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Math 12
Precalculus
Section 6478 – Fall, 2016
MTWR, 5:15-7:45, MSTC 150

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This syllabus is a beta model and subject to modification.

Course Description: This course is the second in a two semester sequence preparing students for Calculus (Math 5, Trigonometry is the first.) In this course, students extend the concept of a function to polynomial, rational, exponential and logarithmic types of functions (and combinations thereof) as well as studying analytic trigonometry. Topics include analysis of equations and word problems involving polynomial, rational, exponential and logarithmic functions, trigonometric identities, inverse trigonometric functions, and solving trigonometric equations.

Prerequisite(s): Math 5 with a grade of "C" or better.
Note(s): A minimum grade of C is required in this course to progress to Math 1A, Precalculus and/or Computer Science 7B.
Credit Hours: 5
Text(s): *Precalculus: Mathematics for Calculus*, 7$^{\text{th}}$ Edition **Author(s):** Steward, Redlin and Watson; **ISBN-13:** 978-1305071759

Course Objectives:
At the completion of this course, students will be able to:

1. Analyze parametric and polar equations, functions and graphs.
2. Apply the properties of equality to solve equations in one variable involving polynomial, rational, exponential, logarithmic, trigonometric, inverse trigonometric expressions which may involve parameters.
3. Apply the properties of the real numbers to solve inequalities in one variable involving polynomial, rational, root, exponential and trigonometric expressions.
4. Perform arithmetic with the complex numbers and use the complex numbers to completely solve a quadratic equation.
5. Analyze polynomial functions in one variable using methods such as end behavior analysis, the factor theorem, the remainder theorem, the theorem on rational zeros, Descartes' rule of signs, the intermediate value theorem, division algorithms, conjugate zeros and the fundamental theorem of algebra.

6. Analyze rational functions in one variable by analyzing the polynomials in the numerator and denominator and interpreting these to find domain, range, intercepts, and asymptotes and visualizing these through the construction of a graph for the function.
7. Demonstrate an understanding of a rich variety of trigonometric identities including the Pythagorean identities, addition identities, the double angle identities, the half angle identities, sum to product and product to sum identities by proof and through the application of these identities to solve trigonometric equations.
8. Analyze trigonometric and inverse trigonometric functions in terms of their domain, range, asymptotes, and periodicity, and how these relate to chords, secants and arcs on the unit circle. Demonstrate an understanding of these circular functions by constructing graphs and solving equations.
9. Use Polya's problem solving strategies to solve problems, with an emphasis on the algebraic method with appropriate applications of polynomial, rational, root, exponential, logarithmic, trigonometric and inverse trigonometric expressions.
10. Communicate mathematics effectively using proper terminology in both verbal and written expressions.

Course Student Learning Outcomes:

1. Demonstrate improved mastery of fundamental skills and knowledge from arithmetic, algebra, and geometry introduced in prerequisite courses.
2. Demonstrate problem solving skills in application problems in the areas of algebra, geometry, and trigonometry, with an emphasis on the concept of function.
3. Create, analyze, and interpret graphs of algebraic and trigonometric functions, especially in relation to their real-world analogs.
4. Develop an appreciation for the use of deductive reasoning skills in mathematics, in the context of algebra and trigonometry.

Grade Distribution:

WebAssign HW	15%
Quizzes	15%
Midterm Exams	45%
Final Exam	25%

Letter Grade Distribution:

>= 90.00	A	70.00 - 79.99	C
80.00 - 89.99	B	60.00 - 69.99	D

Course Policies:

- **General**

  – Turn off cell phones during class time and keep them out of sight.

  – Exams are closed book, closed notes and, generally, no calculators are allowed.

- **Homework Assignments**

  – Students are expected to work independently and in groups. Each individual is expected to come to their own independent understanding of the course material, but working with fellow students and visiting the professor during office hours are essential tools to reach that understanding. Discussion amongst students is encouraged, but to be sure, direct your questions to the professor, tutor, or lab assistant (the Math/Science tutoring center is a good place to study where the lab assistant is available to answer questions when you are stuck.)

  – We will use Webassign, which is keyed to our text, to complete homework assignments. Go to webassign.com and log in with your given username/password, which will be explained in class.

  – After each class, I post a list of **warm-up problems** for students to solve for presentation at the beginning of the next class.

  – Polya's Problem Solving Method is Recommended:
    1. Understand the problem
    2. Make a plan
    3. Carry out the plan
    4. Look back

- **Attendance and Absences**

  – Attendance is expected and will be noted for each class. You are allowed **1** unexcused absence during the semester without penalty. Any further absence will result in point and/or grade deductions. Basically, if you're not there, you missed it.

- **Useful Resources**

  – Geogebra https://www.geogebra.org/download

Academic Honesty Policy:

See Student Conduct Code
http://catalog.collegeofthedesert.edu/rights-responsibilities-of-students/#studentconductstandards.

Tentative Course Outline:
The weekly coverage might change as it depends on the progress of the class. However, you must keep up with the reading assignments.

Week	Content
Week 1	• Quadratic Functions and Models & Polynomial Functions and Their Graphs, Dividing Polynomials, Real Zeros of Polynomials • Reading assignment: 3.1, 3.2, 3.3, 3.4
Week 2	• Complex Zeros and the Fundamental Theorem of Algebra, Rational Functions, Polynomial and Rational Inequalities • Reading assignment: 3.5, 3.6, 3.7
Week 3	• review/exam.
Week 4	• Exponential Functions, The Natural Exponential Function, Logarithmic Functions, Laws of Logarithms • Reading assignment: 4.1, 4.2, 4.3, 4.4
Week 5	• Exponential and Logarithmic Equations, Modeling with Exponential Functions, Logarithmic Scales • Reading assignment: 4.5, 4.6, 4.7
Week 6	• review/exam.
Week 7	• Trigonometric Identities, Addition and Subtraction Formulas, Double-Angle, Half-Angle, and Product-Sum Formulas, Basic Trigonometric Equations • Reading assignment: 7.1, 7.2, 7.3, 7.4
Week 8	• More Trigonometric Equations, Traveling and Standing Waves • Reading assignment: 7.5, Focus on Modeling
Week 9	• review/exam.
Week 10	• Polar Coordinates, Graphs of Polar Equations • Reading assignment: 8.1, 8.2
Week 11	• Polar Form of Complex Numbers; De Moivres Theorem, Plane Curves and Parametric Equations • Reading assignment: 8.3, 8.4
Week 12	• review/exam.
Week 13	• Something interesting.
Week 14	• Something interesting
Week 15	• Review • Reading assignment: Review for Final Exam
Week 16	• Exam Week