

Pre Calculus Curriculum
Boyceville High School
Created by Andrew Hamm, Mathematics Instructor
July 2010

I. Introduction

Pre Calculus is a rigorous year-long course that teaches students the concepts needed to succeed in a technical school or college-level mathematics course, as well as prepares students for AP Calculus at Boyceville High School. Students who enroll in Pre Calculus are expected to have completed a two years of Algebra and one year of Geometry.

Pre Calculus focuses on four major areas of study: Functions, Graphs, and Applications, Trigonometry, Discrete Mathematics and Data Analysis, and Limits. In-class discussions and advanced problem solving are both supplemented by inquiry-based teaching methods, including extensive use of graphing technology-based laboratory activities. Students will complete at least nine different graphing calculator laboratory activities, as well as numerous other algebra, spreadsheet, and geometry lab activities in class to provide further learning opportunities.

II. Course Resources

The textbook used for Advanced Algebra is *Advanced Mathematics: Precalculus with Discrete Mathematics and Data Analysis* by Richard G. Brown (McDougal Littell/Houghton Mifflin, 2003). This textbook provides numerous example problems for students as well as several laboratory exercises, providing students with multiple different learning opportunities. Varied learning opportunities and teaching methods are thoroughly discussed throughout each section, and the large number of homework problems provide the teacher with additional opportunities for differentiation.

In addition to the above resources, I will use a website (<http://www.boycevillescience.com>) to provide students with additional resources. Classroom discussion points will be provided to the students in both PowerPoint and educational vodcast (.mp4) form, and many additional educational links on the Internet will be provided to the students through this website. Students will be required to participate in an online forum with their classmates as well as an online Moodle website, which will provide the students with online review and assessment materials.

III. Assessment & Grading

Students will be assessed using a combination of multiple-choice questions, both resource-generated and teacher-generated, and these questions will closely follow a standardized test format, with both multiple choice and free-response questions given to students with appropriate time restrictions. Formal assessments will be paper-based, while many informal assessments, including review activities, will be completed online through Moodle.

Student grades are comprised of the following parts:

Tests	40%
Daily Quizzes	20%
Homework/Labs	30%
Midterm/Final Exam	10%

Students are assigned a homework problem set for each chapter in their textbook, and these problems comprise the homework portion of their quarter grades. In addition, some worksheets will be assigned periodically throughout the course. I expect all students to show all of their work from start to finish and to keep their solutions organized as well. Laboratory activities are included in their homework grade.

Students can expect daily quizzes in this course, and they will be worth 20% of their grade. Students will have an opportunity to ask some questions each day before the quiz, but extensive questioning is expected to be done outside of class or during work time.

The midterm exam (quarters one and three) and final exam (quarters two and four) are completed according to the district final exam plan and are comprised of a multiple choice section and a free-response section. I will place time restrictions on both sections to better prepare students for future tests students will encounter in post-secondary education.

I have attached my curriculum map for Pre Calculus to provide you with additional information about the course structure and the content taught, including a timeline and information on the laboratory exercises completed throughout the year. Please note that I have excluded references to state standards as Wisconsin is currently reviewing the recently-created Common Core Standards. I will update this column as soon as Wisconsin releases their new Model Academic Standards for High School Mathematics.

IV. Laboratory Activities

Graphing Technology Labs

1. Nonlinear Inequalities
2. Graphing Inverses Using Parametric Equations
3. Solving Trigonometric Inequalities
4. Reduction Identities
5. Investigating Graphs of Polar Equations
6. Vector Transformations with Matrices
7. Transforming Skewed Data
8. Median Fit Lines
9. The Slope of a Curve

Course/Subject: Advanced Algebra Unit 1 – Linear and Quadratic Functions MATHEMATICS CURRICULUM MAP					Grades: 10-11-12
Year-Long Course (1 Credit)	<u>CURRICULUM</u> <i>End Product of Learning, “What” You Teach</i>			<u>INSTRUCTION</u> <i>Means to the End Product, “How” You Teach</i>	<u>ASSESSMENT</u> <i>Validation to Revise Curriculum & Instruction</i>
	TIME FRAME [By Date, Week, Etc.]	WI STANDARD OR BENCHMARK [Include ITL STANDARDS, if relevant]	CONTENT: What we want students to “KNOW”.	SKILL: What we want students to “DO”.	Varied Teaching/Learning Strategies Resources/Comments [ITL Connection, if relevant] [Modifications for IEP, Remediation, Intervention, Gifted/Talented]
Chapter 1 1 day		-How can the intersection of two lines be determined? -What is the midpoint of a line? -How is the midpoint of a line determined?	-Calculate the intersection of two lines -Calculate the midpoint of a line	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning
1 day		-What is the slope of a line? -How is the slope of a line calculated? -How are the slope of two parallel lines related? -How are the slope of two perpendicular lines related? -What is the equation of a line? -What are the different forms for the equation of a line?	-Calculate the slope of a line -Calculate the slope of parallel lines -Calculate the slope of perpendicular lines -Write the equation of a line in various forms	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning
1 day		-How can real-world situations be modeled by linear functions?	-Model real-world situations using linear functions	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning
1 day		-What is a complex number? -How can complex numbers be simplified? -How can complex numbers be added or subtracted from each other?	-Simplify complex numbers -Add and subtract complex numbers from each other -Identify complex numbers	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning
1 day		-What is a quadratic equation? -How can quadratic equations be solved?	-Solve quadratic equations using various methods, including factoring, graphing, and the quadratic formula	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning
1 day		-How is a quadratic function graphed? -What does the graph of a quadratic function look like?	-Graph quadratic functions -Describe the graphs of quadratic functions	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning
1 day		-How can real-world situations be modeled by quadratic functions?	-Model real-world situations using quadratic functions	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning

Course/Subject: Advanced Algebra Unit 2 – Polynomial Functions		MATHEMATICS CURRICULUM MAP			Grades: 10-11-12
Year-Long Course (1 Credit)	<u>CURRICULUM</u> <i>End Product of Learning, “What” You Teach</i>			<u>INSTRUCTION</u> <i>Means to the End Product, “How” You Teach</i>	<u>ASSESSMENT</u> <i>Validation to Revise Curriculum & Instruction</i>
TIME FRAME [By Date, Week, Etc.]	WI STANDARD OR BENCHMARK [Include ITL STANDARDS, if relevant]	CONTENT: What we want students to “KNOW”.	SKILL: What we want students to “DO”.	Varied Teaching/Learning Strategies Resources/Comments [ITL Connection, if relevant] [Modifications for IEP, Remediation, Intervention, Gifted/Talented]	Varied Classroom Assessment Strategies [How we know that students “GET IT”.]
Chapter 2 1 day		-What is a polynomial function? -What is synthetic substitution? -What is the zero of a polynomial function? -How can a polynomial function be evaluated?	-Identify polynomial functions -Calculate the zero(s) of a polynomial function -Use synthetic substitution to evaluate a function	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning
2 days		-What is synthetic division? -How can two polynomials be divided? -What is a remainder?	-Divide polynomials using long division -Divide polynomials using synthetic division	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning
2 days		-How are polynomial functions graphed? -How can the graphs of polynomial functions be used to determine the equation of the function?	-Graph polynomial functions -Write the equations of polynomial functions	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning
2 days		-How can the maximum or minimum values of a polynomial function be determined?	-Calculate the maximum and/or minimum values of a given polynomial function	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning
1 day		-How can technology be used to approximate the real roots of a polynomial equation?	-Use technology to approximate the real roots of a polynomial equation	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning
2 days		-How can polynomial equations be solved? -How can polynomial equations be factored? -What is the rational root theorem?	-Solve polynomial equations using factoring -Factor polynomial equations -Use the rational root theorem to solve polynomial equations	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning
1 day		-What are general theorems regarding polynomial equations	-Solve various polynomial equations using the general theorems	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning

Course/Subject: Advanced Algebra Unit 3 - Inequalities		MATHEMATICS CURRICULUM MAP			Grades: 10-11-12	
Year-Long Course (1 Credit)	<u>CURRICULUM</u> <i>End Product of Learning, "What" You Teach</i>			<u>INSTRUCTION</u> <i>Means to the End Product, "How" You Teach</i>		<u>ASSESSMENT</u> <i>Validation to Revise Curriculum & Instruction</i>
	WI STANDARD OR BENCHMARK [Include ITL STANDARDS, if relevant]	CONTENT: What we want students to "KNOW".	SKILL: What we want students to "DO".	Varied Teaching/Learning Strategies Resources/Comments [ITL Connection, if relevant] [Modifications for IEP, Remediation, Intervention, Gifted/Talented]	Varied Classroom Assessment Strategies [How we know that students "GET IT".]	
Chapter 3 1 day		-What is a linear inequality? -How can linear inequalities of one variable be solved?	-Identify linear inequalities -Solve linear inequalities of one variable	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning	
2 days		-What is a polynomial inequality? -How can polynomial inequalities of one variable be graphed? -How can polynomial inequalities of two variables be graphed?	-Identify polynomial inequalities -Graph polynomial inequalities of one variable -Solve polynomial inequalities of one variable	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning	
2 days		-How can polynomial inequalities in two variables be graphed? -How can polynomial inequalities in two variables be solved? -How can technology be used to solve polynomial inequalities in two variables?	-Graph polynomial inequalities in two variables -Solve polynomial inequalities in two variables -Use technology to solve polynomial inequalities in two variables	-Direct Instruction -Student Questioning -SMART Interactive Activities -Graphing Technology Lab 1: Nonlinear Inequalities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning -Lab Questions	
2 days		-What is linear programming? -How can linear programming be used to solve real-world problems?	-Use linear programming to solve real-world problems	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning	

Course/Subject: Advanced Algebra Unit 4: Functions		MATHEMATICS CURRICULUM MAP			Grades: 10-11-12
Year-Long Course (1 Credit)	<u>CURRICULUM</u> <i>End Product of Learning, "What" You Teach</i>			<u>INSTRUCTION</u> <i>Means to the End Product, "How" You Teach</i>	<u>ASSESSMENT</u> <i>Validation to Revise Curriculum & Instruction</i>
	WI STANDARD OR BENCHMARK [Include ITL STANDARDS, if relevant]	CONTENT: What we want students to "KNOW".	SKILL: What we want students to "DO".	Varied Teaching/Learning Strategies Resources/Comments [ITL Connection, if relevant] [Modifications for IEP, Remediation, Intervention, Gifted/Talented]	Varied Classroom Assessment Strategies [How we know that students "GET IT".]
Chapter 4 1 day		-What is a function? -What is the domain of a function? -What is the range of a function? -What are the zeros of a function? -How is a function graphed?	-Identify functions -Identify the domain of a given function -Identify the range of a given function -Calculate the zeros of a given function -Graph functions	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning
1 day		-What are the common operations on functions? -What is the composite of functions? -How are operations carried out on functions?	-Carry out various operations on functions -Determine the composite of functions	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning
2 days		-How can graphs be reflected? -What are the different types of symmetry for graph reflections on the standard coordinate plane? -What are odd and even functions?	-Graph functions and their reflections -Identify different types of reflections -Identify different types of symmetry	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning
2 days		-What is the inverse of a function? -How are inverse functions identified? -What is the horizontal line test? -What is 1 to 1?	-Use the horizontal line test to determine if a function has an inverse -Identify inverse functions -Use technology to graph inverse functions	-Direct Instruction -Student Questioning -SMART Interactive Activities -Graphing Technology Lab 2: Graphing Inverses Using Parametric Equations	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning -Lab Questions

Course/Subject: Advanced Algebra Unit 5: Trigonometric Equations				MATHEMATICS CURRICULUM MAP		Grades: 10-11-12
Year-Long Course (1 Credit)	<u>CURRICULUM</u> <i>End Product of Learning, "What" You Teach</i>			<u>INSTRUCTION</u> <i>Means to the End Product, "How" You Teach</i>		<u>ASSESSMENT</u> <i>Validation to Revise Curriculum & Instruction</i>
	TIME FRAME [By Date, Week, Etc.]	WI STANDARD OR BENCHMARK [Include ITL STANDARDS, if relevant]	CONTENT: What we want students to "KNOW".	SKILL: What we want students to "DO".	Varied Teaching/Learning Strategies Resources/Comments [ITL Connection, if relevant] [Modifications for IEP, Remediation, Intervention, Gifted/Talented]	Varied Classroom Assessment Strategies [How we know that students "GET IT".]
Chapter 8 2 days		-What is a trigonometric equation? -How are trigonometric equations solved? -How can the graphs of trigonometric functions be used to solve trigonometric equations?	-Use the graphs of trigonometric functions to solve trigonometric equations -Solve various simple trigonometric equations	-Direct Instruction -Student Questioning -SMART Interactive Activities -Graphing Technology Lab 3: Solving Trigonometric Inequalities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning -Lab Questions	
1 day		-What does the graph of the sine function look like? -What does the graph of the cosine function look like? -What is the amplitude of a periodic function? -What is the period of a periodic function? -What are the applications of sine and cosine functions to electricity?	-Graph sine and cosine functions -Calculate the amplitude and period of a sine or cosine function based on either its graph or its equation -Apply sine and cosine functions to electricity and electromagnetic radiation	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning	
1 day		-How can periodic behavior be modeled? -What is the general equation for sine waves? -How can the general equation be manipulated into a trigonometric model?	-Create trigonometric models of various real-world situations -Create equations of various graphs of trigonometric functions	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning	
2 days		-What are the common relationships among the trigonometric functions? -What is the Pythagorean Relationship among the trigonometric functions? What are the cofunction relationships among trigonometric functions?	-Use the common relationships among trigonometric functions to simplify trigonometric expressions -Use the common relationships among trigonometric functions to prove trigonometric identities	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning	
2 days		-How can simple trigonometric equations be used to solve more difficult trigonometric equations? -What are the strategies needed to solve difficult trigonometric equations?	-Solve more difficult trigonometric equations.	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning	

Course/Subject: Advanced Algebra Unit 6: Trigonometric Addition Formulas MATHEMATICS CURRICULUM MAP					Grades: 10-11-12
Year-Long Course (1 Credit)	<u>CURRICULUM</u> <i>End Product of Learning, "What" You Teach</i>			<u>INSTRUCTION</u> <i>Means to the End Product, "How" You Teach</i>	<u>ASSESSMENT</u> <i>Validation to Revise Curriculum & Instruction</i>
TIME FRAME [By Date, Week, Etc.]	WI STANDARD OR BENCHMARK [Include ITL STANDARDS, if relevant]	CONTENT: What we want students to "KNOW".	SKILL: What we want students to "DO".	Varied Teaching/Learning Strategies Resources/Comments [ITL Connection, if relevant] [Modifications for IEP, Remediation, Intervention, Gifted/Talented]	Varied Classroom Assessment Strategies [How we know that students "GET IT".]
Chapter 10 2 days		-What are the addition and difference formulas for the cosine and sine functions? -How can a sum or difference of a trigonometric function be rewritten as a product? -How can the addition and difference formulas for the cosine and sine functions be used to simplify expressions?	-Use the addition and difference formulas for the cosine and sine functions to simplify trigonometric expressions	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning
2 days		-What are the addition and difference formulas for the tangent function? -How can the addition and difference formulas for the tangent function be used to simplify trigonometric expressions?	-Use the addition and difference formulas for the tangent function to simplify trigonometric expressions	-Direct Instruction -Student Questioning -SMART Interactive Activities -Graphing Technology Lab 4: Reduction Identities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning -Lab Questions
2 days		-What are the double-angle formulas? -What are the half-angle formulas? -How can the double-angle and half-angle formulas be used to simplify trigonometric expressions?	-Use the double-angle and half-angle formulas to simplify trigonometric expressions	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning
2 days		-How can very difficult trigonometric equations be solved? -What are some strategies for simplifying and solving very difficult trigonometric equations? -What are some strategies for simplifying and solving very difficult trigonometric inequalities	-Solve very difficult trigonometric equations -Solve very difficult trigonometric inequalities	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning

Course/Subject: Advanced Algebra Unit 7: Polar Coordinates & Complex Numbers					MATHEMATICS CURRICULUM MAP	Grades: 10-11-12
Year-Long Course (1 Credit)	<u>CURRICULUM</u> <i>End Product of Learning, “What” You Teach</i>			<u>INSTRUCTION</u> <i>Means to the End Product, “How” You Teach</i>	<u>ASSESSMENT</u> <i>Validation to Revise Curriculum & Instruction</i>	
TIME FRAME [By Date, Week, Etc.]	WI STANDARD OR BENCHMARK [Include ITL STANDARDS, if relevant]	CONTENT: What we want students to “KNOW”.	SKILL: What we want students to “DO”.	Varied Teaching/Learning Strategies Resources/Comments [ITL Connection, if relevant] [Modifications for IEP, Remediation, Intervention, Gifted/Talented]	Varied Classroom Assessment Strategies [How we know that students “GET IT”.]	
Chapter 11 2 days		-What are polar coordinates? -How are polar coordinates different from Cartesian coordinates? -What are the main components of the polar coordinate plane? -How do you graph on the polar coordinate plane? -How can rectangular and polar coordinates be converted?	-Graph on a polar coordinate plane -Convert from rectangular coordinates to polar coordinates -Convert from polar coordinates to rectangular coordinates -Use technology to graph on a polar coordinate plane	-Direct Instruction -Student Questioning -SMART Interactive Activities -Graphing Technology Lab 5: Investigating Graphs of Polar Equations	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning -Lab Questions	
2 days		-How can complex numbers be represented geometrically? -What is the complex number plane? -How can complex numbers be expressed in polar form?	-Express complex numbers in polar form -Graph complex numbers -Multiply complex numbers in polar form	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning	
2 days		-What is De Moivre’s theorem? -How can powers of complex numbers be calculated?	-Use De Moivre’s theorem to calculate powers of complex numbers	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning	
2 days		-How can roots of complex numbers be calculated?	-Calculate roots of complex numbers	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning	

Course/Subject: Advanced Algebra Unit 8: Vectors and Determinants				MATHEMATICS CURRICULUM MAP		Grades: 10-11-12	
Year-Long Course (1 Credit)	<u>CURRICULUM</u> <i>End Product of Learning, "What" You Teach</i>			<u>INSTRUCTION</u> <i>Means to the End Product, "How" You Teach</i>		<u>ASSESSMENT</u> <i>Validation to Revise Curriculum & Instruction</i>	
TIME FRAME [By Date, Week, Etc.]	WI STANDARD OR BENCHMARK [Include ITL STANDARDS, if relevant]	CONTENT: What we want students to "KNOW".	SKILL: What we want students to "DO".	Varied Teaching/Learning Strategies Resources/Comments [ITL Connection, if relevant] [Modifications for IEP, Remediation, Intervention, Gifted/Talented]		Varied Classroom Assessment Strategies [How we know that students "GET IT".]	
Chapter 12 1 day		-What is a vector? -How can a vector be represented geometrically? -How can vectors be added and subtracted geometrically? -How can scalar multiplication of a vector be done geometrically?	-Draw a vector -Use vectors to represent real-world situations -Add, subtract, and (scalar) multiply vectors geometrically	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning		
2 days		-How can a vector be represented algebraically? -How can vectors be broken down into components? -How can vectors be added, subtracted, and (scalar) multiplied algebraically?	-Represent a vector algebraically -Break a vector down into its x and y components -Add, subtract, and (scalar) multiply vectors algebraically	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning		
2 days		-What is a parametric equation? -How can parametric equations be graphed? -How are parametric equations related to vector equations?	-Graph parametric equations -Relate parametric equations to vector equations -Describe the importance of the parameter to parametric equations	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning		
1 day		-What is the dot product of two vectors? -How are vectors multiplied using the dot product? -How is the angle between two vectors determined? -What are the four important properties of the dot product of vectors?	-Compute the dot product of two vectors -Determine the angle between two vectors -Use the properties of dot products of vectors to multiply two vectors together using the dot product	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning		
2 days		-How are vectors represented in three dimensions? -What equations are needed to work with vectors in three dimensions algebraically?	-Consider vectors in both two and three dimensions -Complete simple algebraic operations (addition, subtraction, scalar multiplication, dot product) on vectors in three dimensions	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning		

2 days		-How can vectors be used to describe a plane? -How many vectors are needed to describe a plane?	-Use vectors in three dimensions to describe a plane -Use technology to complete vector transformations with matrices	-Direct Instruction -Student Questioning -SMART Interactive Activities -Graphing Technology Lab 6: Vector Transformations with Matrices	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning -Lab Questions
1 day		-What is the determinant of a matrix? -How can the determinant of a matrix be determined?	-Calculate the determinant of various matrices	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning
2 days		-What are some common applications of the determinants of matrices? -What is Cramer's Rule for calculating the determinant of a matrix?	-Use Cramer's Rule for calculating the determinant of a matrix -Discuss common applications of the determinant of a matrix	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning
2 days		-What is the cross product of two vectors? -How is the cross product of two vectors different from the dot product of two vectors? -How is the cross product of two vectors calculated?	-Discuss differences between the dot product and cross product of two vectors -Calculate the cross product of two vectors.	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning

Course/Subject: Advanced Algebra Unit 9 – Probability		MATHEMATICS CURRICULUM MAP			Grades: 10-11-12
Year-Long Course (1 Credit)	<u>CURRICULUM</u> <i>End Product of Learning, “What” You Teach</i>			<u>INSTRUCTION</u> <i>Means to the End Product, “How” You Teach</i>	<u>ASSESSMENT</u> <i>Validation to Revise Curriculum & Instruction</i>
TIME FRAME [By Date, Week, Etc.]	WI STANDARD OR BENCHMARK [Include ITL STANDARDS, if relevant]	CONTENT: What we want students to “KNOW”.	SKILL: What we want students to “DO”.	Varied Teaching/Learning Strategies Resources/Comments [ITL Connection, if relevant] [Modifications for IEP, Remediation, Intervention, Gifted/Talented]	Varied Classroom Assessment Strategies [How we know that students “GET IT”.]
Chapter 16 1 day		-What is probability? -What are mutually exclusive events? -What is a Venn diagram? -How can a Venn diagram be used to visually represent outcomes?	-Calculate the probability of certain outcomes that are mutually exclusive -Use Venn Diagrams to visually represent outcomes	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning
2 days		-How do events that occur together differ from mutually exclusive events? -How is the probability of an outcome that occurs with another outcome different from an outcome that is mutually exclusive with other outcomes?	-Calculate the probability of certain outcomes that occur together -Describe differences among outcomes that occur together and outcomes that are mutually exclusive	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning
1 day		-What is the binomial probability theorem? -How can the binomial probability theorem be used to calculate the probability of a given outcome in a binomial experiment?	-Use the binomial probability theorem to calculate the probability of a given outcome in a binomial experiment	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning

Course/Subject: Advanced Algebra Unit 10 - Statistics		MATHEMATICS CURRICULUM MAP			Grades: 10-11-12	
Year-Long Course (1 Credit)	<u>CURRICULUM</u> <i>End Product of Learning, "What" You Teach</i>			<u>INSTRUCTION</u> <i>Means to the End Product, "How" You Teach</i>		<u>ASSESSMENT</u> <i>Validation to Revise Curriculum & Instruction</i>
	TIME FRAME [By Date, Week, Etc.]	WI STANDARD OR BENCHMARK [Include ITL STANDARDS, if relevant]	CONTENT: What we want students to "KNOW".	SKILL: What we want students to "DO".	Varied Teaching/Learning Strategies Resources/Comments [ITL Connection, if relevant] [Modifications for IEP, Remediation, Intervention, Gifted/Talented]	Varied Classroom Assessment Strategies [How we know that students "GET IT".]
Chapter 17 2 days		-What is a table? -What is a graph? -What is an average? -How can an average be mathematically represented? -What is a frequency table? -What is a histogram? -What is a stem-and-leaf plot? -What is an EDA?	-Graph various sets of data -Calculate the mean, median, and mode of various sets of data -Use various types of graphs and tables to represent sets of data -Construct an EDA to describe data	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning	
1 day		-What is a box-and-whisker plot? -What is displayed on a box-and-whisker plot? -How can box-and-whisker plots be used to compare two sets of data?	-Construct box-and-whisker plots for given sets of data -Use box-and-whisker plots to compare given sets of data	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning	
2 days		-What is variability? -What are common sources of variability? -What is a statistic? -What is variance? -What is standard deviation? -How are variance and standard deviation related? -What is the standard value of an item of data?	-Calculate the variance and standard deviation for a set of data -Calculate the standard value for an item of data -Differentiate between statistics and parameters	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning	
3 days		-What is a normal distribution? -What is a standard normal table? -What is the use of a standard normal table? -What are percentiles on a normal distribution?	-Use a normal distribution to determine percentiles -Use a standard normal table to determine percentiles -Interpret the 68/95/99.7 Rule	-Direct Instruction -Student Questioning -SMART Interactive Activities -Graphing Technology Lab 7: Transforming Skewed Data	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning -Lab Questions	
1 day		-What is sampling? -What is the importance of independence in sampling? -What is sampling theory?	-Describe the problems associated when independence isn't used in sampling -Identify problems in given sampling situations	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning	
2 days		-What is a confidence interval? -How are confidence intervals calculated?	-Calculate confidence intervals for given sets of data -Interpret confidence intervals for given sets of data	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning	

Course/Subject: Advanced Algebra Unit 11 – Curve Fitting and Models				MATHEMATICS CURRICULUM MAP		Grades: 10-11-12
Year-Long Course (1 Credit)	<u>CURRICULUM</u> <i>End Product of Learning, “What” You Teach</i>			<u>INSTRUCTION</u> <i>Means to the End Product, “How” You Teach</i>		<u>ASSESSMENT</u> <i>Validation to Revise Curriculum & Instruction</i>
	TIME FRAME [By Date, Week, Etc.]	WI STANDARD OR BENCHMARK [Include ITL STANDARDS, if relevant]	CONTENT: What we want students to “KNOW”.	SKILL: What we want students to “DO”.	Varied Teaching/Learning Strategies Resources/Comments [ITL Connection, if relevant] [Modifications for IEP, Remediation, Intervention, Gifted/Talented]	Varied Classroom Assessment Strategies [How we know that students “GET IT”.]
Chapter 18 2 days		-What is curve fitting? -What is a least-squares line? -What is a correlation coefficient? -How is a least-squares line calculated? -How is a correlation coefficient calculated?	-Calculate a least-squares line for a given set of data -Calculate the correlation coefficient for the least-squares line for a given set of data -Interpret the calculated correlation coefficient	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning	
2 days		-What is an exponential curve? -How is an exponential curve fit to a set of data?	-Calculate whether a set of data exhibits exponential characteristics -Calculate the equation of an exponential curve fit to a given set of data	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning	
2 days		-What is a power curve? -How is a power curve different from an exponential curve? -How is a power curve fit to a set of data?	-Calculate the equation of a power curve and fit it to a set of data -Determine whether a set of data exhibits power characteristics or not	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning	
3 days		-How can one determine the best type of curve to fit to a given set of data?	-Determine the best type of curve to fit to a given set of data	-Direct Instruction -Student Questioning -SMART Interactive Activities -Graphing Technology Lab 8: Median-Fit Lines	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning -Lab Questions	

Course/Subject: Advanced Algebra Unit 12 – Limits & Series		MATHEMATICS CURRICULUM MAP			Grades: 10-11-12
Year-Long Course (1 Credit)	<u>CURRICULUM</u> <i>End Product of Learning, “What” You Teach</i>			<u>INSTRUCTION</u> <i>Means to the End Product, “How” You Teach</i>	<u>ASSESSMENT</u> <i>Validation to Revise Curriculum & Instruction</i>
TIME FRAME [By Date, Week, Etc.]	WI STANDARD OR BENCHMARK [Include ITL STANDARDS, if relevant]	CONTENT: What we want students to “KNOW”.	SKILL: What we want students to “DO”.	Varied Teaching/Learning Strategies Resources/Comments [ITL Connection, if relevant] [Modifications for IEP, Remediation, Intervention, Gifted/Talented]	Varied Classroom Assessment Strategies [How we know that students “GET IT”.]
Chapter 19 4 days		-What is a limit? -What is infinity? -What is negative infinity? -What is the quotient theorem for limits? -What are some common techniques for evaluating the limit of a quotient of functions?	-Calculate the limit of certain functions -Calculate the limit of quotients of certain functions -Calculate the limit as a function approaches infinity or negative infinity	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning
4 days		-How are uncommon rational functions graphed? -What are common methods for graphing uncommon rational functions, without using a table? -How can limits be used to help understand the graph of a function?	-Graph uncommon rational functions using a procedure and limits -Use limits to help understand the graph of a function -Use technology to approximate the slope of a curve	-Direct Instruction -Student Questioning -SMART Interactive Activities -Graphing Technology Lab 9: The Slope of a Curve	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning -Lab Questions
3 days		-How can the area under a curve be approximated? -How can technology be used to approximate the area under a curve? -What are some of the different methods that can be used to approximate the area under a curve?	-Calculate the approximate area under a curve using several different methods -Use technology to approximate the area under a curve	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning
3 days		-What is a power series? -What is a series that converges? -What is a series that diverges? -What is a harmonic series? -How can it be determined whether a series converges or diverges? -What are the differences between series and sequences?	-Identify a power series -Identify the p-series and state when it converges and when it diverges -Determine the interval of convergence for a given series	-Direct Instruction -Student Questioning -SMART Interactive Activities	-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning

Course/Subject: Advanced Algebra Unit 13 – Introduction to Calculus				MATHEMATICS CURRICULUM MAP		Grades: 10-11-12	
Year-Long Course (1 Credit)	<u>CURRICULUM</u> <i>End Product of Learning, “What” You Teach</i>			<u>INSTRUCTION</u> <i>Means to the End Product, “How” You Teach</i>		<u>ASSESSMENT</u> <i>Validation to Revise Curriculum & Instruction</i>	
TIME FRAME [By Date, Week, Etc.]	WI STANDARD OR BENCHMARK [Include ITL STANDARDS, if relevant]	CONTENT: What we want students to “KNOW”.	SKILL: What we want students to “DO”.	Varied Teaching/Learning Strategies Resources/Comments [ITL Connection, if relevant] [Modifications for IEP, Remediation, Intervention, Gifted/Talented]		Varied Classroom Assessment Strategies [How we know that students “GET IT”.]	
Chapter 20 3 days		-How can one find the slope of a curve? -What is a derivative? -How can the derivative of a function be calculated?	-Calculate the derivative of certain functions -Relate the derivative of a function to the slope of its curve at different points	-Direct Instruction -Student Questioning -SMART Interactive Activities		-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning	
3 days		-How can the curve of a function be sketched using derivatives? -How can graphs of unknown functions be easily created without the use of graphing technology?	-Graph unknown functions using the derivative of the function	-Direct Instruction -Student Questioning -SMART Interactive Activities		-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning	
3 days		-How can derivatives be used to solve extreme value problems? -What is an extreme value problem?	-Use derivatives to solve real-world extreme value problems	-Direct Instruction -Student Questioning -SMART Interactive Activities		-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning	
4 days		-How are velocity and acceleration related to position and the derivative? -What is the difference between instantaneous velocity and average velocity? -What is the difference between instantaneous acceleration and average acceleration?	-Use the derivative to calculate an instantaneous value -Use the definition of average to calculate an average value -Relate the velocity to the derivative of position and acceleration to the derivative of velocity	-Direct Instruction -Student Questioning -SMART Interactive Activities		-Daily Quiz -Homework Questions -Questions on Unit Exam -In class direct questioning	