Greater New York Academy of Seventh-day Adventists

Precalculus Syllabus

General Information

Instructor:	Mr. Anthony Palmer
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Course length	1 year

Required Text

Michael Sullivan , Michael Sullivan III, "Precalculus Graphing and Data Analysis": Prentice Hall (1985) ISBN#0-13-435840-6

Course Design: Precalculus is an integrated mathematics course designed to provide an enrichment course strongly recommended for students planning careers requiring higher mathematical skills. Strong emphasis will be given to problem-solving skills, cross-curricular topics, and increased use of technology. At least two of five discrete topics to further enrich student's appreciation of mathematics depending upon group interests and needs.

Objectives: Precalculus will enable students to:

1. Extend their use of a wide variety of functions to analyze the nature of different types of functions and their applications to the real and complex number systems as well as real-life problem-solving situations
2. Develop skill applying algebraic and functional skills to 2-D and 3-D geometry
3. Develop skills in writing and using Cartesian and parametric equations, as well as the use of Cartesian and polar coordinates in 2-D
4. Introduce the concept of limit as it applies to differentiation and anti-differentiation
5. Enrich the skills of students in the following discrete areas:
    - Analytic Geometry in 3-D
    - Systems of Equations and Inequalities
    - Matrices and Determinants
    - Sequences, Series, and Probability
    - Further Explorations in Calculus

Homework: Homework will be assigned on a regular basis and should be handed in completed with full effort. These assignments reinforce the lesson and will be checked. A homework grade will be figured into your final average. Work not completed by the assigned due date will result in a zero grade for that homework assignment.

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Classroom Management: Respect will be given to your instructor, your classmates, classroom facilities and all education materials at all times. We are working together as a team and we need everyone to cooperate.

Assessment: Assessment in this course will be based on tests and quizzes that will be announced. Also, classwork and homework assignments will be counted as well as some group work assignments.

Tardiness: There will be a grade penalty for work missed due to being tardy.

Grading

Homework	20%	Test	30%	Class Work	30%	Quiz	10%
Do Now	10%						

Detailed Syllabus

TIME	TOPIC	MATERIAL, ASSIGNMENT & ASSESSMENT
	REVIEW UNIT 1	
Sept. 8 to 30	• Topics From Algebra and Geometry • Completing the Square; Quadratic Formula • Synthetic Division	Precalculus Graphing and Data analysis by Sullivan and Sullivan III - pp 967-987 Test Sept 30 on Reviews
	TRANSFORMATION OF FUNCTIONS—Unit 2	
Oct. 4 to 25	• Combining functions using the 4 basic operations; composite functions • Identifying characteristics of functions: even, odd, periodic, piece-wise, domain, range, continuity, end behavior • Knowing parent functions: absolute-value, quadratic, radical, reciprocal, • Greatest integer (step), trigonometric, exponential, logarithmic • Inverse functions • Transforming parent functions under translations, stretches, and compressions	Precalculus Graphing and Data analysis by Sullivan and Sullivan III : Chapter 2 Page 109-184 Chapter 2 Review Ques. even numbers Test Oct 25 on Transformation of functions

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TIME	TOPIC	MATERIAL, ASSIGNMENT & ASSESSMENT
POLYNOMIAL AND RATIONAL FUNCTIONS -- Unit 3		
Nov 3 – 23	• Sketching and analyzing graphs of quadratic and polynomial functions • Division of polynomials • Real zeros of polynomial functions, identify the number of zeros • Performing operations on complex numbers and plot numbers in the complex plane • Determining the domain and asymptotes of rational functions and sketch their graph • Partial fractions • Fundamental theorem of algebra	Precalculus Graphing and Data analysis by Sullivan and Sullivan III: page 189-289, 809-815 Review 289-Even Numbers Unit Test Nov. 1 on Polynomials & Rational Functions

TIME	TOPIC	MATERIAL, ASSIGNMENT & ASSESSMENT
EXPONENTIAL AND LOGARITHMIC FUNCTIONS Unit 4		
Nov 29 Dec. 8	• Recognizing, evaluating and graphing exponential and logarithmic functions • Rewriting logarithmic functions with a different base • Natural logarithms, base and its applications e • Properties of logarithms to manipulate logarithmic expressions • Solving exponential and logarithmic equations • Practical applications of exponential and logarithmic functions	Precalculus Graphing and Data analysis by Sullivan and Sullivan III : 297-387 Review Exercise –387 Even Numbers Test Dec 8 Exponentials and Logarithm

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TIME	TOPIC	MATERIAL, ASSIGNMENT & ASSESSMENT
TRIGONOMETRIC FUNCTIONS Unit 5		
Dec 9 to 20	• Radian and degree measures and their conversions • Using the unit circle to define the trigonometric ratios • Graphing trigonometric functions and their transformations • Inverse trigonometric functions • Applications and models of trigonometric functions Special angles $0° \le x \le 360°, 0 \le x \le 2\pi$	Precalculus Graphing and Data analysis by Sullivan and Sullivan III pages 393-452 Chapter Review 468 Odd numbers Test on Dec 17 on Trig. Functions

TIME	TOPIC	MATERIAL, ASSIGNMENT & ASSESSMENT
ANALYTIC TRIGONOMETRY AND VECTORS IN 2-D Unit 6		
Jan 3 to 13	• Use the reciprocal, quotient and co-function identities • Use of the following identities: sum and difference, double-angle, power-reducing, and half-angle, product to sum and sum to product identities • Solving trigonometric equations • Law of sines and law of cosines Areas of oblique triangles • Vectors as directed line segments, unit vectors • Operations on vectors; dot product • Trigonometric form of a complex number • Using De Moivre's theorem to find powers and roots of complex numbers	Precalculus Graphing and Data analysis by Sullivan and Sullivan III—Chapters 6 and 7 pages 473—582 Reviews 517 and 582 Combined Test on both Chapters on Jan 13 First Semester Finals exam Jan 17-19

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TIME	TOPIC	MATERIAL, ASSIGNMENT & ASSESSMENT
ANALYTIC GEOMETRY IN 2-D Unit 7		
Jan 20 – to Feb 3	• Inclination of a line; angle between 2 lines; distance from a point to a line and the graph • Writing the general and standard forms for the conic sections • Determining the geometric components of conic graphs: center, foci, vertices, asymptotes, where applicable • Writing rectangular and parametric equations and convert from one to the other • Converting complex numbers from rectangular to polar coordinates and vice versa • Graphing polar equations	Precalculus Graphing and Data analysis by Sullivan and Sullivan III Sections of Chapter 8 and 9 Pages 591-739 Review questions on select sections Test Feb 7 Analytical Geometry

TIME	TOPIC	MATERIAL, ASSIGNMENT & ASSESSMENT
LIMITS Unit 8		
Feb 9-16	• Definition of a limit; properties of a limit • Continuity of functions • Find the limits of functions; finite and infinite limits • Using the tangent line to approximate slope of a function at a point • Definition of the derivative as the limiting slope of a function • Limits of summation to find areas bounded by a function	Precalculus Graphing and Data analysis by Sullivan and Sullivan III: Sections of Chapter 12 pages 929-961 Select review Questions Test on limits on Feb 17

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TIME	TOPIC	MATERIAL, ASSIGNMENT & ASSESSMENT
SYSTEMS OF EQUATIONS AND INEQUALITIES Unit 10		
Feb 21-31	• Solving systems of equations by substitution, addition, graphing and • Gaussian or Gauss-Jordan elimination • Solving systems of equations in row-echelon form and back substitution • Solving multivariate linear systems, partial fractions • Systems of inequalities and applications in linear programming	Precalculus Graphing and Data analysis by Sullivan and Sullivan III Select Sections Selected Questions from Chapter Review Test Feb 31
SEQUENCES, SERIES, AND PROBABILITY Unit 11		
March 2 -17	• Using sequences, factorial and summation to write the terms and sums of a sequence • Arithmetic and geometric sequences and series; sum of infinite geometric series • Mathematical induction • Binomial theorem; Pascal's triangle • Fundamental counting principle; permutations and combinations • Probability	Precalculus Graphing and Data analysis by Sullivan and Sullivan III— chapter 11 pages 853 –921 Chapter Review Page921 Test on sequences , series & Probability on 17

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TIME	TOPIC	MATERIAL, ASSIGNMENT & ASSESSMENT
FURTHER EXPLORATIONS IN CALCULUS Unit 12		
March 21 31	• Finding derivatives of algebraic functions using power rule, constant multiple rule, product rule, quotient rule, sum rule and chain rule • Integration notation and terminology • Applying integration formulas of the indefinite integral	Precalculus Graphing and Data analysis by Sullivan and Sullivan III Chapter 12 Section12.4 Pages 929-961 Review Quest. 961 Test April 4 test on Calculus
April 4 – May 23 Precalculus Course Review		
June 6 Second Semester Finals		

Remember that chapter and unit tests are scheduled for the end of each unit.

Grading System:

The Following System of marking and recording Grades will be used , Numerical equivalents are also indicated.

Letter	Percentage	Honor Points
A	93-100	4.00
A-	89-92	3.66
B+	86-88	3.33
B	83-85	3.00
B-	79-92	2.66
C+	76-78	2.33
C	73-75	2.00
C-	69-72	1.66
D+	66-68	1.33
D	63-65	1.00
F	62 or less	0.00

Please Refer to the 2005-2006 Bulletin re Attendance policy, dress code, computer policy

.God's Richest Blessing to you in all your scholastic endeavors for the academic year.