

MATH ANALYSIS SYLLABUS

ZAMA HIGH SCHOOL

Course Name and Number: Math Analysis MAD501

Course Description:

Major Concepts/Content: This course will involve students in units and topics of study of operations with functions and equations, circular functions, vectors, applications of matrices, complex and polar coordinates, recursion, advanced proof ideas, rates and areas, statistical interference, algebra and algorithms. Problem solving in real world applications involving these units of study will be the beginning and focal points of lessons. Connections will be made of graphs with equations with real world situations. Reasoning in trigonometry, probability, discrete math, mathematical structure, and the conceptual underpinnings of calculus is a major emphasis in this course.

Major Instructional Activities: Students will be involved in communicating ideas through conjecture and validation of thinking in functions, models, matrices, probability, and statistics. They will be engaged in cooperative groups, whole class settings, or individually to reinforce concepts in functions, polar coordinates, advanced proof ideas, and algebraic algorithms. Students should have access to graphing calculators at all times.

Major Evaluative Techniques: Many evaluative processes will be used to assess students' written and oral work. These include multiple-choice, short-answer, discussion, or open-ended questions; structured or open-ended interview; homework; projects; journals; essays; dramatization; and class presentations. Testing formats will include restricted-time written tests, two-staged tests, take-home tests, oral tests and student-produced tests. Assessment methods can be supplemented by student-produced analysis of problem situations, solutions to problems, reports on investigations and journal entries. Calculators should be available in most assessment situations.

Essential Expectations: Upon successful completion of the mathematical analysis course, the student should be able to:

- Solve equations symbolically, graphically, and numerically and knows how to use the quadratic formula for solving quadratic equations
- Uses matrices to solve systems of equations
- Evaluate $f(x)$ for complex arguments
- Visualize objects, paths, and regions in space, including intersections and cross sections of three-dimensional figures, and describes these using geometric language
- Use and apply vector geometry
- Use coordinate geometry techniques to graph conic sections
- Graph polar and parametric coordinates and equations
- Determine the behavior of a function, its maximum and minimum, its interval and its critical points
- Use arithmetic sequences and geometric sequences and their sums, and sees these as the discrete forms of linear and exponential functions, respectively
- Define, use and manipulate expressions involving variables, parameters, constants, and unknowns in work with formulas, functions, equations, and inequalities
- Recognize, draw, and analyze graphs of trigonometric functions
- Organize, analyzes, and displays single-variable data choosing appropriate frequency distribution, circle graphs, line plots, histograms, and summary statistics
- Interpret representations of data, compares distribution of data, and critiques conclusions and uses of statistics, both in school materials and public documents
- Explore questions of experimental design, use of control groups, and reliability
- Use matrix theory with graphics calculators to solve systems of equations, transformations, and finite functions
- Use and analyze trigonometric principles, properties, and laws
- Solve problems using the Law of Sines and Law of Cosines.

Text:

“Precalculus” Addison Wesley

“Advanced Mathematical Concepts” Glencoe
“Advanced Mathematics” Houghton Mifflin

Materials: Notebook

Grading Policy: See Assessment.

DODDS Grading Scale:

DoDEA Grading Scale

90-100 =	A
80-89 =	B
70-79 =	C
60-69 =	D
59 or below	F

Assessment:

Category Weights

Warmups	4%
Assignments	21%
Quizzes	75%

Warmups: Each day that we have class we will have two warmup problems. These will be on the board when the students come in so that they will have an immediate task upon entering the room. This is designed to encourage promptness to class and to maximize the learning time. The warmups can be used to review previous material, survey student knowledge of a new topic, emphasize an important point, or to challenge thinking. If a student is absent, their grade will be calculated on the fewer number of warmups available.

Assignments: Each grading period we will have a large number of assignments each worth 10 points. Success on the quizzes depends on making an honest effort on the assignments. If a student is absent, they are still expected to complete all assignments and will receive full credit. If a student is in class and is missing an assignment that is

due, they can receive half credit for completed late work (up until the end of the quarter.).

Quizzes: The quizzes are where I can accurately determine student knowledge of the material and are weighted accordingly. Retests are allowed for failed quizzes up to the end of quarter and mid-quarter grading periods. The maximum grade on a retest will be 60 %. Students should study and prepare before the test, to do well the first time, and not rely on retesting to achieve a passing grade.

Homework:

Assignments that are not completed in class will be homework.

Late Work Policy:

Late work can be turned in for half credit up until the end of each grading period.

Tutoring/Extra Help:

First, the student should use their class time wisely so that they are learning the material being presented. If they need extra help, I am available during seminar. If they are still having trouble, I am available after school.

Classroom Management:

I expect all students to do the work assigned without distracting others. This means controlling their behavior so that the student, myself, and others can get their work done without distraction. I set limits on unacceptable behavior verbally in class. If the student continues to disrupt class, I will deduct up to ten points a day from their daily grade. A student that is still interfering with classroom procedures will be giving a time-out. If this is still not effective, the student will get an office referral and/or phone call home. Should further action be required, I will work with the parents, counselors, and/or administration to rectify the situation.

Content Outline:

MATH ANALYSIS

- A. Trigonometry
- B. Vectors
- C. Polar Coordinates
- D. Functions
- E. Exponents and Logarithms
- F. Conic Sections
- G. Series
- H. Matrices
- I. Probability
- J. Statistics
- K. Discrete Mathematics
- L. Complex Numbers
- M. Introduction to Calculus

<u>SECTION</u>	<u>SUB-TOTALS</u>	<u>TOTAL</u>
Math Analysis		180
A. Trigonometry		48
Triangle Trigonometry	10	
Sin, Cos, Tan	2	
Sec, Csc, Cot	2	
Inverse Trig Fcns	2	
Applications	2	
Area	2	
Circle Trigonometry	13	
Degrees	1	
Degree, Minute, Second	1	
Coterminal Angles	1	
Radians	1	
Degrees & Radians	1	
Arc Length	1	
Sector Area	1	
Sin & Cos	2	
Tan	2	
Equations	2	
Trig Function Graphs	10	
Sin & Cos	5	

Equations From Graph	2	
Applications	1	
Tangent & Secant	2	
Trig Relationships		15
Reciprocals	1	
Negatives	1	
Pythagorean	1	
Cofunction	1	
Addition	1	
Double Angles	1	
Half-Angle Formulas	1	
Law of Sines	4	
Law of Cosines	4	
B. Vectors		22
Vectors vs Scalars	1	
Components	4	
Magnitude	1	
Direction	1	
Adding Vectors	3	
Negative Vectors	1	
Subtracting Vectors	2	
Scalar Multiplication	1	
Applications	2	
Dot Product	2	
Cross Product	2	
Three-Dimensional Vectors	2	
C. Polar Coordinates		5
Polar coordinates	1	
Polar to Rectangular	1	
Rectangular to Polar	1	
Polar Graphs	2	
D. Functions		17
Linear Equations	2	
Quadratic Equations	2	
Polynomial equations	3	
Inequalities	2	
Domain & Range	2	

Operations	2	
Transformations	2	
Inverse	2	
E. Exponents & Logarithms		14
Exponent Simplification	2	
Exponent Operations	2	
Exponential Graphs	2	
Logarithm Expressions	2	
Logarithm Equations	2	
Logarithm Operations	2	
Logarithm Graphs	2	
F. Conic Sections		8
Circles	2	
Ellipses	2	
Hyperbolas	2	
Parabolas	2	
G. Series		14
Arithmetic Series	1	
Geometric Series	1	
Sums of Series	2	
Infinite Series	2	
Limits of Infinite Series	2	
Sums of Infinite Series	2	
Sigma Notation	2	
Induction	2	
H. Matrices		15
Dimensions	1	
Elements	1	
Addition	1	
Subtraction	1	
Scalar Multiplication	1	
Matrix Multiplication	2	
Determinates	1	
Inverse	1	
Matrix Equations	2	
Linear Equations	2	

Transformation Matrices	2	
I. Probability		12
Venn Diagrams	1	
Counting	1	
Permutations	2	
Independent Events	2	
Dependent Events	2	
Binomial theorem	2	
Combinations	2	
J. Statistics		10
Mean, Median, Mode, Range	1	
Stem and Leaf Plots	1	
Frequency Graphs	1	
Box and Whisker	1	
Standard deviation	2	
Normal Distribution	2	
Sampling	2	
K. Discrete Mathematics		3
Communication Matrices	3	
L. Complex Numbers		6
Definition	1	
Simplification	1	
Operations	2	
Complex Number Graphs	2	
M. Introduction to Calculus		6
Slope of a Curve	2	
Derivatives	2	
Velocity and Acceleration	2	

Standards:

Shortcut to:

http://www.dodea.edu/instruction/curriculum/New%20Standards/Math/PDF/Gr9-12_Math_Stand.pdf

