

Intro. To Calculus

Month	Content	Skills	Assessment	Essential Questions
September	<ul style="list-style-type: none"> • Exponent Rules • Picks Rule Lab • Factoring polynomials • Review properties of the real numbers 	<ul style="list-style-type: none"> • Be able to use exponent rules to simplify various algebraic expressions. • Learn problem-solving strategies. • Using Picks Rule, find areas of various figures. • Be able to factor polynomials using various methods (GCMF, diff. of squares, trinomial squares, foil, sum, 7 diff. Of cubes, & using grouping to help factor.) • Be able to use & understand the various properties <ul style="list-style-type: none"> - associative - commutative - distributive - identity - inverses & others 	<ul style="list-style-type: none"> • Teacher-made work sheets • Teacher-made tests • Questioning students during class • Discussing the topics with students during class • Appropriate homework assignment with follow-up 	
September	<ul style="list-style-type: none"> • Review for the PSAT exam 	<ul style="list-style-type: none"> • Students practice by answering questions from previously given exams. <ul style="list-style-type: none"> - questions that seem troublesome are discussed • Students learn test taking strategies & the format of the exam. 		

NOTE: Students learn how to use the TI-83 graphing calculator in order to fully explore the topics in this course.

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October	<ul style="list-style-type: none"> Review for the PSAT exam 	<ul style="list-style-type: none"> Students practice by answering questions from previously given exams. <ul style="list-style-type: none"> Questions that seem troublesome are discussed. Students learn test taking strategies & the format of the exam. 	<ul style="list-style-type: none"> Practice SAT/PSAT Exams 	
October	<ul style="list-style-type: none"> The Cartesian Plane & Functions 	<ul style="list-style-type: none"> Students review inequalities & learn how to use a new notation called interval notation. Students solve inequalities. Students solve inequalities with absolute values. Students review formulas such as: <ul style="list-style-type: none"> distance slope midpoint Students review basic functions such as: <ul style="list-style-type: none"> linear functions conic sections, including the parabola & although not a function, the circle Students graph various functions using tools such as: <ul style="list-style-type: none"> x & y intercepts T-tables Symmetry tests 	<ul style="list-style-type: none"> Teacher-made worksheets Teacher-made tests Questioning students during class Discussing the topics with students during class Appropriate homework assignment with follow-up 	

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October	<ul style="list-style-type: none"> •The Cartesian Plane & Functions (cont.) 	<ul style="list-style-type: none"> • Students review what the domain & range of a function are & how to find them. • Students review composite & odd & even functions. • Students graph various linear functions along with other polynomial functions & use these graphs in answering various questions. 		
October	<ul style="list-style-type: none"> • Review of Trigonometric, Logarithmic, & Exponential Functions 	<ul style="list-style-type: none"> • Students review & practice skills learned in Course III, such as: <ul style="list-style-type: none"> - solving Trig. Equations, - solving Trig. Identities - solving Log. Equations - solving Exponential Eq. - Graphing the various functions & answering various questions related to each 	<ul style="list-style-type: none"> • To maintain skills, students will complete a series of worksheets throughout the remainder of the year. 	

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November	<ul style="list-style-type: none"> • Matrix Theory 	<ul style="list-style-type: none"> • Students learn basic matrix operations (+, -, x, /). • Students also learn basic matrix properties. • Students learn what the identity matrix is & how to find one for a given matrix. • Students learn what the transpose of a matrix is & how to find one given a matrix. • Students learn what a symmetric matrix is. • Students learn how to solve a system of linear equations using an augmented matrix. • Students also learn how to row reduce an augmented matrix to row reduced echelon form. • Students also learn how to perform many of these tasks using the TI-83 graphing calculator. • Students work with this calculator throughout the entire course. 	<ul style="list-style-type: none"> • Teacher-made worksheets • Teacher-made tests • Questioning students during class • Discussing the topics with students during class • Appropriate homework assignments with follow-up 	

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December	<ul style="list-style-type: none"> Limits 	<ul style="list-style-type: none"> Students learn & begin to understand the concept of what a limit is & how to find one. Students study various graphs to determine whether a certain limit exists or not. Students become aware of common problems that lead to the non-existence of a limit. Students learn techniques for evaluating limits such as: <ul style="list-style-type: none"> cancellation rationalization direct substitution Students learn how to deal with a one-sided limit. 	<ul style="list-style-type: none"> Teacher-made worksheets Teacher-made tests Questioning students during class Discussing the topics with students during class Appropriate homework assignment with follow-up 	
January	<ul style="list-style-type: none"> Continuity of a function 	<ul style="list-style-type: none"> Students learn what a continuous function is by examining many graphs. Students learn about continuity as it applies to an open vs. closed interval. Students learn what the intermediate Value Theorem is and how to use it. Students learn about infinite limits & what kind of discontinuities produce them. Students also learn how to find vertical asymptotes. 	<ul style="list-style-type: none"> Teacher-made worksheets Teacher-made tests Questioning students during class Discussing the topics with students during class Appropriate homework assignment with follow-up 	

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February	<ul style="list-style-type: none"> • Differentiation 	<ul style="list-style-type: none"> • Students learn the definition for the derivative & how to find slope of the tangent line to a given point using it. • Students learn the alternate form of the derivative & how to use it. • Students learn characteristics that destroy differentiability. • Students learn about velocity, acceleration, & other rates of change. <ul style="list-style-type: none"> - average velocity - instantaneous velocity <li style="padding-left: 20px;">$s'(t)=v(t)$ - acceleration $v'(t)=a(t)$ • Students learn to find solutions to real life problems using rates of change. 	<ul style="list-style-type: none"> • Teacher-made worksheets • Teacher-made tests • Questioning students during class • Discussing the topics with students during class • Appropriate homework assignment with follow-up 	

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March	<ul style="list-style-type: none"> Differentiation Rules Related Rates Problems 	<ul style="list-style-type: none"> Students learn the short cuts for finding derivatives. <ul style="list-style-type: none"> Constant Rule Power Rule Constant Multiple Rule Sum Rule Product Rule Quotient Rule Chain Rule These rules are practiced using various types of functions. Students also work a number of application problems relating to the derivative. 	<ul style="list-style-type: none"> Teacher-made worksheets Teacher-made tests Questioning students during class Discussing the topics with students during class Appropriate homework assignment with follow-up 	
April	<ul style="list-style-type: none"> Derivative Rules for Functions Involving Trig, In, and e. 	<ul style="list-style-type: none"> Students will learn the derivative rules for the various Trig. Functions, In, and e. Students will be able to find derivatives for functions using the general derivative rules in combination with the above mentioned rules. Students will learn to apply these rules in problem solving. 	<ul style="list-style-type: none"> Teacher-made worksheets Teacher-made tests Questioning students during class Discussing the topics with students during class Appropriate homework assignment with follow-up 	

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May	<ul style="list-style-type: none"> • Project 	<ul style="list-style-type: none"> • Students are required to write a paper on a math related topic & to present what they find to the class. Students are asked to use a variety of sources including the internet. • Students choose topics they have a real interest in researching. This makes it a more meaningful project. 	<ul style="list-style-type: none"> • Term paper • Class presentations 	
May	<ul style="list-style-type: none"> • Applications of Differentiation 	<ul style="list-style-type: none"> • Students learn what extreme & relative extreme are & how to use this information to graph functions. • Students learn how to apply Rolle's Theorem & the Mean Value Theorem. • Students learn how to use the first & second derivative test to determine whether a function is increasing/ decreasing, to check for maximum & minimum points, as well as concavity, & to determine inflection points. 	<ul style="list-style-type: none"> • Teacher-made worksheets • Teacher-made tests • Questioning students during class • Discussing the topics with students during class • Appropriate homework assignment with follow-up 	

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June	<ul style="list-style-type: none"> • Applications of Differentiability 	<ul style="list-style-type: none"> • Students revisit limits at infinity. • Students practice curve sketching using all of the knowledge gained throughout the course. • Domain & range <ul style="list-style-type: none"> - x & y intercepts - symmetry tests - discontinuities - horizontal & vertical asymptotes - extreme - concavity - points of inflection 	<ul style="list-style-type: none"> • Teacher-made worksheets • Teacher-made tests • Questioning students during class • Discussing the topics with students during class • Appropriate homework assignment with follow-up 	
June	<ul style="list-style-type: none"> • Integration (if time permits) 	<ul style="list-style-type: none"> • Students learn & practice the following: <ul style="list-style-type: none"> - anti-derivatives & indefinite integration - integration & substitution - summation notation - definite integrals - Fundamental Theorem of Calculus - find area between two curves 	<ul style="list-style-type: none"> • Teacher-made worksheets • Teacher-made tests • Questioning students during class • Discussing the topics with students during class • Appropriate homework assignment with follow-up 	
June	<ul style="list-style-type: none"> • Review for a cumulative final exam 	<ul style="list-style-type: none"> • Review all skills learned during the course of the year. 	<ul style="list-style-type: none"> • Final exam (three parts) 	

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Month	Content	Skills	Assessment	Essential Questions
June (cont.)	<ul style="list-style-type: none">• Kite building	<ul style="list-style-type: none">• Students learn how to build & fly a Tetrahedral kite.	<ul style="list-style-type: none">• Students fly their kites.	

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