <p>S-MD.2 Calculate expected values and use them to solve problems. Calculate the expected value of a random variable; interpret it as the mean of the probability distribution.</p> <p>S-MD.3 Calculate expected values and use them to solve problems. Develop a probability distribution for a random variable defined for a sample space in which theoretical probabilities can be calculated; find the expected value.</p> <p>S-MD.4 Calculate expected values and use them to solve problems. Develop a probability distribution for a random variable defined for a sample space in which probabilities are assigned empirically; find the expected value.</p> <p>SMP.1 Make sense of problems and persevere in solving them SMP.2 Reason abstractly and quantitatively SMP.4 Model with mathematics. SMP.5 Use appropriate tools strategically. SMP.6 Attend to precision SMP.8 Look for and express regularity in repeated reasoning</p>		
Skills/Objectives	Instructional Strategies	Modifications	Assessments	Pacing
SWBAT...	Activities/ Materials /Technology Interdisciplinary Connections Cultural Diversity	ESL / Special Education Academic Support/G&T Differentiated Instruction	Formative Summative Benchmarks	
Obj 9.3 Identify a sample space and calculate probabilities and conditional probabilities in sample spaces with equally likely or unequally likely outcomes	<ul style="list-style-type: none"> Definitions, examples and notes Determine probability of successive or either/or events Find complement of an event Drawing Venn Diagrams and Tree Diagrams Using the Conditional Probability Formula applications 	<ul style="list-style-type: none"> Extended time Assignment modification Group investigations Mnemonics Color coding Highlighting/and underlining Simulations Pair-share 	<p>Formative:</p> <ul style="list-style-type: none"> In class practice problems Board work Do Now prompts Class work Homework Problem solving activities 	5 days

			<ul style="list-style-type: none"> • Think and Discuss • Open-ended questions • Exit prompts • Study Island assignments <p>Summative:</p> <ul style="list-style-type: none"> • Mini-quiz • Quiz 	
NJ-CCSS Domain Essential Questions		NJ-CCSS Cluster.Standard Standards for Mathematical Practice		
F-LQE Linear, Quadratic, and Exponential Models F-BF Building Functions <ul style="list-style-type: none"> • How can patterns, relations and functions be used as tools to best describe and help explain real life situations? • How do you determine whether a sequence is arithmetic or geometric? 		F-LQE.4 Construct and compare linear and exponential models and solve problems. For exponential models, express as a logarithm the solution to $a b^x = d$ where a , c , and d are numbers and the base b is 2, 10, or e ; evaluate the logarithm using technology. F-BF.2 Build a function that models a relationship between two quantities. Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms. SMP.2 Reason abstractly and quantitatively SMP.3 Construct viable arguments and critique the reasoning of others. SMP.4 Model with mathematics. SMP.7 Look for and make use of structure SMP.8 Look for and express regularity in repeated reasoning		
Skills/Objectives SWBAT...	Instructional Strategies Activities/ Materials /Technology Interdisciplinary Connections Cultural Diversity	Modifications ESL / Special Education Academic Support/G&T Differentiated Instruction	Assessments Formative Summative Benchmarks	Pacing
Obj 9.4 Express arithmetic and geometric sequences explicitly and recursively; find the limit of convergent sequences.	<ul style="list-style-type: none"> • Definitions, examples and notes • Discuss/apply the principle of Mathematical Induction. • Generating sequences with/without a calculator • Calculating the sum of a finite arithmetic sequence and a finite and infinite geometric sequence, discuss the limit of convergence. • Finding limits of a sequence 	<ul style="list-style-type: none"> • Extended time • Assignment modification • Group investigations • Mnemonics • Color coding • Highlighting/and underlining • Simulations • Pair-share 	<p>Formative:</p> <ul style="list-style-type: none"> • In class practice problems • Board work • Do Now prompts • Class work 	4 days

<p>Obj 9.5 Use sigma notation and find finite sums of terms in arithmetic and geometric sequences, find sums of convergent geometric series</p>			<ul style="list-style-type: none"> • Homework • Problem solving activities • Think and Discuss • Open-ended questions • Exit prompts • Study Island assignments <p>Summative:</p> <ul style="list-style-type: none"> • Mini-quiz • Quiz 	
<p>NJ-CCSS Domain Essential Questions</p>		<p>NJ-CCSS Cluster.Standard Standards for Mathematical Practice</p>		
<p>A-APR Arithmetic with Polynomials and Rational Expressions</p> <ul style="list-style-type: none"> • How can algebraic properties be used to prove that the nth term of a given sequence is defined? 	<p>A-APR.7 Rewrite rational expressions. 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>SMP.2 Reason abstractly and quantitatively SMP.3 Construct viable arguments and critique the reasoning of others. SMP.6 Attend to precision SMP.8 Look for and express regularity in repeated reasoning</p>			
<p>Skills/Objectives</p> <p>SWBAT...</p>	<p>Instructional Strategies Activities/ Materials /Technology Interdisciplinary Connections Cultural Diversity</p>	<p>Modifications ESL / Special Education Academic Support/G&T Differentiated Instruction</p>	<p>Assessments Formative Summative Benchmarks</p>	<p>Pacing</p>
<p>Obj 9.6 Use the principle of mathematical induction to prove mathematical generalizations</p>	<ul style="list-style-type: none"> • Definitions, examples and notes • Discuss the principals of Mathematical Induction • Apply Mathematical Induction 	<ul style="list-style-type: none"> • Extended time • Assignment modification • Group investigations • Mnemonics • Color coding • Highlighting/and underlining 	<p>Formative:</p> <ul style="list-style-type: none"> • In class practice problems • Board work • Do Now prompts • Class work 	<p>3 days</p>

		<ul style="list-style-type: none"> • Simulations • Pair-share 	<ul style="list-style-type: none"> • Homework • Problem solving activities • Think and Discuss • Open-ended questions • Exit prompts • Study Island assignments <p><u>Summative:</u></p> <ul style="list-style-type: none"> • Mini-quiz <p><u>Performance Assessment</u> -</p> <ul style="list-style-type: none"> • Test <p><u>Benchmark:</u></p> <p>Test</p>	
NJ-CCSS Domain Essential Questions		NJ-CCSS Cluster.Standard Standards for Mathematical Practice		
<p>S-ID Interpreting Categorical and Quantitative Data</p> <ul style="list-style-type: none"> • How can you display data graphically? • How can the collection, organization, interpretation, and display of data be used to answer questions? • What information can be obtained from the graphical display of data? 	<p>S-ID.1 Summarize, represent, and interpret data on a single count or measurement variable. Represent data with plots on the real number line(dot plots, histograms, and box plots).</p> <p>S-ID.2 Summarize, represent, and interpret data on a single count or measurement variable. Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.</p> <p>S-ID.3 Summarize, represent, and interpret data on a single count or measurement variable. Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).</p> <p>S-ID.4 Summarize, represent and interpret data on a single count or measurement variable. 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>S-ID.5 Summarize, represent, and interpret data on two categorical and quantitative variables. Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.</p> <p>SMP.1 Make sense of problems and persevere in solving them</p> <p>SMP.2 Reason abstractly and quantitatively</p> <p>SMP.3 Construct viable arguments and critique the reasoning of others.</p> <p>SMP.4 Model with mathematics.</p> <p>SMP.5 Use appropriate tools strategically.</p>			

		SMP.6 Attend to precision SMP.7 Look for and make use of structure SMP.8 Look for and express regularity in repeated reasoning		
Skills/Objectives SWBAT...	Instructional Strategies Activities/ Materials /Technology Interdisciplinary Connections Cultural Diversity	Modifications ESL / Special Education Academic Support/G&T Differentiated Instruction	Assessments Formative Summative Benchmarks	Pacing
<p>Obj 9.7 Distinguish between categorical and quantitative variables and use various kinds of graphs to display data</p> <p>Obj 9.8 Use measures of center, the five-number summary, a boxplot, standard deviation, and normal distribution to describe quantitative data</p>	<ul style="list-style-type: none"> • Definitions, examples and notes • Discuss circle graphs, box and whiskers, stem plot, histogram • Understanding how to use the grapher to organize and analyze data • Determining mean, median, mode, frequency table, five-number summary, box and whisker plot/boxplot, variance and standard deviation. <p>Analyze data and apply to problem solving</p>	<ul style="list-style-type: none"> • Extended time • Assignment modification • Group investigations • Mnemonics • Color coding • Highlighting/and underlining • Simulations • Pair-share 	<p>Formative:</p> <ul style="list-style-type: none"> • In class practice problems • Board work • Do Now prompts • Class work • Homework • Problem solving activities • Think and Discuss • Open-ended questions • Exit prompts • Study Island assignments <p>Summative:</p> <ul style="list-style-type: none"> • Quiz 	4 days

NJ-CCSS Domain Essential Questions		NJ-CCSS Cluster.Standard Standards for Mathematical Practice		
<p>G-SRT Similarity, Right Triangles, and Trigonometry</p> <p>F-TF Trigonometric Functions</p> <ul style="list-style-type: none"> How is the unit circle related to periodic functions? 		<p>G-SRT.8 Define trigonometric ratios and solve problems involving right triangles. Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.</p> <p>F-TF.3 Extend the domain of trigonometric functions using the unit circle. Use special triangles to determine geometrically the values of sine, cosine, tangent for $\pi/3$, $\pi/4$ and $\pi/6$, and use the unit circle to express the values of sine, cosine, and tangent for $\pi-x$, $\pi+x$, and $2\pi-x$ in terms of their values for x, where x is any real number.</p> <p>F-TF.4 Extend the domain of trigonometric functions using the unit circle. Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions.</p> <p>SMP.1 Make sense of problems and persevere in solving them SMP.2 Reason abstractly and quantitatively SMP.3 Construct viable arguments and critique the reasoning of others. SMP.4 Model with mathematics. SMP.5 Use appropriate tools strategically. SMP.6 Attend to precision</p>		
Skills/Objectives SWBAT...	Instructional Strategies Activities/ Materials /Technology Interdisciplinary Connections Cultural Diversity	Modifications ESL / Special Education Academic Support/G&T Differentiated Instruction	Assessments Formative Summative Benchmarks	Pacing
<p>Obj. 4.1 Convert between radians and degrees, find arc lengths, convert to nautical miles and solve problems involving angular speed.</p> <p>Obj. 4.2 Define the six trigonometric functions using the lengths of the sides of a right triangle</p> <p>Obj. 4.3 Solve problems involving the trigonometric functions of real numbers and the properties of the sine and cosine as periodic functions</p>	<ul style="list-style-type: none"> Definitions, examples and notes String Exploration Activity Present six trigonometric functions Review 45-45-90 and 30 60 90 triangles Instruction on calculator use finding trigonometric measures Application problems Develop unit circle Use of reference angles <p>Materials/Technology/Resources: Graphing Calculator Supplemental worksheet on special angles <u>Precalculus</u>, Addison Wesley, 2007</p> <p>Interdisciplinary Connections: Physics</p>	<ul style="list-style-type: none"> Extended time Assignment modification Group investigations KWL strategies Mnemonics Color coding Highlighting/and underlining Simulations Pair-share 	<p>Formative:</p> <ul style="list-style-type: none"> In class practice problems Board work Do Now prompts Class work Homework Problem solving activities Think and Discuss Open-ended questions Exit prompts Study Island assignments <p>Summative:</p> <ul style="list-style-type: none"> Mini Quiz Quiz 	3 days

NJ-CCSS Domain Essential Questions		NJ-CCSS Cluster.Standard Standards for Mathematical Practice		
<p>F-TF Trigonometric Functions</p> <ul style="list-style-type: none"> • What patterns are used to graph periodic functions? • What observations can you make about the graph of a sine graph vs a cosine graph? • What observations can you make about the graph of a sine graph vs a cosecant graph? 		<p>F-TF.5 Model periodic phenomena with trigonometric functions. Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.</p> <p>F-TF.4 Extend the domain of trigonometric functions using the unit circle. Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions.</p> <p>F-TF.6 Model periodic phenomena with trigonometric functions. Understand that restricting a trigonometric function to a domain on which it is always increasing or always decreasing allows its inverse to be constructed</p> <p>SMP.1 Make sense of problems and persevere in solving them SMP.3 Construct viable arguments and critique the reasoning of others. SMP.4 Model with mathematics. SMP.5 Use appropriate tools strategically. SMP.6 Attend to precision SMP.7 Look for and make use of structure</p>		
Skills/Objectives SWBAT...	Instructional Strategies Activities/ Materials /Technology Interdisciplinary Connections Cultural Diversity	Modifications ESL / Special Education Academic Support/G&T Differentiated Instruction	Assessments Formative Summative Benchmarks	Pacing
<p>Obj 4.4 Generate the graphs of the sine and cosine functions and explore various transformations of these graphs</p> <p>Obj. 4.5 Generate the graphs of the tangent, cotangent, secant and cosecant functions and explore various transformations of these graphs</p> <p>Obj 4.6 Graph combinations of trigonometric and algebraic functions</p>	<ul style="list-style-type: none"> • Definitions, examples and notes • Define Sinusoid • Example of basic graph and transformations • Example of tangent, cotangent, secant and cosecant graphs and transformations • Summary of properties of all six graphs • Examine inverse graphs and explore properties 	<ul style="list-style-type: none"> • Extended time • Assignment modification • Group investigations • Mnemonics • Color coding • Highlighting/and underlining • Simulations • Pair-share 	<p>Formative:</p> <ul style="list-style-type: none"> • In class practice problems • Board work • Do Now prompts • Class work • Homework • Problem solving activities • Think and Discuss • Open-ended questions • Exit prompts • Study Island assignments <p>Summative:</p> <ul style="list-style-type: none"> • Mini Quiz • Quiz 	5 days

NJ-CCSS Domain Essential Questions		NJ-CCSS Cluster.Standard Standards for Mathematical Practice		
<p>F-TF Trigonometric Functions</p> <p>G-SRT Similarity, Right Triangles, and Trigonometry</p> <ul style="list-style-type: none"> How can we use trigonometric functions and their inverses to model real world situations? 		<p>F-TF.7 Model periodic phenomena with trigonometric functions. Use inverse functions to solve trigonometric equations that arise in modeling contexts; evaluate the solutions using technology, and interpret them in terms of the context.</p> <p>G-SRT.8 Define trigonometric ratios and solve problems involving right triangles. Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.</p> <p>SMP.2 Reason abstractly and quantitatively SMP.3 Construct viable arguments and critique the reasoning of others. SMP.4 Model with mathematics. SMP.5 Use appropriate tools strategically. SMP.6 Attend to precision</p>		
Skills/Objectives SWBAT...	Instructional Strategies Activities/ Materials /Technology Interdisciplinary Connections Cultural Diversity	Modifications ESL / Special Education Academic Support/G&T Differentiated Instruction	Assessments Formative Summative Benchmarks	Pacing
<p>Obj 4.7 Relate the concepts of inverse functions to trigonometric functions</p> <p>Obj 4.8 Apply the concepts of trigonometry to solve real-world problems.</p>	<ul style="list-style-type: none"> Definitions, examples and notes Define sinusoid Example of basic graph and transformations Example of tangent, cotangent, secant and cosecant graphs and transformations Summary of properties of all six graphs Examine inverse graphs and explore properties 	<ul style="list-style-type: none"> Extended time Assignment modification Group investigations Mnemonics Color coding Highlighting/and underlining Simulations Pair-share 	<p>Formative:</p> <ul style="list-style-type: none"> In class practice problems Board work Do Now prompts Class work Homework Problem solving activities Think and Discuss Open-ended questions Exit prompts Study Island assignments <p>Summative:</p> <ul style="list-style-type: none"> Mini Quiz Quiz <p>Performance Assessment -</p> <ul style="list-style-type: none"> Test <p>Benchmark:</p> <ul style="list-style-type: none"> Test 	4 days

NJ-CCSS Domain Essential Questions		NJ-CCSS Cluster.Standard Standards for Mathematical Practice		
<p>F-TF Trigonometric Functions</p> <ul style="list-style-type: none"> How can you verify the validity of trigonometric identities? How can we determine an angle measure using trigonometric equations? 		<p>F-TF.8 Prove and apply trigonometric identities. Prove the Pythagorean identity $\sin^2(\theta) + \cos^2(\theta) = 1$ and use it find $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ given $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ and the quadrant.</p> <p>F-TF.9 Prove and apply trigonometric identities. Prove the addition and subtraction formulas for sine, cosine, and tangent and use them to solve problems.</p> <p>SMP.1 Make sense of problems and persevere in solving them SMP.2 Reason abstractly and quantitatively SMP.3 Construct viable arguments and critique the reasoning of others. SMP.5 Use appropriate tools strategically. SMP.6 Attend to precision SMP.7 Look for and make use of structure</p>		
Skills/Objectives SWBAT...	Instructional Strategies Activities/ Materials /Technology Interdisciplinary Connections Cultural Diversity	Modifications ESL / Special Education Academic Support/G&T Differentiated Instruction	Assessments Formative Summative Benchmarks	Pacing
<p>Obj 5.1 Use fundamental identities to simplify trigonometric expressions and solve trigonometric equations.</p> <p>Obj 5.2 Determine if an equation is an identify and confirm identities analytically.</p> <p>Obj 5.3 Apply the identities for the cosine, sine, and tangent of a difference or sum.</p> <p>Obj 5.4 Apply double-angle identities, power-reducing identities, and half-angle identities.</p>	<ul style="list-style-type: none"> Definitions, examples and notes Explore identities graphically Students work in groups to complete identities, answer keys provided at end of exercise Use numerical values to prove difference, sum, double-angle, power-reducing and half-angle Verify identities <p>Materials/Technology/Resources: Graphing Calculator Precalculus, Addison-Wesley, 2007</p> <p>Interdisciplinary Connections: Physics</p>	<ul style="list-style-type: none"> Extended time Assignment modification Group investigations Mnemonics Color coding Highlighting/and underlining Simulations Pair-share 	<p>Formative:</p> <ul style="list-style-type: none"> In class practice problems Board work Do Now prompts Class work Homework Problem solving activities Think and Discuss Open-ended questions Exit prompts Study Island assignments <p>Summative:</p> <ul style="list-style-type: none"> Mini Quiz Quiz 	9 days

NJ-CCSS Domain Essential Questions		NJ-CCSS Cluster.Standard Standards for Mathematical Practice		
<p>G-SRT Similarity, Right Triangles, and Trigonometry</p> <p>F-TF Trigonometric Functions</p> <ul style="list-style-type: none"> How can you find the angle or side measures of non-right triangles? 		<p>G-SRT.10 Apply trigonometry to general triangles.(+) Prove the Laws of Sines and Cosines and use them to solve problems.</p> <p>G-SRT.11 Apply trigonometry to general triangles.(+) Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles.</p> <p>G-SRT.9 Apply trigonometry to general triangles. (+) Derive the formula $A = \frac{1}{2} ab \sin(C)$ for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side.</p> <p>F-TF.7 Model periodic phenomena with trigonometric functions. Use inverse functions to solve trigonometric equations that arise in modeling contexts; evaluate the solutions using technology, and interpret them in terms of the context.</p> <p>SMP.1 Make sense of problems and persevere in solving them</p> <p>SMP.2 Reason abstractly and quantitatively</p> <p>SMP.4 Model with mathematics.</p> <p>SMP.6 Attend to precision</p> <p>SMP.7 Look for and make use of structure</p>		
Skills/Objectives SWBAT...	Instructional Strategies Activities/ Materials /Technology Interdisciplinary Connections Cultural Diversity	Modifications ESL / Special Education Academic Support/G&T Differentiated Instruction	Assessments Formative Summative Benchmarks	Pacing
<p>Obj 5.5 Understand the proof of the Law of Sines and use the computational application of the Law of Sines to solve a variety of problems.</p> <p>Obj 5.6 Apply the Law of Cosines to solve acute and obtuse triangles and to determine the area of a triangle in terms of the measures of the sides and angles.</p>	<ul style="list-style-type: none"> Definitions, examples and notes Review Triangle Congruence Postulates and Theorems Apply Law of Sines to solve a ASA, AAS, SSA(ambiguous case) triangle Apply Law of Cosines to solve SSS & SAS triangles Application problems Review area of a triangle = $\frac{1}{2} bh$, extend by using angle relationships to $\frac{1}{2} \sin \theta$ Use Heron's Formula to determine the area of a SSS triangle 	<ul style="list-style-type: none"> Extended time Assignment modification Group investigations Mnemonics Color coding Highlighting/and underlining Simulations Pair-share 	<p>Formative:</p> <ul style="list-style-type: none"> In class practice problems Board work Do Now prompts Class work Homework Problem solving activities Think and Discuss Open-ended questions Exit prompts <p>Summative:</p> <ul style="list-style-type: none"> Mini Quiz Quiz <p>Performance Assessment -</p>	5 days

			<ul style="list-style-type: none">• Test <p><u>Benchmark:</u></p> <ul style="list-style-type: none">• Test	
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NJ-CCSS Domain Essential Questions		NJ-CCSS Cluster.Standard Standards for Mathematical Practice		
<p>N-VM Vector and Matrix Quantities</p> <ul style="list-style-type: none"> How can we best represent forces acting on objects? 		<p>N-VM.1 Represent and model with vector quantities. Recognize vector quantities as having both magnitude and direction. Represent vector quantities by directed line segments, and use appropriate symbols for vectors and their magnitudes.</p> <p>N-VM.2 Represent and model with vector quantities. Find the components of a vector by subtracting the coordinates of an initial point from the coordinates of a terminal point.</p> <p>N-VM.3 Represent and model with vector quantities. Solve problems involving velocity and other quantities that can be represented by vectors.</p> <p>N-VM.4a Perform operations on vectors. Add and subtract vectors. Add vectors end-to-end, component-wise, and by the parallelogram rule. Understand that the magnitude of a sum of two vectors is typically not the sum of the magnitudes.</p> <p>N-VM.4b Perform operations on vectors. Add and subtract vectors. Given two vectors in magnitude and direction form, determine the magnitude and direction of their sum.</p> <p>N-VM.4c Perform operations on vectors. Add and subtract vectors. Understand vector subtraction $v - w$ as $v + (-w)$, where $-w$ is the additive inverse of w, with the same magnitude as w and pointing in the opposite direction. Represent vector subtraction graphically by connecting the tips in the appropriate order, and perform vector subtraction component-wise.</p> <p>N-VM.5a Perform operations on vectors. Multiply a vector by a scalar. Represent scalar multiplication graphically by scaling vectors and possibly reversing their direction; perform scalar multiplication component-wise.</p> <p>N-VM.5b Perform operations on vectors. Multiply a vector by a scalar. Compute the magnitude of a scalar multiple cv using $\ cv\ = c v$. Compute the direction of cv knowing that when $c v \neq 0$, the direction of cv is either along v (for $c > 0$) or against v (for $c < 0$).</p> <p>SMP.1 Make sense of problems and persevere in solving them SMP.2 Reason abstractly and quantitatively SMP.4 Model with mathematics. SMP.5 Use appropriate tools strategically. SMP.6 Attend to precision</p>		
Skills/Objectives	Instructional Strategies	Modifications	Assessments	Pacing
SWBAT...	Activities/ Materials /Technology Interdisciplinary Connections Cultural Diversity	ESL / Special Education Academic Support/G&T Differentiated Instruction	Formative Summative Benchmarks	
Obj 6.1 Apply the arithmetic of vectors and use vectors to solve real-world problems	<ul style="list-style-type: none"> Definitions, examples and notes of 2 dimensional vectors, vector operations, unit vectors, “HMT” rule Calculating the magnitude of a vector 	<ul style="list-style-type: none"> Extended time Assignment modification Group investigations KWL strategies 	<p>Formative:</p> <ul style="list-style-type: none"> In class practice problems Board work 	4 days

<p>Obj 6.2 Calculate the dot product of vectors</p>	<ul style="list-style-type: none"> • Determining a unit vector • Determining the direction angles • Finding the components of a vector • Discuss applications – converting from a “bearing” (compass) to a direction angle – calculating the effect of wind velocity. <p>Materials/Technology/Resources: Graphing Calculator <u>Precalculus</u>, Addison Wesley, 2007</p> <p>Interdisciplinary Connections: Physics</p>	<ul style="list-style-type: none"> • Mnemonics • Color coding • Highlighting/and underlining • Simulations • Pair-share Small group instruction • Pair-share 	<ul style="list-style-type: none"> • Do Now prompts • Class work • Homework • Problem solving activities • Think and Discuss • Open-ended questions • Exit prompts • Study Island assignments <p>Summative:</p> <ul style="list-style-type: none"> • Mini Quiz 	
<p align="center">NJ-CCSS Domain Essential Questions</p>		<p align="center">NJ-CCSS Cluster.Standard Standards for Mathematical Practice</p>		
<p>N-CN The Complex Number System</p> <ul style="list-style-type: none"> • How can you graph non-functions in polar mode? 		<p>N-CN.4 Represent complex numbers and their operations on the complex plane. Represent complex numbers on the complex plane in rectangular and polar form (including real and imaginary numbers), and explain why the rectangular and polar forms of a given complex number represent the same number.</p> <p>SMP.1 Make sense of problems and persevere in solving them SMP.4 Model with mathematics. SMP.5 Use appropriate tools strategically. SMP.6 Attend to precision SMP.7 Look for and make use of structure</p>		
<p>Skills/Objectives</p> <p align="center">SWBAT...</p>	<p align="center">Instructional Strategies Activities/ Materials /Technology Interdisciplinary Connections Cultural Diversity</p>	<p align="center">Modifications ESL / Special Education Academic Support/G&T Differentiated Instruction</p>	<p align="center">Assessments Formative Summative Benchmarks</p>	<p align="center">Pacing</p>
<p>Obj 6.4 Convert points and equations from polar to rectangular coordinates and vice versa</p>	<ul style="list-style-type: none"> • Definitions, examples and notes • Demonstrate use of calculator in polar mode • Apply symmetry tests 	<ul style="list-style-type: none"> • Extended time • Assignment modification • Group investigations • Mnemonics 	<p>Formative:</p> <ul style="list-style-type: none"> • In class practice problems • Board work 	<p align="center">5 days</p>

<p>Obj 6.4 Convert points and equations from polar to rectangular coordinates and vice versa</p> <p>Obj 6.5 Graph polar equations and determine the maximum 4-value and symmetry of a graph</p>		<ul style="list-style-type: none"> • Color coding • Highlighting/and underlining • Simulations • Pair-share 	<ul style="list-style-type: none"> • Do Now prompts • Class work • Homework • Problem solving activities • Think and Discuss • Open-ended questions • Exit prompts • Study Island assignments <p>Summative:</p> <ul style="list-style-type: none"> • Mini Quiz • Quiz 	
<p align="center">NJ-CCSS Domain Essential Questions</p>		<p align="center">NJ-CCSS Cluster.Standard Standards for Mathematical Practice</p>		
<p>4.1.12A3 (4.3.12D1,2; 4.5C6; 4.5F3)</p> <ul style="list-style-type: none"> • How can you raise a complex number $(a + bi)$ to the nth power, or find the nth root of the complex number? 	<p>SMP.1 Make sense of problems and persevere in solving them SMP.2 Reason abstractly and quantitatively SMP.3 Construct viable arguments and critique the reasoning of others. SMP.4 Model with mathematics. SMP.5 Use appropriate tools strategically. SMP.6 Attend to precision</p>			
<p align="center">Skills/Objectives</p> <p align="center">SWBAT...</p>	<p align="center">Instructional Strategies Activities/ Materials /Technology Interdisciplinary Connections Cultural Diversity</p>	<p align="center">Modifications ESL / Special Education Academic Support/G&T Differentiated Instruction</p>	<p align="center">Assessments Formative Summative Benchmarks</p>	<p align="center">Pacing</p>
<p>Obj 6.6 Represent complex numbers in the complex plane and write them in trigonometric form. Use trigonometric form to simplify some algebraic operations with complex numbers.</p>	<ul style="list-style-type: none"> • Definitions, examples and notes • Review complex numbers • Apply DeMoivres Theorem to raise a complex number to an integer power and find the root of a complex number 	<ul style="list-style-type: none"> • Extended time • Assignment modification • Group investigations • Mnemonics • Color coding • Highlighting/and underlining • Simulations • Pair-share 	<p>Formative:</p> <ul style="list-style-type: none"> • In class practice problems • Board work • Do Now prompts • Class work • Homework • Problem solving activities • Think and Discuss 	<p align="center">4 days</p>

			<ul style="list-style-type: none"> • Open-ended questions • Exit prompts • Study Island assignments <p><u>Summative:</u></p> <ul style="list-style-type: none"> • Mini Quiz • Quiz <p><u>Performance Assessment</u> -</p> <ul style="list-style-type: none"> • Test <p><u>Benchmark:</u></p> <ul style="list-style-type: none"> • Test 	
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Unit 7: Systems and Matrices

Grade: 10-11

Date: May 2012

<p align="center">NJ-CCSS Domain Essential Questions</p>	<p align="center">NJ-CCSS Cluster.Standard Standards for Mathematical Practice</p>
<p>A-REI Reasoning with Equations and Inequalities</p> <ul style="list-style-type: none"> • How do you determine the best method to solve a system of equations? 	<p>A-REL.8 Solve systems of equations. Represent a system of linear equations as a single matrix equation in a vector variable.</p> <p>SMP.1 Make sense of problems and persevere in solving them SMP.2 Reason abstractly and quantitatively SMP.3 Construct viable arguments and critique the reasoning of others. SMP.4 Model with mathematics. SMP.5 Use appropriate tools strategically.</p>

Skills/Objectives SWBAT...	Instructional Strategies Activities/ Materials /Technology Interdisciplinary Connections Cultural Diversity	Modifications ESL / Special Education Academic Support/G&T Differentiated Instruction	Assessments Formative Summative Benchmarks	Pacing
Obj 7.1 Solve systems of equations graphically and algebraically	<ul style="list-style-type: none"> • Definitions, examples and notes • Review solving a system by graphing, substitution, addition/subtraction elimination method <p><u>Materials/Technology/Resources:</u> Graphing Calculator <u>Precalculus</u>, Addison Wesley, 2007</p> <p><u>Interdisciplinary Connections:</u> Business</p>	<ul style="list-style-type: none"> • Extended time • Assignment modification • Group investigations • Mnemonics • Color coding • Highlighting/and underlining • Simulations • Pair-share Small group instruction • Pair-share 	<p><u>Formative:</u></p> <ul style="list-style-type: none"> • In class practice problems • Board work • Do Now prompts • Class work • Homework • Problem solving activities • Think and Discuss • Open-ended questions • Exit prompts • Study Island assignments <p><u>Summative:</u></p> <ul style="list-style-type: none"> • Mini Quiz • Quiz 	2 days

NJ-CCSS Domain Essential Questions	NJ-CCSS Cluster.Standard Standards for Mathematical Practice
N-VM Vector and Matrix Quantities <ul style="list-style-type: none"> • How can you solve systems of equations using matrices? • How can you determine the equation of a 2nd or 3rd degree polynomial given 3 points which lie on the curve? 	<p>N-VM.6 Perform operations on matrices and use matrices in applications. Use matrices to represent and manipulate data, e.g., to represent payoffs or incidence relationships in a network.</p> <p>N-VM.7 Perform operations on matrices and use matrices in applications. Multiply matrices by scalars to produce new matrices, e.g., as when all of the payoffs in a game are doubled.</p> <p>N-VM.8 Perform operations on matrices and use matrices in applications. Add, subtract, and multiply matrices of appropriate dimensions</p> <p>N-VM.10 Perform operations on matrices and use matrices in applications. Understand that the zero and identity matrices play a role in matrix addition and multiplication similar to the role of 0 and 1 in the real numbers. The determinant of a square matrix is nonzero if and only if the matrix has a multiplicative inverse.</p> <p>N-VM.11 Perform operations on matrices and use matrices in applications. Multiply a vector (regarded as a matrix with one column) by a matrix of suitable dimensions to produce another vector. Work with matrices as transformations of vectors.</p>

		<p>A-REL.8 Solve systems of equations. Represent a system of linear equations as a single matrix equation in a vector variable.</p> <p>SMP.3 Construct viable arguments and critique the reasoning of others. SMP.4 Model with mathematics. SMP.5 Use appropriate tools strategically. SMP.6 Attend to precision SMP.7 Look for and make use of structure</p>		
Skills/Objectives SWBAT...	Instructional Strategies Activities/ Materials /Technology Interdisciplinary Connections Cultural Diversity	Modifications ESL / Special Education Academic Support/G&T Differentiated Instruction	Assessments Formative Summative Benchmarks	Pacing
<p>Obj 7.2 Find sums, differences, products and inverses of matrices</p> <p>Obj 7.3 Solve systems of linear equations using Gaussian elimination, the row echelon form of a matrix, or an inverse matrix</p>	<ul style="list-style-type: none"> • Definitions of basic functions such as add, subtract, multiplication by a scalar, and product of 2 matrices, examples and notes • Demonstrate solving matrices on the calculator and by hand • Discuss the algorithm to calculate by hand the determinant of a 3x3 and nxn matrix, check by using the calculator • Curve fitting application (we know how to find the equation of a line thru 2 points – find the quadratic or cubic equation thru 3 or 4 points). 	<ul style="list-style-type: none"> • Extended time • Assignment modification • Group investigations • Mnemonics • Color coding • Highlighting/and underlining • Simulations • Pair-share 	<p>Formative:</p> <ul style="list-style-type: none"> • In class practice problems • Board work • Do Now prompts • Class work • Homework • Problem solving activities • Think and Discuss • Open-ended questions • Exit prompts • Study Island assignments <p>Summative:</p> <ul style="list-style-type: none"> • Mini Quiz • Quiz 	6 days
NJ-CCSS Domain Essential Questions		NJ-CCSS Cluster.Standard Standards for Mathematical Practice		
<p>4.1.12B1 (4.1.12B3; 4.3.12D1; 4.5C1,2,4,6)</p> <ul style="list-style-type: none"> • Why are rational expressions decomposed into partial fractions? 		<p>SMP.1 Make sense of problems and persevere in solving them SMP.2 Reason abstractly and quantitatively SMP.3 Construct viable arguments and critique the reasoning of others. SMP.6 Attend to precision SMP.7 Look for and make use of structure</p>		

Skills/Objectives SWBAT...	Instructional Strategies Activities/ Materials /Technology Interdisciplinary Connections Cultural Diversity	Modifications ESL / Special Education Academic Support/G&T Differentiated Instruction	Assessments Formative Summative Benchmarks	Pacing
Obj 7.4 Decompose rational expressions into partial fractions	<ul style="list-style-type: none"> • Definitions, examples and notes • Finding the original fractions that when added or subtracted yield the given rational expression with denominators that have: <ul style="list-style-type: none"> ○ Linear factors ○ Repeated linear factors ○ Quadratic factors ○ Repeated quadratic factors 	<ul style="list-style-type: none"> • Extended time • Assignment modification • Group investigations • Mnemonics • Color coding • Highlighting/and underlining • Simulations • Pair-share 	<p>Formative:</p> <ul style="list-style-type: none"> • In class practice problems • Board work • Do Now prompts • Class work • Homework • Problem solving activities • Think and Discuss • Open-ended questions • Exit prompts • Study Island assignments <p>Summative:</p> <ul style="list-style-type: none"> • Mini Quiz 	4 days
NJ-CCSS Domain Essential Questions		NJ-CCSS Cluster.Standard Standards for Mathematical Practice		
A-REI Reasoning with Equations and Inequalities <ul style="list-style-type: none"> • How can you determine the maximum or minimum value to obtain a targeted goal? 	<p>A-REI.11 Represent and solve equations and inequalities graphically. Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, radical, absolute value, and exponential functions.</p> <p>SMP.1 Make sense of problems and persevere in solving them SMP.2 Reason abstractly and quantitatively SMP.3 Construct viable arguments and critique the reasoning of others. SMP.4 Model with mathematics. SMP.5 Use appropriate tools strategically. SMP.6 Attend to precision SMP.7 Look for and make use of structure</p>			

Skills/Objectives SWBAT...	Instructional Strategies Activities/ Materials /Technology Interdisciplinary Connections Cultural Diversity	Modifications ESL / Special Education Academic Support/G&T Differentiated Instruction	Assessments Formative Summative Benchmarks	Pacing
Obj 7.5 Solve linear programming problems and systems of inequalities using graphical methods.	<ul style="list-style-type: none"> • Definitions, examples and notes • Demonstrate use of shading on the grapher & by hand • Solve an inequality by finding the max & min values of an objective function which represents the vertex or corner points of a linear programming problem with a solution 	<ul style="list-style-type: none"> • Extended time • Assignment modification • Group investigations • Mnemonics • Color coding • Highlighting/and underlining • Simulations • Pair-share 	<p>Formative:</p> <ul style="list-style-type: none"> • In class practice problems • Board work • Do Now prompts • Class work • Homework • Problem solving activities • Think and Discuss • Open-ended questions • Exit prompts • Study Island assignments <p>Summative:</p> <ul style="list-style-type: none"> • Mini Quiz • Quiz <p>Performance Assessment -</p> <ul style="list-style-type: none"> • Test <p>Benchmark:</p> <ul style="list-style-type: none"> • Test 	2 days

NJ-CCSS Domain Essential Questions		NJ-CCSS Cluster.Standard Standards for Mathematical Practice		
<p>G-GPE Expressing Geometric Properties with Equations</p> <ul style="list-style-type: none"> • Why are the circle, parabola, hyperbola and ellipse called conics? • How can we write the equation of a conic given specific information? • How are conics related to the real world? 		<p>G-GPE.3 Translate between the geometric description and the equation for a conic section. Derive the equations of ellipses and hyperbolas given the foci, using the fact that the sum or difference of distances from the foci is constant.</p> <p>SMP.1 Make sense of problems and persevere in solving them SMP.2 Reason abstractly and quantitatively SMP.4 Model with mathematics. SMP.5 Use appropriate tools strategically. SMP.6 Attend to precision SMP.7 Look for and make use of structure</p>		
Skills/Objectives SWBAT...	Instructional Strategies Activities/ Materials /Technology Interdisciplinary Connections Cultural Diversity	Modifications ESL / Special Education Academic Support/G&T Differentiated Instruction	Assessments Formative Summative Benchmarks	Pacing
<p>Obj 8.1 Find the equation, focus, and directrix of a parabola</p> <p>Obj 8.2 Find the equation, vertices, and foci of an ellipse.</p> <p>Obj 8.3 Find the equation, vertices, and foci of a hyperbola.</p> <p>Obj 8.4 Determine equations for translated and rotated axes for conic sections.</p>	<ul style="list-style-type: none"> • Definitions, examples and notes • Physical models of conic sections • Demonstrate graphing each conic by hand using foci • Investigating the conics application in the real world • Determining eccentricity • Writing the equation of a conic given specific information • Given an equation, determine the essential parts to the conic and use them to graph the conic <p><u>Materials/Technology/Resources:</u> Graphing Calculator <u>Precalculus</u>, Addison Wesley, 2007</p> <p><u>Interdisciplinary Connections:</u> Physics</p>	<ul style="list-style-type: none"> • Extended time • Assignment modification • Group investigations • Mnemonics • Color coding • Highlighting/and underlining • Simulations • Pair-share Small group instruction • Pair-share 	<p><u>Formative:</u></p> <ul style="list-style-type: none"> • In class practice problems • Board work • Do Now prompts • Class work • Homework • Problem solving activities • Think and Discuss • Open-ended questions • Exit prompts • Study Island assignments <p><u>Summative:</u></p> <ul style="list-style-type: none"> • Mini Quiz • Quiz 	8 days

NJ-CCSS Domain Essential Questions		NJ-CCSS Cluster.Standard Standards for Mathematical Practice		
4.3.12C1 (4.2.12.A2; 4.2.12.E2; 4.3.12B2,4; 4.3.12D2; 4.5E1-3; 4.5F3,4) <ul style="list-style-type: none"> How can vectors be used to represent figures in three dimensional space? 		SMP.2 Reason abstractly and quantitatively SMP.4 Model with mathematics. SMP.5 Use appropriate tools strategically. SMP.6 Attend to precision SMP.7 Look for and make use of structure		
Skills/Objectives SWBAT...	Instructional Strategies Activities/ Materials /Technology Interdisciplinary Connections Cultural Diversity	Modifications ESL / Special Education Academic Support/G&T Differentiated Instruction	Assessments Formative Summative Benchmarks	Pacing
Obj 8.6 Draw three dimensional figures and analyze vectors in space	<ul style="list-style-type: none"> Definitions, examples and notes Physical models of Cartesian Space Finding distance & a midpoint Worksheet 	<ul style="list-style-type: none"> Extended time Assignment modification Group investigations Mnemonics Color coding Highlighting/and underlining Simulations Pair-share 	Formative: <ul style="list-style-type: none"> In class practice problems Board work Do Now prompts Class work Homework Problem solving activities Think and Discuss Open-ended questions Exit prompts Study Island assignments Summative: <ul style="list-style-type: none"> Quiz Performance Assessment - <ul style="list-style-type: none"> Test Benchmark: <ul style="list-style-type: none"> Test 	3 days

NJ-CCSS Domain Essential Questions		NJ-CCSS Cluster.Standard Standards for Mathematical Practice		
<p>4.3.12 A2 (4.2.12.D2; 4.2.12.E2; 4.3.12B.2,3,4; 4.5C3; 4.5E1; 4.5F3)</p> <ul style="list-style-type: none"> • How are limits and derivatives related? • How do you find the area under a curve? 		<p>SMP.1 Make sense of problems and persevere in solving them SMP.2 Reason abstractly and quantitatively SMP.4 Model with mathematics. SMP.5 Use appropriate tools strategically. SMP.6 Attend to precision SMP.7 Look for and make use of structure</p>		
Skills/Objectives SWBAT...	Instructional Strategies Activities/ Materials /Technology Interdisciplinary Connections Cultural Diversity	Modifications ESL / Special Education Academic Support/G&T Differentiated Instruction	Assessments Formative Summative Benchmarks	Pacing
<p>Obj 10.1 Calculate instantaneous velocities and derivatives using limits</p> <p>Obj 10.2 Calculate definite integrals using areas</p> <p>Obj 10.3 Use the properties of limits and evaluate one-sided limits, two-sided limits, and limits involving infinity</p> <p>Obj 10.4 Estimate derivatives and integrals using numerical techniques</p>	<ul style="list-style-type: none"> • Definitions, examples and notes • Review rational equations – find asymptotes and points of discontinuity • Use trapezoidal rule program for calculating the area under a curve <p><u>Materials/Technology/Resources:</u> Graphing Calculator Precalculus, Addison Wesley, 2007</p> <p><u>Interdisciplinary Connections:</u> Physics</p>	<ul style="list-style-type: none"> • Extended time • Assignment modification • Group investigations • KWL strategies • Mnemonics • Color coding • Highlighting/and underlining • Simulations • Pair-share Small group instruction • Pair-share 	<p><u>Formative:</u></p> <ul style="list-style-type: none"> • In class practice problems • Board work • Do Now prompts • Class work • Homework • Problem solving activities • Think and Discuss • Open-ended questions • Exit prompts • Study Island assignments <p><u>Summative:</u></p> <ul style="list-style-type: none"> • Quiz <p><u>Performance Assessment</u> -</p> <ul style="list-style-type: none"> • Test <p><u>Benchmark:</u></p> <ul style="list-style-type: none"> • Test 	10 days

NORTH BRUNSWICK TOWNSHIP HIGH SCHOOL

(2345) Honors Math Analysis

Grade 11

5 Credits, 1 Year

Course Description:

In Honors Math Analysis students will continue their study of rational and exponential functions, sequences and series, conic sections, logarithms, circular functions, curve fitting, parametric equations and polar coordinates. Emphasis is placed on the use of a graphing calculator, interpretation of graphs and applications in “real world” situations. The Advanced Placement Calculus curriculum will be introduced during the fourth quarter. The purchase of a TI-83+ or better graphing calculator is required. The student must complete a summer assignment.

Proficiencies:

Upon completion of this course the student should be able to

- Extend the properties of exponents to rational exponents.
- Perform arithmetic operations with complex numbers.
- Represent complex numbers and their operations on the complex plane.
- Use complex numbers in polynomial identities and equations.
- Use polynomial identities to solve problems.
- Rewrite rational expressions.
- Represent and solve equations and inequalities graphically.
- Analyze functions using different representations.
- Build a function that models a relationship between two quantities.
- Build new functions from existing functions.
- Construct and compare linear, quadratic, and exponential models and solve problems.
- Extend the domain of trigonometric functions using the unit circle.
- Model periodic phenomena with trigonometric functions.
- Prove and apply trigonometric identities.
- Understand similarity in terms of similarity transformations.
- Define trigonometric ratios and solve problems involving right triangles.
- Apply trigonometry to general triangles.
- Summarize, represent, and interpret data on a single count or measurement variable.
- Summarize, represent, and interpret data on two categorical and quantitative variables.
- Understand independence and conditional probability and use them to interpret data.
- Calculate expected values and use them to solve problems.
- Represent and model with vector quantities.
- Perform operations on vectors.
- Perform operations on matrices and use matrices in applications.
- Apply the theorems of 3 dimensions (3 space)
- Apply the concept of limit to differential and integral calculus
- Find the derivative of a function using the definition

Course Requirements

Students will be expected to:

1. Do homework assignments
2. Have a graphic utility
3. Have periodic quizzes and tests

Evaluation:

Marking period grades will be determined as follows:

- 90% performance assessments
- 10% homework

rev. 8/2011