



VIRGINIA BEACH CITY PUBLIC SCHOOLS
CHARTING THE COURSE

Department of Teaching & Learning
Parent/Student Course Information

MATHEMATICAL ANALYSIS

(MA 3162)

Online (MAO 162)

One credit, One year

Grades 11-12

Counselors are available to assist parents and students with course selections and career planning. Parents may arrange to meet with the counselor by calling the school's guidance department.

COURSE DESCRIPTION

This rigorous course extends concepts of intermediate algebra while introducing various topics of college algebra. Topics include functions, conic sections, theory of equations, matrices, sequences and series, polar coordinates, exponential and logarithmic functions and limits. Topics of trigonometry are extended.

PREREQUISITE

Algebra II/Trigonometry or Algebra II and Trigonometry

OPTIONS FOR NEXT COURSE

Advanced Placement Calculus AB or Advanced Placement Calculus BC
Advanced Placement Computer Science A or Advanced Placement Statistics

REQUIRED TEXTBOOK

Precalculus with Limits, First Edition, Young, Wiley (2010)

RECOMMENDED CALCULATOR

TI-83 Plus, TI-84 Plus, TI-84 Plus C or TI-84 Plus CE or TI-Nspire

Virginia Beach Instructional Objectives
Mathematical Analysis – MA3162

VBO#	Objective
Unit 1: Functions and Their Graphs	
MA.FN.1.1	The student will be able to identify the characteristics of functions including: intercepts, domain, range and increasing, decreasing or constant intervals, including absolute value functions of the form $f(x) = g(x) + h(x)$ where both functional parts are linear functions. (SOL MA.1)
MA.FN.1.2	The student will be able to determine if symmetry exists and determine whether a function is odd, even or neither, both algebraically and graphically. (SOL MA.1)
MA.FN.1.3	The student will be able to use transformations to sketch a graph of a function with and without graphing utilities. (SOL MA.1)
MA.FN.1.4	The student will be able to find composition of functions and inverse functions algebraically and graphically. (SOL MA.2)
Unit 2: Polynomials and Rational Functions	
MA.FN.2.1	The student will be able to thoroughly analyze and graph polynomial functions and apply the maximum and minimum values to solve problems. (SOL MA.1)
MA.FN.2.2	The student will be able to thoroughly analyze and identify major characteristics of rational functions including, domain, range, zeros, intercepts and vertical or horizontal asymptotes. (SOL MA.1)
MA.FN.2.3	The student will solve polynomial and rational inequalities and problems modeled by polynomial and rational inequalities.
Unit 3: Exponential and Logarithmic Functions	
MA.FN.3.1	The student will be able to identify and use transformations to graph exponential functions. The student should be able to define e and to make a sketch of the graph of $y = e^x$. (SOL MA.9)
MA.FN.3.2	The student will be able to identify and use transformations to graph logarithmic functions, including the natural logarithmic function. (SOL MA.9)
MA.FN.3.3	The student will be able to solve exponential and logarithmic equations algebraically using properties and apply both to problem solving. (SOL MA.9)
Unit 4: Trigonometric Functions and the Unit Circle	
MA.TR.4.1	The student will identify, create and solve real world problems involving triangles, utilizing the trigonometric functions, the Pythagorean Theorem, the Law of Sines and the Law of Cosines. (SOL MA.13)
MA.TR.4.2	The student will be able to determine the value of the trigonometric ratios of the special angles and their related angles without a calculator, or given the ratio, find the angle measure. (SOL MA.13)
MA.TR.4.3	The student will be able to use transformations to make a sketch for each of the six trigonometric functions and given a graph, write an equation. (SOL MA.13)
Unit 5: Trigonometric Identities and Formulas	
MA.TR.5.1	The student will be able to apply fundamental trigonometric identities, simplify trigonometric expressions using identities and verify trigonometric identities. (SOL MA.13)
Unit 6: Solving Trigonometric Equations	
MA.TR.6.1	The student will be able to thoroughly analyze and identify major characteristics of inverse trigonometric functions. (SOL MA.13)
MA.TR.6.2	The student will be able to solve trigonometric equations using algebraic techniques, inverse functions and trigonometric identities. (SOL MA.13)

VBO#	Objective
	Unit 7: Polar Topics and Vectors
MA.PV.7.1	The student will be able to use a graphing calculator to investigate and identify characteristics of polar equations. This includes identification of classical polar curves, their intercepts, extremities, symmetries and intersections of multiple polar curves. (SOL MA.10)
MA.PV.7.2	The student will convert complex numbers from rectangular form to polar form and from polar form to rectangular form. (SOL MA.10)
MA.PV.7.3	The student will be able to perform operations with vectors in the coordinate plane and to apply vectors to practical problems. (SOL MA.11)
	Unit 8: Linear Systems and Matrices
MA.AA.8.1	The student will be able to perform matrix operations, solve systems of equations using matrices and apply matrices to problem solving. (SOL MA.14)
	Unit 9: Conics and Parametric Equations
MA.PV.9.1	The student will investigate and identify the characteristics of conic section equations in (h, k) and standard forms. Transformations in the coordinate plane will be used to graph conic sections. (SOL MA.8)
MA.PV.9.2	The student will be able to graph curves described by parametric equations, eliminate the parameter, find parametric equations for functions and use parametric equations to solve application problems. (SOL MA.12)
	Unit 10: Sequences, Series and Summation
MA.AA.10.1	The student will be able to solve problems using finite and infinite sequences and series. (SOL MA.5)
MA.AA.10.2	The student will be able to determine if an infinite sequence or series is convergent or divergent and to find the limit if it exists. (SOL MA.5)
	Unit 11: Math Induction and the Binomial Theorem
MA.DM.11.1	The student will be able to apply the principle of mathematical induction to prove formulas and mathematical situations. (SOL MA.6)
MA.DM.11.2	The student will be able to use the binomial theorem. Students will be able to use sigma notation, binomial expansion and determine a k^{th} term. (SOL MA.4)
	Unit 12: Limits and Continuity
MA.FN.12.1	The student will be able to determine $\lim_{x \rightarrow \pm\infty} f(x)$ and $\lim_{x \rightarrow c} f(x)$ if they exist using intuitive reasoning, algebraic method, numerical substitution and a graphing calculator. (SOL MA.7)
MA.FN.12.2	The student will be able to determine the continuity or discontinuity and classify discontinuity as point, jump or infinite and use these concepts to sketch a function graph. (SOL MA.3)

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For further information please call (757) 263-1070.

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