

MATH 118 PreCalculus Algebra

1. Catalog Description

MATH 118. Precalculus Algebra 4 units

GE Area B1

Prerequisite: Completion of ELM requirement and passing score on appropriate Mathematics Placement Examination.

Pre-calculus algebra without trigonometry. Special products and factoring, exponents and radicals. Fractional and polynomial equations. Matrices, determinants, and systems of equations. Polynomial, rational, exponential, and logarithmic functions. Graphing, inequalities, absolute value, and complex numbers. MATH 118 is equivalent to MATH 116 and MATH 117. Not open to students with credit in MATH 117, MATH 141, MATH 161, or MATH 221. Credit will be granted in only one of the following courses: MATH 116, MATH 118. 4 lectures. Fulfills GE B1; for students admitted Fall 2016 or later, a grade of C- or better in one GE B1 course is required to fulfill GE Area B.

2. Required Background or Experience

The ability to perform all of the routine algebraic operations with accuracy and confidence.

3. Learning Objectives

The student should be able to:

- Use and understand the language and notation of the algebra of functions.
- Use and understand the basic properties of the elementary functions: polynomials, rational, exponential, and logarithmic.
- Use and understand the basic algebraic principles of graphing.
- Solve linear and quadratic equations and inequalities.
- Perform arithmetic operations with complex numbers.
- Perform the basic operations with matrices and determinants.
- Solve systems ($n < 4$) of linear equations using matrices and determinants.

4. Text and References

- Stewart, Precalculus 7th edition, 2016, customized for Cal Poly, Cengage.

5. Minimum Student Materials

Paper, pencils, and notebook.

6. Minimum University Facilities

Classroom with ample chalkboard space for class use.

7. Content and Method

Topic Lectures

Chapter 1: Fundamentals 7

- 1.1: Real Numbers
- 1.2: Exponents and Radicals
- 1.3: Algebraic Expressions
- 1.4: Rational Expressions
- 1.5: Equations
- 1.6: Complex Numbers
- 1.7: Modeling with Equations
- 1.8: Inequalities
- 1.9: The Coordinate Plane; Graphs of Equations; Circles
- 1.10: Lines
- 1.11: Solving Equations and Inequalities Graphically
- 1: Focus on Modeling

Chapter 2: Functions 6

- 2.1: Functions
- 2.2: Graphs of Functions
- 2.3: Getting Information from the Graph of a Function
- 2.4: Average Rate of Change of a Function
- 2.5: Linear Functions and Models
- 2.6: Transformations of Functions
- 2.7: Combining Functions
- 2.8: One-to-One Functions and Their Inverses
- 2: Focus on Modeling

Chapter 3: Polynomial and Rational Functions 8

- 3.1: Quadratic Functions and Models
- 3.2: Polynomial Functions and Their Graphs
- 3.3: Dividing Polynomials
- 3.4: Real Zeros of Polynomials
- 3.5: Complex Zeros and the Fundamental Theorem of Algebra
- 3.6: Rational Functions
- 3.7: Polynomial and Rational Inequalities
- 3: Focus on Modeling

Chapter 4: Exponential and Logarithmic Functions 7

- 4.1: Exponential Functions
- 4.2: The Natural Exponential Function
- 4.3: Logarithmic Functions

- 4.4: Laws of Logarithms
- 4.5: Exponential and Logarithmic Equations
- 4.6: Modeling with Exponential Functions
- 4: Focus on Modeling

Chapter 10: Systems of Equations and Inequalities 6

- 10.1: Systems of Linear Equations in Two Variables
- 10.2: Systems of Linear Equations in Several Variables (three variables only)
- 10.3: Matrices and Systems of Linear Equations
- 10.4: The Algebra of Matrices
- 10.5: Inverses of Matrices and Matrix Equations (optional)
- 10.6: Determinants and Cramer's Rule
- 10.9: Systems of Inequalities (optional)
- 10: Focus on Modeling

Total 34

8. Methods of Assessment

The primary methods of assessment are: essay examinations, quizzes and homework. Typically, there will be one or more hour-long examinations during the quarter, and a required comprehensive final examination.