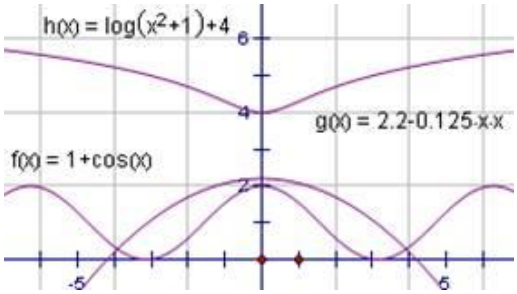
Syllabus and Course Guide

for

Precalculus – Fall '09



Instructor: Geoff Hagopian
Office: Math 12
Office Hours: MWF: 10 – 11 and TR: 1 – 2
Email: ghagopian@collegeofthedesert.edu
Web Page: http://faculty.collegeofthedesert.edu/ghagopian
Telephone: (760) 776-7223

Main Text: *Precalculus*, by Stewart, Redlin and Watson or the *Custom Ed.*, isbn 0495280909

Catalog Description:
This course is the second in a two semester sequence preparing students for Calculus. In this course, students will extend the concept of a function to polynomial, rational, exponential and logarithmic functions 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..

Tutoring:
Math/Science Study Center in Math 4 --computers and tutors.
MESA club in SA9--study guides a tutoring staff.

Technology:
You are required to have access to a graphing calculator of some sort.

Prerequisites:
Intermediate Algebra (MATH 40) with a grade of "B" or better, indicating familiarity with:

1. The use of linear models involving a constant rate of change.
2. How to compute the slope of a line with sufficient given information.
3. Tables, graphs, and/or equations which represent linear relations.
4. How to create a linear model in the form of a table, graph, or equation.
5. Methods of solving 2x2 and 3x3 systems of linear equations.
6. How to graph and find the equation of circles and parabolas given sufficient information.
7. Methods of solving quadratic equations including factoring, completing the square, taking square roots and the quadratic formula.
8. Methods of solving linear and quadratic inequalities.
9. Representing quadratic relations using a table, graph, or standard equations.
10. Methods of graphing circles and parabolas by finding key points such as vertices, intercepts, and other symmetric points.
11. How to manipulate rational exponents in algebraic expressions and for solving root equations.
12. The use of exponential functions in modeling with a constant growth (decay) factor.
13. Tables, graphs, and equations which represent exponential relations.

Homework
We'll use the ILRN.COM homework system which is detailed in lecture.

Tests and Grading
Most of your grade points will be determined by 5 chapter tests, whose dates are indicated in the tentative schedule. The homework assignments are the crucial touchstone that will guide daily class discussions. Everyone should come prepared to lead and/or follow a discussion on the topic for each scheduled meeting. To be successful, you'll want to have test scores whose weighted average exceeds 70% (C), 80% (B) or 90% (A) where pre-final exam points are awarded by the following weighting scheme:
5% attendance
15% homework
80% chapter tests and final exam

Overview
Precalculus is a course designed to do just what it suggests: prepare you for a first course in calculus. This means learning many definitions and properties of basic functions and methods of solving equations, but it also—perhaps most importantly—means learning how to solve problems. The basic outline for general problem solving devised by Polya is a four step program:

1. Understand the problem
2. Devise a plan for solving the problem
3. Carry out the plan
4. Look back

This outline is fleshed out on the next page.

Polya's Four Step Program for Problem Solving

1. UNDERSTANDING THE PROBLEM

    - Do you have good definitions for all the words in the problem statement?.
    - What is the unknown? That is, what does the problem want to be produced? What are the given data? What condition(s) must be satisfied?
    - Is it possible to satisfy the conditions? Are the condition(s) sufficient to determine the unknown? Or is it insufficient? Or redundant? Or contradictory?
    - Draw a figure or make a diagram to help conceptualize what is going on. Introduce suitable notation.
    - Could you restate the problem in an equivalent way that makes more sense to you?

2. DEVISING A PLAN

Polya mentions (1957) that there are many reasonable ways to solve problems. The skill at choosing an effective strategy is best learned by solving many problems. You will find choosing a strategy increasingly easy. A partial list of strategies is included:

• Guess and check • Make and orderly list • Eliminate possibilities • Use symmetry • Consider special cases	• Look for a pattern • Draw a picture • Solve a simpler problem • Use a model • Work backward	• Use a formula • Be ingenious • Solve an equation • Use direct reasoning

Often times an algebra problem is best solved using the algebraic method:

- Introduce a variable to represent the unknown.
- Write related quantities in terms of this variable.
- Set up an equation using the variable.
- Solve the equation.

3. CARRYING OUT THE PLAN
    - Carrying out your plan of the solution, *check each step*. Can you see clearly that the step is correct? Can you prove that it is correct? If your plan isn't working, you may need to go back to step 2 and devise a better plan.
4. Looking Back
    - Can you *check the result?* Can you derive the solution differently?
    - Can you use the result, or the method, for some other problem?
    - Can you generalize your solution to a larger class of problems?

The Importance of Looking Back

Looking back may be the most important part of problem solving and is the best opportunity to learn from the problem. The phase was identified by Polya with admonitions to examine the solution by such activities as checking the result, checking the argument, deriving the result differently, using the result, or the method, for some other problem, reinterpreting the problem, interpreting the result, or stating a new problem to solve. Teachers and researchers report, however, that developing the disposition to look back is very hard to accomplish with students. Some researchers have found little evidence of looking back among students--even when it is stressed by instruction. One teacher put it succinctly: "In schools, there is no looking back." This likely stems from a culture of mathematics education that holds "answer getting" as the paramount objective. Also, pressure to cover a prescribed course syllabus; the absence of tests that measure processes and student frustration contribute to the tendency not to reflect on what a problem means in a larger context.
The importance of looking back should outweigh these difficulties.. It is often what you learn *after* you have solved the problem that really counts.