CAL POLY

September 2008

MATH 128 Pre-Calculus Algebra Laboratory

1. Catalog Description

MATH 128 Pre-Calculus Algebra Laboratory (1) (CR/NC)

Facilitated study and discussion of the theory, problems, and applications of pre-calculus algebra. Credit/No Credit grading only. 1 laboratory. Corequisite: Concurrent enrollment in the associated section of MATH 118.

2. Required Background or Experience

Concurrent enrollment in the associated section of Math 118.

3. Learning Objectives

The student should be able to:
a. Achieve the course objectives of Math 118 at a higher level of understanding and with improved self-confidence.
b. Communicate and interact with peers on a mathematical level.
c. Develop a sense of community with fellow classmates.

4. Text and References

Cohen, David, et al., Precalculus: A Problems-Oriented Approach, 6th ed., Thomson/Brooks-Cole, 2005.

5. Minimum Student Materials

Paper, pencils and notebook.

6. Minimum University Facilities

Classroom with ample chalkboard space for class use.

7. Content and Method

Chapter 1: Fundamentals
- 1.1 Sets of Real Numbers
- 1.2 Absolute Value
- 1.3 Solving Equations (Review and Preview)
- 1.4 Rectangular Coordinates. Visualizing Data
- 1.5 Graphs and Graphing Utilities
- 1.6 Equations of Lines
- 1.7 Symmetry and Graphs. Circles

Chapter 2: Equations and Inequalities
- 2.1 Quadratic Equations: Theory and Examples
- 2.2 Other Types of Equations
- 2.3 Inequalities
- 2.4 More on Inequalities

Chapter 3: Functions
- 3.1 The Definition of a Function
- 3.2 The Graph of a Function
- 3.3 Shapes of Graphs. Average Rate of Change
- 3.4 Techniques in Graphing
- 3.5 Methods of Combining Functions (*Skip iteration*)
- 3.6 Inverse Functions

Chapter 4: Polynomial and Rational Functions: Applications to Optimization
- 4.1 Linear Functions
- 4.2 Quadratic Functions
- 4.4 Setting Up Equations That Define Functions
- 4.5 Maximum and Minimum Problems

Chapter 12: Roots of Polynomial Equations
- 12.1 The Complex Number System
- 12.2 Division of Polynomials
- 12.3 The Remainder Theorem and the Factor Theorem
- 12.4 The Fundamental Theorem of Algebra
- 12.5 Rational and Irrational Roots (*optional*)
- 12.6 Conjugate Roots and Descartes's Rule of Signs (*Descartes's Rule optional*)
- 12.7 Introduction to Partial Fractions (*optional*)
- 12.8 More About Partial Fractions (*optional*)

Chapter 4: Polynomial and Rational Functions: Applications to Optimization
- 4.6 Polynomial Functions
- 4.7 Rational Functions

Chapter 5: Exponential and Logarithmic Functions
- 5.1 Exponential Functions
- 5.2 The Exponential Function $y = e^x$
- 5.3 Logarithmic Functions
- 5.4 Properties of Logarithms
- 5.5 Equations and Inequalities with Logs and Exponents
- 5.6 Compound Interest
- 5.7 Exponential Growth and Decay

Chapter 10: Systems of Equations
- 10.1 Systems of Two Linear Equations in Two Unknowns
- 10.2 Gaussian Elimination
- 10.3 Matrices
- 10.4 The Inverse of a Square Matrix (*optional*)
- 10.5 Determinants and Cramer's Rule
- 10.6 Nonlinear Systems of Equations (*optional*)
- 10.7 Systems of Inequalities (*optional*)

Method

Supervised work both individually and in small groups, facilitated discussions, oral presentations, practice examinations.

8. Methods of Assessment

Credit will be awarded on the basis of attendance, participation, and a grade of C- or better in Math 118.