

# Precalculus Course

Student

Contents

Homework, Tests, and Performance Results

## Comments by the Designer of this Curriculum

This course is equivalent to a 12<sup>th</sup> grade high school precalculus course. Students were given a rigorous homework assignment after every class and were required to organize all work in this binder as proof of the completion of the course. A third of this course was studying for and taking tests. Each homework assignment and each test were given a score and recorded on the "Precalculus Course Performance Results" page below. A detailed list of the topics covered in the course can also be found below. Anything not presented in this curriculum is covered in previous or subsequent courses.

## Instructor

Curriculum written and taught by Matthew Graham Dellinger, B.A. Molecular and Cell Biology, University of California Berkeley, 16,000 hours experience tutoring subjects such as arithmetic, prealgebra, beginning algebra, geometry, intermediate algebra, trigonometry, precalculus, calculus I, calculus II, calculus III, differential equations and linear algebra, AP Biology, AP Physics, and AP Chemistry.

## Curriculum

Polynomials, long division, synthetic division, the Rational Zeros Theorem, the Factor Theorem, the Remainder Theorem, factoring the sum or difference of two cubes, review on all types of factoring, the Complex Conjugate Theorem, end behavior, turning points of graphs, the relationship between multiplicity of zeros and crossing and touching the x-axis, rational functions and their graphs, proper form, vertical, horizontal, diagonal, and curved asymptotes, holes, x-intercepts, y-intercepts, nonlinear inequalities, solutions in graphical form and interval notation, the equations and graphs of conics, center, radius, foci, vertices, directrix, line of symmetry, major and minor axes, sequences and series, including arithmetic and geometric sequences, infinite geometric series, explicit vs. recursive form, sigma notation, the multiplication rule for counting, permutations, combinations, sets, Venn diagrams, formulas for counting the union and intersection of sets, probability, sample space, mutually exclusive events, formulas for the probability of the union of two events, the complement rule, the Binomial Theorem, Pascal's triangle, polar equations and their graphs, trigonometry review, parametric equations and their graphs, reflection, symmetry, and inversion of relations, review on functions and function notation, finding the coordinates of points where functions intersect, review on basic algebraic equations with square roots, squares, rational expressions, and other expressions, review on the quadratic formula, even and odd functions, one-to-one functions, inverse functions, the Horizontal Line Test, review on the Vertical Line Test, finding inverse functions in table form, graph form, and equation form, restricting domain and/or range of inverse functions, confirming that functions are inverses with composition, the difference quotient, average rate of change of a function, arithmetic mean, geometric mean, median, mode, and weighted average, the complex plane, review on exponential and logarithmic equations, base "e" and base "10," compound interest, the loudness of sound, the change of base formula, the law of uninhibited growth (microorganisms, radioactive decay, half-life), and the logistic growth model.

# Precalculus

## Course Performance Results

Student

### Point Distribution

Homework (scaled)	400 Points
Tests (unscaled)	400 Points
Final Cumulative Test (unscaled)	200 Points

---

1000 Points

### Grading Method

900-1000	A Passing
800-899	B Passing
700-799	C Passing
600-699	D Passing
0-599	F Passing

## Homework Scores

Polynomial (Part I): A Review of Polynomials	/38
Polynomials (Part II): Long Division	/18
Polynomials (Part III): Long Division and Synthetic Division	/22
Polynomials (Part IV): Solving Polynomial Equations When...	/(3)7 = /21
Polynomials (Part V): Irrational Zeros, Complex Zeros, and...	/2(12) = /24
Polynomials (Part VI): Graphs of Polynomial Functions...	/19
Rational Functions and Their Graphs (Part I)	/3(6) = /18
Rational Functions and Their Graphs (Part II)	/3(6) = /18
Solving Nonlinear Inequalities (Polynomials)	/13
Solving Nonlinear Inequalities (Rational Expressions)	/2(8) = /16
Review for Test I	/25
Conics (Part I)	/14
Conics (Part II)	/20
Conics (Part III)	/2(11) = /22
Sequences and Series (Part I)	/19
Sequences and Series (Part II)	/24
Sequences and Series (Part III)	/22
Counting (Part I)	/16
Counting (Part II)	/16
Probability	/2(13) = /26
The Binomial Theorem	/2(11) = /22
Review for Test II	/25

**Trigonometry Review** /37  
**Polar Coordinates** /33  
**Graphing Polar Equations and Converting to Rectangular Form** /18  
**Parametric Equations and Their Graphs** /2(13) = /26  
**Review on Functions and Function Notation** /34  
**Reflection, Symmetry, and Inversion** /57  
**Symmetric Functions and Review on Exponents and Logarithms** /36  
**Review for Test III** /25

**Inverse Functions (Part I)** /35  
**Inverse Functions (Part II)** /14  
**Becoming More Fluent with Function Notation and Reviewing Previous...** /23  
**Average** /28  
**The Complex Plane and Graphing Polar Equations with Radian Units** /26  
**Applications (Part I)** /28  
**Applications (Part II)** /2(10) = /20  
**Review for Test IV** /25

**Practice Final Test-Part I (Version 2)** /25  
**Practice Final Test-Part II (Version 2)** /25

=====  
**Total Possible Raw Homework Score =**  
**Scaled Homework Score =**

## Test Scores

**Test I** /100  
**Test II** /100  
**Test III** /100  
**Test IV** /100  
**Final Test (Part I)** /100  
**Final Test (Part II)** /100

=====  
**Total Test Score =**

**Final Score = Scaled Homework ( ) + Unscaled Tests ( ) = /1000**

**Score Percentage: ( /1000) x 100 = %**

**Course Grade:**