

## Secondary Mathematics Pre-Advanced Placement Pre-Calculus

Unit 1: Functions and Their Graphs		1 <sup>st</sup> 6 Weeks			
Date Taught	TEKS	Content/Vocabulary	Guiding Questions	Activities	Resources
	<p>(P.1) The student defines functions, describes characteristics of functions, and translates among verbal, numerical, graphical, and symbolic representations of functions, including polynomial, rational, power (including radical), exponential, logarithmic, trigonometric, and piecewise-defined functions. The student is expected to:</p> <p>(A) describe parent functions symbolically and graphically, including <math>f(x) = x^n</math>, <math>f(x) = In x</math>, <math>f(x) = \log_a x</math>, <math>f(x) = 1/x</math>, <math>f(x) = e^x</math>, <math>f(x) =  x </math>, <math>f(x) = a^x</math>, <math>f(x) = \sin x</math>, <math>f(x) = \arcsin x</math>, etc.;</p> <p>(B) determine the domain and range of functions using graphs, tables, and symbols;</p> <p>(C) describe symmetry of graphs of even and odd functions;</p> <p>(D) recognize and use connections among significant values of a function (zeros, maximum values, minimum values, etc.), points on the graph of a function, and the symbolic representation of a function</p> <p>(P.2) The student interprets the meaning of the symbolic representations of functions and operations on functions to solve meaningful problems. The student is expected to:</p>	<p>Students will be able to use the Pythagorean Theorem, the Distance Formula and the Midpoint Formula to analyze geometric shapes and solve real-life problems.</p> <p>Students will be able to use symmetry and x and y intercepts to sketch graphs of equations.</p> <p>Students will use slope and linear equations in two variables to solve real-life problems.</p> <p>Students will understand the definition of a function, how to use function notation, find domain and range of functions, evaluate difference quotients and use functions to model and solve real-life problems.</p> <p>Students will be able to analyze the graphs of functions and determine average rate of change. Students will be able to identify even and odd functions.</p>	<p>What are the different ways that we can use the Pythagorean Theorem, the Midpoint Formula and the Distance Formula?</p> <p>How can we sketch graphs by analyzing the equation?</p> <p>How can we model real life problems using linear functions?</p> <p>What is a function?</p> <p>How is the graph of a function used to determine the key elements of that function?</p>	<p>1.1 Rectangular Coordinates</p> <p>1.2 Graphs of Equations</p> <p>1.3 Linear Equations in Two Variable</p> <p>1.4 Functions</p> <p>1.5 Analyzing Graphs of Functions</p>	<p><b>District Resources</b> Larson <u>Pre-Calculus with Limits</u> Graphing Calculators HM mathSpace Student CD-ROM Instructional DVDs and Videotapes Complete Solutions Guide Test Item File and Test Generator Online Instructor's Success Organizer Online Teaching Center Laying the Foundation (LTF)</p> <p><b>Internet Resources</b> <a href="#">MISD Mathematics Web Site</a> <a href="#">EduSpace</a> <a href="#">Larson Pre-Calculus</a></p> <p><b>Campus Resources</b> To be filled in by each campus</p> <p><b>Manipulatives</b> Cartesian Dry Erase Board</p>



## Secondary Mathematics Pre-Advanced Placement Pre-Calculus

Unit 1: Functions and Their Graphs			1 <sup>st</sup> 6 Weeks		
Date Taught	TEKS	Content/Vocabulary	Guiding Questions	Activities	Resources
	<p>(A) apply basic transformations, including <math>a \cdot f(x)</math>, <math>f(x) + d</math>, <math>f(x - c)</math>, <math>f(b \cdot x)</math>, and compositions with absolute value functions, including <math> f(x) </math>, and <math>f( x )</math>, to the parent functions;</p> <p>(B) perform operations including composition on functions, find inverses, and describe these procedures and results verbally, numerically, symbolically, and graphically</p> <p>(P.3) The student uses functions and their properties, tools and technology, to model and solve meaningful problems. The student is expected to:</p> <p>(A) investigate properties of trigonometric and polynomial functions;</p> <p>(B) use functions such as logarithmic, exponential, trigonometric, polynomial, etc. to model real-life data;</p> <p>(C) use regression to determine the appropriateness of a linear function to model real-life data (including using technology to determine the correlation coefficient);</p> <p>(D) use properties of functions to analyze and solve problems and make predictions;</p>	<p>Students will be able to recognize and graph the various parent functions: linear, quadratic, cubic, square root, rational, piecewise, absolute value, and greatest integer functions.</p> <p>Students will be able to use transformations to sketch graphs of functions.</p> <p>Students will be able to perform function operations including composite functions.</p> <p>Students will be able find, verify and understand the properties of inverse functions.</p> <p>Students will be able to write mathematical models using direct and inverse variation.</p> <p><b>Cartesian plane</b> <b>Symmetry</b> <b>Linear extrapolation</b> <b>Linear interpolation</b> <b>Difference quotient</b> <b>Average rate of change</b> <b>Secant line</b> <b>Even and odd functions</b> <b>Composite function</b> <b>One-to-one function</b> <b>Jointly proportional</b></p>	<p>What are the characteristics of the most commonly used functions in algebra?</p> <p>How do you write equations and draw graphs for the simple transformations of parent functions?</p> <p>How do you combine two parent functions to form a new function?</p> <p>What is the inverse of a function and how do you represent it graphically and algebraically?</p> <p>How do you write equations to model real world data and identify different models of variation?</p>	<p>1.6 A Library of Functions</p> <p>1.7 Transformations of Functions</p> <p>1.8 Combinations of Functions: Composite Functions</p> <p>1.9 Inverse Functions</p> <p>1.10 Mathematical Modeling and Variation</p> <p>LTF Activities</p>	<p><b>District Resources</b> <a href="#">Larson Pre-Calculus with Limits</a> Graphing Calculators HM mathSpace Student CD-ROM Instructional DVDs and Videotapes Complete Solutions Guide Test Item File and Test Generator Online Instructor's Success Organizer Online Teaching Center Laying the Foundation (LTF)</p> <p><b>Internet Resources</b> <a href="#">MISD Mathematics Web Site</a> <a href="#">EduSpace</a> <a href="#">Larson Pre-Calculus</a></p> <p><b>Campus Resources</b> To be filled in by each campus</p> <p><b>Manipulatives</b> Cartesian Dry Erase Board</p>

## Secondary Mathematics Pre-Advanced Placement Pre-Calculus

Unit 2: Polynomial and Rational Functions		1 <sup>st</sup> 6 Weeks			
Date Taught	TEKS	Content/Vocabulary	Guiding Questions	Activities	Resources
	<p>(P.1) The student defines functions, describes characteristics of functions, and translates among verbal, numerical, graphical, and symbolic representations of functions, including polynomial, rational, power (including radical), exponential, logarithmic, trigonometric, and piecewise-defined functions. The student is expected to:</p> <p>(A) describe parent functions symbolically and graphically, including <math>f(x) = x^n</math>, <math>f(x) = \ln x</math>, <math>f(x) = \log_a x</math>, <math>f(x) = 1/x</math>, <math>f(x) = e^x</math>, <math>f(x) =  x </math>, <math>f(x) = a^x</math>, <math>f(x) = \sin x</math>, <math>f(x) = \arcsin x</math>, etc.;</p> <p>(B) determine the domain and range of functions using graphs, tables, and symbols;</p> <p>(D) recognize and use connections among significant values of a function (zeros, maximum values, minimum values, etc.), points on the graph of a function, and the symbolic representation of a function</p> <p>(E) investigate the concepts of continuity, end behavior, asymptotes, and limits and connect these characteristics to functions represented graphically and numerically.</p> <p>(P.3) The student uses functions and their properties, tools and technology, to model and solve meaningful problems. The student is expected to:</p>	<p>Students will be able to analyze and use quadratic functions to model problems.</p> <p>Students will be able to sketch the graphs of polynomial functions using transformations, leading coefficients, degree, zeros, and Intermediate Value Theorem.</p> <p>Students will be able to divide polynomials using long and synthetic division. Students will also be able to understand and use the Remainder Theorem and Factor Theorem.</p> <p>Students will be able to perform operations on complex numbers and use complex conjugates to write the quotient of two complex numbers.</p> <p>Students will be able to find all polynomial zeros.</p> <p>Students will be able to add, subtract and multiply rational expressions and simplify complex fractions.</p> <p>Students will be able to analyze and sketch the graphs of rational functions.</p>	<p>How do you sketch graphs and write equations for parabolas?</p> <p>How do you sketch the graphs of polynomial functions?</p> <p>How do you divide a polynomial by another polynomial and interpret the result?</p> <p>How do you perform operations with complex numbers?</p> <p>How do you find all zeros of a polynomial function?</p> <p>How do you simplify rational expressions?</p> <p>What is a rational function and how do you graph it?</p>	<p>2.1 Quadratic Functions and Models</p> <p>2.2 Polynomial Functions of Higher Degree</p> <p>2.3 Polynomial and Synthetic Division</p> <p>2.4 Complex Numbers</p> <p>2.5 Zeros of Polynomial Functions</p> <p>Appendix A.4 Rational Expressions</p> <p>2.6 Rational Functions</p>	<p><b>District Resources</b> Larson Pre-Calculus with <u>Limits</u> Graphing Calculators HM mathSpace Student CD-ROM Instructional DVDs and Videotapes Complete Solutions Guide Test Item File and Test Generator Online Instructor's Success Organizer Online Teaching Center Laying the Foundation (LTF)</p> <p><b>Internet Resources</b> <a href="#">MISD Mathematics Web Site</a> <a href="#">EduSpace</a> <a href="#">Larson Pre-Calculus</a></p> <p><b>Campus Resources</b> To be filled in by each campus</p> <p><b>Manipulatives</b> Cartesian Dry Erase Board Moby's Strip</p>



## Secondary Mathematics Pre-Advanced Placement Pre-Calculus

Unit 2: Polynomial and Rational Functions			1 <sup>st</sup> 9 Weeks, Days to Teach: 8 Days		
Date Taught	TEKS	Content/Vocabulary	Guiding Questions	Activities	Resources
	(A) investigate properties of trigonometric and polynomial functions;  (B) use functions such as logarithmic, exponential, trigonometric, polynomial, etc. to model real-life data;  (D) use properties of functions to analyze and solve problems and make predictions;	<b>Local (Relative) Extreme</b> <b>Absolute (Global) Extreme</b> <b>Continuity</b> <b>End Behavior</b> <b>Concavity</b> <b>Critical Numbers</b> <b>Intermediate Value Theorem</b> <b>Synthetic Division/Horner's Algorithm</b> <b>Remainder Theorem</b> <b>Factor Theorem</b> <b>Complex Numbers</b> <b>Imaginary Numbers</b> <b>Complex Conjugate</b> <b>Fundamental Theorem of Algebra</b> <b>Rational Zero Theorem</b> <b>Upper and Lower Bounds</b> <b>Slant (Oblique) Asymptote</b> <b>Limits</b>			<b>District Resources</b> Larson Pre-Calculus with <u>Limits</u> Graphing Calculators HM mathSpace Student CD-ROM Instructional DVDs and Videotapes Complete Solutions Guide Test Item File and Test Generator Online Instructor's Success Organizer Online Teaching Center Laying the Foundation (LTF)  <b>Internet Resources</b> <a href="#">MISD Mathematics Web Site</a> <a href="#">EduSpace</a> <a href="#">Larson Pre-Calculus</a>  <b>Campus Resources</b> To be filled in by each campus  <b>Manipulatives</b> Cartesian Dry Erase Board Moby's Strip

## Secondary Mathematics Pre-Advanced Placement Pre-Calculus

Unit 2: Polynomial and Rational Functions			2nd 6 Weeks		
Date Taught	TEKS	Content/Vocabulary	Guiding Questions	Activities	Resources
	<p>(P.1) The student defines functions, describes characteristics of functions, and translates among verbal, numerical, graphical, and symbolic representations of functions, including polynomial, rational, power (including radical), exponential, logarithmic, trigonometric, and piecewise-defined functions. The student is expected to:</p> <p>(A) describe parent functions symbolically and graphically, including <math>f(x) = x^n</math>, <math>f(x) = \ln x</math>, <math>f(x) = \log_a x</math>, <math>f(x) = 1/x</math>, <math>f(x) = e^x</math>, <math>f(x) =  x </math>, <math>f(x) = a^x</math>, <math>f(x) = \sin x</math>, <math>f(x) = \arcsin x</math>, etc.;</p> <p>(B) determine the domain and range of functions using graphs, tables, and symbols;</p> <p>(D) recognize and use connections among significant values of a function (zeros, maximum values, minimum values, etc.), points on the graph of a function, and the symbolic representation of a function</p> <p>(E) investigate the concepts of continuity, end behavior, asymptotes, and limits and connect these characteristics to functions represented graphically and numerically.</p> <p>(P.3) The student uses functions and their properties, tools and technology, to model and solve meaningful problems. The student is expected to:</p> <p>(A) investigate properties of trigonometric and polynomial functions;</p>	<p>Students will be able to solve polynomial and rational inequalities.</p> <p><b>Local (Relative) Extreme</b> <b>Absolute (Global) Extreme</b> <b>Continuity</b> <b>End Behavior</b> <b>Concavity</b> <b>Critical Numbers</b> <b>Intermediate Value Theorem</b> <b>Synthetic Division/Horner's Algorithm</b> <b>Remainder Theorem</b> <b>Factor Theorem</b> <b>Complex Numbers</b> <b>Imaginary Numbers</b> <b>Complex Conjugate</b> <b>Fundamental Theorem of Algebra</b> <b>Rational Zero Theorem</b> <b>Upper and Lower Bounds</b> <b>Slant (Oblique) Asymptote</b> <b>Limits</b></p>	<p>How do you find solutions to polynomial and rational inequalities?</p>	<p>2.7 Nonlinear Inequalities</p> <p>LTF Activities</p>	<p><b>District Resources</b> Larson Pre-Calculus with <u>Limits</u> Graphing Calculators HM mathSpace Student CD-ROM Instructional DVDs and Videotapes Complete Solutions Guide Test Item File and Test Generator Online Instructor's Success Organizer Online Teaching Center Laying the Foundation (LTF)</p> <p><b>Internet Resources</b> <a href="#">MISD Mathematics Web Site</a> <a href="#">EduSpace</a> <a href="#">Larson Pre-Calculus</a></p> <p><b>Campus Resources</b> To be filled in by each campus</p> <p><b>Manipulatives</b> Cartesian Dry Erase Board Moby's Strip</p>



## Secondary Mathematics Pre-Advanced Placement Pre-Calculus

Unit 2: Polynomial and Rational Functions			2nd 6 Weeks		
Date Taught	TEKS	Content/Vocabulary	Guiding Questions	Activities	Resources
	(B) use functions such as logarithmic, exponential, trigonometric, polynomial, etc. to model real-life data;  (D) use properties of functions to analyze and solve problems and make predictions;				<b>District Resources</b> Larson Pre-Calculus with <u>Limits</u> Graphing Calculators HM mathSpace Student CD-ROM Instructional DVDs and Videotapes Complete Solutions Guide Test Item File and Test Generator Online Instructor's Success Organizer Online Teaching Center Laying the Foundation (LTF)  <b>Internet Resources</b> <a href="#">MISD Mathematics Web Site</a> <a href="#">EduSpace</a> <a href="#">Larson Pre-Calculus</a>  <b>Campus Resources</b> To be filled in by each campus  <b>Manipulatives</b> Cartesian Dry Erase Board Moby's Strip

## Secondary Mathematics Pre-Advanced Placement Pre-Calculus

Unit 3: Exponential and Logarithmic Functions			2 <sup>nd</sup> 6 Weeks		
Date Taught	TEKS	Content/Vocabulary	Guiding Questions	Activities	Resources
	<p>(P.1) The student defines functions, describes characteristics of functions, and translates among verbal, numerical, graphical, and symbolic representations of functions, including polynomial, rational, power (including radical), exponential, logarithmic, trigonometric, and piecewise-defined functions. The student is expected to:</p> <p>(A) describe parent functions symbolically and graphically, including <math>f(x) = x^n</math>, <math>f(x) = In x</math>, <math>f(x) = \log_a x</math>, <math>f(x) = 1/x</math>, <math>f(x) = e^x</math>, <math>f(x) =  x </math>, <math>f(x) = a^x</math>, <math>f(x) = \sin x</math>, <math>f(x) = \arcsin x</math>, etc.;</p> <p>(B) determine the domain and range of functions using graphs, tables, and symbols;</p> <p>(E) investigate the concepts of continuity, end behavior, asymptotes, and limits and connect these characteristics to functions represented graphically and numerically.</p> <p>(P.2) The student interprets the meaning of the symbolic representations of functions and operations on functions to solve meaningful problems. The student is expected to</p> <p>(C) investigate identities graphically and verify them symbolically, including logarithmic properties, trigonometric identities, and exponential properties.</p>	<p>The student will be able to recognize, evaluate and graph exponential functions.</p> <p>The student will be able to recognize, evaluate, and graph logarithmic functions.</p> <p>The student will be able to evaluate and rewrite logarithmic functions using the change of base formula and properties of logarithms.</p> <p>The student will be able to solve exponential and logarithmic equations.</p> <p>The student will be able to model situations using exponential growth and decay, logarithmic functions, Gaussian functions, and logistic growth functions.</p> <p><b>Exponential Function</b>  <b>Exponential Growth/Decay</b>  <b>Natural Base</b>  <b>Natural Exponential Function</b>  <b>Continuous Compounding</b>  <b>Logarithmic Function</b>  <b>Natural Logarithmic Function</b>  <b>Change of Base Formula</b>  <b>Gaussian Model</b>  <b>Normal Distribution</b>  <b>Bell Shaped Curve</b>  <b>Logistics Curve</b></p>	<p>How do you write and graph exponential functions?</p> <p>How do you recognize, evaluate, and graph logarithmic functions?</p> <p>How do you rewrite logarithmic expressions to simplify or evaluate them?</p> <p>How do you solve exponential and logarithmic equations?</p> <p>How do you use exponents and logarithms to model a variety of situations?</p>	<p>3.1 Exponential Functions and Their Graphs</p> <p>3.2 Logarithmic Functions and Their Graphs</p> <p>3.3 Properties of Logarithms</p> <p>3.4 Exponential and Logarithmic Equations</p> <p>3.5 Exponential and Logarithmic Models</p> <p>LTF Activities</p>	<p><b>District Resources</b>  Larson <u>Pre-Calculus with Limits</u>  Graphing Calculators  HM mathSpace Student CD-ROM  Instructional DVDs and Videotapes  Complete Solutions Guide  Test Item File and Test Generator  Online Instructor's Success Organizer  Online Teaching Center  Laying the Foundation (LTF)</p> <p><b>Internet Resources</b>  <a href="#">MISD Mathematics Web Site</a>  <a href="#">EduSpace</a>  <a href="#">Larson Pre-Calculus</a></p> <p><b>Campus Resources</b>  To be filled in by each campus</p> <p><b>Manipulatives</b></p>



## Secondary Mathematics Pre-Advanced Placement Pre-Calculus

Unit 3: Exponential and Logarithmic Functions			2 <sup>nd</sup> 6 Weeks		
Date Taught	TEKS	Content/Vocabulary	Guiding Questions	Activities	Resources
	<p>(P.3) The student uses functions and their properties, tools and technology, to model and solve meaningful problems. The student is expected to:</p> <p>(B) use functions such as logarithmic, exponential, trigonometric, polynomial, etc. to model real-life data;</p> <p>(D) use properties of functions to analyze and solve problems and make predictions;</p> <p>(P.2) The student interprets the meaning of the symbolic representations of functions and operations on functions to solve meaningful problems. The student is expected to:</p> <p>(A) apply basic transformations, including <math>a \cdot f(x)</math>, <math>f(x) + d</math>, <math>f(x - c)</math>, <math>f(b \cdot x)</math>, and compositions with absolute value functions, including <math> f(x) </math>, and <math>f( x )</math>, to the parent functions;</p>				<p><b>District Resources</b> Larson Pre-Calculus with <u>Limits</u> Graphing Calculators HM mathSpace Student CD-ROM Instructional DVDs and Videotapes Complete Solutions Guide Test Item File and Test Generator Online Instructor's Success Organizer Online Teaching Center Laying the Foundation (LTF)</p> <p><b>Internet Resources</b> <a href="#">MISD Mathematics Web Site</a> <a href="#">EduSpace</a> <a href="#">Larson Pre-Calculus</a></p> <p><b>Campus Resources</b> To be filled in by each campus</p> <p><b>Manipulatives</b></p>

## Secondary Mathematics Pre-Advanced Placement Pre-Calculus

Unit 4: Trigonometry		2 <sup>nd</sup> 6 Weeks			
Date Taught	TEKS	Content/Vocabulary	Guiding Questions	Activities	Resources
	<p>(P.1) The student defines functions, describes characteristics of functions, and translates among verbal, numerical, graphical, and symbolic representations of functions, including polynomial, rational, power (including radical), exponential, logarithmic, trigonometric, and piecewise-defined functions. The student is expected to:</p> <p>(B) determine the domain and range of functions using graphs, tables, and symbols;</p> <p>(C) describe symmetry of graphs of even and odd functions;</p> <p>(P.3) The student uses functions and their properties, tools and technology, to model and solve meaningful problems. The student is expected to:</p> <p>(A) investigate properties of trigonometric and polynomial functions;</p> <p>(B) use functions such as logarithmic, exponential, trigonometric, polynomial, etc. to model real-life data;</p> <p>(D) use properties of functions to analyze and solve problems and make predictions; and</p>	<p>The student will be able to describe angles using radian and degree measure.</p> <p>Students will be able to use the unit circle to evaluate trigonometric functions.</p> <p>Students will be able to evaluate trigonometric functions of acute angles.</p> <p>Students will be able to evaluate trigonometric functions of any angle.</p> <p>Students will be able to sketch the graphs of sine and cosine functions.</p> <p>Students will be able to sketch the graphs of the remaining trig functions.</p> <p>Students will be able to solve real-life problems using right triangles, directional bearings and harmonic motion.</p> <p><b>Periodic function</b> <b>Period</b> <b>Reciprocal Identities</b> <b>Reference Angle</b> <b>Cycle</b> <b>Amplitude</b> <b>Phase Shift</b> <b>Initial Side</b></p>	<p>How do you describe angles and angular movement?</p> <p>How do you evaluate trigonometric functions by using the unit circle?</p> <p>How do you use trigonometry to find unknown side lengths and angles in right triangles?</p> <p>How do you evaluate trigonometric functions of any angles?</p> <p>How do the graphs of sine and cosine differ?</p> <p>How can you graph the remaining trig functions using the sine and cosine functions?</p> <p>How do you use trigonometric functions to solve real-life problems?</p>	<p>4.1 Radian and Degree Measure</p> <p>4.2 Trigonometric Functions: The Unit Circles</p> <p>4.3 Right Triangle Trigonometry</p> <p>4.4 Trigonometric Functions of Any Angle</p> <p>4.5 Graphs of Sine and Cosine Functions</p> <p>4.6 Graphs of Other Trigonometric Functions</p> <p>4.8 Applications and Models</p> <p>LTF Activities</p>	<p><b>District Resources</b> Larson Pre-Calculus with <u>Limits</u> Graphing Calculators HM mathSpace Student CD-ROM Instructional DVDs and Videotapes Complete Solutions Guide Test Item File and Test Generator Online Instructor's Success Organizer Online Teaching Center Laying the Foundation (LTF)</p> <p><b>Internet Resources</b> <a href="#">MISD Mathematics Web Site</a> <a href="#">EduSpace</a> <a href="#">Larson Pre-Calculus</a></p> <p><b>Campus Resources</b> To be filled in by each campus</p> <p><b>Manipulatives</b> Paper plates Adding Machine Tape</p>



## Secondary Mathematics Pre-Advanced Placement Pre-Calculus

Unit 4: Trigonometry			2 <sup>nd</sup> 6 Weeks		
Date Taught	TEKS	Content/Vocabulary	Guiding Questions	Activities	Resources
	(E) solve problems from physical situations using trigonometry, including the use of Law of Sines, Law of Cosines, and area formulas and incorporate radian measure where needed.	<b>Terminal Side</b> <b>Standard Position</b> <b>Co-terminal angles</b> <b>Central Angle</b> <b>Radian Measure</b> <b>Linear and Angular Speed</b> <b>Sector of a Circle</b> <b>Unit Circle</b> <b>Cosecant</b> <b>Secant</b> <b>Cotangent</b>			<b>District Resources</b> Larson Pre-Calculus with <u>Limits</u> Graphing Calculators HM mathSpace Student CD-ROM Instructional DVDs and Videotapes Complete Solutions Guide Test Item File and Test Generator Online Instructor's Success Organizer Online Teaching Center Laying the Foundation (LTF)  <b>Internet Resources</b> <a href="#">MISD Mathematics Web Site</a> <a href="#">EduSpace</a> <a href="#">Larson Pre-Calculus</a>  <b>Campus Resources</b> To be filled in by each campus  <b>Manipulatives</b> Paper plates Adding Machine Tape

## Secondary Mathematics Pre-Advanced Placement Pre-Calculus

Unit 4: Trigonometry (cont...)			3 <sup>rd</sup> 6 Weeks		
Date Taught	TEKS	Content/Vocabulary	Guiding Questions	Activities	Resources
	<p>(P.1) The student defines functions, describes characteristics of functions, and translates among verbal, numerical, graphical, and symbolic representations of functions, including polynomial, rational, power (including radical), exponential, logarithmic, trigonometric, and piecewise-defined functions. The student is expected to:</p> <p>(A) describe parent functions symbolically and graphically, including <math>f(x) = x^n</math>, <math>f(x) = \ln x</math>, <math>f(x) = \log_a x</math>, <math>f(x) = 1/x</math>, <math>f(x) = e^x</math>, <math>f(x) =  x </math>, <math>f(x) = a^x</math>, <math>f(x) = \sin x</math>, <math>f(x) = \arcsin x</math>, etc.;</p> <p>(B) determine the domain and range of functions using graphs, tables, and symbols;</p> <p>(C) describe symmetry of graphs of even and odd functions;</p> <p>(D) recognize and use connections among significant values of a function (zeros, maximum values, minimum values, etc.), points on the graph of a function, and the symbolic representation of a function; and</p> <p>(E) investigate the concepts of continuity, end behavior, asymptotes, and limits and connect these characteristics to functions represented graphically and numerically.</p>	<p>Students will be able to evaluate and graph the inverse trigonometric functions and their compositions.</p>	<p>How do you evaluate and graph inverse trigonometric functions?</p>	<p>4.7 Inverse Trigonometric Functions</p>	<p><b>District Resources</b> Larson Pre-Calculus with <u>Limits</u> Graphing Calculators HM mathSpace Student CD-ROM Instructional DVDs and Videotapes Complete Solutions Guide Test Item File and Test Generator Online Instructor's Success Organizer Online Teaching Center Laying the Foundation (LTF)</p> <p><b>Internet Resources</b> <a href="#">MISD Mathematics Web Site</a> <a href="#">EduSpace</a> <a href="#">Larson Pre-Calculus</a></p> <p><b>Campus Resources</b> To be filled in by each campus</p> <p><b>Manipulatives</b> Paper plates Adding Machine Tape Spaghetti</p>



## Secondary Mathematics Pre-Advanced Placement Pre-Calculus

Unit 4: Trigonometry (cont...)			3 <sup>rd</sup> 6 Weeks		
Date Taught	TEKS	Content/Vocabulary	Guiding Questions	Activities	Resources
	<p>(P.2) The student interprets the meaning of the symbolic representations of functions and operations on functions to solve meaningful problems. The student is expected to:</p> <p>(C) investigate identities graphically and verify them symbolically, including logarithmic properties, trigonometric identities, and exponential properties.</p> <p>(P.3) The student uses functions and their properties, tools and technology, to model and solve meaningful problems. The student is expected to:</p> <p>(A) investigate properties of trigonometric and polynomial functions;</p> <p>(B) use functions such as logarithmic, exponential, trigonometric, polynomial, etc. to model real-life data;</p> <p>(D) use properties of functions to analyze and solve problems and make predictions; and</p> <p>(E) solve problems from physical situations using trigonometry, including the use of Law of Sines, Law of Cosines, and area formulas and incorporate radian measure where needed.</p>				<p><b>District Resources</b> Larson Pre-Calculus with <u>Limits</u> Graphing Calculators HM mathSpace Student CD-ROM Instructional DVDs and Videotapes Complete Solutions Guide Test Item File and Test Generator Online Instructor's Success Organizer Online Teaching Center Laying the Foundation (LTF)</p> <p><b>Internet Resources</b> <a href="#">MISD Mathematics Web Site</a> <a href="#">EduSpace</a> <a href="#">Larson Pre-Calculus</a></p> <p><b>Campus Resources</b> To be filled in by each campus</p> <p><b>Manipulatives</b> Paper plates Adding Machine Tape Spaghetti</p>

## Secondary Mathematics Pre-Advanced Placement Pre-Calculus

Unit 5: Analytical Trigonometry		3 <sup>rd</sup> 6 Weeks			
Date Taught	TEKS	Content/Vocabulary	Guiding Questions	Activities	Resources
	<p>(P.2) The student interprets the meaning of the symbolic representations of functions and operations on functions to solve meaningful problems. The student is expected to:</p> <p>(C) investigate identities graphically and verify them symbolically, including logarithmic properties, trigonometric identities, and exponential properties.</p> <p>(P.3) The student uses functions and their properties, tools and technology, to model and solve meaningful problems. The student is expected to:</p> <p>(E) solve problems from physical situations using trigonometry, including the use of Law of Sines, Law of Cosines, and area formulas and incorporate radian measure where needed.</p>	<p>Students will be able to use fundamental trigonometric identities to evaluate trig functions, simplify trig expressions, and rewrite trig expressions.</p> <p>Students will be able to verify a trigonometric identity.</p> <p>Students will be able to use algebraic techniques to solve trigonometric equations including equations involving multiple angles.</p> <p>Students will be able to use sum and difference formulas to evaluate trigonometric functions, verify identities, and solve trigonometric equations.</p> <p>Students will be able to rewrite and evaluate trigonometric functions using multiple angle, power-reducing, half-angle, product-to-sum, and sum-to-product formulas.</p> <p><b>Trigonometric Identity</b> <b>Harmonic Motion</b> <b>Half-Angle Formula</b> <b>Double-Angle Formula</b> <b>Power-Reducing Formula</b></p>	<p>How do you rewrite trig expressions in order to simplify and evaluate functions?</p> <p>How do you verify a trigonometric identity?</p> <p>How do you solve trigonometric equations written in quadratic form or involving more than one angle?</p> <p>How do you simplify expressions and solve equations that contain sums or differences of angles?</p> <p>How do you rewrite trigonometric expressions that contain functions of multiple or half angles, or functions that involve squares or products of trigonometric expressions?</p>	<p>5.1 Using Fundamental Identities</p> <p>5.2 Verifying Trigonometric Identities</p> <p>5.3 Solving Trigonometric Equations</p> <p>5.4 Sum and Difference Formulas</p> <p>5.5 Multiple-Angle and Product-to-Sum Formulas</p> <p>LTF Activities</p>	<p><b>District Resources</b> Larson Pre-Calculus with <u>Limits</u> Graphing Calculators HM mathSpace Student CD-ROM Instructional DVDs and Videotapes Complete Solutions Guide Test Item File and Test Generator Online Instructor's Success Organizer Online Teaching Center Laying the Foundation (LTF)</p> <p><b>Internet Resources</b> <a href="#">MISD Mathematics Web Site</a> <a href="#">EduSpace</a> <a href="#">Larson Pre-Calculus</a></p> <p><b>Campus Resources</b> To be filled in by each campus</p> <p><b>Manipulatives</b></p>

## Secondary Mathematics Pre-Advanced Placement Pre-Calculus

Unit 6: Additional Topics in Trigonometry			3 <sup>rd</sup> 6 Weeks		
Date Taught	TEKS	Content/Vocabulary	Guiding Questions	Activities	Resources
	<p>(P.3) The student uses functions and their properties, tools and technology, to model and solve meaningful problems. The student is expected to:</p> <p>(E) solve problems from physical situations using trigonometry, including the use of Law of Sines, Law of Cosines, and area formulas and incorporate radian measure where needed.</p> <p>(P.6) The student uses vectors to model physical situations. The student is expected to:</p> <p>(A) use the concept of vectors to model situations defined by magnitude and direction; and</p> <p>(B) analyze and solve vector problems generated by real-life situations.</p>	<p>Students will be able to use the Law of Sines to solve oblique triangles.</p> <p>Students will be able to use the Law of Cosines to solve oblique triangles. Students will be able use Heron's formula to find the area of a triangle.</p> <p>Students will be able perform basic vector operations and represent them graphically and as vector components.</p> <p>Students will be able to find the dot and cross product of two vectors and write a vector as the sum of its components.</p> <p>Students will be able to plot complex numbers in the complex plane and be able to write the trigonometric form of complex numbers. Students will be able to apply DeMoivre's Theorem to find powers of complex numbers.</p> <p><b>Law of Sines</b> <b>Oblique Triangle</b> <b>Law of Cosines</b> <b>Heron's Formula</b> <b>Vector in a Plane</b> <b>Directed Line Segment</b> <b>Initial Point</b> <b>Terminal Point</b></p>	<p>How do you use trigonometry to solve and find the areas of oblique triangles?</p> <p>How do you use trigonometry to solve and find the areas of oblique triangles?</p> <p>How do you represent and perform operations with vector quantities?</p> <p>How do you write a vector as a sum of two vector components?</p> <p>How do you represent and perform operations on complex numbers by using trigonometry?</p>	<p>6.1 Law of Sines</p> <p>6.2 Law of Cosines</p> <p>6.3 Vectors in the Plane</p> <p>6.4 Vectors and Dot Products</p> <p>6.5 Trigonometric Form of a Complex Number</p> <p>LTF Activities</p>	<p><b>District Resources</b> Larson <u>Pre-Calculus with Limits</u> Graphing Calculators HM mathSpace Student CD-ROM Instructional DVDs and Videotapes Complete Solutions Guide Test Item File and Test Generator Online Instructor's Success Organizer Online Teaching Center Laying the Foundation (LTF)</p> <p><b>Internet Resources</b> <a href="#">MISD Mathematics Web Site</a> <a href="#">EduSpace</a> <a href="#">Larson Pre-Calculus</a></p> <p><b>Campus Resources</b> To be filled in by each campus</p> <p><b>Manipulatives</b></p>



## Secondary Mathematics Pre-Advanced Placement Pre-Calculus

Unit 6: Additional Topics in Trigonometry			3 <sup>rd</sup> 6 Weeks		
Date Taught	TEKS	Content/Vocabulary	Guiding Questions	Activities	Resources
		<b>Magnitude</b> <b>Vector Component</b> <b>Component form of a Vector</b> <b>Standard Position of a Vector</b> <b>Zero Vector</b> <b>Scalar Multiplication</b> <b>Scalars</b> <b>Vector Addition</b> <b>Parallelogram Law</b> <b>Resultant</b> <b>Unit Vector</b> <b>Orthogonal Vectors</b> <b>Complex Plane</b> <b>DeMoivre's Theorem</b> <b><math>n</math>th Roots of Unity</b>			<b>District Resources</b> Larson Pre-Calculus with <u>Limits</u> Graphing Calculators HM mathSpace Student CD-ROM Instructional DVDs and Videotapes Complete Solutions Guide Test Item File and Test Generator Online Instructor's Success Organizer Online Teaching Center Laying the Foundation (LTF)
					<b>Internet Resources</b> <a href="#">MISD Mathematics Web Site</a> <a href="#">EduSpace</a> <a href="#">Larson Pre-Calculus</a>
					<b>Campus Resources</b> To be filled in by each campus
					<b>Manipulatives</b>



## Secondary Mathematics Pre-Advanced Placement Pre-Calculus

Unit 6: Additional Topics in Trigonometry			4 <sup>th</sup> 6 Weeks		
Date Taught	TEKS	Content/Vocabulary	Guiding Questions	Activities	Resources
	<p>(P.3) The student uses functions and their properties, tools and technology, to model and solve meaningful problems. The student is expected to:</p> <p>(E) solve problems from physical situations using trigonometry, including the use of Law of Sines, Law of Cosines, and area formulas and incorporate radian measure where needed.</p> <p>(P.6) The student uses vectors to model physical situations. The student is expected to:</p> <p>(A) use the concept of vectors to model situations defined by magnitude and direction; and</p> <p>(B) analyze and solve vector problems generated by real-life situations.</p>	<p>Students will be able perform basic vector operations and represent them graphically and as vector components.</p> <p>Students will be able to find the dot and cross product of two vectors and write a vector as the sum of its components.</p> <p>Students will be able to plot complex numbers in the complex plane and be able to write the trigonometric form of complex numbers. Students will be able to apply DeMoivre's Theorem to find powers of complex numbers.</p> <p><b>Law of Sines</b>  <b>Oblique Triangle</b>  <b>Law of Cosines</b>  <b>Heron's Formula</b>  <b>Vector in a Plane</b>  <b>Directed Line Segment</b>  <b>Initial Point</b>  <b>Terminal Point</b>  <b>Magnitude</b>  <b>Vector Component</b>  <b>Component form of a Vector</b>  <b>Standard Position of a Vector</b>  <b>Zero Vector</b>  <b>Scalar Multiplication</b>  <b>Scalars</b>  <b>Vector Addition</b>  <b>Parallelogram Law</b>  <b>Resultant</b>  <b>Unit Vector</b></p>	<p>How do you represent and perform operations with vector quantities?</p> <p>How do you write a vector as a sum of two vector components?</p> <p>How do you represent and perform operations on complex numbers by using trigonometry?</p>	<p>6.3 Vectors in the Plane</p> <p>6.4 Vectors and Dot Products</p> <p>6.5 Trigonometric Form of a Complex Number</p> <p>LTF Activities</p>	<p><b>District Resources</b>  Larson Pre-Calculus with <u>Limits</u>  Graphing Calculators  HM mathSpace Student CD-ROM  Instructional DVDs and Videotapes  Complete Solutions Guide  Test Item File and Test Generator  Online Instructor's Success Organizer  Online Teaching Center  Laying the Foundation (LTF)</p> <p><b>Internet Resources</b>  <a href="#">MISD Mathematics Web Site</a>  <a href="#">EduSpace</a>  <a href="#">Larson Pre-Calculus</a></p> <p><b>Campus Resources</b>  To be filled in by each campus</p> <p><b>Manipulatives</b></p>



## Secondary Mathematics Pre-Advanced Placement Pre-Calculus

Unit 6: Additional Topics in Trigonometry			4 <sup>th</sup> 6 Weeks		
Date Taught	TEKS	Content/Vocabulary	Guiding Questions	Activities	Resources
		Orthogonal Vectors Complex Plane DeMoivre's Theorem $n$ th Roots of Unity			<b>District Resources</b> Larson Pre-Calculus with <u>Limits</u> Graphing Calculators HM mathSpace Student CD-ROM Instructional DVDs and Videotapes Complete Solutions Guide Test Item File and Test Generator Online Instructor's Success Organizer Online Teaching Center Laying the Foundation (LTF)  <b>Internet Resources</b> <a href="#">MISD Mathematics Web Site</a> <a href="#">EduSpace</a> <a href="#">Larson Pre-Calculus</a>  <b>Campus Resources</b> To be filled in by each campus  <b>Manipulatives</b>



## Secondary Mathematics Pre-Advanced Placement Pre-Calculus

Unit 7: Systems of Equations and Inequalities			4 <sup>th</sup> 6 Weeks		
Date Taught	AP Prerequisites	Content/Vocabulary	Guiding Questions	Activities	Resources
	Prerequisites of Calculus AB/BC and College Mathematics.	<p>Students will be able to solve non-linear systems of equations using substitution and graphing.</p> <p>Students will be able to solve multivariable systems using row-echelon form and Gaussian elimination.</p> <p>Students will be able to recognize and find partial fraction decomposition of rational expressions.</p> <p><b>Row-Echelon form</b> <b>Gaussian Elimination</b></p>	<p>How do you use substitution to solve nonlinear systems of equations?</p> <p>What is Gaussian elimination and how is it used?</p> <p>How can you rewrite a rational expression as a sum of two or more simpler rational expressions?</p>	<p>7.1 Linear and NonLinear Systems of Equations</p> <p>7.3 Multivariable Linear Systems</p> <p>7.4 Partial Fractions</p> <p>LTF Activities</p>	<p><b>District Resources</b> Larson <u>Pre-Calculus with Limits</u> Graphing Calculators HM mathSpace Student CD-ROM Instructional DVDs and Videotapes Complete Solutions Guide Test Item File and Test Generator Online Instructor's Success Organizer Online Teaching Center Laying the Foundation (LTF)</p> <p><b>Internet Resources</b> <a href="#">MISD Mathematics Web Site</a> <a href="#">EduSpace</a> <a href="#">Larson Pre-Calculus</a></p> <p><b>Campus Resources</b> To be filled in by each campus</p> <p><b>Manipulatives</b></p>

## Secondary Mathematics Pre-Advanced Placement Pre-Calculus

Unit 9: Sequences, Series and Probability			4 <sup>th</sup> 6 Weeks		
Date Taught	TEKS	Content/Vocabulary	Guiding Questions	Activities	Resources
	<p>(P.4) The student uses sequences and series as well as tools and technology to represent, analyze, and solve real-life problems. The student is expected to:</p> <p>(A) represent patterns using arithmetic and geometric sequences and series;</p> <p>(B) use arithmetic, geometric, and other sequences and series to solve real-life problems;</p> <p>(D) apply sequences and series to solve problems including sums and binomial expansion.</p>	<p>The student will be able to use sequence and summation notation to write terms and sums of a sequence.</p> <p>The student will be able to recognize, write, and find the nth terms of arithmetic sequences and use those sequences to solve real life problems.</p> <p>The student will be able to recognize, write, and find the nth terms of geometric sequences and use those sequences to solve real life problems.</p> <p>The student will be able to use the binomial theorem and Pascal's Triangle to calculate binomial coefficients and use binomial coefficients to write binomial expansions.</p> <p>The student will be able to use permutations, combinations, and the Fundamental Counting Principle to solve counting problems.</p> <p>The student will be able to find the probabilities of mutually exclusive events, and independent events as well as the probability of the compliment of an event.</p>	<p>How do you represent a sequence of numbers or the sum of a sequence?</p> <p>How do you find the nth term or partial sum of an arithmetic sequence?</p> <p>How do you find the nth term or sum of a geometric sequence?</p> <p>How do you expand a binomial using Binomial Theorem or Pascal's Triangle?</p> <p>How do you count the number of ways in which an event can occur?</p> <p>How do you find the probability that a series of events will occur?</p>	<p>9.1 Sequences and Series</p> <p>9.2 Arithmetic Sequences and Partial Sums</p> <p>9.3 Geometric Sequences and Series</p> <p>9.5 Binomial Theorem</p> <p>9.6 Counting Principles</p> <p>9.7 Probability</p> <p>LTF Activities</p>	<p><b>District Resources</b> Larson <u>Pre-Calculus with Limits</u> Graphing Calculators HM mathSpace Student CD-ROM Instructional DVDs and Videotapes Complete Solutions Guide Test Item File and Test Generator Online Instructor's Success Organizer Online Teaching Center Laying the Foundation (LTF)</p> <p><b>Internet Resources</b> <a href="#">MISD Mathematics Web Site</a> <a href="#">EduSpace</a> <a href="#">Larson Pre-Calculus</a></p> <p><b>Campus Resources</b> To be filled in by each campus</p> <p><b>Manipulatives</b> Coins Dice Cards</p>



## Secondary Mathematics Pre-Advanced Placement Pre-Calculus

Unit 9: Sequences, Series and Probability			4 <sup>th</sup> 6 Weeks		
Date Taught	TEKS	Content/Vocabulary	Guiding Questions	Activities	Resources
		Infinite Sequence Finite Sequence Factorial Recursively Summation Notation Sigma Notation Index of Summation Upper Limit of Summation Lower Limit of Summation Finite Series Infinite Series nth Partial Sum Arithmetic Sequence Recursive Formula Geometric Sequence Common Ratio Infinite Geometric Series Geometric Series Binomial Theorem Binomial Coefficients Pascal's Triangle Binomial Expansion Fundamental Counting Principle Permutation Distinguishing Permutation Combinations Sample Space Mutually Exclusive Union Intersection Independent Compliment			<b>District Resources</b> Larson <u>Pre-Calculus with Limits</u> Graphing Calculators HM mathSpace Student CD-ROM Instructional DVDs and Videotapes Complete Solutions Guide Test Item File and Test Generator Online Instructor's Success Organizer Online Teaching Center Laying the Foundation (LTF)  <b>Internet Resources</b> <a href="#">MISD Mathematics Web Site</a> <a href="#">EduSpace</a> <a href="#">Larson Pre-Calculus</a>  <b>Campus Resources</b> To be filled in by each campus  <b>Manipulatives</b> Coins Dice Cards



## Secondary Mathematics Pre-Advanced Placement Pre-Calculus

Unit 10: Topics in Analytic Geometry			4 <sup>th</sup> 6 Weeks		
Date Taught	TEKS	Content/Vocabulary	Guiding Questions	Activities	Resources
	<p>(P.5) The student uses conic sections, their properties, and parametric representations, as well as tools and technology, to model physical situations. The student is expected to:</p> <p>(A) use conic sections to model motion, such as the graph of velocity vs. position of a pendulum and motions of planets;</p> <p>(B) use properties of conic sections to describe physical phenomena such as the reflective properties of light and sound;</p> <p>(C) convert between parametric and rectangular forms of functions and equations to graph them; and</p> <p>(D) use parametric functions to simulate problems involving motion</p>	<p>Students will be able to find the inclination of a line, the angle between two lines and the distance between a point and a line.</p> <p>Students will be able to recognize conics as an intersection of a plane and a double-napped cone, write the equation of a conic section and graph a conic equation.</p>	<p>How do you find the distance between a point and a line and the inclination of a line?</p> <p>How are the different conic sections formed and how do you solve problems involving parabolas?</p>	<p>10.1 Lines</p> <p>10.2 Introduction to Conics: Parabolas</p>	<p><b>District Resources</b> Larson <u>Pre-Calculus with Limits</u> Graphing Calculators HM mathSpace Student CD-ROM Instructional DVDs and Videotapes Complete Solutions Guide Test Item File and Test Generator Online Instructor's Success Organizer Online Teaching Center Laying the Foundation (LTF)</p> <p><b>Internet Resources</b> <a href="#">MISD Mathematics Web Site</a> <a href="#">EduSpace</a> <a href="#">Larson Pre-Calculus</a></p> <p><b>Campus Resources</b> To be filled in by each campus</p> <p><b>Manipulatives</b> Cone Thumbtacks String Polar Graph Paper</p>



## Secondary Mathematics Pre-Advanced Placement Pre-Calculus

Unit 10: Topics in Analytic Geometry			3 <sup>rd</sup> 9 Weeks, Days to Teach: 12 ½ Days		
Date Taught	TEKS	Content/Vocabulary	Guiding Questions	Activities	Resources
		Conic Section Degenerate Conic Directrix Focus (Foci) Focal Chord Latus Rectum Major and Minor Axes Eccentricity Branches Transverse Axis Conjugate Axis General Form of Equation Rotation of Axis Rotation and Invariants Rectangular Equation Parametric Equation Plane Curve Parameter Eliminating the Parameter Cycloid Polar Coordinate System Pole Polar Axis Polar Coordinate Coordinate Conversion Limaçon Rose Curve Lemniscate Cardoid			<b>District Resources</b> Larson <a href="#">Pre-Calculus with Limits</a> Graphing Calculators HM mathSpace Student CD-ROM Instructional DVDs and Videotapes Complete Solutions Guide Test Item File and Test Generator Online Instructor's Success Organizer Online Teaching Center Laying the Foundation (LTF)  <b>Internet Resources</b> <a href="#">MISD Mathematics Web Site</a> <a href="#">EduSpace</a> <a href="#">Larson Pre-Calculus</a>  <b>Campus Resources</b> To be filled in by each campus  <b>Manipulatives</b> Cone Thumbtacks String Polar Graph Paper

## Secondary Mathematics Pre-Advanced Placement Pre-Calculus

Unit 10: Topics in Analytic Geometry			5 <sup>th</sup> 6 Weeks		
Date Taught	TEKS	Content/Vocabulary	Guiding Questions	Activities	Resources
	<p>(P.5) The student uses conic sections, their properties, and parametric representations, as well as tools and technology, to model physical situations. The student is expected to:</p> <p>(A) use conic sections to model motion, such as the graph of velocity vs. position of a pendulum and motions of planets;</p> <p>(B) use properties of conic sections to describe physical phenomena such as the reflective properties of light and sound;</p> <p>(C) convert between parametric and rectangular forms of functions and equations to graph them; and</p> <p>(D) use parametric functions to simulate problems involving motion</p>	<p>Students will be able to write equations of ellipses, graph ellipses and solve real-life problems involving properties of ellipses.</p> <p>Students will be able to write equations of hyperbolas, graph hyperbolas and solve real-life problems involving properties of hyperbolas.</p> <p>Students will be able to rotate the coordinate axes to eliminate the <math>xy</math> term in equations of conics and use the discriminant to classify conics.</p> <p>Students will be able to evaluate sets of parametric equations, sketch curves represented by sets of parametric equations and rewrite parametric equations as single rectangular equations.</p> <p>Students will be able to plot polar coordinates and be able to convert points and equations from rectangular to polar.</p> <p>Students will be able to graph polar equations by point plotting and recognize special polar graphs.</p>	<p>How do you solve problems involving ellipses?</p> <p>How do you classify conic sections on the basis of their general equation?</p> <p>How does the <math>xy</math> term affect a conic section?</p> <p>How do you write equations to describe the motion of a point in a plane?</p> <p>How do you describe the position of a point in a plane using distance and angle rather than <math>x</math> and <math>y</math> coordinates?</p> <p>How do you sketch graphs of polar equations?</p>	<p>10.3 Ellipses</p> <p>10.4 Hyperbolas</p> <p>10.5 Rotation of Conics</p> <p>10.6 Parametric Equations</p> <p>10.7 Polar Coordinates</p> <p>10.8 Graphs of Polar Equations</p>	<p><b>District Resources</b> Larson <a href="#">Pre-Calculus with Limits</a> Graphing Calculators HM mathSpace Student CD-ROM Instructional DVDs and Videotapes Complete Solutions Guide Test Item File and Test Generator Online Instructor's Success Organizer Online Teaching Center Laying the Foundation (LTF)</p> <p><b>Internet Resources</b> <a href="#">MISD Mathematics Web Site</a> <a href="#">EduSpace</a> <a href="#">Larson Pre-Calculus</a></p> <p><b>Campus Resources</b> To be filled in by each campus</p> <p><b>Manipulatives</b> Cone Thumbtacks String Polar Graph Paper</p>



## Secondary Mathematics Pre-Advanced Placement Pre-Calculus

Unit 10: Topics in Analytic Geometry			5 <sup>th</sup> 6 Weeks		
Date Taught	TEKS	Content/Vocabulary	Guiding Questions	Activities	Resources
		<p>Students will be able to write and graph equations of conics in polar forms and use those to model real life problems.</p> <p><b>Conic Section</b>  <b>Degenerate Conic</b>  <b>Directrix</b>  <b>Focus (Foci)</b>  <b>Focal Chord</b>  <b>Latus Rectum</b>  <b>Major and Minor Axes</b>  <b>Eccentricity</b>  <b>Branches</b>  <b>Transverse Axis</b>  <b>Conjugate Axis</b>  <b>General Form of Equation</b>  <b>Rotation of Axis</b>  <b>Rotation and Invariants</b>  <b>Rectangular Equation</b>  <b>Parametric Equation</b>  <b>Plane Curve</b>  <b>Parameter</b>  <b>Eliminating the Parameter</b>  <b>Cycloid</b>  <b>Polar Coordinate System</b>  <b>Pole</b>  <b>Polar Axis</b>  <b>Polar Coordinate</b>  <b>Coordinate Conversion</b>  <b>Limaçon</b>  <b>Rose Curve</b>  <b>Lemniscate</b>  <b>Cardoid</b></p>	How do you represent conic sections in polar coordinates?	<p>10.9 Polar Equations of Conics</p> <p>LTF Activities</p>	<p><b>District Resources</b>  Larson <u>Pre-Calculus with Limits</u>  Graphing Calculators  HM mathSpace Student CD-ROM  Instructional DVDs and Videotapes  Complete Solutions Guide  Test Item File and Test Generator  Online Instructor's Success Organizer  Online Teaching Center  Laying the Foundation (LTF)</p> <p><b>Internet Resources</b>  <a href="#">MISD Mathematics Web Site</a>  <a href="#">EduSpace</a>  <a href="#">Larson Pre-Calculus</a></p> <p><b>Campus Resources</b>  To be filled in by each campus</p> <p><b>Manipulatives</b>  Cone  Thumbtacks  String  Polar Graph Paper</p>



## Secondary Mathematics Pre-Advanced Placement Pre-Calculus

Unit 12: Limits and Introduction to Calculus			5 <sup>th</sup> 6 Weeks		
Date Taught	TEKS/AP Required Elements	Content/Vocabulary	Guiding Questions	Activities	Resources
	<p><b>AP Required Elements:</b></p> <p><b>Analysis of graphs</b> With the aid of technology, graphs of functions are often easy to produce. The emphasis is on the interplay between the geometric and analytic information and on the use of calculus both to predict and to explain the observed local and global behavior of a function.</p> <p><b>Limits of functions (including one-sided limits)</b></p> <ul style="list-style-type: none"> <li>❖ An intuitive understanding of the limiting process</li> <li>❖ Calculating limits using algebra</li> <li>❖ Estimating Limits from graphs or tables of data</li> </ul> <p><b>Asymptotic and unbounded behavior</b></p> <ul style="list-style-type: none"> <li>❖ Understanding asymptotes in terms of graphical behavior</li> <li>❖ Describing asymptotic behavior in terms of limits involving infinity</li> </ul> <p><b>Concept of the Derivative</b></p> <ul style="list-style-type: none"> <li>❖ Derivative presented graphically, numerically &amp; analytically</li> <li>❖ Derivative interpreted as an instantaneous rate of change</li> <li>❖ Derivative defined as the limit of the difference quotient</li> <li>❖ Relationship between differentiability and continuity</li> </ul> <p><b>Derivative at a point</b></p> <ul style="list-style-type: none"> <li>❖ Slope of a curve at a point. Examples are emphasized, including points at which there are vertical tangents and points at which there are no tangents.</li> </ul>	<p>Students will be able to use the definition of a limit to estimate limits and determine whether limits of functions exist.</p> <p>Students will be able to use the dividing and rationalizing techniques to evaluate the limits of functions and approximate functions graphically and numerically.</p>	<p>How do you find and interpret the limit of a function for a certain value of <math>x</math>?</p> <p>How do you evaluate limits that cannot be solved through use of direct substitution?</p>	<p>12.1 Introduction to Limits</p> <p>12.2 Techniques for Evaluating Limits</p>	<p><b>District Resources</b> Larson <u>Pre-Calculus with Limits</u> Graphing Calculators HM mathSpace Student CD-ROM Instructional DVDs and Videotapes Complete Solutions Guide Test Item File and Test Generator Online Instructor's Success Organizer Online Teaching Center Laying the Foundation (LTF)</p> <p><b>Internet Resources</b> <a href="#">MISD Mathematics Web Site</a> <a href="#">EduSpace</a> <a href="#">Larson Pre-Calculus</a></p> <p><b>Campus Resources</b> To be filled in by each campus</p> <p><b>Manipulatives</b> Modeling Clay</p>



## Secondary Mathematics Pre-Advanced Placement Pre-Calculus

Unit 12: Limits and Introduction to Calculus			5 <sup>th</sup> 6 Weeks		
Date Taught	TEKS/AP Required Elements	Content/Vocabulary	Guiding Questions	Activities	Resources
	<ul style="list-style-type: none"> <li>❖ Tangent line to a curve at a point and local linear approximation</li> <li>❖ Instantaneous rate of change as a limit of average rate of change</li> <li>❖ Approximate rate of change from graphs and tables of values</li> </ul> <p><b>TEKS:</b></p> <p>(P.4) The student uses sequences and series as well as tools and technology to represent, analyze, and solve real-life problems. The student is expected to:</p> <p>(C) describe limits of sequences and apply tier properties to investigate convergent and divergent series.</p>				<p><b>District Resources</b> Larson <u>Pre-Calculus with Limits</u> Graphing Calculators HM mathSpace Student CD-ROM Instructional DVDs and Videotapes Complete Solutions Guide Test Item File and Test Generator Online Instructor's Success Organizer Online Teaching Center Laying the Foundation (LTF)</p> <p><b>Internet Resources</b> <a href="#">MISD Mathematics Web Site</a> <a href="#">EduSpace</a> <a href="#">Larson Pre-Calculus</a></p> <p><b>Campus Resources</b> To be filled in by each campus</p> <p><b>Manipulatives</b> Modeling Clay</p>

## Secondary Mathematics Pre-Advanced Placement Pre-Calculus

Unit 12: Limits and Introduction to Calculus			6 <sup>th</sup> 6 Weeks		
Date Taught	TEKS/AP Required Elements	Content/Vocabulary	Guiding Questions	Activities	Resources
	<p><b>AP Required Elements:</b></p> <p><b>Analysis of graphs</b> With the aid of technology, graphs of functions are often easy to produce. The emphasis is on the interplay between the geometric and analytic information and on the use of calculus both to predict and to explain the observed local and global behavior of a function.</p> <p><b>Limits of functions (including one-sided limits)</b></p> <ul style="list-style-type: none"> <li>❖ An intuitive understanding of the limiting process</li> <li>❖ Calculating limits using algebra</li> <li>❖ Estimating Limits from graphs or tables of data</li> </ul> <p><b>Asymptotic and unbounded behavior</b></p> <ul style="list-style-type: none"> <li>❖ Understanding asymptotes in terms of graphical behavior</li> <li>❖ Describing asymptotic behavior in terms of limits involving infinity</li> </ul> <p><b>Concept of the Derivative</b></p> <ul style="list-style-type: none"> <li>❖ Derivative presented graphically, numerically &amp; analytically</li> <li>❖ Derivative interpreted as an instantaneous rate of change</li> <li>❖ Derivative defined as the limit of the difference quotient</li> <li>❖ Relationship between differentiability and continuity</li> </ul> <p><b>Derivative at a point</b></p> <ul style="list-style-type: none"> <li>❖ Slope of a curve at a point. Examples are emphasized, including points at which there are vertical tangents and points at which there are no tangents.</li> </ul>	<p>Students will be able to use a tangent line to approximate the slope of a graph at a point and use the limit definition of slopes to find exact slopes.</p> <p>Students will be able to evaluate limits of functions at infinity and find limits of sequences.</p> <p>Students will be able to find limits of summations, use rectangles to approximate areas of plane regions, and use limits of summations to find areas of plane regions.</p>	<p>How do you find the slope of a graph at any single point?</p> <p>How do you find the limits of functions at infinity and the limits of sequences?</p> <p>How do you approximate and find exact areas of plane regions defined by functions?</p>	<p>12.3 The Tangent Line Problem</p> <p>12.4 Limits at Infinity and Limits of Sequences</p> <p>12.5 The Area Problem</p> <p>LTF Activities</p>	<p><b>District Resources</b> Larson Pre-Calculus with Limits Graphing Calculators HM mathSpace Student CD-ROM Instructional DVDs and Videotapes Complete Solutions Guide Test Item File and Test Generator Online Instructor's Success Organizer Online Teaching Center Laying the Foundation (LTF)</p> <p><b>Internet Resources</b> <a href="#">MISD Mathematics Web Site</a> <a href="#">EduSpace</a> <a href="#">Larson Pre-Calculus</a></p> <p><b>Campus Resources</b> To be filled in by each campus</p> <p><b>Manipulatives</b> Modeling Clay</p>



## Secondary Mathematics Pre-Advanced Placement Pre-Calculus

Unit 12: Limits and Introduction to Calculus			6 <sup>th</sup> 6 Weeks		
Date Taught	TEKS/AP Required Elements	Content/Vocabulary	Guiding Questions	Activities	Resources
	<ul style="list-style-type: none"> <li>❖ Tangent line to a curve at a point and local linear approximation</li> <li>❖ Instantaneous rate of change as a limit of average rate of change</li> <li>❖ Approximate rate of change from graphs and tables of values</li> </ul> <p><b>TEKS:</b></p> <p>(P.4) The student uses sequences and series as well as tools and technology to represent, analyze, and solve real-life problems. The student is expected to:</p> <p>(C) describe limits of sequences and apply tier properties to investigate convergent and divergent series.</p>				<p><b>District Resources</b> Larson <u>Pre-Calculus with Limits</u> Graphing Calculators HM mathSpace Student CD-ROM Instructional DVDs and Videotapes Complete Solutions Guide Test Item File and Test Generator Online Instructor's Success Organizer Online Teaching Center Laying the Foundation (LTF)</p> <p><b>Internet Resources</b> <a href="#">MISD Mathematics Web Site</a> <a href="#">EduSpace</a> <a href="#">Larson Pre-Calculus</a></p> <p><b>Campus Resources</b> To be filled in by each campus</p> <p><b>Manipulatives</b> Modeling Clay</p>



## Secondary Mathematics Pre-Advanced Placement Pre-Calculus

Unit 13: AP Extensions			6 <sup>th</sup> 6 Weeks		
Date Taught	TEKS	Content/Vocabulary	Guiding Questions	Activities	Resources
		<p>The student will be able to factor complex expressions involving rational exponents and trig functions.</p> <p>The student will be able to understand the relationship between Position, Velocity, and Acceleration.</p> <p>The student will be able to estimate the area under a curve using different types of Riemann Sums?</p> <p><b>Riemann Sum</b> <b>Trapezoidal Rule</b> <b>Left Rectangles</b> <b>Right Rectangles</b></p>	<p>How can factoring rules be utilized to simplify higher level expressions?</p> <p>How can you determine position, velocity, or acceleration by looking at a table or graph?</p> <p>How can you estimate the area under a curve?</p>	<p>LTF Advanced Factoring Practice</p> <p>LTF Particle Motion for Pre-Calculus</p> <p>LTF Reading the Graph of a Velocity Function</p> <p>LTF Adaptation of AP Calculus</p> <p>LTF Accumulation 1</p> <p>LTF Accumulation 2</p>	<p><b>District Resources</b> Larson <u>Pre-Calculus with Limits</u> Graphing Calculators HM mathSpace Student CD-ROM Instructional DVDs and Videotapes Complete Solutions Guide Test Item File and Test Generator Online Instructor's Success Organizer Online Teaching Center Laying the Foundation (LTF)</p> <p><b>Internet Resources</b> <a href="#">MISD Mathematics Web Site</a> <a href="#">EduSpace</a> <a href="#">Larson Pre-Calculus</a></p> <p><b>Campus Resources</b> To be filled in by each campus</p> <p><b>Manipulatives</b> CBRs Modeling Clay</p>